Longfield Solar Farm

Environmental Statement [PINS Ref: EN010118]

Outline Construction Environmental Management Plan

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1. Introduction

1.1. Introduction

1.1.1 Longfield Solar Energy Farm Ltd (hereafter referred to as the 'Applicant') has prepared this Outline Construction Environmental Management Plan (CEMP) in relation to an application for a Development Consent Order (DCO) for the construction, operation and maintenance, and decommissioning of the Longfield Solar Farm (hereafter referred to as the 'Scheme').

1.1.2. A DCO would provide the necessary authorisations and consents for the Scheme which comprises a solar photovoltaic (PV) electricity generating facility with a total capacity exceeding 50 megawatts (MW), an energy storage facility and an export/import connection to the National Grid, via an extension of the existing Bulls Lodge Substation. The Scheme will be located within the 'Order limits'.

1.1.3. The aim of this Outline CEMP is to provide a clear and consistent approach to the control of construction activities in the Order limits. This document does not address operational or decommissioning activities, which would be subject to separate environmental management plans and procedures.

1.1.4. Likely significant effects have been identified through the Environmental Impact Assessment (EIA) process and are reported in the ES. A range of 'standard' or best practice mitigation and construction management measures were accounted for in the assessments and these will be implemented during construction of the Scheme. This Outline CEMP details these construction mitigation measures. It also sets out the monitoring activities designed to ensure that such mitigation measures are carried out, and that they are effective.

1.1.5. Detailed CEMPs for the Scheme will be produced following grant of the DCO, appointment of a contractor(s), and prior to the start of construction of the Scheme. It is envisaged that there could be multiple detailed CEMPs, or that the CEMPs are prepared, approved and implemented for specific works or phases of the Scheme.

1.1.6. The Scheme includes an extension to the existing Bulls Lodge Substation in order to connect the Solar Farm Site to the electricity transmission network. The extension to Bulls Lodge Substation is a discrete element of the Scheme and will be constructed by National Grid. A separate CEMP will be prepared for the works to be undertaken by National Grid and/or its contractor(s) in accordance with the Outline CEMP, as relevant to the works to be undertaken by National Grid.

1.1.7. This Outline CEMP is designed with the objective of ensuring compliance with the relevant environmental legislation and mitigation measures set out within the ES. This document provides the likely structure of the detailed CEMPs and relevant preliminary information. It indicates what additional information or controls might be included under each sub-section within the detailed CEMPs, which will be produced by the contractor(s) selected to deliver the Scheme's construction phase.

1.1.8. The detailed CEMPs will be prepared in accordance with this Outline CEMP, as a Requirement of the DCO and would be approved by the relevant local planning authorities in advance of starting the construction works.

1.1.9. The key elements of this Outline CEMP include:

a. An overview of the Scheme and associated construction programme;

b. Identification of potential environmental effects;

c. Proposed design and other mitigation measures to prevent or reduce potential adverse environmental effects;

d. Monitoring and reporting of effectiveness of mitigation measures;

e. Key roles and responsibilities; and

f. Links to other complementary plans and procedures.

1.1.10. The appointed contractor(s) will be responsible for working in accordance with the environmental controls documented in the Outline CEMP and for the preparation and implementation of the detailed CEMPs.

1.1.11. Any additional construction licences, permits or approvals that are required will be listed in the detailed CEMPs.

1.2. The Order limits

1.2.1. The Order limits comprise a single parcel of land separated by several areas of woodland approximately 453ha in size. The Order limits are located within the administrative areas of Chelmsford City Council and Braintree District Council, in the county of Essex.

1.2.2. The Scheme comprises the installation of solar photovoltaic (PV) generating panels and on-site energy storage facilities together with grid connection infrastructure.

1.2.3. The area of land required for the construction, operation and maintenance, and decommissioning of the Scheme is shown on **Figure 1-2** and described in ***Chapter 2: The Scheme*** of the ES **[EN010118/APP/6.1]**. This includes land required for temporary and permanent uses.

1.2.4. The CEMPs will include (as relevant to that CEMP) plans showing the land within each administrative area, plans illustrating the Order limits boundaries, and the construction compound area.

1.3. The Scheme

1.3.1. The Order limits are described in ***Chapter 2: The Scheme***, of the Environmental Statement [**EN010118/APP/6.1**] and comprises the Solar Farm Site (which includes the BESS and the Longfield Substation), the Grid Connection Route, the Bulls Lodge Substation Extension, and access routes.

1.3.2. The existing Bulls Lodge Substation will be extended to facilitate the connection of the Solar Farm Site to the National Grid, via the Grid Connection Route.

2. Construction Environmental Management

2.1. Introduction

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

2.2. Roles and Responsibilities

2.2.1. Key roles and responsibilities during the construction phase in managing environmental impacts will likely include, but are not limited to:

a. Site Manager – Overall responsibility for activity onsite, and will be based onsite full time.

b. Construction Project Manager - Overall responsibility for ensuring all elements in the DCO, CEMPs and all environmental legal and other requirements are implemented, and appropriately resourced, managed, reviewed and reported.

c. Environment 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 Environment Manager will liaise with relevant environmental bodies and other third parties as appropriate.

d. Environmental Clerk of Works (ECoW) – Oversee the management of, and provide advice about environmental and ecological risks during construction including for example, management of protected species, surface water management, pollution, air quality and noise.

e. Ecological Clerk of Works (EcoCoW) - Management of the risks to biodiversity on construction sites, advising protecting valued biodiversity features and providing practical solutions.

f. Flood Warden – There will be a dedicated responsibility to be prepared for, and manage, the response to flood incidents.

g. Health and Safety Manager – Responsible for the monitoring and controlling of health and safety compliance and related rules and regulations on-site.

h. Community Liaison Officer - A Community Liaison Group will be set up in accordance with the relevant DCO requirement prior to construction and will continue through until final commissioning of the Scheme as a formal forum for local issues to be raised. A Community Liaison Officer will be appointed to lead discussions with local communities, and also act as the primary point of contact should there be any queries or complaints.

2.2.2. These roles and responsibilities are indicative and will be confirmed in the detailed CEMPs.

2.3. Construction Programme

2.3.1. Subject to being granted consent and following a final investment decision, the earliest construction is anticipated to start is Q1 2024 and construction will require an estimated 24 months.

2.3.2. It is not intended that the Scheme will be built in phases, with the exception of the BESS. The BESS may be constructed in two phases, with the first part built alongside the solar PV, and a second phase after five years of operation.

2.3.3. More detail on the construction programme and phasing will be provided within the detailed CEMPs.

2.4. Working Hours

2.4.1. Construction working hours on the Solar Farm Site will run from 07:00 to 19:00 Monday to Saturday. Working days will generally be one 12-hour shift.

2.4.2. Construction working hours on the Bulls Lodge Substation Extension will run from 07:00 to 19:00 Monday to Saturday with the exception of overhead line works which will run from 07:00 to 19:00 Monday to Sunday.

2.4.3. Where on-site works are to be conducted outside the core working hours, they will comply with the limits and controls detailed in the CEMPs, and any other restrictions agreed with the relevant planning authorities.

2.5. Control of Noise

2.5.1. Noise thresholds have been identified for nearby noise sensitive receptors during construction, presented in Section 11.5 of ***Chapter 11: Noise and Vibration*** of the Environmental Statement (and based on Annex E of BS 5228-1) [**EN010118/APP/6.1**]. These will be defined in the detailed CEMP. Thus, where on-site works are to be conducted outside the core working hours, they will comply with any restrictions agreed with the relevant planning authorities, in particular regarding the control of noise and traffic. Compliance with these noise limits will ensure adverse effects are unlikely. Abnormal or emergency construction traffic movements may occur outside of normal working hours. In the event of these occurrences, specific noise mitigation measures will be put in place to reduce potential noise impacts at nearby noise sensitive receptors as set out in section 3.

2.6. Control of Light

2.6.1. Construction temporary site lighting, in the form of mobile lighting towers with a power output of 8 kilo volt-amperes (kVAs), will be required in areas where natural lighting is unable to reach (sheltered/confined areas) and during core working hours within winter months. Artificial lighting would be provided to maintain sufficient security and health and safety for the Order limits, whilst adopting the mitigation principles to avoid excessive glare and minimise spill of light to nearby receptors (including ecology and residents) outside of the Order limits as far as reasonably practicable.

2.6.2. All construction lighting will be deployed in accordance with the following recommendations to prevent or reduce the impact on human and ecological receptors:

a. The use of lighting will be minimised to that required for safe site operations;

b. Lighting will utilise directional fittings to minimise outward light spill and glare (e.g. via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and

c. Lighting will be directed towards the interior of the Order limits rather than towards the boundaries.

2.7. Traffic Management

2.7.1. During construction, the appointed contractor(s) will ensure that the impacts from construction traffic on the local community (including local residents and businesses and users of the surrounding transport network) are minimised, where reasonably practicable, by implementing the measures set out in the Framework Construction Traffic Management Plan (CTMP) (***Appendix 13B*** of the ES **[EN010118/APP/6.2]**) and ***Chapter 13: Transport and Access*** of the ES **[EN010118/APP/6.1]**. A detailed CTMP will be required to be produced by the contractor(s) prior to commencement of construction.

2.8. Off Site Delivery Routes

2.8.1. The Framework CTMP provides details of the designated routes for HGV movements and worker car movements. It also details any measures designed to reduce travel during peak hours on the local road network.

2.9. Parking Provisions

2.9.1. As detailed in the Framework CTMP, the temporary compounds will include parking areas. The location and size of parking provisions on-site, loading and unloading areas for plant and materials, storage areas, wheel washing facilities and construction traffic management measures will be set out in the CTMP, which will also include a description of any laydown areas or accommodation areas.

2.9.2. Wheel cleaning facilities will be used by vehicles prior to exiting the Order limits onto the public highway if there is mud or debris from the construction site on the vehicles.

2.10. Recycling and Disposing of Waste

2.10.1. In order to control the waste generated during site preparation and construction, the contractor(s) will separate the main waste streams on-site, prior to transport to an approved, licensed third party waste facility for recycling or disposal.

2.10.2. A Construction Resource Management Plan (CRMP) will be prepared by the contractor(s), which will specify the waste streams which would be monitored and targets set with regards to the waste produced, including any re-use and recycling of materials. The CRMP will be finalised with specific measures to be implemented prior to the start of construction.

2.10.3. All waste to be removed from the Order limits will be undertaken by fully licensed waste carriers and taken to licensed waste facilities.

2.11. Security

2.11.1. Site security during construction will be managed by the contractor(s). The site security fencing will remain in place throughout the duration of the construction period. Any storage of materials will be kept secure to prevent theft of vandalism. A safe system for accessing the materials storage areas would be implemented by the contractor(s).

2.11.2. There will be designated security staff during construction who will manage the Order limits and patrol the perimeter.

2.12. Responding to Environmental Incidents and Emergencies

2.12.1. An emergency response plan will be developed in consultation with the relevant local authority emergency planning officer, emergency services including the local fire service, as well as the Environment Agency in relation to responding to flood warnings and events.

2.12.2. The plan will detail the procedures for responding to incidents and emergencies on site, and any reporting.

2.13. Good Practice

2.13.1. The Considerate Constructors Scheme (CCS) will be adopted to assist in reducing pollution and nuisance from the Scheme, by employing good practice measures which go beyond statutory compliance.

3. Mitigation and Management

3.1. Purpose

3.1.1. This section of the Outline CEMP sets out the mitigation and management measures to be included as a minimum in the detailed CEMP. It also identifies where monitoring is proposed to assess the effectiveness of the mitigation measures.

Table 3-1: Climate Change

Potential Impact	*Mitigation / Enhancement Measure*	*Monitoring Requirements*
Greenhouse Gas (GHG) emissions from construction traffic and equipment; Use of natural resources in construction materials; and Increased flood risk on-site due to climate change needing to be considered in the design.	Appropriate standard and good practice control measures will include: a. Adopting the Considerate Constructors Scheme (CCS) to assist in reducing pollution, including greenhouse gases (GHGs), from the Scheme by employing good industry practice measures which go beyond statutory compliance. b. Encouraging the use of lower carbon modes of transport by identifying and communicating local bus and rail connections and pedestrian and cycle access routes to/ from the Scheme to all construction staff and providing appropriate facilities for the safe storage of cycles. c. Utilising the Chelmer Valley Park and Ride site for construction worker parking (with a supporting shuttle service to/ from the Site) during the peak construction. d. Liaising with construction personnel for potential to implement staff minibuses and car sharing options. e. Implementing a Travel Plan to reduce the volume of construction staff and employee trips (note, there will be a separate Travel Plan for National Grid workers). f. Increasing recyclability by segregating construction waste to be re-used and recycled where reasonably practicable. g. Designing, constructing, and implementing the Scheme in such a way as to minimise the creation of waste and maximise the use of alternative materials with lower embodied carbon such as locally sourced products and materials with a higher recycled content.	The Environmental Manager will regularly record compliance in a log book. The CEMP will detail the frequency.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	h. Switching off vehicles and plant when not in use and ensuring construction vehicles conform to current EU emissions standards. i. Conducting regular planned maintenance of the Scheme to optimise efficiency.	
The following measures are required to ensure safety of staff during construction from increased flood risk on-site due to climate change.	j. Storing topsoil and other construction materials outside of the 1 in 100-year floodplain extent (Flood Zone 3), as far as reasonably practicable; k. Appointing a designated Flood Warden who is familiar with the risks and remains vigilant to news reports, Environment Agency flood warnings, relevant weather warnings and water levels of the local waterways; and l. Health and safety plans developed for construction activities will be required to account for potential climate change impacts on workers, such as flooding and heatwaves. More details on the specific mitigation measures for flood risk are provided in **Table 3-4.**	As above

Table 3-2: Cultural Heritage

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Temporary impacts on the setting of below ground archaeological remains and other built heritage assets during construction associated with increased visual and noise intrusion.	Where no appropriate embedded design mitigation can be applied to the management of the archaeological resource, additional mitigation measures will be applied, including: a. A programme of archaeological mitigation through record, such as strip and map and record or detailed excavations to a level commensurate with the significance of the asset, will be implemented for archaeological remains within the footprint of the Scheme prior to the construction works targeting the assets identified in Table 7-8 of the Cultural Heritage Chapter (**Volume 1, Chapter 7: Cultural Heritage of the ES [EN010118/APP/6.1]**). b. A programme of archaeological mitigation field work and recording will be undertaken during the construction works alongside a watching archaeological brief where full excavations is not required.	Monitoring requirements will be set out in the Overarching WSI.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	An overarching WSI, which will be secured by a DCO Requirement, will set out the objectives for the historic environment mitigation and set out the mechanisms for the appointed archaeological contractors to design and programme the fieldwork, undertake evaluation, analysis, reporting and archiving.	
Temporary impacts on the setting of below ground assets during construction	Archaeological evaluation to be undertaken in extensive areas of intrusive ground activities, prior to or during construction, including: a. Electrical Cables (Works Order Nos. 1, 4 and 6) – programme of archaeological trial trenching and/or archaeological monitoring of intrusive activities; b. Grid Connection Route (Work No.4.) – programme of archaeological trial trenching and/or archaeological monitoring of intrusive activities; c. Bulls Lodge Substation extension (Works Order No. 5) – programme of archaeological geophysical survey, trial trenching for areas not previously covered, and, if required, mitigation, ahead of construction; d. Temporary Construction Compounds (Works No. 7) – topsoil strip and intrusive works to be subject to archaeological monitoring and recording; e. SuDS ponds and other drainage features (Work No. 6 (j) – intrusive works to be subject to a programme of archaeological trial trenching and/or archaeological monitoring; and f. Access Tracks (Work Nos. 6(f) and 6(e)) – topsoil strip and intrusive works to be subject to archaeological monitoring and recording).	As above

Table 3-3: Ecology

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Habitat loss or gain – direct impacts associated with changes in land use resulting from the Scheme.	The following standard mitigation measures will be implemented to protect retained vegetation, designated sites, protected species and other area of biodiversity value from disturbance, damage and accidental pollution:	A time for the implementation of any necessary mitigation, prior to

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Fragmentation of populations or habitats – indirect impacts due to the Scheme diving a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function. Disturbance – indirect impacts resulting from a change in normal conditions (light, noise, vibration, human activity) that result in individuals or populations of species changing behaviour or range. Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports.	a. Pre-construction surveys will be undertaken to validate and, where necessary, update the baseline survey findings. The purpose of the pre-construction surveys is to ensure mitigation during the construction phase is based on the latest protected species information. This will also be required for any protected species licensing. b. Pre-construction surveys will be undertaken to provide an update on the presence and location of any invasive species, the findings of which will inform the implementation of measures to prevent their spread into the wild. This will include production of a Biosecurity Management Plan which will set out procedures to ensure that no invasive species are brought onto the Site (e.g. Wildlife and Countryside Act 1981 (as amended) Schedule 9 species). In the event that any future infestations of invasive non-native species are identified prior to and or during the development process, exclusion zones will be established around them and the Ecological Clerk of Works (ECoW) contacted for advice, as required. c. The design of the Scheme will comply with industry good practice and environmental protection legislation during both construction and operation e.g. prevention of surface and groundwater pollution, fugitive dust management, noise prevention or amelioration. d. The crossing of Boreham Brook will be undertaken using HDD methods to avoid impacts to watercourses. e. No works will be undertaken within at least 10m of all watercourses, including a minimum of 8m from the edge the floodplain of the River Ter which is considered sufficient to mitigate for potential hazards such as chemical and soils spills into watercourses and avoid potential direct impacts to the River Ter and Otter, which occasionally use the river for commuting and foraging. f. Safe storage of chemicals / other hazardous materials (e.g. fuel) reaching watercourses during flood events during construction (refer to Table 3-4 of this document). g. Preparation of mitigation strategies for protected species and where required, application for licences from Natural England for translocation of animals away from construction areas sufficiently in advance of the works to meet with the optimum time for mitigation and to minimise any changes to the construction programme.	construction. Additional surveys may be undertaken in advance of the works, site clearance and construction phase as advised by the Applicant's ecologist, based on the findings of the updated walkover and protected species surveys, or otherwise as identified as appropriate by the Applicant or their appointed contractor(s).

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	h. Vegetation clearance will be undertaken in advance of construction and at an appropriate time of year so as to avoid incidental injuring or killing of reptiles and amphibians. There will be no need to undertake any translocation of reptiles. i. Avoidance of the nesting bird period i.e. March to August (inclusive) for vegetation clearance where reasonably practicable. Any vegetation clearance proposed within the nesting bird period will be checked for the presence of any nests by a suitably qualified ornithologist, prior to vegetation removal, and if active nests are found, then appropriate buffer zones would be put in place and the area monitored until the young birds have fledged. j. Reasonable avoidance measures, including appropriate buffers (of up to 30m) around any identified Badger setts, or trees with bat roost potential (a buffer of 15m) throughout the Scheme (e.g. solar array and along the cable corridors). k. Implementation of measures to avoid animals being injured or killed within construction working areas, through excluding them from such areas and preventing them falling into and becoming trapped in excavations. The Outline Landscape and Ecology Management Plan (LEMP) **[EN010118/APP/7.13]** sets out the key measures required to avoid, mitigate and compensate for the impacts and effects of the Scheme on biodiversity (and landscape) features, and to enhance the biodiversity, landscape and green infrastructure value of all land within the Order limits. This includes the Bulls Lodge Substation Extension works.	

Table 3-4: Flood Risk, Drainage and Surface Water

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Pollution of surface or groundwater due to deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off;	**General** The Applicant will comply with: a. Guidance for Pollution Prevention (GPP) 1: Understanding your environmental responsibilities – good environmental practices (Ref 21Ref 21);	Temporary drainage will be monitored throughout construction. Specific details will be

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Temporary impacts on sediment dynamics and hydromorphology within watercourses and waterbodies, where new crossings are required to lay cables, or where culverting is required for new access tracks. Temporary impacts on groundwater flow due to the requirement for below ground excavations, including for the drilling/boring launch and receiving pits for watercourse cable crossings. Temporary changes in flood risk from changes in surface water runoff and exacerbation of localised flooding, due to deposition of silt, sediment in drains and ditches. Temporary changes in flood risk due to the construction of Solar PV Panels, site compound and storage facilities, which alter the surface water runoff from the Order limits. Potential impacts on local water supplies.	b. Guidance for Pollution Prevention (GPP) 2 Above ground oil storage tanks (Ref 5); c. GPP3: Use and design of oil separators in surface water drainage systems (Ref 1- 25); d. GPP 4 Treatment and disposal of wastewater where there is no connection to the public foul sewer (Ref 6); e. GPP 5 Works and maintenance in or near water (Ref 7); f. GPP 8: Safe storage and disposal of used oils (Ref 8); g. GPP 13: Vehicle washing and cleaning (Ref 13); h. GPP 19: Vehicles: Service and Repair (Ref 14); i. GPP 20: Dewatering underground ducts and chambers (Ref 15); j. GPP 21: Pollution incident response planning (Ref 9); k. GPP 22: Dealing with spills (Ref 16); and l. GPP 26: Safe storage – drums and intermediate bulk containers (Ref 17). Where new GPPs are yet to be published, previous Pollution Prevention Guidance (PPGs) still provide useful advice on the management of construction to avoid, minimise and reduce environmental impacts, although they should not be relied upon to provide accurate details of the current legal and regulatory requirements and processes. Construction phase operations would be carried out in accordance with guidance contained within the following PPG: a. PPG6: Working at construction and demolition sites (Ref 22); b. PPG7: Safe Storage – the safe operation of refuelling facilities (Ref 23); and c. PPG18: Managing fire water and major spillages (Ref 24). Advice contained within the guidance will be listed in or appended to the detailed CEMPs. The detailed CEMPs will be supported by a Water Management Plan (WMP), that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. The WMP will include details of pre, during and post-construction water quality monitoring. This will be based on a combination of	confirmed in detailed CEMP. The WMP will include details of pre, during and post-construction water quality monitoring. This will be based on a combination of visual observations and reviews of the Environment Agency's automatic water quality monitoring network.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	visual observations and reviews of the Environment Agency's automatic water quality monitoring network. The WMP will include details for pollution prevention and response in the event of an incident. **Staff Awareness and Training** The Contractor(s) will ensure that construction staff are fully aware of the potential impact to water resources associated with the construction works and procedures to be followed in the event of an accidental pollution event occurring. This would be included in the site induction and training, with an emphasis on procedures and guidance to reduce the risk of water pollution. **Pollution Plans** Plans to deal with accidental pollution would be included within the detailed CEMPs prior to commencement of construction. Any necessary equipment (e.g. spillage kits) would be held on-site and all site personnel would be trained in their use. The Environment Agency would be informed immediately in the unlikely event of a suspected pollution incident. **Storage of Materials** The detailed CEMPs will incorporate measures set out in relevant Construction Industry Research and Information Association (CIRIA) Guidance (Ref 12). In addition to those measures set out above in this table, examples of such measures include: a. Placing arisings and temporary stockpiles outside of the Flood Zone 3 flood extent and away from drainage systems. If areas located within Flood Zone 2 are to be utilised for the storage of construction materials, then a standard rules permit will be sought from the Environment Agency; b. Containment measures will be implemented, including drip trays, bunding or double-skinned tanks of fuels and oils; c. All chemicals would be stored in accordance with their Control of Substances Hazardous to Health (COSHH) guidelines, whilst spill kits will be provided in areas of fuel/oil/minor chemicals storage; d. An emergency spillage Plan will be produced, which site staff will have read and confirmed that they understand, via the site induction;	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	e. The mixing and handling of materials would be undertaken in designated areas and away from surface water drains; f. Plant and machinery will be kept away from surface waterbodies wherever possible and would have drip trays installed beneath oil tanks/engines/gearboxes and hydraulics, which would be checked and emptied regularly. Refuelling and delivery areas would be located away from surface water drains; and g. Exposed ground and stockpiles would be protected as appropriate and practicable to prevent windblown migration of potential contaminants. Water suppression would be used if there is a risk of fugitive dust emissions. **Discharge/Disposal of Site Runoff** a. Site drainage, including surface runoff and dewatering effluents, will be discharged to sewers where possible and relevant permissions will be obtained from the sewerage or statutory undertaker. Discharge to watercourses will only be permitted where discharge consent or other relevant approval has been obtained (where necessary); b. Surface water runoff from Bulls Lodge Substation extension will drain into Boreham Brook via a new outfall. c. Scheme drainage during construction will receive appropriate pollution control measures as agreed with the sewerage undertaker or the Environment Agency as appropriate. Holding or settling tanks, separators and other measures which may be required, will be provided and maintained; d. The relevant sections of BS 6031: Code of Practice for Earthworks (Ref 18) will be followed for the general control of site drainage; e. Where practical, earthworks will be undertaken during the drier months of the year. When undertaking earth moving works periods of very wet weather will be avoided, where practical, to minimise the risk of generating runoff contaminated with fine particulates. However, it is likely that some working during wet weather periods will be unavoidable, in which case other mitigation measures will be implemented to control fine sediment laden runoff. Water may also be required to dampen earthworks during dry weather to reduce dust impacts, and any runoff generated will need to be appropriately	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	managed by the contractor(s) in accordance with the pollution prevention principles described in this chapter; f. To protect watercourses from fine sediment runoff, topsoil/subsoil will be stored a minimum of 20m from watercourses on flat lying land. Where this is not practicable, and it is to be stockpiled for longer than a two-week period, the material will either be covered with geotextile mats, seeded to promote vegetation growth, or runoff prevented from draining to a watercourse without prior treatment; g. Appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff will be provided. Construction site runoff will either be treated on site and discharged under a Water Discharge Activity Permit from the Environment Agency to Controlled Waters (potentially also including infiltration to ground) or to the nearest public sewer with sufficient capacity for treatment following discussions with Anglian Water/Essex and Suffolk Water, or removed from site for disposal at an appropriate and licenced waste facility; h. Where needed equipment and plant are to be washed out and cleaned in designated areas within the compound where runoff can be isolated for treatment before disposal; i. Mud futdeposits will be controlled at entry and exit points to the Site using wheel washing facilities and/or road sweepers operating during earthworks activities or as required; j. Debris and other material will be prevented from entering surface water drainage, through maintenance of a clean and tidy site, provision of clearly labelled waste receptacles, grid covers and the presence of site security fencing; and k. Foul water from any site compound (including temporary toilets) will be tankered away to an appropriate disposal facility by a licensed waste disposal contractor; l. If any suspected contaminated material is discovered during the works, the contractor would be required to investigate the areas and assess the need for containment or disposal of the material. If material is considered to be contaminated, it will be disposed of to an appropriately licensed facility; m. Foundations and services will be designed and constructed to prevent the creation of pathways for the migration of contaminants and would be constructed of materials that are suitable for the ground conditions and designed use. For example, water supply	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	pipes would be designed in accordance with current good practice and applicable guidance to ensure pipes are protected from potential impacts associated with contamination; and n. No discharges from any self-contained wheel wash and localised wheel wash will be permitted to discharge directly into any surface water system. **Temporary Drainage** Measures that would be considered for implementation for temporary drainage through the construction design and/or detailed CEMPs include: a. All reasonably practicable measures will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse, arising from construction activities. The measures will accord with the principles set out in industry guidelines. Measures may include use and maintenance of temporary lagoons, tanks, bunds and fabric silt fences or silt screens as well as consideration of the type of plant used; b. A temporary drainage system will be developed to prevent runoff contaminated with fine particulates from entering surface water drains without treatment. This will include identifying all land drains and waterbodies in the Scheme area and ensuring that they are adequately protected using drain covers, sand bags, earth bunds, geotextile silt fences, straw bales, or proprietary treatment (e.g. lamella clarifiers); c. Cut-off ditches or geotextile silt-fences, installed around excavations, exposed ground and stockpiles to prevent uncontrolled release of sediments; d. Site access points would be regularly cleaned to prevent build-up of dust and mud; and e. All potentially contaminated waters (for example washdown areas, stockpiles and other areas of risk for water contamination) to have separate drainage. Any contaminated waters would be tankered away from the Order limits. In addition, if monitoring demonstrates unsatisfactory levels of solids or other pollutants, measures would be implemented (e.g. changes to site drainage and settlement facilities and/or use of flocculants) to control suspended solids or other contaminated discharge to watercourses.	

	Spillage Risk a. Fuel will be stored and used in accordance with the Control of Substances Hazardous to Health Regulations 2002 (Ref 19), and the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 20). Particular care will be taken with the delivery and use of concrete and cement as it is highly corrosive and alkaline; b. Fuel and other potentially polluting chemicals will either be in self bunded leak proof containers or stored in a secure impermeable and bunded area (minimum capacity of 110% of the capacity of the containers); c. Any plant, machinery or vehicles will be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site if possible or only at designated areas within the Site compound. Only construction equipment and vehicles free of all oil/fuel leaks will be permitted on site. Drip trays will be placed below static mechanical plant; d. Refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses, and away from drains as far as reasonably practicable. Vehicles will not be left unattended during refuelling; e. As far as reasonably practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses; f. All fixed plant used on the Site will be self-bunded; g. Mobile plant is to be in good working order, kept clean and fitted with plant 'nappies' at all times; h. The WMP will include details for pollution prevention and will be prepared and included alongside the detailed CEMPs. Spill kits and oil absorbent material will be carried by mobile plant and located at high risk locations across the Order limits and regularly topped up. All construction workers will receive spill response training and tool box talks; i. The Order limits will be secure to prevent any vandalism that could lead to a pollution incident; j. Construction waste/debris are to be prevented from entering any surface water drainage or water body; k. All washing down of vehicles and equipment will take place in designated areas and wash water will be prevented from passing untreated into watercourses;	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	l. Surface water drains on public roads trafficked by plant or within the construction compound will be identified and, where there is a risk that fine particulates or spillages could enter them, the drains will be protected (e.g. using covers or sand bags) or the road regularly cleaned by road sweeper; m. Suitable facilities for concrete wash water (e.g. geotextile wrapped sealed skip, container or earth bunded area) will be adequately contained, prevented from entering any drain, and removed from the Site for appropriate disposal at a suitably licenced waste facility. n. Water quality monitoring of potentially impacted watercourse will be undertaken to ensure that pollution evets can be detected against baseline conditions and dealt with effectively; and o. Any site welfare facilities will be appropriately managed and all foul waste disposed of by an appropriate contractor to a suitably licenced facility if it not possible to connect to the public sewer. p. A standalone, site specific frac-out risk assessment will be produced prior to drilling the cable crossings, as is standard practice, to mitigate any water quality deterioration from the drilling process. **Watercourse Crossings** a. For the cable route crossings the launch and receiving pits will be a maximum size of 2m x 2m x 2m. b. The launch and receiving pits will be a minimum of 10m from the watercourse edge. c. The cable route crossing of watercourse to be a minimum of 1.5m below the bed of the watercourse. **Flood Risk** Construction works undertaken adjacent to watercourses will comply with relevant guidance (e.g. CIRIA guidance) during construction. Construction works within the grid connection corridors, specifically in areas located within Flood Zone 3, would not be undertaken when an Environment Agency Flood Warning is in place. The detailed CEMPs will incorporate measures aimed at preventing an increase in flood risk during the construction works. Materials would be stored outside of Flood Zone 2 and 3 and	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	the construction laydown area site office and supervisor would be notified of any potential flood occurring by use of the Floodline Warnings Direct service. The Contractor(s) will be required to produce a Flood Risk Management Action Plan/Method Statement with the detailed CEMPs which will provide details of the response to an impending flood and include the following: a. 24-hour availability and ability to mobilise staff in the event of a flood warning; b. The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period where there is a forecast risk c. Details of the evacuation and site closedown procedures; d. Arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas; e. The Contractor(s) will sign up to Environment Agency flood warning alerts and describe in the emergency response plan the actions it will take in the event of a flood event occurring. These actions will be hierarchical meaning that as the risk increases the contractor(s) will implement more stringent protection measures; f. If water is encountered during below ground construction, suitable de-watering methods will be used. Any groundwater dewatering required in excess of the exemption thresholds will be undertaken in line with the requirements of a full or temporary water abstraction license(s) from the Environment Agency (under the Water Resources Act 1991 as amended) and the Environmental Permitting Regulations (England and Wales) 2016; and g. Safe egress and exits are to be maintained at all times when working in excavations. When working in excavations a banksman is to be present at all times.	

Table 3-5: Landscape and Visual Amenity

Potential Impact	*Mitigation / Enhancement Measure*	*Monitoring Requirements*
Loss of existing landscape features, e.g. vegetation; and Visibility of construction activities.	The Outline LEMP **[EN010118/APP/7.13]** sets out proposed measures to mitigate the potential impacts and effects on landscape (and biodiversity) features, and to enhance the landscape and biodiversity value of the Order limits (i.e: the green infrastructure). A detailed LEMP will be submitted to and approved by the relevant planning authority including measures to: a. Protect and retain existing trees and vegetation; b. Manage and enhance landscape and biodiversity; c. Ensure compliance through management and monitoring; and d. Ensure maintenance and management, including a landscaping maintenance plan. **Tree Works** a. The findings of the pre-construction tree survey and Arboricultural Report, accompanied by an Arboricultural Method Statements, where construction works are likely to affect trees, will be taken into account by the appointed contractor(s); b. Where works in close proximity to retained trees cannot be practically avoided, these works will be undertaken in accordance with current best practice, defined in British Standard (BS) 5837: 2012 Trees in relation to design, demolition and construction – Recommendations (Ref 10) and National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees; and c. All necessary protective fencing will be installed prior to the commencement of any site clearance or construction works. **Lighting** Temporary site lighting during construction required to enable safe working during construction in hours of darkness will be designed as far as reasonably practical so as not to cause a nuisance outside of the Order limits. Standard good practice measures would be employed to minimise light spill, including glare during construction.	An arboricultural survey in line with BS5837:2012 (Ref 10) would be undertaken concurrently with detailed design of the Scheme, to identify where trees are likely to be affected by the construction works and to inform the development of the detailed design. Such pre-construction surveys would be undertaken in accordance with the Landscape and Biodiversity Management Plan. Additional surveys may be required during the advance works, site clearance and construction phase as advised as necessary by the Applicant's arboricultural specialist, based on the findings of the tree survey, or otherwise as

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	Screening Existing vegetation along the boundary of the Order limits will be retained and managed where practicable to ensure its continued presence and to aid the screening of low-level views into the Order limits.	identified as appropriate by the Applicant or their appointed main contractor.

Table 3-6: Noise and Vibration

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Noise due to construction activities, including traffic, plant and machinery, at nearby Noise Sensitive Receptors (NSR). Vibration due to construction activities causing annoyance at NSRs and damage to building structures.	The following Best Practicable Means (BPM) will be applied, as far as reasonably practicable, during construction works to minimise noise and vibration at NSRs, including, neighbouring residential properties and other sensitive receptors arising from construction activities: a. Ensuring that all appropriate processes, procedures and measures are in place to minimise noise before works begin and throughout the construction programme; b. All contractor(s) to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2) which should form a prerequisite of their appointment; c. Ensuring that, where reasonably practicable, noise and vibration is controlled at source (e.g. the selection of inherently quiet plant and low vibration equipment), review of the construction programme and methodology to consider quieter methods, consideration of the location of equipment on-site and control of working hours; d. Use of modern plant, complying with applicable UK noise emission requirements; e. Hydraulic techniques for breaking to be used in preference to percussive techniques, where reasonably practicable; f. Drop heights of materials will be minimised; g. Plant and vehicles will be sequentially started up rather than all together; h. Off-site pre-fabrication where reasonably practicable;	A construction noise monitoring scheme shall be developed and agreed with appropriate stakeholders following appointment of a principal contractor and prior to commencement of construction works. The detailed CEMPs would also set out a scheme for the provision of monthly reporting information to and local residents to advise of potential noisy works that are due to take place and for monitoring of noise complaints and

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	i. Use of screening locally around significant noise producing plant and activities; j. Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications; k. All construction plant and equipment to be properly maintained, silenced where appropriate, operated to prevent excessive noise and switched off when not in use; l. Loading and unloading of vehicles, dismantling of site equipment or moving equipment or materials around the Order limits to be conducted in such a manner as to minimise noise generation, as far as reasonably practicable; m. All vehicles used on-site shall incorporate reversing warning devices as opposed to the typical tonal reversing alarms to minimise noise disturbance where reasonably practicable; n. Appropriate routing of construction traffic on public roads and along access tracks pursuant to the CTMP; o. Provision of information to the relevant planning authority and local residents to advise of potential noisy works that are due to take place; p. Monitoring of noise complaints and reporting to the Applicant for immediate investigation and action. A display board will be installed on-site and a website will be set up. These will include contact details for the Site Manager or alternative public interface with whom nuisance or complaints can be lodged. A log book of complaints will be prepared and managed by the Site Manager; q. Construction working hours on the Solar Farm Site will run from 07:00 to 19:00 Monday to Saturday. Construction working hours on the Bulls Lodge Substation Extension will run from 07:00 to 19:00 Monday to Saturday with the exception of overhead line works which will run from 07:00 to 19:00 Monday to Sunday; r. Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use; and s. Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas.	reporting to the Applicant for immediate investigation and action.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	Liaison will be undertaken with occupiers of sensitive receptors that may be adversely affected by construction noise and vibration. All communications will contain contact details to direct any questions or complaints to. Consideration has been given to traffic routing, timing and access points to the Scheme to minimise noise impacts at existing receptors. Management of HGVs within the Scheme and being let on to the highway network will be managed through a Framework Construction Traffic Management Plan (CTMP).	

Table 3-7: Socio-Economics and Land Use

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Potential for damage to soil. Causing soil compaction by carrying out works in inappropriate (wet) conditions could reduce infiltration potentially enhancing any run-off and/or erosion issues. If compacted the land maybe of lower quality on decommissioning.	Prior to commencement of works a Soil Resource Management Plan (SRMP) will be prepared in accordance with the Outline Soils Resource Management Plan (Outline SRMP) (**[EN010118/APP/7.10 Appendix A]**). The SRMP will detail the management of soil on areas such as temporary working compounds, temporary and permanent tracks and sites of temporary and permanent buildings. The SRMP will include details of topsoil and subsoil stripping depths, how and where soils will be stored, conditions under which soil stripping and reinstatement will be carried out and how the reinstatement will be carried out. The Outline SRMP and SRMP will follow the principles of best practice including the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 1-26). and The Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings (1-27).	Soil assessments and monitoring will be undertaken as detailed in the Outline Soil Resource Management Plan at ***Appendix A***.
Disruption to local residents, businesses and community facilities	Primary mitigation measures are embedded within the Scheme, as set out in the respective chapters, to reduce other construction and operational effects (such as noise, air quality, transport, and landscape and visual) which in turn will mitigate the effects on the local community and existing facilities from a socio-economic and land use perspective. Measures to mitigate the effects of construction noise are outlined in **Table 3-6**. Measures to mitigate the effects of visual impacts from construction are outlined in **Table 3-5**.	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	Measures to mitigate the effects of construction traffic are outlined in **Table 3-8**. Measures to mitigate the effects of construction on air quality are outlined in **Table 3-9.**	

Table 3-8: Transport and Access

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Increased traffic flows, including HGVs on the roads leading to the Order limits. Severance and intimidation associated with increased construction traffic and abnormal loads.	The ***Framework CTMP*** (***Appendix 13B.1*** of the Environmental Statement **[EN010118/APP/6.2]**) sets out measures to manage construction traffic within the vicinity of the Order limits along the local highway network during the construction period of the works, in order to limit any potential disruptions and implications on the wider transport network, as well as for the existing road users. It identifies the management of freight traffic i.e. Heavy Goods Vehicles (HGVs), as well as staff vehicles. Full details will be provided in the final CTMP which will be secured by a DCO Requirement. An **Outline Public Rights of Way Management Plan** (***Appendix 13B.2*** of the Environmental Statement **[EN010118/APP/6.2]**) sets outlines how Public Rights of Way (PRoW) will be managed to ensure they are safe and accessible during construction. A detailed Public Right of Way Management Plan will be secured by a DCO Requirement.	There will be monitoring of HGVs, staff vehicles travelling to and from the Order limits, together with safety monitoring at specific locations, as detailed in the Framework CTMP.

Table 3-9: Air Quality

Potential Impact	*Mitigation / Enhancement Measure*	*Monitoring Requirements*
Increased nitrogen dioxide (NO_2) and particulate matter (PM_{10}) from on-site and off-site construction vehicle/plant emissions. Increased particulates and deposited dust from Site activities, materials transportation, storage and handling, including use of haul roads.	Appropriate mitigation and control measures will be included in the detailed CEMPs, which would include: **Communications:** a. Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site; b. Display the name and contact details of person(s) accountable for air quality and dust issues on the Order limits. This may be the environment manager/engineer or the site manager; c. Display the head or regional office contact information; and d. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections. **Site Management:** a. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken; b. Make the complaints log available to the local authority when asked; c. Record any exceptional incidents that cause dust and/or air emissions, either on-site or off-site, and the action taken to resolve the situation in the logbook; d. Hold regular liaison meetings with other high-risk construction sites within 500m of the Order limits (if applicable) to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes; e. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;	Measures in the detailed CEMPs will include the implementation of: • Inspection procedures at the Order limits boundary to periodically visually assess any dust and air pollution which may be generated; • Inspection of maintenance schedules for construction vehicles, plant and machinery; and • Inspection and recording procedures relating to the level of traffic movements, use and condition of haul routes.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	f. Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; g. Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on-site or, if it a large site, which is the case for the Order limits, before work on a phase commences; **Preparing and Maintaining the Site:** a. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities that are at least as high as any stockpiles on-site where stockpiles are within 100m of receptors. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period where operations are within 100m of receptors. Avoid site runoff of water or mud. Keep site fencing, barriers and scaffolding clean using wet methods; b. Remove materials that have a potential to produce dust from the Order limits as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below; and c. Cover, seed or fence stockpiles to prevent wind whipping. **Operating Vehicles / Machinery and Sustainable Travel:** a. Vehicles and plant will be switched off and secured when not in use and construction vehicles will conform to current EU emissions standards; b. Avoid the use of diesel – or petrol-powered generators and use mains electricity of battery powered equipment where practicable; c. Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate;	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	d. Produce a Construction Traffic Management Plan to manage the sustainable delivery of goods and materials; e. Implement a Construction Traffic Management Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing); f. Static construction plant will be located away from Order limits boundaries that are close to sensitive receptors, where reasonable and practicable. g. Cutting and grinding operations, if required, will be conducted using equipment and techniques that reduce emissions and incorporate appropriate dust suppression measures. h. Damping down of dust-generating equipment and vehicles within the Order limits and the provision of dust suppression in all areas of the Order limits that are likely to generate dust. i. Measures will be taken to keep roads and accesses clean. j. Vehicle, plant and equipment maintenance records will be kept on-site and reviewed regularly. **Operations:** a. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate; and b. Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. **Waste Management:** a. Avoid bonfires and burning of waste materials. **Earthworks:** a. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove the cover in small areas during work and not all at once. Avoid site runoff of water or mud.	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	b. Keep site fencing, barriers and scaffolding clean using wet methods. c. Remove materials that have a potential to produce dust from the Order limits as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below. d. Cover, seed or fence stockpiles to prevent wind whipping. **Construction Activities** a. Avoid scabbling (roughening of concrete surfaces) if possible; b. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. c. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. d. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. **Trackout** a. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; b. Avoid dry sweeping of large areas. c. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; d. Regular inspection of haul routes and prompt repair (if required) will be undertaken. e. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; f. Record all inspections of haul routes and any subsequent action in a site logbook;	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	g. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned; h. Implement a wheel washing system; (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); i. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; j. Access gates to be located at least 10 m from receptors where possible; k. Haul routes will be maintained so as to control dust emissions, as far as reasonably practicable. The frequency of cleaning will be suitable for the purposes of suppressing dust emissions from the site boundaries; and l. Enforcement of speed limits on haul roads for safety reasons and for the purposes of suppressing dust emissions will be implemented.	

Table 3-10: Ground Conditions

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Potential for risks to human health associated with waste generation, land contamination, airborne contamination and groundwater contamination. The discovery of ground contamination during groundworks. Levelling of the Order limits including the possible introduction of new fill materials.	Ground investigation works will be undertaken prior to commencing construction. Results will be reviewed by the appointed contractor(s), including any additional investigation or mitigation measures beyond the impact avoidance measures stated here. Best practice avoidance and mitigation measures include: a. All workers will be required to wear Personal Protective Equipment (PPE) such as dust masks as applicable. b. Containment measures will be implemented, including drip trays, bunding or double-skinned tanks of fuels and oils; all chemicals would be stored in accordance with their COSHH guidelines, whilst spill kits would be provided in areas of fuel/oil storage.	The Environmental Manager will regularly record compliance in a log book. The CEMP will detail the frequency.

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	c. All plant and machinery will be kept away from surface water bodies wherever possible, checked regularly and, where necessary, the use of drip trays would be employed. Refuelling and delivery areas will be located away from surface water drains. d. An emergency spillage action plan will be produced, which staff would have read and understood, and provisions made to contain any leak/spill. e. Should any potentially contaminated ground, including isolated 'hotspots' of contamination and/or potential deposits of asbestos containing materials (ACM), be encountered, the contractor(s) will be required to investigate the areas and assess the need for containment or disposal of the material. The contractor(s) will also be required to assess whether any additional health and safety measures are required. f. To further minimise the risks of contaminants being transferred and contaminating other soils or water, construction workers will be briefed as to the possibility of the presence of such materials. g. In the event that contamination is identified, appropriate remediation measures would be taken to protect construction workers, future site users, water resources, structures and services; h. Arisings and temporary stockpiles will be placed away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion. i. The risk to surface water and groundwater from run-off from any contaminated stockpiles during construction works would be reduced by implementing suitable measures to minimise rainwater infiltration and/or capture runoff and leachates, through use of bunding and/or temporary drainage systems. These mitigation measures would be designed in line with current good practice, follow appropriate guidelines and all relevant licences/permits. j. It will be ensured that all material is suitable for its proposed use and would not result in an increase in contamination-related risks on identified receptors, including any landscaped areas and underlying groundwater.	

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	k. Any waters removed from excavations by dewatering would be discharged appropriately, subject to the relevant permits being obtained from the Environment Agency. l. A dust suppression/management system will be implemented in order to control the potential risk from airborne contamination migrating off-site to adjacent sites. m. Piling design and construction works will be completed following the preparation of a piling risk assessment. Health and safety measures for construction workers will include the use of personal protective equipment, training and toolbox talks. Work will be carried out in accordance with relevant Construction Design Management (CDM) Regulations 2015.	

Table 3-11: Major Accidents and Disasters

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
All works will be undertaken in accordance with relevant Health and Safety legislation and guidance. Details of fire, police, emergency services and hospitals will be publicised and included in the site induction. The relevant risk assessments for safety during construction will be required and produced by the contactor prior to construction, which will be implemented to minimise the risk of accidents and disasters on site.		

Table 3-12: Telecommunications, Television Reception and Utilities

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Potential to affect existing utility infrastructure above and below ground	The risk of damage to utilities during construction will be minimised through mitigation, which will involve: a. Locating the Scheme outside of utilities' protected zones;	No monitoring required

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
	b. The use of ground penetrating radar or other appropriate techniques will be employed before excavation to identify any unknown utilities. c. Consultation and agreement of construction/demobilisation methods will be undertaken prior to works commencing (this would be covered by the protective provisions included in the DCO). d. Infrastructure that crosses the Scheme will be mapped and avoided through the design.	

Table 3-13: Waste

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
Potential to impact on sensitive receptors (humans, wildlife and controlled waters) if not stored and managed appropriately.	The contractor(s) will consider the objectives of sustainable resource and waste management and seek to use material resources efficiently, reduce waste at source, reduce waste that requires final disposal to landfill and apply the principles of the waste hierarchy. This would include, where reasonably practical, working towards a cut and fill balance for excavations; segregation of construction materials on-site for appropriate re-use, recycling and recovery, with landfill as a last resort. This would be achieved by a combination of measures, including: a. The contractor(s) will prepare and implement a Construction Resource Management Plan (CRMP); b. All waste transported off site will be delivered to appropriately licenced receivers of such materials; and c. As part of the CRMP, the contractor(s) will segregate construction waste to be re-used and recycled where reasonably practicable.	The types, quantities and final destination of waste generated during the construction phase would be identified, measured and recorded through the CRMP. A register of all waste loads leaving the Order limits would be maintained to provide a suitable audit trail for compliance purposes and to facilitate monitoring and reporting of waste types, quantities and

Potential Impact	Mitigation / Enhancement Measure	Monitoring Requirements
		management methods.
Impacts of waste on the surrounding environment	a. Use of off-site pre-fabrication will be used, where reasonably practical, including the use of prefabricated structural elements, cladding units, mechanical and electrical risers and packaged plant rooms. b. Burning of waste or unwanted materials will not be permitted on-site. c. All hazardous materials including chemicals, cleaning agents and solvent containing products to be properly sealed in sealed containers at the end of each day prior to storage in appropriately protected and bunded storage areas. d. Materials requiring removal from the Order limits would be transported using licensed carriers and records kept, detailing the types and quantities of waste moved and the destinations of this waste, in accordance with the relevant regulations.	As above

4. Complementary Plans and Procedures

4.1.1. A suite of complementary environmental plans and procedures have been included within the DCO application and set out proposed mitigation for the construction phase, and in some cases the operational phase.

4.1.2. These documents are illustrated in **Plate 1** (in blue) and include:

a. Framework Construction Traffic Management Plan (CTMP), including a Travel Plan [**EN010118/APP/6.2**];

b. Outline Landscape and Ecology Management Plan (OLEMP) **[EN010118/APP/7.13]**;

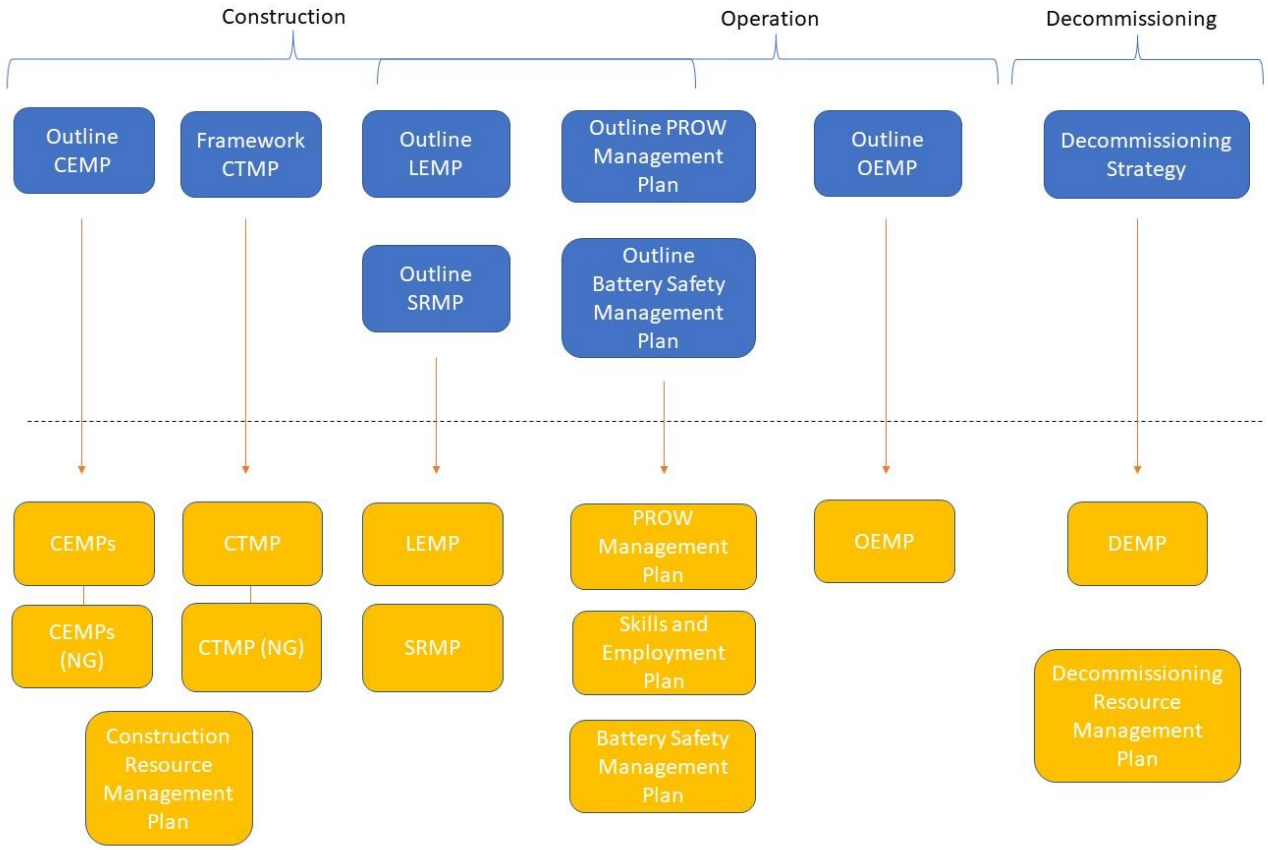
c. Outline Soils Resource Management Plan (SRMP) **[EN010118/APP/7.10 Appendix A** of this **OCEMP]**;

d. Outline Public Right of Way (PROW) Management Plan **[EN010118/APP/6.2]**; and

e. Outline Battery Safety Management Plan **[EN010118/APP/7.6]**.

4.1.3. Where the specific details of the mitigation are yet to be determined, further detailed plans are proposed (in orange), which will be approved by the relevant local authority, and where relevant in consultation with other stakeholders. These will be developed alongside the CEMPs.

4.1.4. The suite of management plans is illustrated in Plate 1.



Note, CEMPs will include detailed issue-specific plans such as dust management plans, water management plans, biosecurity management plans etc.

Plate 1: Longfield Solar Farm Management Plans

5. Implementation and Operation

5.1.1. The detailed CEMPs will set out all roles, responsibilities and actions required in respect of implementation of the measures described in this Outline CEMP, including:

a. An organogram showing team roles, names and responsibilities;

b. Training requirements for relevant personnel on environmental topics;

c. Information on-site briefings and toolbox talks that will be used to equip relevant staff with the necessary level of knowledge to follow environmental control procedures;

d. Measures to advise employees of changing circumstances as work progresses;

e. Communication methods;

f. Document control;

g. Monitoring, inspections and audits of site operations; and

h. Environmental emergency procedures.

5.1.2. The Project Manager and Environmental Manager have responsibility for ensuring compliance with the Outline CEMP and CEMPs.

6. Monitoring and Reporting

6.1. Monitoring

6.1.1. Monitoring and reporting will be undertaken for the duration of the construction phase in order to demonstrate the effectiveness of the measures set out in the detailed CEMPs and related construction controls, and allow for corrective action to be taken where necessary.

6.1.2. As part of the monitoring process the designated Environmental Manager will be present on site throughout the construction process and when new activities are commencing. The Environmental Manager will observe site activities and report any deviations from the detailed CEMPs in a logbook, along with the action taken and general conditions at the time. The Applicant will be informed of any deviations from the CEMPs as soon as possible following identification of such issues. The Environmental Manager would also act as day-to-day contact with relevant local authorities and other regulatory agencies such as the Environment Agency.

6.1.3. During construction, the Environmental Manager will conduct walkover surveys to ensure all requirements of the CEMPs are being met. Action from these surveys will be documented on an Environmental Action Schedule, discussed with the Site Manager for programming requirements and issued weekly for actioning.

6.1.4. The Environmental Manager will also arrange regular formal inspections and audits to ensure the requirements of the detailed CEMP are being met. Details of monitoring, inspection and audits to be undertaken will be provided in the CEMPs.

6.1.5. After completion of the works, the Environmental Manager will conduct a final review.

6.2. Records

6.2.1. The Environmental Manager/ Project Manager will retain records of all monitoring, inspections and audits. These records will include:

a. Results of routine site inspections by Environmental Manager/ Project Manager;

b. Environmental surveys and investigations;

c. Environmental Action Schedule;

d. Environmental equipment test records;

e. Licences and approvals; and

f. Corrective actions taken in response to incidents, breaches of the approved CEMPs or complaints received from a third party.

6.2.2. The CEMPs will be updated if it is necessary to add additional control measures, with a full review as required throughout the construction period. Existing control measures and mitigation will not be amended without prior agreement with the local authorities.

7. References

Ref 1 HMSO (2008) The Planning Act 2008.
Ref 2 HMSO (1974); Control of Pollution Act 1973.
Ref 3 HMSO (1995); Environmental Act 1995.
Ref 4 British Standards Institute (2014) BS 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites, Noise, BSi, London.
Ref 5 Northern Ireland Environment Agency (NIEA) (2018), Above ground oil Storage tanks: GPP 2.
Ref 6 NIEA (2017), Treatment and disposal of wastewater where there is no connection to the public foul sewer, GPP 4.
Ref 7 NIEA (2018); Works maintenance in or near water, GPP 5.
Ref 8 NIEA (2017); Safe storage and disposal of used oils, GPP 8.
Ref 9 NIEA (2017); Pollution incident response planning GPP 21.
Ref 10 British Standards Institute (2012) BS 5837:2012 – Trees in relation to design, demolition and construction. Recommendations, Noise, BSi, London.
Ref 11 Department for Food and Rural Affairs (Defra) Guidance on protecting our water, soils and air.
Ref 12 Construction Industry Research and Information Association (CIRIA) Guidance.
Ref 13 NIEA (2017); Vehicle washing and cleaning.
Ref 14 NIEA (2017) Vehicles: Servicing and Repairs.
Ref 15 NIEA (2017) Dewatering underground ducts and Chambers.
Ref 16 NIEA (2018) Guidance for Pollution Prevention.
Ref 17 NIEA (2018) Safe storage of Drums and Intermediate Bulk Containers (IBCs).
Ref 18 British Standards Institute (2009) BS6031:2009 Code of Practice for Earth Works (British Standards Institute, 2009).
Ref 19 HMSO (2002) Control of Substances Hazardous to Health Regulations.
Ref 20 HMSO (2001) Control of Pollution (Oil Storage) (England) Regulations
Ref 21 NIEA (2020) A general guide to preventing pollution, GPP1
Ref 22 Environment Agency. Pollution Prevention Guidelines. Working at construction and demolition sites: PPG6.
Ref 23 Environment Agency. Pollution Prevention Guidance. Safe storage – the safe operation of refuelling facilities: PPG7.
Ref 24 Environment Agency. Pollution Prevention Guidance. Managing Fire Water and Major Spillages: PPG18.
Ref 25 NetRegs Environmental Guidance for your Business in Northern Ireland and Scotland. GPP3: Use and design of oil separators in surface water drainage systems.
Ref 26 Defra (2009)Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.
Ref 27 The Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings.

8. Appendix A: Outline Soil Resource Management Plan

Prepared by ADAS

EDF Renewables




Longfield Solar Farm

Outline Soil Resource Management Plan

February 2022

ADAS

ADAS GENERAL NOTES

Project No.: 1010626

Title: Longfield Solar Farm - Outline Soil Resource Management Plan

Date: 01/02/2022

Office: **ADAS Rosemaund, Preston, Wynne, Hereford, HR1 3PG**

Status: Edition 01

Author	Ruth Metcalfe	**Technical reviewer**	John Grylls
Date:	2-2-22	Date:	02/02/22

EXECUTIVE SUMMARY

The purpose of the outline Soil Resource Management Plan (SRMP) for Longfield Solar Farm is:

- to ensure the protection and conservation of soil resources on site
- identify best practice to maintain the physical properties of the soils on site
- provide on-site reference on the management of the soil resource for site operators

The plan covers, on soil handling, the assessment of soil moisture content, storage of soil in bunds and trafficking. The guidance is applicable throughout the life of the solar farm.

CONTENTS

1 INTRODUCTION

Longfield Solar Farm is a proposed solar farm with energy storage, which will generate and store renewable energy for supply to the National Grid. The solar farm development will comprise the commissioning, operation and decommissioning phases.

The outline proposal includes several temporary construction compounds, office, warehouse and plant buildings, battery energy storage compound, inverters and transformers. In addition, there will be cabling, access routes, fencing and frame mounted solar PV panels.

An Agricultural Land Classification (ALC) survey of the site was undertaken (LSF_ES_Appendix 21A_ALC Survey) by Land Research Associates (2020). Details of the observations are included in the survey report.

A summary of the findings by grade is given:

Grade 2 land includes freely draining soils (Wetness Class (WC) I) with a medium clay loam or medium silty clay loam topsoil. The main limitation to the agricultural use is soil droughtiness. In some places the topsoil is underlain by a slowly permeable layer at depth which results in Wetness Class II.

Subgrade 3a land includes soil with sandy clay loam and medium silty clay loam topsoils over poorly structured subsoils (WC III) or a heavy clay loam topsoil with permeable upper subsoil (WC II). There is a soil wetness limitation affecting the workability of the land and a moderate droughtiness limitation.

Subgrade 3b land includes soils with a heavy clay loam topsoil overlying a clay subsoil and having impeded drainage (WC III). A limited area in the south east of the site has a sandy clay loam topsoil overlying gravel and is limited by droughtiness to Subgrade 3b.

The survey classified the land within the site boundary as:

Table 1 Agricultural Land Classification Grade - whole site area

Agricultural Land Classification Grade	Total Area (ha)	% of site boundary
1	0	0
2	55.2	12
3a	100.5	22
3b	261.6	58
4	0	0
5	0	0
Non Agricultural Land	10.4	2
Not surveyed	25.2	6
Total	452.9	100

The land by ALC grade required for construction is:

Table 2 Agricultural Land Classification grade- land required for construction

Agricultural Land Classification Grade	Total Area (ha)	% of site boundary
1	0	0
2	14.3	11
3a	29.7	22
3b	74.8	55
4	0	0
5	0	0
Non Agricultural Land	8.9	7
Not surveyed	7.4	5
Total	135.1	100

The purpose of the outline Soil Resources Management Plan (SRMP) is to:

- ensure the protection and conservation of soil resources on site;
- identify best practice to maintain the physical properties of the soils on site; and
- provide on-site reference on the management of the soil resource for site operators.

The SRMP follows the principles of best practice[1] [2] to maintain the physical properties of the soil with aim of the restoring the land to its pre-construction condition at the end of the lifetime of the solar farm.

[1] Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites

[2] The Institute of Quarry

ing (2021) Good Practice Guide for Handling Soils in Mineral Workings. [redacted]

2 SOIL ASSESSMENT

The SRMP establishes a baseline of the soil resources prior to the construction phase and enables grouping of soils into soil units which have similar physical characteristics. As part of the Agricultural Land Classification Survey details on soil texture, depth, drainage characteristics and stone content were recorded. There were 3 main soil types identified in the Soil Resources and Agricultural Land Quality report for the site (LSF_ES_Appendix 21A_ALC Survey Map 2).

The main soil type is described as a heavy soil with impeded drainage and is widespread throughout the site. A second soil type with silty soils is found in four areas – in the north west near Scarlett's Wood, to the east of Bird's Farm and two areas close to Toppinghoehall Wood. The third soil type described as loamy soil over gravel is shown in a limited area near Toppinghoehall Wood and to the south of Lost Wood. This soil type includes a small area of light textured soils with a sandy loam topsoil overlying gravel and is identified in the SRMP as a fourth soil type. Descriptions of the soil types are in Appendix 1.

The soils can be grouped into soil handling units of similar texture, primarily to avoid mixing of different soil textures during removal and storage.

3 SOIL UNITS FOR HANDLING

There are 3 phases - commissioning, operation and decommissioning - within the lifetime of a solar farm, where management of the soil resource is required. To ensure the condition and quality of the soil is preserved the soils should only be handled when dry and friable. To reduce damage to the soil structure the soil moisture state should be assessed on site by a suitably qualified person prior to any work commencing and after rainfall events.

Soils can differ in their susceptibility to compaction depending on their textural class, degree of structural development and water retention properties. Light textured soils with a clay content of less than 18% such as sandy loam are significantly less susceptible to compaction than a heavy textured soil with a clay content of more than 27% such as a heavy clay loam, which have a low resilience to structural damage.

Three soil handling units are identified across the site, which if disturbed, will require separate handling.

Table 3: Soil resilience to structural damage classification

Soil Handling Unit	Resilience to Structural damage during soil handling in a dry condition	Soil texture class
A (Green)	High	Light textured soils: sandy loam
B (Orange)	Medium	Medium textured soils with <27% clay content: sandy clay loam, medium silty clay loam, medium clay loam
C (Red)	Low	Heavy soils with >27% clay content: heavy clay loam

The following soil units have been identified on site with topsoil texture determining the classification:

Unit A - medium sandy loam to a depth of 330mm from the surface over coarse sandy loam and gravel

Unit B - medium clay loam, sandy clay loam or medium silty clay loam to a depth of 300mm from the surface with upper subsoils of similar texture over a lower subsoil of heavy silty clay loam or clay

Unit C - heavy clay loam to a depth of 300mm over upper subsoil of heavy clay loam and lower subsoil of either heavy clay loam or clay.

Unit C is widespread throughout the site with Unit B covering a significant area. Unit C is limited to a small area in the south east. The distribution of the soil handling units is shown on Plan 1 (Appendix 2).

4 SOIL STRIPPING- EARTHWORKS

The Soil Handling Units plan (Appendix 2) shows the units of soil which should be stripped and stored in bunds separately during the commissioning phase.

The following points should be in place prior to the stripping of soil

- the site layout should accommodate designated soil storage areas
- the volume of soil to be stripped and storage requirements can be calculated
- best practice is to use an excavator and dump truck to strip and move soil
- all machinery should operate and travel on subsoil or access routes
- matting may be required on access routes to contain and reduce soil compaction
- vegetation on the areas to be disturbed e.g. compounds, access road etc. should be cut short to less than 100mm as necessary, no more than 2 weeks before stripping
- a record of any soil placed in storage and a plan of the storage bunds should be maintained throughout the life of the solar farm
- the topsoil should be stripped to a depth of approximately 300mm

5 SOIL MOISTURE ASSESSMENT

To minimise the risk of structural damage to the soil the soil when in a suitable condition identified by the soil moisture assessment outlined below.

The following points should be considered on each occasion that soil handling is proposed:

- topsoil stripping will only occur when the soils are as dry as reasonably practicable (normally below the plastic limit and not normally within 24 hours of significant rainfall (i.e. <10mm in a 24 hour period)
- during light rainfall events local level decisions to proceed or stop should be based on the current wetness state of the soils being handled
- there should be no surface water standing in the area to be stripped
- the ground should be sufficiently dry for traffic to travel across without forming ruts
- soil should not be moved when the ground is covered by snow or is frozen

To determine the suitability of the soil for handling the following in-field soil moisture test should be undertaken to assess the moisture content of the soil prior to working.

The method involves rolling a ball of soil into intact threads (3mm diameter), which if possible, indicate the soils are in a plastic and wet condition[3] [4] [5] (see Table 6). A visual examination of the soil taken initially and then an assessment of the soil consistency (the cohesion and adhesion of the soil) as set out in Tables 4, 5 and 6.

Table 4 Visual Assessment of Soil Moisture

Soil Condition	Procedure
If the soil is wet, films of water are visible on the surface of the soil particles or aggregates and/or when a soil sample is squeezed by hand and readily deforms into a 'cohesive' ball	NO HANDLING
Soil peds readily break up or crumble when squeezed in the hand	HANDLING OK
If the sample is moist (a slight dampness when squeezed by hand) but the soil colour does not change upon further wetting	HANDLING OK IF UNDERTAKEN BY TRACKED EXCAVATOR AND CONSISTENCY TEST IS PASSED
If the sample is dry and darkens if water is added the soil is brittle	HANDLING OK IF CONSISTENCY TEST IS PASSED

Table 5 Consistency Test (1)

[3] MAFF 1982 Reference Book 441 Techniques for measuring soil physical properties HMSO

[4] Natural England 2021 Planning and aftercare advice for reclaiming land to agricultural use.

[5] The Institute of Quarrying (2021). Good Practice Guide for Handling Soils Supplementary Note 4 Soil Wetness

Attempt to mould a soil sample into a ball by hand:

Soil Condition	Procedure
Impossible because the soil is too hard or dry	HANDLING OK
Impossible because the soil is too loose (dry)	HANDLING OK
Impossible because the soil is too loose and wet	HANDLING NOT OK
Possible	GO to Table 4

Table 6 Consistency Test (2)

Attempt to roll the ball by hand into a thread of 3mm diameter on a flat non-adhesive surface

Soil Condition	Procedure
Impossible the soil crumbles or disintegrates	HANDLING OK
Possible	NO HANDLING

6 SOIL STORAGE

Topsoil from different soil units should be stored in separate soil bunds and placed on soil in a similar soil unit. Soil may be stored in areas used for landscaping.

The following points should be considered when planning soil storage to keep soil aerated, reduce erosion, runoff and ponding:

- the soil bund should be no higher than 3m for topsoil
- the bund should be shaped to shed water
- be located on dry level ground
- not disrupt any natural surface drainage
- the bund should be seeded with a suitable grass mix
- the bund should be monitored and managed for weeds
- grass on the bund should be managed either by cutting or grazing.
- A record should be kept of soil placed into storage on the site. Each bund should be identified with the soil volume and soil unit.

7 SITE MACHINERY AND VEHICLE MOVEMENT

On any construction site there exists the risk of soil compaction from the use of heavy machinery and traversing land in unsuitable ground conditions. The aim should be to minimise the risk through appropriate site management of operations during the commissioning, operation and decommissioning phases. Much of the site is classified as having a low resilience to structural soil damage and hence the risk of soil compaction.

The management of trafficking on site and traversing the land when the soil is in a suitable dry condition is key to managing the risk of soil compaction. Where land is to be returned to agricultural use at the end of the solar farm life it is important that the risk of soil compaction and its management is considered as part of the pre-construction planning.

As a guide to planning operations it should be noted that the Field Capacity Day figure for the site is about 103 days, which is relatively low for England (Appendix 3).

The term Field Capacity is a measure of the duration of climatic wetness when soils hold the maximum amount of water. In a normal year the soils are likely to return to Field Capacity in early December and remain at Field Capacity until early April. As a broad guide planning of the construction works should take this into consideration and seek to undertake minimal traversing across the site and soil handling during the period early December to early April and/or to develop appropriate procedures to do so such as the use of matting. An on-site inspection of the soil condition prior to vehicle movement across the site is essential.
Using machinery such as dump trucks fitted with tracks or low ground pressure tyres to spread the weight of the machinery should be used.

When travelling across the site all machinery and vehicles should keep to access routes where possible to contain the risk of soil compaction.

8 DECOMMISSIONING

The outline Soil Resources Management Plan will be part of the decommissioning phase and its purpose will be to:

- to ensure the protection and conservation of soil resources
- undertake best practice to maintain the physical properties of the soils
- provide on-site reference on the management of the soil resource for site operators undertaking the decommissioning works

In addition to the best practice guidance in the SRMP, the following points are relevant to the management of soil resources at the decommissioning phase:

- when solar farm infrastructure such as compounds, inverters etc and any ground coverings are removed the subsoil condition should be examined by digging a trial pit
- where appropriate the subsoils may be loosened ideally with a subsoiler set up to appropriate depth and spacing to alleviate compaction or with an excavator ripper attachment
- the surface of the subsoil should be cleared of any debris and large stone
- across the site trial pits to assess the soil profile and any compaction should be undertaken to contribute to a programme of remediation
- should there be deep compaction (>450mm depth) in the soil profile the use of specialist equipment should be considered
- grass on the soil bunds will be sprayed off 10 days before soil reinstatement
- examine the conditions of the soil under the bunds and take remedial action such as loosening if required
- where there have been compounds or fuelling points the subsoil should be sampled and a UKAS and MCERTS (or equivalent) laboratory analysis undertaken for metals, oils and Polycyclic Aromatic Hydrocarbons (PAHs)
- the decommissioning phase and reinstatement of soil should be monitored by a suitably qualified competent person. Records of operations should be kept with photographic evidence
- soil conditions for pile pull out should be dry and friable (to be reviewed as part of the decommissioning plan)
- any void left after pile pull out should be examined and may require in-filling with similar soil
- the condition of field drainage should be assessed and reviewed for any remedial action

APPENDIX 1 SOIL UNIT DESCRIPTIONS

The descriptions are extracted from Document: LSF_ES_Appendix 21A_ALC Survey and refer to the soil types.

Soil Handling Unit A covers a very limited area where there is a sandy loam topsoil. These soils were identified as a loamy soil over gravel in the Agricultural Land Classification survey (observations 204,209 and 389). The pit description refers to the observation point at 392, which has a sandy clay loam topsoil.

For the purposes of soil handling classification, the sandy loam topsoil has been placed in Soil Unit A (high resilience to soil structural damage). The description below describes observation 204.

0-32 cm dark brown (7.5YR3/2) sandy loam: moderately stony; *(pit structural description given as moderately developed medium and coarse granular)*

32- 65 cm dark greyish brown (10YR4/2) coarse sandy loam: moderately stony (flints*); pit structural description weakly developed medium granular structure)*

65cm+ gravel

Freely draining - Wetness Class I (*soil porosity not noted but from pit description will be more than 0.5% pores greater than 0.5mm in diameter*).

Soil Handling Unit B covers areas in the north, centre and south of the site. These soils were identified as a silty soil type. The topsoil texture includes medium silty clay loam and sandy clay loam.

A pit description at observation 129 is given:

0-29 cm greyish brown (10YR5/2) medium silty clay loam; slightly stony (5-10% small and medium sub-angular hard stones and flints); moderately developed fine and medium sub-angular blocky structure; friable

29-52 cm yellowish brown (10YR5/6) medium silty clay loam with few fine yellow (10YR7/6) mottles; very slightly stony (5% small sub-angular hard stones and flints); well developed medium sub-angular blocky structure; friable

52-100cm+ brownish yellow (10YR6/6) medium silty clay loam; common fine diffuse reddish yellow (7.5YR6/8) and light grey (10YR7/2) mottles; very slightly stony (5% small sub-angular hard stones and flints); moderately developed medium angular blocky structure; friable

Soil drainage-ranges from freely draining (Wetness Class I or II to imperfectly drained Wetness Class III where clay is present in the subsoil

Soil Handling Unit C is widespread across the site and includes topsoils which have a low resilience to structural damage. While the area is underlain by chalky glacial till or de-calcified drift, the topsoils are generally non calcareous. A pit description is given for observation 44:

0-31cm dark greyish brown (10YR4/2) heavy clay loam; moderately stony (15% small and medium flints and pebbles); weakly developed coarse sub-angular blocky structure; non-calcareous; firm

31-42cm yellowish brown (10YR5/6) clay with abundant medium distinct yellow (10YR7/6) and grey (10YR5/1) mottles and ped faces; slightly stony (10% small and medium sub-angular flints and small rounded soft chalk); weakly developed very coarse prismatic structure; very firm; slightly calcareous

42-100cm+ yellowish brown (10YR5/6) clay with abundant medium distinct reddish yellow (7.5YR6/8) and grey (10YR6/1) mottles; moderately stony (20% small and medium soft chalk stones); weakly developed very coarse prismatic structure; very firm; calcareous.

APPENDIX 2 PLAN 1

575000

215000

Legend:

- Site Boundary
- Soil Unit A - Light Textured Soils
- Soil Unit B - Medium Textured Soils
- Soil Unit C - Heavy Textured Soils
- Not Surveyed

Terling
Church Green
Braintree Road
Hatfield Road
Witham Ro
Borsham Road
Leighs Road
Terling Hall Road
Drakes Lane
Drakes Lane Industrial Estate
Cranham Road
Russell Green
Boreham Industrial Estate
Waltham Road
Waltham Road Industrial Estate
Crix
Damases Lane
Main Road
New Hall School
Park

Rev	Date	Description	Drn	Chk	App
00	08/02/2022	2740008	ET	SP	MW

Longfield Solar Farm

TITLE: Plan 1:

Soil Handling Units

0 200 400 600 800

Metres

SCALE: 1:20,000 @ A3

N W E S

REV 00

Document Path: C:\OneDrive\RSK Group\Nature Positive - 2740008 Longfield Solar Farm\06 GIS\2740008 - Plan 1 - Soil Handling Units.aprx

APPENDIX 3

Table A: Agro-climatic variables

(Grid reference TL754 134 altitude 52m)

Average Annual Rainfall (AAR)	576 mm
January-June Accumulated Temperature (AT0)	1423 day °C
Field Capacity Days (FCD)	103
Field Capacity Period	mid Dec - late Mar
Moisture Deficit Wheat (MDW)	122 mm
Moisture Deficit Potatoes (MWP)	118 mm
Climate (upper grade limit)	1