THE DROVES
SOLAR FARM

The Droves Solar Farm

outline Operational Environmental Management Plan (Clean)

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1 Introduction

1.1 Background

1.1.1 This document provides the outline for the Operational Environmental Management Plan (OEMP) for The Droves Solar Farm (hereafter referred to as 'the Scheme').

1.1.2 A Development Consent Order (DCO) would provide the necessary authorisations and consents for the Scheme which comprises the construction, operation, and decommissioning of a solar photovoltaic (PV) electricity generating station and associated development comprising a Battery Energy Storage System (BESS), a Customer Substation, and Grid Connection Infrastructure, including a new National Grid Substation. The Scheme would allow for the generation and export of over 50MW Alternating Current (AC) of renewable energy, connecting into the National Electricity Transmission System (NETS) overhead line that passes through the Site.

1.1.3 Due to its total capacity exceeding 50 MW the Scheme is classified as a Nationally Significant Infrastructure Project (NSIP) under Sections 14(1)(a) and 15(2) of the Planning Act 2008 **(Ref 1)** and therefore requires consent via a DCO. The decision whether to grant a DCO will be made by the Secretary of State for Energy Security and Net Zero following the Examination and Recommendation by the Planning Inspectorate.

1.1.1 An Environmental Impact Assessment (EIA) has been undertaken for the Scheme and an **Environmental Statement (ES) [APP/6.1 to 6.5]** has been prepared in accordance with the Infrastructure Planning (EIA) Regulations 2017 (EIA Regulations) **(Ref. 2)**. In accordance with the requirements of the EIA Regulations, the ES contains the assessment of the likely significant effects on the environment that may be caused during the construction of the Scheme and describes proposed mitigation measures.

1.1.2 This oOEMP is designed with the objective of ensuring compliance with the relevant environmental mitigation measures set out within the ES. This document provides the likely structure of, and some outline information relevant to, the detailed OEMP. The detailed OEMP will be produced substantially in accordance with this oOEMP following the grant of the DCO and before the Scheme becomes operational. It will then be submitted to Breckland Council (BC) for approval, in accordance with Requirement 14 of the **draft Development Consent Order (draft DCO) [APP/3.1]**.

1.1.3 The key elements of this oOEMP include:

- An overview of the Scheme and associated operational programme
- Prior assessment of environmental impacts (through the EIA process)
- Proposed design and other mitigation measures to prevent or reduce potential adverse environment effects

- Monitoring and reporting of effectiveness of mitigation measures; and
- Links to other complementary plans and procedures.

1.1.4 In summary, the oOEMP will identify how commitments made in the EIA will be translated into actions during the operational phase and includes a process for implementing the actions through allocation of key roles and responsibilities. Any additional licences, permits or approvals that are required will be listed in the detailed OEMP, including any environmental information submitted in respect of them. The detailed OEMP will be a live document updated throughout the operational phase as required, for example to reflect changes in legislation or contact details. This oOEMP has been designed with the objective of compliance with the relevant environmental legislation and mitigation measures set out within the ES.

1.1.5 It is noted that multiple detailed OEMPs may be prepared, approved, and implemented, for example separate OEMPs may be prepared for the Solar PV Site and the Customer Substation. Within this document 'detailed OEMP' is defined to collectively refer to all detailed OEMPs which may be prepared.

1.1.6 In accordance with Requirement 14 of the **draft DCO [APP/3.1]**, the ultimate Operator of the Scheme will be responsible for working in accordance with the environmental controls documented in this oOEMP and for the preparation and implementation of the detailed OEMP.

1.1.7 This document has been updated at Deadline 5 to commit to the production of an emergency response plan. The document references have not been updated from the original submission. Please refer to the **Guide to the Application [APP/1.3.7]** for the list of current versions of documents.

1.2 The Applicant

1.2.1 The Applicant is The Droves Solar Farm Limited. The Droves Solar Farm Limited is a 100%-owned subsidiary of Island Green Power UK Projects Limited, which is in turn a 100%-owned subsidiary of Island Green Power's UK group holding company, Island Green Power Group Limited (IGP). The Applicant is part of IGP, who are a leading international developer of utility-scale solar projects and battery storage systems, established in 2013.

1.2.2 IGP has successfully delivered nearly 40 solar projects worldwide that have generated more than 3 GW of energy capacity. This includes 21 solar projects in the UK. These range in size from below 5 MW to Nationally Significant Infrastructure Projects (NSIPs) such as Cottam, currently the UK's largest consented solar project. Cottam will generate 600 MW of clean, renewable and secure electricity and includes 600 MW of Battery Storage that will store then release energy as needed.

1.2.3 IGP's mission is to deliver renewable energy solutions that create lasting value for the communities they serve, protecting the environment while fostering economic growth and energy independence.

1.3 The Scheme

1.3.1 The Scheme would be located within the Order limits, also referred to as 'the Site'. The Order limits contain all elements of the Scheme comprising the Solar PV Site, the Customer Substation, the National Grid Substation, the BESS, Grid Connection Infrastructure, Mitigation and Enhancement Areas, and the Highway Works (shown in **ES Figure 3.2: The Order limits [APP/6.3]** are described further in **ES Chapter 3: Order limits and Context [APP/6.2]**).

1.3.2 Highway Works are sections of the highway network that will contain localised improvements, such as improvements to road edge where it is deteriorated, or temporary highway and traffic works required to safely accommodate the Abnormal Indivisible Load (AIL) deliveries. These areas will support the movement of construction vehicles on narrower sections of the local highway network within parts of the construction vehicle routes to the Site (refer to **ES Chapter 9: Transport and Access [APP/6.2]**).

1.3.3 Further details of the Site and the Scheme are presented in **ES Chapter 5: The Scheme [APP/6.1]**. The **Design Principles, Parameters and Commitments [APP/5.8]** set out the maximum parameters which will be met by the contractor and Applicant.

2 Operational Environmental Management

2.1 Introduction

2.1.1 This section sets out the general site arrangements for the operational phase of the Scheme, including replacement activities.

2.2 Operation Programme

2.2.1 Operation of the Scheme is expected to start following construction, no earlier than Q4 2033. The Scheme will operate for no more than 60 years, with decommissioning assumed for the purposes of the environmental impact assessment to be no earlier than 2093.

2.3 Operational Activities

2.3.1 During the operational phase, activity on the Solar PV Site would be restricted principally to vegetation management, equipment maintenance and servicing, ad hoc replacement of any components that fail or reach the end of their lifespan, periodic fence inspection, and monitoring to ensure the continued effective operation of the Scheme. Replacement of PV Panels and BESS Units is discussed in **Section 2.12**.

2.3.2 The National Grid Substation will be managed and maintained by National Grid. The Customer Substation will be managed and maintained by the Applicant/Operator.

2.3.3 As stated in **ES Chapter 9: Transport and Access [APP/6.2]**, during the Scheme's operational phase, there are anticipated to be up to five visits to the Site per month for general maintenance purposes. These would typically be made by light van or 4 x 4 type vehicles. The installed Cabling will be located either underground or overground. Access may be required for maintenance, but this is only likely once or twice a year.

2.3.4 Welfare facilities will be required at both the Customer Substation and the National Grid Substation. Any wastewater will be removed via tanker to local licensed wastewater treatment works.

2.4 Operational Staff

2.4.1 No permanent on-site staff will be required to operate the Scheme. There will be limited Staff facilities located in the control rooms associated with the Customer Substation. Equipment for monitoring the Solar PV Site and BESS will be located in the Relay and Control Rooms. Whilst this would typically be accessed remotely, it would be available for occasional physical access during routine visits

2.4.2 No on-site staff will be required to operate the National Grid Substation but there will be limited staff facilities.

2.5 Working Hours

2.5.1 The Solar PV Site will generally be unmanned during normal operation. Routine maintenance would be carried out as required Monday to Friday 07.00 – 18.00. Emergency maintenance would be carried out as and when needed.

2.6 Parking Provisions

2.6.1 During the operational phase, permeable gravel hardstanding will be provided within the operational compounds of the National Grid Substation, the Customer Substation, and the BESS.

2.7 Control of Light

2.7.1 Lighting is generally not required within the Solar PV Site during the operational phase of the Scheme. During the cleaning of the panels (as described in **Section 2.9**), panels could be cleaned at night, which may require lighting. If undertaken, the level of lighting would be similar to lighting required for night-time agricultural activities carried out in the area.

2.7.2 All routine maintenance activities, except for panel cleaning if required during the night time, would be scheduled for daylight hours as far as is practicable, and therefore it is anticipated that focussed task specific lighting should only be required in the event of emergency works/equipment failure requiring night-time working or panel cleaning operations, as deemed appropriate.

2.7.3 Motion sensing security lighting would be provided within Customer Substation, National Grid Substation, and within the BESS compound to be used to maintain safe working conditions in winter months, security purposes, and maintenance activities. Light spill from internal lighting is anticipated to be minimal. A detailed lighting assessment will be undertaken of the required lighting and a sensitive lighting strategy will be set out within the detailed OEMP.

2.8 Operational Traffic and Access

2.8.1 During the operational phase, other than during the operational replacement of PV panels (refer to **Section 2.12**), there will be a small number of daily vehicle trips, with additional staff attending when required for maintenance and cleaning activities.

2.8.2 Existing field accesses are proposed for the operational access where this is practicable and would reuse construction accesses. **ES Figure 5.1: Concept Masterplan [APP/6.3]** illustrates the location of accesses.

2.8.3 During the operational phase, the Landowner will maintain pedestrian and vehicular use of the existing farm tracks within the Order limits to allow continued maintenance of existing woodland. The Landowner is granted access to woodland parcels that don't lie immediately adjacent to the existing farm tracks. Indicative access routes to woodland parcels that do not lie immediately adjacent to the existing farm tracks are illustrated in **outline Landscape and Ecological Management Plan (oLEMP) Appendix 1: Green Infrastructure Strategy Plans [APP/7.11]**.

2.9 Panel Cleaning

2.9.1 Due to the wet UK climate, PV panels are largely self-cleaning and deterioration in PV system output due to dust or dirt is generally low. The requirement for, and the frequency of, cleaning of the Solar PV Arrays due to the build-up of dust and dirt varies depending upon site specific conditions. For example, the presence of fine dust emitters such as quarries, agricultural operations (harvesting), and the volume and proximity of nearby woodland can all impact the level of dust deposition. However, the main factor influencing cleaning requirements in the UK is lichen growth which again is influenced by site specific and climatic factors.

2.9.2 As stated above, the deterioration in output due to dust or dirt is generally low and, therefore, the requirement for cleaning due to loss of output is balanced against cost of the cleaning operation. Some sites can operate without the need to be cleaned, whereas some sites require cleaning annually. The cleaning requirements for the Scheme can only be accurately determined once operational and, therefore, to present a worst case for the assessments presented in the ES, a two-yearly cycle is assumed.

2.9.3 The PV panels would be cleaned using water only. Up to 776.5m^3 per year would be required per year to clean the panels. Deionised water would be used as preference. No chemical cleaning products would be used, with stubborn dirt brushed or wiped off the panels.

2.10 Management of Vegetation Planting

2.10.1 An **oLEMP [APP/7.11]** has been prepared and submitted as part of this DCO Application.

2.10.2 The **oLEMP** provides a framework for delivering the landscape strategy and the successful establishment and future management of proposed landscape works associated with the Scheme. It sets out the short and long-term measures and practices that will be implemented to establish, monitor and manage landscape, and ecology mitigation and enhancement (biodiversity net gain) measures embedded in the design.

2.10.3 The **oLEMP** sets out the measures proposed:

- To mitigate the effects of the Scheme on landscape and biodiversity features

- To enhance the biodiversity, landscape, and green infrastructure value of the Order limits; and
- To secure compliance with relevant national and local planning policies.

2.10.4 A detailed LEMP will be prepared in accordance with the **oLEMP [APP/7.11]** and will be submitted to and approved by the relevant local planning authority or authorities prior to the construction phase. This will include provisions in respect of on-going maintenance and management of the landscape and ecology

2.11 Recovery, Recycling and Disposing of Waste

2.11.1 Solid waste materials generated during Scheme's operational phase would primarily be general (household type) waste from the staff visiting site. However, there would also be a limited volume of packaging waste associated with the delivery of spare components. In accordance with legislation and guidance applicable at the time, all general and packaging type waste would be segregated prior to transport to an approved, licensed third party landfill and recycling facilities.

2.11.2 Additionally, any waste components (e.g. faulty or damaged PV Panels, batteries, cables, connectors and mounting structures) would also be removed and recycled as far as practical and in accordance with legislation and guidance applicable at the time (refer to **Section 2.12**).

2.11.3 **Section 2.12** summarises the anticipated design life and replacement frequency for the main elements of the Scheme (PV panels, BESS etc.), based on other similar solar Nationally Significant Infrastructure Project (NSIP) schemes.

2.11.4 Waste is discussed further in **ES Chapter 17: Other Environmental Matters [APP/6.2]**.

2.12 Replacement Activities

2.12.1 The replacement programme for the Scheme is expected to be as follows:

- It is expected that the operational life of PV panels is 40 years. The operational replacement of panels is anticipated to comprise:
  - Replacement of individual defective and broken PV panels on an ad hoc basis; and
  - Planned replacement of all PV panels once during the operational phase. The Solar PV panels are anticipated to be replaced over a 12 to 24 month period. It is expected that the BESS could be replaced up to five times during the operational phase. The operational replacement of BESS has been assessed in the ES.

2.12.2 The assessment in the ES has considered a reasonable worst-case scenario for operational replacement with regard to frequency and duration of replacement activities. Where a shorter or longer operational replacement programme is anticipated to result in

a greater level of likely significant effects in respect of a particular EIA topic, the worst-case programme has been assumed for the purposes of the assessment of that topic.

2.12.3 Elements of the activities during the replacement programme would be similar to those carried out during construction. Where mitigation has been identified in the ES to mitigate construction effects is applicable to the replacement programme, these have been repeated in **Section 3** of this oOEMP.

2.12.4 During the replacement period, the components will be delivered and replaced on a rolling basis to minimise the amount of energy generation loss experienced by the Scheme.

2.13 Water Supply

2.13.1 During the operational phase, self-contained portable welfare units which store foul/wastewater for collection/emptying by specialist licenced contractors would be deployed on an ad hoc basis (e.g. if required by maintenance crews).

2.13.2 The water supply for operational staff facilities would either be transported to the PV Sites by road from an existing nearby licenced water abstraction source and stored on site; or where mains water is available this will also be utilised. Welfare facilities will be required at the Customer Substation and National Grid Substation. Any wastewater will be removed via tanker to local licenced wastewater treatment works.

2.13.3 The volume of stored fire water will be maintained to ensure there is sufficient water for firefighting purposes. More details on fire water supply and storage is provided within the **outline Battery Safety Management Plan (oBSMP) [APP/7.14]**.

2.14 Surface Water Drainage

2.14.1 The detailed operational drainage design would be carried out preconstruction with the objective of ensuring that drainage of the land to the present level is maintained. It would follow either the design of a new drainage system taking into account the proposed new infrastructure (access tracks, cable trenches and structure foundations) to be constructed or, if during the construction of any of the infrastructure there is any interruption to existing schemes of land drainage, new sections of drainage would be constructed.

2.14.2 The design of new drainage systems would be based on the **ES Chapter 12: Water Resources [APP/6.2]** and **ES Appendix 12.2: Flood Risk Assessment [APP/6.4]** and **ES Appendix 12.3: Water Framework Directive Assessment [APP/6.4]**. Infiltration drainage design would be in accordance with Building Research Establishment (BRE) Digest 365: Soakaway Design and Sewers for Adoption and infrastructure would be placed at least 10m away from watercourses.

2.14.3 Management of fire water is further described in **ES Chapter 12: Water Resources [APP/6.2]** and oBSMP **[APP/7.14]**.

2.15 Grazing

2.15.1 For the purposes of assessment and reporting of effects, as a reasonable worst case it is assumed that vegetation will be managed with machinery and there will be no grazing at the Solar PV Site during the operational phase.

2.15.2 However, should consent be granted, grazing by sheep will be explored, noting that there are no known landowner restrictive covenants or other reasons that would prevent such use.

2.16 Security

2.16.1 The Solar PV Site will receive several security risk management threat assessments during the development, construction, operation, and ultimately decommissioning phases. These security risk management threat assessments are conducted by suitable qualified and experienced persons (SQEP) and will determine security risks.

2.16.2 The Applicant recognises, and embraces, the symbiotic relationship between safety and security. The security arrangements to be present at the Solar PV Site will therefore contribute to the overall safety of all who will, or may, enter the Site. The security arrangements will be SQEP reviewed at identified epochs commensurate to the Security Risk rating and will further assess any changes in the Security Risk Management Threat Assessment.

2.16.3 The boundary of the Solar PV Site will be secured both by fencing and by the provision of Closed-Circuit Television (CCTV) equipment. Cameras would be placed on poles with a maximum height of 3m. Perimeter fencing will be deer wire mesh and wooden post fencing with a maximum height of 2.5m. All new access tracks will be secured by gates, which will be set back from the public highway. Where existing access tracks are used that also provide access to residential properties, appropriate security measures will be put in place in consultation with the relevant property owner(s).

There will be palisade fencing around the BESS compound, Customer Substation and National Grid Substation which will have a maximum height of 3m.

2.16.4 Other potential security measures to be included comprise:

- Detection systems such as beam break, image detection etc. to raise alarm when fence breached
- Audio announcement when intruder detected to warn alarm triggered and police on way
- Barriers/locked gates at main entrances to the Solar PV Site
- Steel doors on substation buildings

- Buried cables as much as possible
- Remote monitoring; and
- Alarm response contract with keyholder/security company.

2.17 Responding to Environmental Incidents and Emergencies

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

2.18 Public Consultation and Liaison

2.18.1 During the operational phase of the Scheme, a full-time equivalent position of the Scheme's operational team will be a dedicated 'community contact' who is responsible for monitoring community interaction to ensure community concerns are heard, responded to and suitably addressed throughout the duration of the Scheme's operational phase. The Scheme's operational team will also appoint a Community Liaison Manager (CLM) as a temporary facilitator of communications between communities and the Scheme's operators during the peak replacement scenario.

2.18.2 Details of the role and responsibility of the 'community contact' and the CLM will be set out in the detailed OEMP.

2.18.3 The contact details for the 'community contact' and the CLM within the operational team will be made available to members of the public through elected representatives or online, and kept up-to-date at all times.

2.18.4 Any environmental complaints received during the operational phase will be investigated, with appropriate action taken and recorded, so that a full audit trail is available should the complainant raise the issue(s) with the local authority.

3 Mitigation and Monitoring – Solar PV Site, BESS, Customer Substation

3.1 Purpose

3.1.1 This section of the oOEMP sets out the mitigation and management measures to be included as a minimum in the detailed OEMP, pertaining to the Solar PV Site, BESS, and Customer Substation. This section also identifies where monitoring is proposed to assess the effectiveness of the mitigation measures.

3.2 Landscape and Visual

Table 3-1 Landscape and Visual

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Loss of existing landscape features (e.g., vegetation). Visibility of operational activities.	The **oLEMP [APP/7.11]** sets out the measures proposed to mitigate the potential impacts and effects on landscape (and biodiversity) features, and to enhance the landscape and biodiversity value of the Order limits. A detailed LEMP will be prepared in accordance with the principles of the oLEMP and will be submitted to and approved by the relevant planning authority or authorities. This will include measures to ensure landscape mitigation and enhancements are established and maintained into and throughout the operational phase. **Avoidance Measures** Avoidance measures are incorporated into the design of the Scheme in order to reduce development impacts and control any negative effects on the landscape, especially on sensitive receptors. These measures include: • Avoiding development where it would be visually intrusive and affect the character and visual experience of the landscape **General Offsets/ Buffers** Buffers outlined in **ES Chapter 5: The Scheme [APP/6.1]** have been embedded into the design of the Scheme to	Specific measures will be confirmed in the detailed **LEMP**.

	protect the landscape fabric of the Site. As well as standard offsets/buffers identified that have been applied across the Scheme, Embedded Operation Phase Mitigation section of **ES Chapter 6: Landscape and Visual [APP/6.2]** identifies offset and buffering and setting backs of the Scheme to reduce Landscape and Visual Impacts. **Landscape Design Parameters** Key design landscape and visual embedded mitigation measures are set out in paragraph 6.7.18 of **ES Chapter 6: Landscape and Visual [APP/6.2]**. PV panels • Single Axis Trackers would be aligned in north-south rows, and fixed South Facing PV Arrays would be aligned in east-west rows. The maximum height of the highest part of the Single Axis Trackers and its greatest inclination would be 4.5m. The maximum height of the solar PV modules when horizontal would be 2.5m. The maximum height of the highest part of the fixed solar PV modules will be 3.5m. BESS • The installation of the BESS has been selected based on locations where a combination of existing screening and capacity for planting mitigation can reduce visual impacts. Lighting • Security lighting within the Customer Substation and BESS compound would be motion detection sensors for operational and security purposes.	

	• Good practice measures would be employed to minimise light spill. The lighting design will seek to limit any impacts on sensitive receptors through directional cowls. Proposed Planting The proposed planting approach is detailed within the **oLEMP [APP/7.11]**, illustrated within its appendices: • Green Infrastructure Plan • Vegetation Removal Plan; and • Advanced Planting Plan The following approach has been taken to the planting strategy, as detailed in the **oLEMP [APP/7.11]**: • Retention of the majority of existing landscape features within and around the boundaries of the Site, namely mature hedgerows and tree cover which contribute to the landscape character of the local context. These landscape features serve to restrict, filter and enclose visibility within the Site and study area south of Bartholomew's Hills Plantation. There is some loss of vegetation proposed as part of the Scheme to allow for the Site and internal field access. • Offset and buffering of the Scheme with new, woodland, hedgerow and tree planting to mitigate potential views from the nearby PRoW, roads and residential dwellings both within and in close proximity to the Site. • In addition to the establishment of new hedgerow and hedgerow trees, the embedded mitigation also includes the retention, gapping up and enhancement of existing hedgerow within the Site. New planting species would be native, locally prevalent and also include a mixture of	

	deciduous and evergreen species to provide year-round screening. Alongside the existing hedgerow and trees within the Site's context, the gapping up of hedgerow with native trees and whips would provide visual screening of the Scheme from visual receptors within the wider study area, and from PRoW and droves within the Site itself. • The long-term management and maintenance of existing and new vegetation is an embedded mitigation measure which ensures vegetation would be actively managed in the long term, as secured and detailed within the **oLEMP [APP/7.11]**. The prescribed maintenance height of hedgerow at 3m is an embedded mitigation measure which aims to screen views towards taller elements of the Scheme from nearby PRoW. The active management and maintenance of trees and woodland within the Site, both newly planted and existing, aims to ensure they not only survive but reach maturity and establishment in the medium to long term durations. In turn, these landscape features are primary mechanisms for filtering and screening views towards the Scheme from nearby PRoW, roads and residential dwellings. • Setting back the Scheme from key landscape features within and adjacent to the Site, such as trees, hedgerow and woodland. The minimum offsets/buffers from existing landscape features are outlined fully in **ES Chapter 5: The Scheme [APP/6.1]**. The Scheme would be offset from existing PRoW by a minimum of 15m, to respect the amenity and experience for PRoW users along existing routes and allow for the sowing of extensive areas of new grassland along the margins of the Scheme. New grassland/wildflower areas are also proposed to be sown underneath the Solar PV Arrays which would enhance biodiversity within the Site; and	

	• As referred to within the **oLEMP [APP/7.11]**, recreational enhancements such as interpretation boards and the potential for new publicly accessible amenity space within the north-western site area, that is connected to the existing PRoW network. In addition to this, a number of new permissive routes are proposed, of approximately 4.7km in total, which would link to the existing PRoW network within the study area to provide recreational benefits. This total number can be broken down to approximately 1.2km new offsite permissive route provision and approximately 3.5km new onsite permissive route provision. **Arboricultural Protection** The Scheme has been designed, as far as practicable, to avoid and reduce impacts and effects on Arboriculture by embedding mitigation measures into the design process. This is set out in **ES Appendix 16.4: Arboricultural Impact Assessment [APP/6.4]** and **ES Chapter 16: Other Environmental Matters [APP/6.2]**. Particular protection measures include: • Design work has been undertaken in order to retain, avoid and fully protect identified veteran trees to provide sufficient space to allow for open cut trenching around veteran tree buffer zones ensuring impacts to veteran trees are avoided – secured in the **Works Plan [APP/2.3]**.	

3.3 Ecology and Biodiversity

Table 3-2 Ecology and Biodiversity

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Impacts on biodiversity features during the operation of the Scheme	The **oLEMP [APP/7.11]** contains habitat management measures to take place within the Solar PV Site which will provide net gains for biodiversity. Prescriptions include substantial new hedgerow and tree planting, reinforcement planting at existing hedgerows and field boundaries, extensive grassland habitat creation and sympathetic management both within buffers and within the arrays, as well as discrete, valuable habitat creation (e.g. grassland habitats including wildflower grassland) in appropriate locations. **Habitats** During operation, habitat management and maintenance works will be timed, where appropriate, to avoid ecologically sensitive periods, for example hedgerow maintenance will avoid nesting bird season. Details of this are prescribed within the **oLEMP [APP/7.11].** With the exception of land that has been excluded from development, the perimeter of the Solar PV Site will be fenced for security purposes. **Bats** Permanent lighting is not required within the Solar PV Site for the operational phase. Motion sensing security lighting will be provided within the Customer Substation and within the	Specific measures will be confirmed in the detailed LEMP,

	BESS compound, to be used only for maintenance and security purposes. A sensitive lighting strategy (set out within the detailed OEMP) as part of the detailed OEMP will specify how this artificial lighting will be installed and used, which will serve to mitigate adverse impacts on ecological receptors which are adversely impacted by lighting, such as bats. The Scheme will strengthen existing key movement corridors through the planting up of gaps along existing hedgerows and tree lines, as well as through the creation of new hedgerow and tree lines to improve connectivity throughout the Scheme. The creation of diverse habitats including new grassland habitats which will improve potential foraging opportunities. **Badger** The fencing strategy for the Scheme has been sensitively designed to allow permeability across the Site by Badger, such that freedom of movement will remain, and connectivity to foraging resources within the wider landscape will remain while created habitats develop. Where appropriate, Badger fencing will incorporate specific design measures such as gaps, gates or other features, (particularly associated with existing vegetated corridors and key commuting routes) in order to ensure continued permeability and access to foraging areas across the Site for Badger. Should new badger setts be excavated in areas where they come into conflict with ongoing management activities, then these setts would likely be excluded under a mitigation licence from Natural England. The mitigation licence would secure any compensation measures (such as the creation of artificial setts) required, the exclusion of the setts, and would	

	ensure any impacts to setts are compliant with current legislation. **Birds** Mitigation and compensation measures in respect of Skylark and Curlew are proposed, including provision of new open grassland areas, favourable management of grassland margins and associated habitats, and long-term provision of Skylark plots within arable land outside of the Solar PV Site. The proposed approach is set out within **ES Appendix 7.3: Proposed Ground Nesting Bird Mitigation Strategy [APP/6.4]** and details of creation and management of specific grassland areas for ground nesting birds are identified within the **oLEMP [APP/7.11]**.	
Potential pollution from battery fire or replacement at the BESS.	The risk of a fire and measures to mitigate impacts in the event of a fire are detailed within **oBSMP [APP/7.14]**.	Specific measures will be confirmed in the detailed BSMP.

3.4 Cultural Heritage and Archaeology

Table 3-3 Cultural Heritage and Archaeology

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Operational phase impacts upon Heritage / Archaeology assets	Mitigation that has been embedded into the Scheme by design includes the avoidance of archaeologically sensitive areas and areas considered to cause an indirect impact to the significance of heritage assets through their setting. In locations with heritage assets that could be impacted by the Scheme through their settings, enhanced visual screening through vegetation (and distance offsets) are proposed. Landscape mitigation to mitigate potential adverse effects upon heritage assets will include planting of shelter belts and scattered trees, planting of new hedgerows, and existing hedgerow reinforcement. The Customer Substation and BESS have been located to the south of Bartholomew's Hill Plantation to reduce impact on heritage assets to the north of the Site (particularly Castle Acre Castle and Castle Acre Priory). Further, Removal of Field 35 from any built development and setting back of solar arrays from northern half of Field 33. Such removal is designed to mitigate potential setting impacts upon heritage assets to the north, particularly Castle Acre Castle and Priory The Applicant will look for opportunities to better reveal or enhance the significance of the heritage assets affected.	No monitoring required.

Operational phase impacts upon buried archaeological assets.	Where preservation in situ has been identified as embedded mitigation for buried archaeological remains during the construction phase, this will be maintained into the operational phase. It is not envisaged that any ground disturbance or additional pilling is required beyond that experienced during the construction phase. If ground disturbance is required beyond that caused during the construction phase than an appropriate archaeological mitigation strategy will be identified and agreed with the archaeological advisor(s) to the LPA(s) in advance of any required works (i.e. a written scheme of investigation (WSI)). PV panel replacement will involve replacement using the same mounting structures where practicable, and vehicles will use Access Tracks installed during the construction phase. If required, archaeological works will be undertaken by suitably qualified and experienced professional archaeological specialists. All archaeological works will be undertaken in line with national guidance (i.e. Historic England and CIfA guidance). If required, works will be monitored by an Archaeological Clerk of Works and/or the Archaeological Advisors to the LPAs will monitor the completion of works in accordance with an appropriate WSI.	No monitoring required.

3.5 Transport and Access

Table 3-4 Transport and Access

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Vehicle movements during the operational phase	Providing suitable points of access for operational phase vehicles with turning areas. The planting of landscaping and screening to conceal reflections from the PV panels as far as practicable, which could affect drivers on the local highway network. Implementation of measures from the **outline Construction Transport Management Plan (oCTMP) [APP/7.7]** (where appropriate) during the programme of replacement for the PV panels, Transformers and BESS.	The overall responsibility will be with the Scheme operator. Specific responsibilities will be confirmed in the detailed OEMP.
Management of permissive paths.	The permissive paths will be managed through: The provision of new non-vehicular permissive paths. These routes will provide pedestrians improved accessibility to the countryside and improved connectivity to the wider PRoW network. These permissive paths are to remain open up to 364 days per year throughout the proposed 60-year operational lifetime of the Scheme. These permissive paths will provide a beneficial impact on PRoW use for local users and visitors through mitigating adverse impacts on other PRoWs and providing alternative access routes to the use of the local highway network. These measures, when implemented, will enhance connectivity in the local area; and	The overall responsibility will be with the Scheme operator. Specific responsibilities will be confirmed in the detailed OEMP.

	• The **outline Public Right of Way and Permissive Path Management Plan (oPRoWPPMP) [APP/7.12]** will also apply to the operational phase.	

3.6 Noise and Vibration

Table 3-5 Noise and Vibration

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Impact of noise and vibration associated with operational equipment on nearby sensitive receptors.	The specification of plant machinery with low noise emission and properly attenuated supply and extract terminations will help to minimise noise emissions during the operational phase. The use of enclosures, local screening, mufflers, and silencers will also be used as appropriate. Plant within the Customer Substation and BESS will be designed to have minimal tonal, impulsive or intermittent features, as required. Selection of the final mechanical and electrical plant would be made on the basis of different considerations including noise. The detailed design of the Scheme, including final plant locations and selections, will be secured through a requirement of the DCO. This would require total rated noise levels L_{Ar}, including the applicable character correction, not to exceed an operational noise limit of 35dB L_{Ar} at residential receptors. Noise levels on PRoW will also be controlled not to exceed a noise level of 55dB L_{Aeq}. All Conversion Units within 500m of Keepers Cottage will be limited to noise emission levels of 83dB L_{WA} (Sound Power Level) by using a quieter Conversion Unit model within this area or attenuate the Conversion Units within 500m by 8dB from the currently assumed level of 91dB L_{WA}, via means of screening/barrier, enclosure, or appropriate plant silencer kit, to achieve the above criterion at Keepers Cottage.	Site staff will carry out regular monitoring and maintenance of equipment. This will include identifying any changes in sound pitches or volume early and carrying out the relevant maintenance. This ensures that plant noise at sensitive receptors throughout the operational lifetime of the Scheme is not materially worse than the levels presented in the ES. The results of such monitoring will be submitted to the relevant planning authority for review. Where this review indicates plant noise levels generated by the Scheme have materially increased, the undertaker and relevant planning authority will liaise in respect of any further maintenance or mitigation required to reduce levels at

	Where practicable, the Scheme layout has been developed to minimise noise and vibration effects at sensitive receptor locations. The final design of the Scheme would be developed to generally maximise the distance between the proposed noise-generating equipment and noise-sensitive residential receptors wherever reasonably practicable. Placement of the Customer Substation and BESS (Field 27 & 24) has been selected to maximise separation distances to residential receptors as far as reasonably possible. Noise source data for plant in **ES Chapter 10: Noise and Vibration [APP/6.2]** has been selected based on experience of previous solar farms. There is a requirement for flexibility in design so noise source data may not be representative of plant in the final design. Although there can be variations in noise emissions, noise emitting plant will be selected with consideration of noise emissions where practicable. In addition, the following measures will apply: • Noise emissions are one of the criteria evaluated when procuring appropriate equipment for use on the Site • An acoustic barrier of 3.5m height is proposed along the western boundaries of Field 27 and partially along the western side of Field 24, between the BESS and the PRoW. This has been embedded within the design of the Scheme to attenuate noise and to reduce visual impacts • Minimum separation distance of 15m between Conversion Units in the Solar PV Site to the PRoW have been incorporated • Minimum separation distance of 250m for Conversion Units in the Solar PV Site to residential receptors have been incorporated, except where explicitly stated	receptors back to those presented in the ES. The complaints procedure will be managed in consultation with Breckland Council which will be reviewed annually. Further details are to be confirmed in the detailed OEMP.

	• Where required, manufacturer-supplied noise mitigation will be installed; and • Where required, noise generating equipment will be enclosed/containerised. Although the indicative Scheme layout and plant selection has been optimised to minimise noise levels at sensitive receptors, there is a requirement to retain some flexibility with respect to the final specifications of the operating plant. Consequently, the Applicant commits that noise at sensitive receptors will be no higher than the levels presented in **ES Chapter 10: Noise and Vibration [APP/6.2]** and these levels will be set out in the detailed OEMP.	

3.7 Soil and Agriculture

Table 3-6 Soils and Agriculture

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Potential for surface soil compaction and disturbance in some areas due to maintenance work. For example, grassed access alleys traversed by light vehicles for Site maintenance could cause surface compaction in damp or wet soil conditions.	A Soil Management Plan (SMP) will detail how the risk of causing surface compaction can be minimised and how to remove compaction if it has occurred. Examples include specification of vehicles used for any trafficking off Access Tracks, minimising travel over the land in vehicles when ground conditions are wet placement and movement of any livestock troughs and site inspection by a suitably experienced soil scientist to monitor for the emergence of any soil compaction issues. The SMP will be prepared in accordance with the **outline Soil Management Plan (oSMP) [APP/7.13]** as secured via a requirement in the DCO. Maintenance work on Solar PV Arrays and equipment in relation to soil and land disturbance will be carried out in accordance with the SMP. Vegetation would be managed with machinery. There may be the opportunity for land beneath the PV panels to be grazed by sheep although the ES assumes that all grassland will be managed by machinery as a default position.	Soil assessments and monitoring will be undertaken as detailed in the SMP.
The discovery of ground contamination	A watching brief shall be maintained throughout the construction phase to monitor for any unexpected contamination. A Discovery Strategy is to be employed where	Watching brief to be maintained.

	contamination is discovered, the details of which will be confirmed in the detailed OEMP.	

3.8 Water Resources

Table 3-7 Water Resources

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
The following impacts may occur without adequate mitigation: • Impacts on water quality in waterbodies that may receive surface water runoff or be at risk of chemical spillages from supporting infrastructure for the Scheme (e.g., substations, battery stores, solar stations, local site offices and car parking etc.) and maintenance activities. • Potential for reduced chemical loading of watercourses associated with cessation of nitrate, pesticide, herbicide and insecticide applications on arable fields, or reduction in fine sediment/soil erosion, which would be beneficial. • Impacts on flood risk from increased runoff from new impervious areas across the Site.	Mitigation that has been embedded into the Scheme by design includes: **Flood Risk and Resilience** • Critical electrical infrastructure, including the Customer Substation, 33kV Sub-distribution Switch Rooms and Conversion Units are sequentially located to areas with a 'Low' probability of fluvial flooding (less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)), where practicable, based on site-specific flood modelling and topographic data • Smaller fixed infrastructure such as Conversion Units are required to be positioned at specific operational locations within the Solar PV Site and therefore offer limited flexibility in siting. These components are typically located outside the 1 in 100 plus climate change extent (1% annual exceedance probability (AEP) +CC), but where they fall within areas of modelled pluvial risk, they will be protected through localised flood resilience measures; and • Less-flood sensitive infrastructure forming the wider Scheme (PV panels and Cabling) have been sequentially located outside the 1 in 100 plus climate change annual probability extent (1% +CC) or where this is not	Regular recording of compliance in a logbook. The detailed OEMP will detail the frequency. A Surface Water Drainage Strategy (which will form part of a detailed CEMP(s)) will include details of pre-construction, construction, and post-construction water quality monitoring.

	practicable restricted to areas which experience less than 1m depth of flooding during the same event. The following built aspects will be served by a SuDS network designed to the 1% AEP event plus 40% climate change allowance: • Work No. 2: BESS; and • Work No. 3: Customer Substation. Access tracks will be served by trackside drainage ditches and will include check dams at regular intervals, as stipulated in the SuDS Manual, to prevent the rapid transfer of water downslope. The Scheme will have dedicated contaminated water tanks with automated penstocks to prevent fire suppressant reaching the infiltration components of the SuDS network, in the rare event of a fire within the BESS and Customer Substation. Any potentially contaminated water will be tankered offsite to a licenced treatment facility. Drainage system outfalls, such as installing 'sentinel' monitoring systems, will be installed to quickly identify if pollutants are found to be entering the drainage system and enable remedial action. The containment area will be fully cleaned prior to any shut-off valves being re-opened. Hazardous or polluting substances must be stored, handled and disposed of in accordance with applicable regulations, and any plant or equipment containing these should be suitably engineered to avoid loss of these substances to ground. **Solar PV Arrays**	

	Flexibility for Single Axis Trackers or Fixed South Facing PV Arrays has been built into the design with foundations likely to be metal frames driven into the ground. These will either be piles rammed directly into the ground or rammed into a pre-drilled hole, or a pillar attaching to a steel ground screw depending on ground conditions. For both Fixed South Facing PV Arrays and Single Axis Trackers, all sensitive and electrical equipment mounted on the PV panels will be elevated by the supporting legs or frame so that it is no less than 0.4m above the surrounding peak pluvial flood level, in accordance with the site-specific hydraulic modelling and flood resilience principles. **Drainage and Surface Water Management** 10m buffers from infrastructure will be established around watercourses. This is an improvement over the baseline scenario, where arable farming typically involves ploughing closer to ditches than the proposed separations, resulting in better drainage outcomes • Where practicable, runoff from equipment and access tracks will be directed to permeable SuDS features such as gravel-filled trenches or French drains, or similar passive drainage features appropriate to local conditions While works would ordinarily require Flood Risk Activity Permits from the Environment Agency and Land Drainage Consents from the Lead Local Flood Authority, it is intended that these requirements be disapplied through the Development Consent Order • Access to the Scheme during construction, operational, and decommissioning phases will be taken from new permeable or existing Access Tracks accessed from the local highway network. This limits the potential for	

	increased surface water runoff rates and sedimentation effects during construction / decommissioning Where practicable, existing Access Tracks would be retained to limit the requirement to develop new access which can disturb soils and lead to compaction. Where new Access Tracks are required, they would be designed to avoid crossing drainage ditches, where practicable. Appropriate soil handling and storage protocols are set out in the **oSMP [APP/7.13]**. **ES Appendix 12.2: Flood Risk Assessment [APP/6.4]** commits the Scheme to having dedicated contaminated water tanks with automated penstocks to prevent fire suppressant reaching the infiltration components of the SuDS network, in the rare event of a fire within Work Nos.: 2 and 3. Penstocks should be tested on a regular basis. Should repairs be required then this should be undertaken promptly.	

3.9 Climate Change

Table 3-8 Climate Change

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Greenhouse gas emissions from the operational maintenance activities required during operation of Scheme Stronger winds, heatwaves, heavy precipitation and flood risk and increased risk of fires/wildfires.	Where applicable, the construction embedded mitigation measures as outlined in the **oCEMP [APP/7.6]** will be put in place during the operational phase to optimise efficiency and will be outlined in the detailed OEMP, to be prepared in accordance with this oOEMP. PV panels will be cleaned with deionised water and not chemical agents. The following measures will be outlined in this oOEMP, to be prepared in accordance with the below: • Critical infrastructure within the Scheme (the Conversion Units / 33kV Sub-distribution Switch Rooms, Customer Substation, and BESS) have been sequentially located where possible to an area with a “Low probability of flooding” and therefore in land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%) where practicable, based on site-specific flood modelling and topographic data. • Non-flood sensitive infrastructure forming the wider Scheme (Solar PV Arrays and Cabling) will be sequentially located outside the 1 in 100 plus climate change annual probability extent (1% +CC) or where this is not practicable restricted to areas which experience less than 1m depth of flooding during the same event.	The overall responsibility will be with the Scheme operator. Specific responsibilities will be confirmed in the detailed OEMP. Monitoring weather forecasts and the news for Environment Agency flood warnings, relevant weather warnings, and water levels of the local waterways Refer to the **oBSMP [APP/7.14]**.

	Flexibility for Single Axis Trackers or Fixed South Facing PV Arrays has been built into the design with foundations likely to be galvanised steel poles driven into the ground. For the purposes of assessment included in **ES Chapter 13: Climate Change [APP/6.2]**, Single Axis Trackers have been considered as a worst-case scenario due to their larger size, resulting in higher embodied carbon. For both Fixed South Facing PV Arrays and Single Axis Trackers, all sensitive and electrical equipment mounted on the PV panels will be elevated by the supporting legs or frame so that it is no less than 0.4m above the surrounding peak pluvial flood level, in accordance with the site-specific hydraulic modelling and flood resilience principles. Using equipment's cooling systems where necessary/adapting working practices and equipment used based on current weather conditions. Monitoring weather conditions to ensure Solar PV Arrays are not cleaned during periods of hot weather which could cause thermal shock. • Protecting workers and resources from extreme weather conditions through appropriate PPE and working practices as secured through the detailed OEMP. • Monitoring weather forecasts and the news for Environment Agency flood warnings, relevant weather warnings, and water levels of the local waterways. • Regular planned maintenance of the Scheme will be conducted to optimise efficiency of the Scheme infrastructure. • Increasing recyclability by segregating waste to be re-used and recycled where reasonably practicable.	

	• Off-site reuse, recycling and recovery of materials and waste where reuse on site is not practicable. • Operating 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. • Encouraging the use of lower carbon modes of transport by identifying and communicating local bus connections and pedestrian and cycle access routes to/from the Scheme to all staff. • Off-site prefabrication will be undertaken where practicable, including use of prefabricated elements. • Switching off vehicles and plant when not in use and ensuring vehicles conform to current UK emissions standards. • Using equipment's cooling systems where necessary, i.e. for the BESS and for the standalone conversion units, and adapting working practices and equipment used based on current weather conditions. • Protecting workers and resources from extreme weather conditions through appropriate PPE and working. • BESS to include Heating, Ventilation and Cooling (HVAC) systems which would be contained within the individual equipment containers as well as other measures outlined in the **oBSMP [APP/7.14]**. In terms of high precipitation and increase in storm intensity, **ES Chapter 12: Water Resources [APP/6.2]** describes water management measures to control surface water run-off and drain hardstanding and other structures.	

	• The Scheme will adhere to good practice and guidance. Gas-insulated switchgear equipment is now supplied to minimise leakages. Additionally, through regular checks of the equipment for gas leaks, it can be expected that leaks to be de minimis.	

3.10 Socio-economics

Table 3-9 Socio-economics

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Peak impacts on the socio-demographic and tourism environment	Peaks in operational phase activity are anticipated to take place in association with replacement of PV panels and BESS Units. In these instances, embedded mitigation and good practice measures set out for construction will be reintroduced and implemented for these periods of peak activity on the Scheme.	To be confirmed in the detailed OEMP.
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 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 during the operational phase are outlined in technical ES aspect chapters. New non-vehicular permissive paths will be installed, which would be open up to 364 days per year throughout the proposed 60-year operational lifetime of the Scheme. Approximately 3.5km in total on Site, which would link to the existing PRoW network the wider area to provide recreational benefits. Recreational enhancements such as interpretation boards and the potential for new publicly accessible amenity space within the north-western part of the Order limits, that is connected to the existing PRoW network.	To be confirmed in the detailed OEMP.

	Internal access routes will be provided within the Site to minimise vehicles needing to use the Local Road Network (LRN) where possible. The details of this will be secured through the detailed design of the Scheme. The Applicant will embed initiatives to sustain long-term skills development and community benefits. This will include offering site tours for schools and colleges, delivering educational outreach on solar energy, and supporting summer internship and research programmes. The Applicant will also explore sponsoring local students and running green energy awareness campaigns to raise understanding of the sector. These measures will be coordinated with Breckland Council and other local partners, and set out in the **outline Employment, Skills and Supply Chain Strategy (oESSCS) [APP/7.15]**. The potential to locate temporary workers, during periods of scheduled replacement activities, in either private rental accommodation or in temporary serviced accommodation to moderate the level of demand for temporary accommodation will be considered to mitigate impacts on accommodation demand for both residents, and visitors and tourists. Measures to mitigate the effects of landscape and visual amenity impacts from operation are outlined in **Table 1**. Measures to mitigate the effects of operational traffic are outlined in **Table 4**.	
Visual impact on tourism and recreation facilities	The embedded visual mitigation includes designing the preliminary layout of the Site to provide suitable buffers from roads, PRoW, and neighbouring tourism destinations. These buffers, along with minimal on-site activity during general operation, help to mitigate impacts on the durability of tourism	Specific measures will be confirmed in the detailed LEMP.

	receptors during its operational lifetime. Furthermore, proposed landscaping planting is likely to mature over the lifetime of the Scheme, which will mitigate effects of the Scheme on the surrounding landscape and amenity for residents and tourists. Measures to mitigate visual impacts are set out in the **oLEMP [APP/7.11]**. These mitigation measures, such as noise attenuation, glint and glare mitigation, and additional landscape screening to residential and other sensitive receptors will help to reduce overall impacts on tourism and recreational receptors such as tourist attractions and recreational routes in the proximity of the Scheme. General operational and maintenance traffic will be directed to using access and travel routes most appropriate for the vehicle type required.	
Disruption to users of PRoW during operation Disruption to users of PRoW during peak operational and maintenance periods	The routing of PRoW is retained by the Scheme design to ensure the use and connectivity of PRoW is maintained throughout the operational lifetime of the Scheme. Any diversions to PRoW and other recreational routes, if required during infrastructure replacement activities events, will be temporary with original routing restored as soon as practicable, appropriately signed, and the duration and length of diversions will be optimised to minimise impacts on accessibility and use. An **oPRoWPPMP [APP/7.12]** outlines these measures. Other potential mitigation measures may include the reintroduction of traffic management including banksmen at sensitive points on the highway network or at PRoW and recreational route crossing points. These will help to reduce peak effects on recreational receptors sensitive to traffic	To be confirmed in the detailed PRoWPPMP.

	movements and mitigate against likely significant effects to long-distance recreational routes.	
Landowner Income	The Scheme allows for continued income for eligible landowners by way of ground rent in place of the loss of income from agricultural use of the Solar PV Site.	No monitoring required

3.11 Human Health

Table 3-10 Human health

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Disruption to the local community	A Community Liaison Manager will be appointed as a temporary facilitator of communications between communities and the Scheme's operators during the peak replacement scenario. During long-term general operational activities, a full-time equivalent position of the Scheme's operational team should also be in a dedicated 'community contact' position whereby they are responsible for monitoring community interaction to ensure community concerns are heard, responded to and suitably addressed throughout the duration of the Scheme's operational phase. Details of the Community Liaison Manager within the operational team should be made available to members of the public through elected representatives or online, and kept up-to-date at all times. This will therefore reduce the likely significance of effect on human health in the communities most affected by the Scheme. The Scheme will include enhancements to existing PRoWs and provide new non-vehicular permissive paths.	To be confirmed in the detailed OEMP.

3.12 Other Environmental Matters (OEM)

Table 3-11 Other Environmental Matters (OEM)

Air Quality		
Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
BESS fire emissions.	Measures included in the **oBSMP [APP/7.14]**: • Notification of potentially affected residents including advice on the health effects of smoke and ways to reduce exposure (e.g. close windows and stay indoors) • Notification of potentially affected members of the public to move to a cleaner air location • Cancellation of outdoor events and potentially moving affected residents to a cleaner air location; and • Should there be a BESS fire in close proximity to the road, the site operator to determine wind direction and seek to close the road if deemed necessary.	To be confirmed in the detailed BSMP.
Back-up generator emissions.	Ensure the back-up generators adhere to Stage V emissions standards and seek alternatives where practicable, such as batteries or alternative fuel; and Should a diesel generator be used at the 33kV Sub-distribution Switch Rooms, ensure appropriate buffer distances are applied as practicable and that testing is kept to a minimum.	The overall responsibility will be with the Scheme operator.

Vehicle emissions from the operational maintenance activities required during operation of Scheme	Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. In addition, plant and vehicles will conform to relevant applicable standards for the vehicle type as follows: • Euro 4 (Oxides of Nitrogen (NOx)) for petrol cars, vans and minibuses • Euro 6 (NOx and PM) for diesel cars, vans and minibuses; and • Euro VI (NOx and PM) for lorries, buses, coaches and Heavy Goods Vehicles (excluding specialist abnormal indivisible loads).	The overall responsibility will be with the Scheme operator. Specific responsibilities will be confirmed in the detailed OEMP.
Fugitive dust emissions during replacement activities.	Good practice measures set out for construction will be reintroduced and implemented for replacement activities, as appropriate. Appropriate mitigation and control measures will be included in the detailed OEMP, which would include: **Communications** • Develop and implement a Stakeholder Communications Plan that includes community engagement before work commences on-site • Display the name and contact details of person(s) accountable for air quality and dust issues on the Site. This may be the Environmental Manager; and • Display the contractor's head or regional office contact information. **Dust Management**	The overall responsibility will be with the Scheme operator. Specific responsibilities will be confirmed in the detailed OEMP. The following monitoring will be undertaken: • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authorities when asked. This should include regular dust soiling checks of

	• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the relevant local authorities. **Site Management** • 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 • Make the complaints log available to the local authority when asked • Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook. • Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, 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. **Preparing and maintaining the site** • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Avoid site runoff of water or mud **Operating vehicle/machinery and sustainable travel** • Ensure all off-road vehicles comply with the requirements of the Non-Road Mobile Machinery (NRMM) standards,	surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authorities when asked • 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; and • Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the local authority. Where practicable, commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

	where applicable. Use stage 4 NRMM as a minimum and stage 5 where practicable • Ensure all vehicles/machinery are switched off when stationary/not in use • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable • 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 authorities, where appropriate) • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing); and • Signs to direct construction vehicles associated with the Scheme will be installed along the construction traffic route. **Operations** • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where practicable and appropriate • Use enclosed chutes and conveyors and covered skips	• Any unforeseen issues that arise in relation to vehicle movements will be logged by the Site Manager. If necessary, the issues will be discussed with the local highway authority so that they can be resolved as appropriate.

	• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and • 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** • No bonfires or burning of waste materials. **Trackout** • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site • Avoid dry sweeping of large areas. In dry conditions, areas near to the Site access will be sprayed with water supplied to prevent the spread of dust • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable • Record all inspections of haul routes and any subsequent action in a site logbook • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned	

	• Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). A wheel washing facility will be provided at each access. This will be located at the egress point of each access road • A visual inspection of vehicles will be undertaken before they depart the Site, to ensure that they are not carrying any residual debris onto the highway • If required, a road sweeper will be provided for the area surrounding access to alleviate any residual debris generated during the construction phase, as required; and • 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.	
Glint and Glare		
Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Glint and Glare effects	The following embedded mitigation measures have been incorporated into the Scheme design: • The Scheme design has incorporated setbacks from dwelling receptors where practicable; and • Advanced Planting as shown in **oLEMP Appendix 3: Advanced Planting Plan [APP/7.11]** and hoarding/mesh fencing where required.	Specific measures will be confirmed in the detailed LEMP. In accordance with paragraph 2.17.4, and within the first year of operation, a glint and glare complaints procedure will be established in consultation with Breckland Council.

	Additionally, 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.	
Aviation		
Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Birdstrike hazard to aircraft operating at RAF Marham	None of the ecological and biodiversity enhancements, nor flood risk management features, are anticipated to increase numbers of large and/or flocking bird species, such as ducks, geese and corvids, which are potentially hazardous to air traffic. However, consultation will be held with the MoD during the operational phase regarding birdstrike hazard to ensure that the Scheme does not increase the risk of impact.	The Scheme operator will consult with the MoD during the operational phase regarding birdstrike hazard.
Waste		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Impacts of waste to the surrounding environment. Potential to impact on sensitive receptors (humans, wildlife, and controlled waters) if not stored and managed appropriately.	The Scheme will prioritise waste prevention, followed by allowing for reuse, recycling, and recovery of equipment when it comes to replacement as part of the with landfill disposal as the last resort, in line with the waste hierarchy. A Waste Management Strategy will be developed as part of the detailed OEMP to ensure operational waste is managed suitably, and that waste arisings are sent for handling at	Specific measures will be confirmed in the detailed OEMP.

Impacts on waste recycling and handling facility capacity.	facilities within the waste local authorities that have capacity to do so without adversely impacting upon their capacity to handle waste arisings for all other waste streams in the authority area. The Duty of Care to ensure waste is described and classified falls with the Contractor. As such, all waste will be appropriately classified in accordance with the Environment Agency WM3 Technical Guidance (**Ref.8**), or any other technical assessment or guidance applicable at the time that achieves the same standard, before a suitable route for recovery or disposal can be identified. Materials requiring removal from the Order limits during operation 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 All waste management will comply with the Waste Electrical and Electronic Equipment (WEEE) regulations, and waste will be transported by licensed hauliers to authorised waste management sites with the necessary permits for the consigned wastes. The Scheme is expected to generate WEEE during the operational phase. This includes PV panels and smaller quantities from Ancillary Infrastructure. These items will be recovered and recycled by an authorised reprocessor in compliance with the WEEE Regulations 2013. To ensure this is done according to “Best Available Treatment Recovery and Recycling Techniques”, a list of up-to-date authorised reprocessors should be established prior to the operational phase of the Scheme and kept up-to-date throughout the	

	operational phase. This will be secured through measures set out within the detailed OEMP. Batteries will be separated from WEEE streams so they can be recovered, recycled, or disposed of in accordance with the Waste Batteries and Accumulators Regulations 2009. This is most likely to be undertaken by the battery manufacturer or supplier. This requirement will be secured ahead of the Scheme's operational phase, based on the detail provided in the detailed OEMP to ensure it is undertaken as legally required throughout the operational lifetime of the Scheme. Materials requiring removal from the Order limits during operation 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. Infrastructure such as PV panels and BESS Units that need to be replaced during the operational phase, will be removed and recycled as far as practical and in accordance with legislation and guidance applicable at the time, or if more suitable at the time, sold for refurbishment and reuse. **BESS Management** End-of life or damaged BESS units are to be electrically disconnected from the system when identified as requiring replacement. A specific risk assessment will be conducted prior to the removal of the damaged or defective units to ensure the safety of employees and contractors. Damaged or defective units will be inspected and placed in an approved protective container prior to being transported from Site, to ensure	

	against any risk of contaminants entering ground or surface water. End-of life batteries awaiting regular replacement will be stored in-situ, which provides contamination bunding and surface-water runoff protections associated with the BESS enclosure. Batteries that are removed from the BESS will be, where practicable, returned to the battery manufacturer for repair/ refurbishment. End-of-life BESS infrastructure is controlled under The Waste Batteries and Accumulators Regulations 2009. These Regulations require battery producers to receive, sort, and suitably handle batteries and deliver to an approved battery treatment operator for treatment and recycling. All end-of-life battery management activities will be undertaken in compliance with these Regulations or any other applicable at the time.	
Telecommunications, Television Receptors and Utilities		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Utilities, Telecommunications and Television Receptors	During the operational phase, there will be safe working beneath any overhead lines in line with National Grid's technical guidance note 287 **(Ref. 3)**, including, for example, ensuring adequate clearances are in place when plant and equipment are being moved beneath overhead lines, and limiting any planting beneath overhead lines to low growing species.	No monitoring required.

	Measures in relation to safe working near buried utilities, particularly gas pipelines, will be in place at all phases of the Scheme. For example, safety measures set out in National Grid and Northern Gas Networks guidance documents for third parties working in the vicinity of high pressure gas pipelines and associated installations **(Ref. 5; Ref. 6)**.	
Electromagnetic Fields		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Potential for risks to human health associated with electromagnetic fields.	The following embedded mitigation measures have been incorporated into the Scheme's design: • The Scheme will be designed so that the maximum levels of electromagnetic radiation received at existing residential properties, places of work, and PRoWs, from the 400kV cables during operation will be below ICNIRP reference levels **(Ref. 4)** • Electrical fields from the underground power cables will be shielded by the surrounding jacket and the conducting soil; and • All proposed cables and associated electrical infrastructure will be 'UKCA' and/or 'CE' marked. The Applicant will make available to the public clear information on electromagnetic field (EMF) levels and compliance through the community contact.	The Environmental Manager will regularly record compliance in a logbook. The detailed OEMP will detail the frequency. Where requested via the community contact, the Applicant will keep the public informed on EMF levels and compliance.

4 Mitigation and Monitoring – National Grid Substation and Grid Connection Infrastructure

4.1 Purpose

4.1.1 This Section of the oOEMP sets out the mitigation and management measures to be included as a minimum in the detailed OEMP, pertaining to the National Grid Substation and Grid Connection Infrastructure only. It also identifies where monitoring is proposed to assess the effectiveness of the mitigation measures. These components of the Scheme will be operated by National Grid Electricity Transmission plc (NGET).

4.2 Landscape and Visual

Table 4-1 Landscape and Visual

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Loss of existing landscape features (e.g., vegetation). Visibility of operational activities.	The **oLEMP [APP/7.11]** sets out the measures proposed to mitigate the potential impacts and effects on landscape (and biodiversity) features, and to enhance the landscape and biodiversity value of the National Grid Substation and Grid Connection Infrastructure areas. A detailed LEMP will be prepared in accordance with the principles of the **oLEMP [APP/7.11]** and will be submitted to and approved by the relevant planning authority or authorities. This will include measures to ensure landscape mitigation and enhancements are established and maintained into and throughout the operational phase. **General Offsets/Buffers** Buffers outlined in **ES Chapter 5: The Scheme [APP/6.1]** and secured through the **Design Principles, Parameters and Commitments [APP/5.8]**, have been embedded into the design of the National Grid Substation and Grid Connection Infrastructure to protect the landscape fabric of the Site. As well as standard offsets/buffers identified that have been applied, the Embedded Operation Phase Mitigation section of **ES Chapter 6: Landscape and Visual [APP/6.2]** identifies offset and buffering and setting backs of the Scheme to reduce Landscape and Visual Impacts.	Specific measures will be confirmed in the detailed LEMP.

	Landscape Design Parameters Key design landscape and visual embedded mitigation measures are set out in Section 7 of **ES Chapter 6: Landscape and Visual [APP/6.2]**. Lighting • Security lighting within the National Grid Substation would use motion detection sensors for operational and security purposes; and • Good practice measures would be employed to minimise light spill. The lighting design will seek to limit any impacts on sensitive receptors through directional cowls. Proposed Planting Proposed planting approach is detailed within the **oLEMP [APP/7.11]**, illustrated within its appendices: • Green Infrastructure Plan • Vegetation Removal Plan; and • Advanced Planting Plan. The following approach has been taken to the planting strategy, as detailed in the **oLEMP [APP/7.11]**: • Retention of the majority of existing landscape features within and around the boundaries of the Site, namely mature hedgerows and tree cover which contribute to the landscape character of the local context. These landscape features serve to restrict, filter and enclose visibility within the Site and study area south of Bartholomew's Hills Plantation. There is some loss of vegetation proposed as	

	part of the Scheme to allow for the Grid Connection Infrastructure. • Offset and buffering of the Scheme with new, woodland, hedgerow and tree planting to mitigate potential views from the nearby PRoW, roads and residential dwellings both within and in close proximity to the Site. • In addition to the establishment of new hedgerow and hedgerow trees, the embedded mitigation also includes the retention, gapping up and enhancement of existing hedgerow within the Site. New planting species would be native, locally prevalent and also include a mixture of deciduous and evergreen species to provide year-round screening. The long-term management and maintenance of existing and new vegetation is an embedded mitigation measure which ensures vegetation would be actively managed in the long term, as secured and detailed within the **oLEMP [APP/7.11]**. The prescribed maintenance height of hedgerow at 3m is an embedded mitigation measure which aims to screen views towards taller elements of the National Grid Substation and Grid Connection Infrastructure from nearby PRoW. The active management and maintenance of trees and woodland within the Site, both newly planted and existing, aims to ensure they not only survive but reach maturity and establishment in the medium to long term durations. • Setting back the Scheme from key landscape features within and adjacent to the Site, such as trees, hedgerow and woodland. The minimum offsets/buffers from existing landscape features are outlined fully in **ES Chapter 5: The Scheme [APP/6.1]**. The Scheme would be offset from existing PRoW by a minimum of 15m, to respect the amenity and experience for PRoW users along existing	

	routes and allow for the sowing of extensive areas of new grassland along the margins of the Scheme. **Arboricultural Protection** The Scheme has been designed, as far as practicable, to avoid and reduce impacts and effects on Arboriculture by embedding mitigation measures into the design process. Particular protection measures include: • Design work has been undertaken in order to retain, avoid and fully protect identified veteran trees to provide sufficient space to allow for open cut trenching around veteran tree buffer zones ensuring impacts to veteran trees are avoided – secured in the **Works Plan [APP/2.3]**.	

4.3 Ecology and Biodiversity

Table 4-2 Ecology and Biodiversity

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Impacts on biodiversity features during the operation of the Scheme	**Habitats** During the operational phase, habitat management and maintenance works will be timed, where appropriate, to avoid ecologically sensitive periods, for example hedgerow maintenance will avoid nesting bird season. Details of this are prescribed within the **oLEMP [APP/7.11]**. **Bats** Motion sensing security lighting will be provided within National Grid Substation, to be used only for maintenance and security purposes. A sensitive lighting strategy (set out within the detailed OEMP) as part of the detailed OEMP will specify how this artificial lighting will be installed and used, which will serve to mitigate adverse impacts on ecological receptors which are adversely impacted by lighting, such as bats. **Badger** Should new badger setts be excavated in areas where they come into conflict with ongoing management activities, then these setts would likely be excluded under a mitigation licence from Natural England. The mitigation licence would secure any compensation measures (such as the creation of artificial setts) required, the exclusion of the setts, and would	Specific measures will be confirmed in the detailed LEMP.

	ensure any impacts to setts are compliant with current legislation.	

4.4 Cultural Heritage and Archaeology

Table 4-3 Cultural Heritage and Archaeology

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Operational phase impacts upon Heritage / Archaeology assets	Mitigation that has been embedded into the Scheme by design includes the avoidance of archaeologically sensitive areas and areas considered to cause an indirect impact to the significance of heritage assets through their setting. In locations with heritage assets that could be impacted by the Scheme through their settings, enhanced visual screening through vegetation (and distance offsets are proposed. Landscape mitigation to mitigate potential adverse effects upon heritage assets will include planting of shelter belts and scattered trees, planting of new hedgerows, and existing hedgerow reinforcement. The National Grid Substation has been located to the south of Bartholomew's Hill Plantation to reduce impact on heritage assets to the north of the Site (particularly Castle Acre Castle and Castle Acre Priory). Such removal is designed to mitigate potential setting impacts upon heritage assets to the north, particularly Castle Acre Castle and Priory.	No monitoring required.
Operational phase impacts upon buried archaeological assets.	Where preservation in situ has been identified as embedded mitigation for buried archaeological remains during the construction phase, this will be maintained during the operational phase. It is not envisaged that any ground disturbance or additional piling is required beyond that experienced during the	No monitoring required.

	construction phase. If ground disturbance is required beyond that caused during the construction phase than an appropriate archaeological mitigation strategy will be identified and agreed with the archaeological advisor(s) to the LPA(s) in advance of any required works (i.e. a written scheme of investigation (WSI)). If required, archaeological works will be undertaken by suitably qualified and experienced professional archaeological specialists. All archaeological works will be undertaken in line with national guidance (i.e. Historic England and CIfA guidance). If required, works will be monitored by the Archaeological Clerk of Works and/or the Archaeological Advisors to the LPAs will monitor the completion of works in accordance with an appropriate WSI.	

4.5 Transport and Access

Table 4-4 Transport and Access

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Vehicle movements during the operational phase	Providing suitable points of access for operational phase vehicles with turning areas. Implementation of measures from the **oOTMP [APP/7.9]** (where appropriate) during the programme of replacement for the Transformers.	The overall responsibility will be with NGET. Specific responsibilities will be confirmed in the detailed OEMP.

4.6 Noise and Vibration

Table 4-5 Noise and Vibration

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Impact of noise and vibration associated with operational equipment on nearby sensitive receptors.	The specification of plant machinery with low noise emission and properly attenuated supply and extract terminations will help to minimise noise emissions during the operational phase. The use of enclosures, local screening, mufflers, and silencers will also be used as appropriate. Plant within the National Grid Substation will be designed to have minimal tonal, impulsive or intermittent features, as required. Selection of the final mechanical and electrical plant would be made on the basis of different considerations including noise. The detailed design of the Scheme, including final plant locations and selections, will be secured through a requirement of the DCO. This would require total rated noise levels L_{Ar}, including the applicable character correction, not to exceed an operational noise limit of 35dB L_{Ar} at residential receptors. Noise levels on PRoW will also be controlled not to exceed a noise level of 55dB L_{Aeq}. The total combined Sound Power Level from noise sources within the National Grid Substation compound will not exceed 89dB L_{WA} at any time. Where practicable, the Scheme layout has been developed to minimise noise and vibration effects at sensitive receptor locations. The final design of the Scheme would be developed to generally maximise the distance between the proposed noise-generating equipment and noise-sensitive residential receptors wherever reasonably practicable.	Site staff will carry out regular monitoring and maintenance of equipment. This will include identifying any changes in sound pitches or volume early and carrying out the relevant maintenance. This ensures that plant noise at sensitive receptors throughout the operational lifetime of the Scheme is not materially worse than the levels presented in the ES. The results of such monitoring will be submitted to the relevant planning authority for review. Where this review indicates plant noise levels generated by the Scheme have materially increased, the undertaker and relevant planning authority will liaise in respect of any further maintenance or mitigation required to reduce levels at

	Placement of National Grid Substation has been selected to maximise separation distances to residential receptors as far as reasonably possible. Noise source data for plant in **ES Chapter 10: Noise and Vibration [APP/6.2]** has been selected based on experience of similar developments. There is a requirement for flexibility in design so noise source data may not be representative of plant in the final design. Although there can be variations in noise emissions, noise emitting plant will be selected with consideration of noise emissions where practicable. In addition, the following measures will apply: • Noise emissions are one of the criteria evaluated when procuring appropriate equipment for use on the Site • An acoustic barrier of 3.5m height is proposed along the western boundaries of Field 27 and partially along the western side of Field 24, between the BESS compound and the PRoW, which will be incorporated within the design of the Scheme to attenuate noise and to reduce visual impacts, in part associated with the National Grid Substation. • Where required, manufacturer-supplied noise mitigation will be installed; and • Where required, noise generating equipment will be enclosed/containerised. Although the indicative Scheme layout and plant selection has been optimised to minimise noise levels at sensitive receptors, there is a requirement to retain some flexibility with respect to the final specifications of the operating plant. Consequently, the Applicant commits that noise at sensitive receptors will be no higher than the levels presented in **ES**	receptors back to those presented in the ES. The complaints procedure will also be managed in consultation with Breckland Council, and the process will be reviewed annually. Further details are to be confirmed in the detailed OEMP.

	Chapter 10: Noise and Vibration [APP/6.2] and these levels will be set out in the detailed OEMP.	

4.7 Soil and Agriculture

Table 4-6 Soils and Agriculture

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Potential for surface soil compaction and disturbance in some areas due to maintenance work. For example, grassed access alleys traversed by light vehicles for Site maintenance could cause surface compaction in damp or wet soil conditions.	A SMP will detail how the risk of causing surface compaction can be minimised and how to remove compaction if it has occurred. The SMP will be prepared in accordance with the **oSMP [APP/7.13]** submitted in support of this DCO Application. Vegetation would be managed with machinery.	Soil assessments and monitoring will be undertaken as detailed in the detailed SMP.
The discovery of ground contamination	A watching brief shall be maintained throughout the construction phase to monitor for any unexpected contamination. A Discovery Strategy is to be employed where contamination is discovered, the details of which will be confirmed in the detailed OEMP.	Watching brief to be maintained.

4.8 Water Resources

Table 4-7 Water Resources

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
The following impacts may occur without adequate mitigation: • Impacts on water quality in waterbodies that may receive surface water runoff or be at risk of chemical spillages from supporting infrastructure for the Scheme (e.g., National Grid Substation) and maintenance activities. • Potential for reduced chemical loading of watercourses associated with cessation of nitrate, pesticide, herbicide and insecticide applications on arable fields, or reduction in fine sediment/soil erosion, which would be beneficial. • Impacts on flood risk from increased runoff from new impervious areas across the Site.	Mitigation that has been embedded into the Scheme by design includes: **Flood Risk and Resilience** The National Grid Substation is located to an area with a 'Low' probability of fluvial flooding (less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)), based on site-specific flood modelling and topographic data. The following built aspects will be served by a SuDS network designed to the 1% AEP event plus 40% climate change allowance: • Work No. 4: National Grid Substation. The Scheme will have dedicated contaminated water tanks with automated penstocks to prevent fire suppressant reaching the infiltration components of the SuDS network, in the rare event of a fire within the National Grid Substation. Drainage system outfalls, such as installing 'sentinel' monitoring systems, will be installed to quickly identify if pollutants are found to be entering the drainage system and enable remedial action. The containment area will be fully cleaned prior to any shut-off valves being re-opened. Hazardous or polluting substances must be stored, handled and disposed of in accordance with applicable regulations,	Regular recording of compliance in a logbook. The detailed OEMP will detail the frequency. A Surface Water Drainage Strategy (which will form part of a detailed CEMP) will include details of pre-construction, construction, and post-construction water quality monitoring.

	and any plant or equipment containing these should be suitably engineered to avoid loss of these substances to ground. **Drainage and Surface Water Management** 10m buffers from infrastructure will be established around watercourses. This is an improvement over the baseline scenario, where arable farming typically involves ploughing closer to ditches than the proposed separations, resulting in better drainage outcomes: • Where practicable, runoff will be directed to permeable SuDS features such as gravel-filled trenches or French drains, or similar passive drainage features appropriate to local conditions; and • Access to the Scheme during the operational phase will be taken from new permeable or existing farm tracks accessed from the local highway network. The Scheme is committed to having dedicated contaminated water tanks with automated penstocks to prevent fire suppressant reaching the infiltration components of the SuDS network, in the rare event of a fire within Work No. 4. Any captured suppressant will be tankered offsite to a licenced treatment facility. Penstocks should be tested on a regular basis. Should repairs be required then this should be undertaken promptly.	

Climate Change

Table 4-8 Climate Change

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Greenhouse gas emissions from the operational maintenance activities required during operation of Scheme Stronger winds, heatwaves, heavy precipitation and flood risk and increased risk of fires/wildfires.	Where applicable, the construction embedded mitigation measures as outlined in the **oCEMP [APP/7.6]** will be put in place during operational phase to optimise efficiency and will be outlined in the detailed OEMP, to be prepared in accordance with this oOEMP. The following measures will be outlined in the detailed OEMP, to be prepared in accordance with the below: • The National Grid Substation has been sequentially located where possible to an area with a “Low probability of flooding” and therefore in land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%), based on site-specific flood modelling and topographic data. • Using equipment’s cooling systems where necessary/adapting working practices and equipment used based on current weather conditions. • Protecting workers and resources from extreme weather conditions through appropriate PPE and working practices as secured through the detailed OEMP. • Monitoring weather forecasts and the news for Environment Agency flood warnings, relevant weather warnings, and water levels of the local waterways.	The overall responsibility will be with NGET. Specific responsibilities will be confirmed in the detailed OEMP. Monitoring weather forecasts and the news for Environment Agency flood warnings, relevant weather warnings, and water levels of the local waterways

	• Regular planned maintenance of the Scheme will be conducted to optimise efficiency of the Scheme infrastructure. • Increasing recyclability by segregating waste to be re-used and recycled where reasonably practicable. • Off-site reuse, recycling and recovery of materials and waste where reuse on site is not practicable. • Operating 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. • Encouraging the use of lower carbon modes of transport by identifying and communicating local bus connections and pedestrian and cycle access routes to/from the Scheme to all staff. • Off-site prefabrication will be undertaken where practicable, including use of prefabricated elements. • Switching off vehicles and plant when not in use and ensuring vehicles conform to current UK emissions standards; and • Using equipment's cooling systems where necessary, i.e. for the National Grid Substation, and adapting working practices and equipment used based on current weather conditions. In terms of high precipitation and increase in storm intensity, **ES Chapter 12: Water Resources [APP/6.2]** describes water management measures to control surface water run-off and drain hardstanding and other structures. • The Scheme will adhere to good practice and guidance. Gas-insulated switchgear equipment is now supplied to	

	minimise leakages. Additionally, through regular checks of the equipment for gas leaks, it can be expected that leaks to be de minimis.	

4.9 Socio-Economics

Table 4-9 Socio-Economics

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Disruption to local residents, businesses and community facilities	Primary mitigation measures are embedded within the Scheme, as set out in the respective ES chapters, to reduce 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 during the operational phase are outlined in technical ES aspect chapters. Measures to mitigate the effects of landscape and visual amenity impacts from operation are outlined in **Table 4-1**. Measures to mitigate the effects of operational traffic are outlined in **Table 4-4**.	To be confirmed in the detailed OEMP.
Visual impact on tourism and recreation facilities	The embedded visual mitigation includes designing the preliminary layout of the Site to provide suitable buffers from roads, PRoW, and neighbouring tourism destinations. These buffers, along with minimal on-site activity during general operation, help to mitigate impacts on the durability of tourism receptors during the National Grid Substation's operational lifetime. Furthermore, proposed landscaping planting is likely to mature over the lifetime of the Scheme, which will mitigate effects of the Scheme on the surrounding landscape and amenity for residents and tourists. Measures to mitigate visual impacts are set out in the **oLEMP [APP/7.11]**. These mitigation measures, such as noise	Specific measures will be confirmed in the detailed LEMP**.**

	attenuation, glint and glare mitigation, and additional landscape screening to residential and other sensitive receptors will help to reduce overall impacts on tourism and recreational receptors such as tourist attractions and recreational routes in the proximity of the Scheme. General operational and maintenance traffic will be directed to using access and travel routes most appropriate for the vehicle type required.	

4.10 Human Health

Table 4-10 Human health

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
None explicitly relevant to the National Grid Substation or Grid Connection Infrastructure.		

4.11 Other Environmental Matters (OEM)

Table 4-11 Other Environmental Matters (OEM)

Air Quality		
Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Back-up generator emissions.	Ensure the back-up generators adhere to Stage V emissions standards and seek alternatives where practicable, such as batteries or alternative fuel.	The overall responsibility will be with NGET.
Vehicle emissions from the operational maintenance activities required during operation of Scheme	Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. All plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. In addition, plant and vehicles will conform to relevant applicable standards for the vehicle type as follows: • Euro 4 (Oxides of Nitrogen (NOx)) for petrol cars, vans and minibuses • Euro 6 (NOx and PM) for diesel cars, vans and minibuses; and • Euro VI (NOx and PM) for lorries, buses, coaches and Heavy Goods Vehicles (excluding specialist abnormal indivisible loads).	The overall responsibility will be with NGET. Specific responsibilities will be confirmed in the detailed OEMP.
Glint and Glare		

Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
None relevant to the National Grid Substation or Grid Connection Infrastructure.	N/A	N/A
Aviation		
Potential Impact	Mitigation/Enhancement Measure	Monitoring Requirements
Birdstrike hazard to aircraft operating at RAF Marham	None of the ecological and biodiversity enhancements, nor flood risk management features, are anticipated to increase numbers of large and/or flocking bird species, such as ducks, geese and corvids, which are potentially hazardous to air traffic. However, consultation will be held with the MoD during the operational phase regarding birdstrike hazard to ensure that the Scheme does not increase the risk of impact.	The Scheme operator will consult with the MoD during the operational phase regarding birdstrike hazard.
Waste		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Impacts of waste to the surrounding environment.	The Scheme will prioritise waste prevention, followed by allowing for reuse, recycling, and recovery of equipment	To be confirmed in the detailed OEMP.

Potential to impact on sensitive receptors (humans, wildlife, and controlled waters) if not stored and managed appropriately. Impacts on waste recycling and handling facility capacity.	when it comes to replacement as part of the with landfill disposal as the last resort, in line with the waste hierarchy. A Waste Management Strategy will be developed as part of the detailed OEMP to ensure operational waste is managed suitably, and that waste arisings are sent for handling at facilities within the waste local authorities that have capacity to do so without adversely impacting upon their capacity to handle waste arisings for all other waste streams in the authority area. The Duty of Care to ensure waste is described and classified falls with the Contractor. As such, all waste will be appropriately classified in accordance with the Environment Agency WM3 Technical Guidance (**Ref.8**), or any other technical assessment or guidance applicable at the time that achieves the same standard, before a suitable route for recovery or disposal can be identified. All waste management will comply with relevant regulations, and waste will be transported by licensed hauliers to authorised waste management sites with the necessary permits for the consigned wastes. Materials requiring removal from the Order limits during operation 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. Infrastructure such as Transformers that need to be replaced during the operational phase, will be removed and recycled as far as practical and in accordance with legislation and guidance applicable at the time, or if more suitable at the time, sold for refurbishment and reuse.	

Telecommunications, Television Receptors and Utilities		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Utilities, Telecommunications and Television Receptors	During the operational and maintenance phase, there will be safe working beneath any overhead lines in line with National Grid's technical guidance note 287 **(Ref. 3)**, including, for example, ensuring adequate clearances are in place when plant and equipment are being moved beneath overhead lines, and limiting any planting beneath overhead lines to low growing species. Measures in relation to safe working near buried utilities, particularly gas pipelines, will be in place at all phases of the Scheme. For example, safety measures set out in National Grid and Northern Gas Networks guidance documents for third parties working in the vicinity of high pressure gas pipelines and associated installations **(Ref. 5; Ref. 6)**.	No monitoring required.
Electromagnetic Fields		
Mitigation/Enhancement Measure	Monitoring Requirements	Monitoring Requirements
Potential for risks to human health associated with electromagnetic fields.	The following embedded mitigation measures have been incorporated into the Scheme design: • The Scheme will be designed so that the maximum levels of electromagnetic radiation received at existing residential properties, places of work, and PRoWs, from	The Environmental Manager will regularly record compliance in a logbook. The detailed OEMP will detail the frequency. Where requested via the community contact, the Applicant

	the 400kV cables during operation will be below ICNIRP reference levels **(Ref. 4)** • Electrical fields from the underground power cables will be shielded by the surrounding jacket and the conducting soil; and • All proposed cables and associated electrical infrastructure will be 'UKCA' and/or 'CE' marked. The Applicant will make available to the public clear information on electromagnetic field (EMF) levels and compliance through the Community Contact.	will keep the public informed on EMF levels and compliance.

5 Complementary Plans and Procedures

5.1.1 A suite of complementary environmental plans and procedures for the operational phase will be developed alongside the detailed OEMP have been included within this DCO Application and set out proposed mitigation for the operational phase, and further detailed plans will be prepared for further approval.

- **ES Appendix 12.2: Flood Risk Assessment [APP/6.4]**
- **ES Appendix 12.3: Water Framework Directive Assessment [APP/6.4]**
- **oOTMP [APP/7.9]**
- **oLEMP [APP/7.11]**
- **oPRoWPPMP [7.12]**
- **oSMP [7.13]**
- **oBSMP [7.14]**; and
- **oESSCS [7.15]**.

6 Implementation and Operation

6.1.1 The detailed OEMP will set out all roles, responsibilities and actions required in respect of implementation of the measures described in this oOEMP, including:

- An organogram showing team roles, names, and responsibilities
- Training requirements for relevant personnel on environmental topics
- Information via 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
- Measures to advise employees of changing circumstances
- Communication methods
- Document control
- Monitoring, inspections, and audits of site operations; and
- Environmental emergency procedures.

7 Monitoring and Reporting

7.1 Monitoring

7.1.1 Monitoring and reporting will be undertaken for the duration of the operational phase to demonstrate the effectiveness of the measures set out in the detailed OEMP and related operational controls and allow for corrective action to be taken where necessary.

7.1.2 As part of the monitoring process a designated Environmental Manager will observe site activities and report any deviations from the detailed OEMP in a logbook, along with the action taken and general conditions at the time. In addition, the Environmental Manager will conduct regular walkover surveys which will be documented and arrange regular formal inspections to ensure the requirements of the detailed OEMP are being met.

7.1.3 The Environmental Manager would also act as day-to-day contact with relevant local authorities and other regulatory agencies, such as the Environment Agency.

7.2 Records

7.2.1 The Environmental Manager will retain records of environmental monitoring and implementation of the detailed OEMP. This will allow provision of evidence that the detailed OEMP are being implemented effectively. These records will include:

- Results of routine site inspections by Environmental Manager/Project Manager
- Environmental surveys and investigations
- Environmental Action Schedule
- Environmental equipment test records
- Licences and approvals; and
- Corrective actions taken in response to incidents, breaches of the approved detailed OEMP or complaints received from a third party.

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

References

Ref. 1 Planning Act 2008 (as amended).

Ref. 2 The Infrastructure Planning) Environmental Impact assessment) Regulations 2017 (as amended).

Ref. 3 National Grid (2016). Technical Guidance Note 287: Third-party guidance for working near National Grid Electricity Transmission equipment.

Ref. 4 1998 International Commission on the Non-Ionizing Radiation Protection (ICNIRP) guidelines.

Ref. 5 National Grid (2007). Specifications for Safe Working in the Vicinity of National Grid High Pressure Gas Pipelines and Associated Installations - Requirements for Third Parties.

Ref. 6 Northern Gas Networks (2017). Working safely near high pressure gas pipelines and associated installations: Third party requirements.

Ref. 7 HM Government (2013). The Waste Electrical and Electronic Equipment (WEEE) Regulations 2013.

Ref. 8 Environment Agency (2021) Waste classification technical guidance: WM3.

THE DROVES

SOLAR FARM