



Preliminary Environmental Information Report

Appendix 19A: Commitment Register

PEIR Chapters [PINS Ref: EN 010171]

Document Reference: EN 010171/PEIR APP/19A

Revision Number: 1

December 2025

Future Energy Llanwern Limited

Contents

19.0	Commitments Register	1
19.1	Overview	1
19.2	Purpose.....	1
19.3	Commitments Register.....	1

19.0 Commitments Register

19.1 Overview

19.1.1 This Commitments Register has been developed alongside the Environmental Impact Assessment (EIA) process and includes embedded environmental measures proposed to mitigate impacts identified during the EIA process. The Commitments Register presented to support the Preliminary Environmental Impact Assessment (PEIR) also identifies the anticipated securing mechanism within the Development Consent Order (DCO) along with the relevant application document.

19.2 Purpose

19.2.1 The purpose of the Commitments Register is to provide a summary of the mitigation measures which will apply during the construction, operation and decommissioning phases of the Proposed Development.

19.2.2 The Commitments Register has been populated with a range of environmental measures including those designed to avoid, prevent, and reduce impacts. These have been informed by the ongoing design evolution process, stakeholder engagement and consultation, good practice and/or are considered to be industry best practice and procedures for Nationally Significant Infrastructure Projects (NSIPs), in particular solar farm development.

19.2.3 The Commitments Register identifies how each mitigation measure will be secured including the requirements of the DCO, and related DCO Application documents.

19.3 Commitments Register

19.3.1 The Commitments Register is presented in **Table 19A-1**. Note: not all commitment reference numbers are sequential due to some commitments made earlier in the project development being removed as a result of changes to the project including design development

Table 19A-1 Commitment Register

Commitment Reference	Description	Greenhouse Gases	Cultural Heritage and Archaeology	Ecology	Ornithology	Water Environment	Landscape and Visual Impact Assessment	Glint and Glare	Noise and Vibration	Socio-Economics	Traffic and Transport	Ground Conditions	Other Environmental Topics	Anticipated Securing Mechanism	Timing	Consent Granting Body	Relevant Application Documents
C-1	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, public right of way (PRoW) and watercourse.													Requirements	Prior to phase of construction	Planning Inspectorate	Appendix 2C Crossing Schedule
C-2	All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.													Requirements	Prior to phase of construction	Planning Inspectorate	All technical chapters other than Glint and Glare
C-3	Following construction, construction compounds will be returned to previous conditions as far as reasonably possible.													Requirements	Prior to phase of construction	Planning Inspectorate	All technical chapters other than Glint and Glare
C-4	A detailed Construction Environmental Management Plan (CEMP) to ensure that the construction phase is carefully planned to avoid the more significant impacts, including: - Implementing measures to prevent ground-nesting species such as skylark from nesting in the areas to be panelled. Such measures would include keeping the sward very short in the fields and using deterrents such as raptor kites. - Surveying and buffering nest sites of Schedule 1 species (e.g. barn owl) during the breeding season. - Utilise acoustic barriers where necessary (e.g. at nesting Cetti's warbler sites). - An Ecological Clerk of Works (ECoW) will be on Site, throughout the works but most importantly during the bird breeding season to undertake pre-works checks for nests.													Requirements	Prior to phase of construction	Planning Inspectorate	All technical chapters other than Glint and Glare

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C-5	A detailed decommissioning plan would be developed prior to the end of the project detailing sensitive methods of decommissioning.													Requirements	Decommissioning	Planning Inspectorate	All technical chapters other than Glint and Glare
C-6	The reens will be buffered to protect them from deterioration, avoid impacts to faunal species and to provide opportunities for habitat enhancement. Buffers to reens of semi-natural habitat will reduce run-off of nutrient enriched water entering the reens, and allow sensitive management for terrestrial invertebrates.													Requirements	Operation	Planning Inspectorate	Ecology (8) and Water Environment (10)
C-7	The oLEMP will be prepared to ensure benefits to the SSSI features along with monitoring and contingency measures to ensure their maintenance.													Requirements	Prior to phase of construction	Planning Inspectorate	Technical Chapters LVIA (11), Ecology (8) and Ornithology (9)
C-8	Signage and/or temporary public rights of way (PRoW) /footpath diversions will be provided during construction.													Requirements	Prior to phase of construction	Planning Inspectorate	Technical Chapters LVIA (11), Traffic and Transport (15) and Socio-economics, Tourism and Recreation (14)
C-9	Core working hours for construction will be 0700 to 1900 Monday to Friday, and 0800 to 1300 on Saturdays, piling activities will be restricted to 09:00 to 17:00 hours Monday to Friday. Apart from specific circumstances to be set out and agreed in the oCEMP.													Requirements	Prior to phase of construction	Planning Inspectorate	Technical Chapters LVIA (11), Traffic and Transport (15), Noise and Vibration (13) and Socio-economics, Tourism and Recreation (14)
C-10	An outline landscape strategy (the Landscape and Environmental Management Plan or 'oLEMP') will be prepared													Requirements	Prior to phase of construction	Planning Inspectorate	Technical Chapters LVIA (11), Ecology (8) and Ornithology (9)
C-11	Early-stage design and specification for construction of the Proposed Development with a view to minimising future GHG emissions, using the PAS 2080:202312 standard for carbon management in buildings and infrastructure as a basis for design optimisation, with													Requirements	During Construction	Planning Inspectorate	Chapter 6: Greenhouse Gases

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	consideration of the carbon reduction hierarchy during design and construction: - Avoid: aligning the outcomes of the Proposed Development and/or programme of work with the net zero transition at the system level and evaluate the basic need at the asset and/or network level; - Switch: assess alternative solutions and then adopt one that reduces whole life emissions through alternative scope, design approach, materials, technologies for operational carbon reduction, among others, while satisfying the whole life performance requirements; and - Improve: identify and adopt solutions and techniques that improve the use of resources and design life of an asset/network, including applying circular economy principles to assess materials/products in terms of their potential for reuse or recycling after end of life.																
C-12	Maximising the opportunity to use more sustainable materials by identifying in procurement documentation, that materials and products with reduced embodied carbon emissions, and materials/resources featuring recycled content are preferred (where safe and of sufficient integrity for engineering).													Requirements	During Construction	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-13	Designing, specifying and constructing the Proposed Development with a view to maximising the operational lifespan and minimising the need for maintenance and refurbishment (and thus reducing the frequency of releasing associated GHG emissions).													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-14	Specifying efficient mechanical and electrical equipment (such as cables, structures, mounts) that is long-lasting and chosen for its durability and energy efficiency credentials.													Requirements	During Construction	Planning Inspectorate	Chapter 6: Greenhouse Gases

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C-15	Using locally sourced materials where available and practicable to minimise the distance materials are transported from source to Site.													Requirements	During Construction	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-16	Using more modern and efficient construction plant and delivery vehicles, and/or those powered by lower carbon fuels or electricity.													Requirements	During Construction	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-17	Relevant design, mitigation and enhancement measures will be identified in the ES, which may include: <ul style="list-style-type: none"> - Specifying high efficiency mechanical and electrical equipment such as cables, structures, mounts - Maximising the operational effectiveness (efficient PV panels) and minimising the parasitic load. - Establish effective systems for energy monitoring and sub-metering for key components of the Proposed Development for optimisation of operational conditions. - Maximising the operational lifespan and minimising the need for maintenance and refurbishment (and all associated emissions). - Maximising the potential for reuse and recycling of materials/elements at the end-of-life stage. - Operating, maintaining and refurbishing the Proposed Development using energy efficient equipment. 													Requirements	Operation	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-18	The Proposed Development will generate renewable electricity across its entire lifetime. This provides a benefit in terms of displacing more carbon intensive forms of generation on the wider national grid. The net positive significant effect will be determined via comparisons to the potential emissions released from an alternative fossil-fuel generating stations (such as a combined cycle gas turbine plant).													Requirements	Operation	Planning Inspectorate	Chapter 6: Greenhouse Gases
C-19	Opportunities for direct enhancement may come through potential mitigation measures, specifically design alterations to preserve historic assets in-situ. This will would be dependent on the preservation state and importance of the encountered archaeological remains being considered.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 7: Cultural Heritage and Archaeology

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C-20	Where feasible, and warranted, design adjustments will be agreed with the Principal Design team, in consultation where necessary with other environmental discipline teams, with an aim to minimise impacts to known and previously unrecorded historic assets.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 7: Cultural Heritage and Archaeology
C-21	Where design adjustments are not feasible or warranted, an appropriate mitigation strategy will be proposed to reduce or mitigate any significant adverse effects identified.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 7: Cultural Heritage and Archaeology
C-22	Measures to mitigate effects will normally consist of design adjustments, to allow significant resources to be protected and retained (preservation in situ) or, where this is not feasible, investigation and recording before and during development, with dissemination at an appropriate level (preservation by record).													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 7: Cultural Heritage and Archaeology
C-23	Possible mitigation strategy may follow a phased, iterative approach including a programme of non-intrusive surveys, followed by localised evaluation investigations, such as targeted trial trenching, prior to the commencement of construction where necessary. Dependent on investigation results further mitigation measures may be required this may including targeted monitoring of construction works in the form of archaeological watching briefs.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 7: Cultural Heritage and Archaeology
C-24	The Contractor would notify all parties working on the project on the measures to take, in accordance with The Historic Environment (Wales) Act 2023 , Planning Policy Wales 2024, the Newport City Council Local Development Plan (2015) and Monmouthshire County Council Local Development Plan (2014) , if any unexpected archaeological remains are encountered during construction. All work should be completed in line with a Project Design, also known as a Written Scheme of Investigation, to be agreed with Heneb and, if required, Cadw.														Prior to phase of construction		Chapter 7: Cultural Heritage and Archaeology

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C-25	The layout will reflect, where feasible, a preference for the retention and protection of higher value habitats including scrub, mature trees, higher quality grassland and watercourses. Losses of important vegetation will be compensated for through the planting/ creation of new habitats;													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-26	A detailed CEMP will be implemented which will include refuelling locations and use of spill kits, pre-works surveys, method statements will detail the following: - construction of crossing points to avoid waterbody siltation and measures to protect reens from pollution and siltation. - sensitive working practices including marking out buffer zones, - installation of silt fences, - dust control, - storage of topsoil - lighting - reinstatement of habitats.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-27	A pre-works surveys of all ditch/reen crossing points will be undertaken in case water vole have taken up residence in the interim period as part of embedded measures within the CEMP, and where possible crossings micro-sited to avoid and buffer active burrows. An ECoW will be present during the removal of suitable habitat, as detailed in the CEMP. This will include a hand search of any refuges and any reptiles moved to a place of safety.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-28	Updated badger surveys will be carried out prior to the start of the construction and decommissioning phase to identify any additional setts present within or adjacent to the construction areas. The locations of any setts will be considered and either retained with an appropriate buffer or individual setts will be closed under an appropriate licence.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-29	The detailed CEMP will stipulate that any open trenches will be either covered at night or a means of escape such as a plank will be placed inside for otters, hedgehogs and brown hares.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology

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C-30	Measures to avoid or reduce the risk of accidental encroachment on setts or entrapment of individual badgers during construction will be set out in the CEMP													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-31	Hedgerows across the Site will be protected from damage outside via the designated buffer zones. Measures to avoid or reduce the risk of accidental encroachment will be set out in the CEMP. Method statements will be employed to ensure that the minimum length required will be removed.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-32	A detailed Landscape Environmental Management Plan (LEMP) will be produced once a contractor has been appointed. The detailed LEMP will follow the principles set out in the outline LEMP supporting this PEIR and subsequent ES.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-33	Construction methods to avoid significant adverse impacts to retained habitats.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-34	Existing farm access tracks will be used wherever possible during construction, maintenance and decommissioning; improvements to these tracks including possible widening will be required. These will aim to utilise existing hedgerow gaps wherever possible. Any hedgerow lost during the creation of an access will be replaced within the scheme.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology

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C-35	New reen crossings will be designed to minimise impacts to habitats and riparian species, sited away from sensitive locations (such as water vole burrows) and will avoid fragmentation effects.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-36	Gaps below fencing to prevent fragmentation for mobile species such as badger and otter;													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-37	Mature trees, particularly those with potential for roosting bats will be retained;													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-38	Where appropriate, cabling will be directionally drilled below ground to avoid disturbance to above-ground habitat and watercourses													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-39	A detailed drainage strategy will be required to show no impacts on the reens or downstream ecological receptors;													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology
C-40	Mitigation licences for impacts to dormouse/ great crested newt habitat with appropriate compensatory habitat where required.													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology

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C-41	Creation of new habitats to support and enhance existing faunal populations.													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology
C-42	A Landscape & Ecology Management Plan (LEMP) will be implemented post-construction to include sensitive management of reens and buffers, low intensity grazing regime and sensitive hedgerow management to enhance site for the range of fauna and flora it supports;													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology
C-43	The removal of the southern hedgerow where double hedgerows exist on east-west running hedgerows will allow light to reach the reen, which would be expected to result in increased plant and fauna diversity within the reen.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology
C-44	The reen buffers will be designed to provide high value, semi-natural habitat;													Requirements	Operation	Planning Inspectorate	Chapter 8: Ecology
C-45	There will be no obstruction of reens;													Requirements	Operation	Planning Inspectorate	Chapter 8: Ecology
C-46	Suitable gaps (indicatively 30 x 30cm) will be incorporated into all lengths of security fencing to allow mammals to pass beneath.													Requirements	Operation	Planning Inspectorate	Chapter 8: Ecology

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C-47	<p>A detailed CEMP to ensure that the construction phase is carefully planned to avoid the more significant impacts, including:</p> <ul style="list-style-type: none"> - Implementing measures to prevent ground-nesting species such as skylark from nesting in the areas to be panelled. Such measures would include keeping the sward very short in the fields and using deterrents such as raptor kites. - Surveying and buffering nest sites of Schedule 1 species (e.g. barn owl) during the breeding season. - Utilise acoustic barriers where necessary (e.g. at nesting Cetti's warbler sites). - An ECoW will be on Site, throughout the works but most importantly during the bird breeding season to undertake pre-works checks for nests. - A method statement will be designed with input from the project ecologist to minimise visual/ noise disturbance to retained fields during construction/ decommissioning. 													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 9: Ornithology
C-48	<p>A method statement as part of the CEMP will be designed with input from the project ecologist to minimise visual/ noise disturbance to retained fields during construction/ decommissioning.</p>													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 9: Ornithology
C-49	<p>Nesting gadwall, Barn owl, kingfisher and Cetti's warbler nests will be protected by the inherent 7m and 12.5m watercourse buffers, except where crossings are required. Where crossings are required, a pre-works check for active nests would be implemented via the CEMP to ensure any active nests are identified and protected until all chicks have fledged.</p>													Requirements	Construction	Planning Inspectorate	Chapter 9: Ornithology
C-50	<p>To reduce the likelihood of nests being damaged, vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All active nests will be retained until all chicks have fledged, as detailed in the oCEMP.</p>													Requirements	Construction	Planning Inspectorate	Chapter 9: Ornithology

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C-51	The detailed CEMP will note that nest sites for barn owl will be protected from noise/ visual disturbance with a 30m exclusion zone during breeding.													Requirements	Construction	Planning Inspectorate	Chapter 9: Ornithology
C-52	Where vegetation removal is undertaken during the breeding season (March – August inclusive), a pre-works check for active nests within reens/ ditches and hedgerows would be implemented via the CEMP to ensure any active nests are identified and protected until all chicks have fledged.													Requirements	Construction	Planning Inspectorate	Chapter 9: Ornithology
C-53	Additional screening may be required to reduce noise impacts on birds within the retained fields during winter and breeding, e.g. shelduck, curlew and gadwall, which are sensitive to noise. This will be informed by the construction programme as it will only apply to noise created within close proximity to the bird mitigation fields.													Requirements	Construction	Planning Inspectorate	Chapter 9: Ornithology
C-54	Bird mitigation fields will be managed in accordance with the detailed LEMP.													Requirements	Operation	Planning Inspectorate	Chapter 9: Ornithology
C-55	It may not be possible to avoid the disturbance effect from operation of the Site but it will be possible to minimise it by routing access tracks so that they don't run along the boundaries of fields used by wintering birds. These should also avoid any known barn owl nesting sites. In addition, thick and tall hedgerow boundaries should be maintained to screen the Site from the fields used by wintering SPA birds.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 9: Ornithology
C-56	Panel installation to have significant clearance between rows and the arrays themselves are partially transparent, which will permit vegetation growth beneath and continue to provide bird foraging and potential nesting habitat.													Requirements	Post construction	Planning Inspectorate	Chapter 9: Ornithology
C-57	By design solar panels will be positioned at an inclined angle and this, along with the large gaps between rows this will enable birds to distinguish the surface from a water body.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 9: Ornithology

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C-58	Utilising existing farm access tracks wherever possible during construction, maintenance and decommissioning to minimise impacts to breeding habitat within reens and hedgerows. Whilst improvements to these tracks including possible widening will be required, tracks will aim to utilise existing hedgerow gaps wherever possible and only very small scale hedgerow loss will be required.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 8: Ecology and 9: Ornithology
C-59	Habitat creation for loss of breeding and foraging habitat, including infill hedgerow planting in gaps of retained hedgerows.													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology and 9: Ornithology
C-60	Panel installation to reduce unnecessary land take and allow grassland to be maintained below to provide foraging habitat.													Requirements	Post construction	Planning Inspectorate	Chapter 8: Ecology and 9: Ornithology
C-61	Proposed Development may offer opportunity to enhance or reinstate the network of drainage features within the Site.													Requirements	Post construction	Planning Inspectorate	Chapter 10: Water Environment
C-62	The Proposed Development will include the use of appropriate drainage design, the use of runoff and sediment control measures where necessary and through the implementation of good working practice and adherence to a detailed CEMP.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-63	The detailed CEMP will include: - Adoption of best practice pollution prevention, drainage control, and waste management procedures; - Control of drainage and sediment runoff from excavation areas and any access tracks; - Agreement on watercourse crossing schedule (method and type of structure); - Control of drainage and sediment runoff during the construction of													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment

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	watercourse crossings (where applicable); - Control of concrete pouring; and - Appropriate design of foundation installation, the management of soil water levels and the potential to generate excessive quantities of groundwater contaminated sediments.																
C-64	It is expected that buffer distances to watercourses will be maintained at a minimum of 7m from top of bank across the Site.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-65	The Flood Consequence Assessment (FCA) undertaken as part of the PEIR and ES will identify additional mitigation measures to protect the assets from flood risk increasing with climate change													Requirements	pre-construction	Planning Inspectorate	Chapter 10: Water Environment
C-66	Approach to watercourse cable crossings has not yet been agreed however the proposed method will be informed by the sensitivity of the watercourse, with trenchless construction techniques applied where appropriate.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-67	Existing internal tracks, points of access and field gates would be utilised where practical, however, in cases where these tracks need to be upgraded or new tracks constructed a Type 1 track would be constructed to provide access. The internal tracks would be 5m wide and comprised of compacted stone.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-68	Where there will be a requirement to cross a watercourse, different temporary methods may be required dependent on the ground conditions and environmental constraints present within the Site. All scenarios would include a drainage trench up to 0.7m deep running along the length of the road.													Requirements	Pre-construction	Planning Inspectorate	Chapter 10: Water Environment

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C-69	An outline drainage strategy for the operational phase will be produced as part of the FCA to accompany the ES. The outline drainage strategy is anticipated to be the subject of a planning condition and will be prepared by the contractor before being agreed with NRW and the LLFAs. The strategy will incorporate the use of appropriate SuDS techniques as required, treating and infiltrating/attenuating surface water run-off generated from the Site, prior to discharging into the local surface water network at an agreed rate.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-70	The solar arrays will be mounted above ground level to minimise loss of flood storage. At this stage it is assumed the panel modules would be mounted on structures with a clearance level above ground level (agl) of up to approximately 1.0m, and a maximum upper height of 3.52m agl.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-71	The height of the arrays will be informed by predicted flood levels over the operational life of the Proposed Development.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-72	There would be a separation distance of approximately 1-2 cm between the rows of modules. The gaps will be maintained between each panel on the arrays to prevent an accumulation of rainwater runoff and to replicate greenfield response.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-73	The appointed contractor will be required to prepare a Construction Phase drainage strategy that effectively manages surface water runoff during the construction phase to prevent pollution risk to the water environment. This will need to be an adaptive strategy that responds to the evolving nature of the construction site, with focus on the interception, treatment and safe management of surface water runoff that could otherwise migrate directly or indirectly to receiving waterbodies.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment
C-74	The detailed CEMP will be supported by method statements prepared by the appointed contractor for works in close proximity to sensitive receptors. It is recommended that these are developed in consultation with the relevant authorities and include but not limited to the following: <ul style="list-style-type: none"> • The Severn Estuary; • Monks Ditch; 													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment

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	<ul style="list-style-type: none"> • Windmill Reen (Yoke Reen); • Mill Reen; • Elver Pill Reen; • Cold Harbour Reen; and • Back Ditch. 																
C-75	<p>The appointed contractor will prepare a full detailed CEMP, which will contain measures to protect both surface and groundwater quality, and other water resource aspects. The need for additional mitigation measures during construction will be determined through ongoing consultation with NRW and reported in the ES.</p> <p>Examples of potentially appropriate additional mitigation measures are as follows:</p> <ul style="list-style-type: none"> • Water quality monitoring before and during construction activities that have the potential to effect water quality in receiving water bodies; • Installation of barriers adjacent to sensitive water features to intercept polluted surface water runoff; and • A piling method which does not allow the ‘dragging down’ of contaminants and does not create preferential pathways from the near-surface soils to the aquifers where required depending onsite conditions. It is anticipated that the appropriate piling method will be determined as detailed design progresses following additional assessment of the ground conditions i.e., completion of intrusive ground investigation to obtain site-specific geotechnical and geo-environmental data to inform detailed design and through consultation with relevant stakeholders. 												Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 10: Water Environment	
C-76	<p>The LEMP may include the following:</p> <ul style="list-style-type: none"> - advance survey of landscape elements and other environmental receptors; - retention plans to ensure the protection of particular landscape elements; - advance landscape works to ‘grow’ proposed planting as early as possible, where practicable; - restoration of temporary construction works, (post construction); - implementation of landscape works which are likely to include earthworks and drainage, fencing/boundary, colour coordination, hard works, soft works/planting and maintenance; enhancement works; - a maintenance period of five years will be implemented to ensure the establishment of proposed landscape planting works; and - a management plan will be implemented to care for the landscape 												Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 11: Landscape and Visual Impact Assessment	

Commitment Reference	Description	Greenhouse Gases	Cultural Heritage and Archaeology	Ecology	Ornithology	Water Environment	Landscape and Visual Impact Assessment	Glint and Glare	Noise and Vibration	Socio-Economics	Traffic and Transport	Ground Conditions	Other Environmental Topics	Anticipated Securing Mechanism	Timing	Consent Granting Body	Relevant Application Documents
	and environmental measures as part of the on-going operational period.																
C-77	Solar panel optimisation: Adjusting the orientation, tilt, or spacing of solar panels to minimize glare reflection.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 12: Glint and Glare
C-78	Screening: Implementing physical barriers or vegetation to obstruct the line of sight between the solar farm and sensitive receptors where viable.													Requirements	Pre-construction	Planning Inspectorate	Chapter 12: Glint and Glare
C-79	Exploring design options that minimize the visual impact of the solar farm on the surrounding landscape.													Requirements	Pre-construction	Planning Inspectorate	Chapter 12: Glint and Glare
C-80	Requirement to inform residents of the works where moderate effects to human perception are predicted.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-81	Once a Contractor is appointed, further assessment of potential construction noise impacts should be undertaken. The further assessment, based on detailed construction information, should define the requirements for primary and secondary mitigation. The results of the assessment should be set out in the detailed CEMP and any required mitigation implemented accordingly.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration

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C-82	All construction activities to be undertaken within normal working hours for construction. Whilst most HDD activities are considered likely to be complete in relatively short durations (<7 days), where any HDD work is required over an extended period, and where the potential for significant effects arises, applying BPM in accordance with the recommendations in BS 5228-1.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-83	All construction contractors will be required to follow standard good construction practice as outlined in BS 5228-1:2009+A1:2014. The Contractor will use 'Best Practicable Means' (BPM) to ensure noise and vibration emissions are minimised and to avoid nuisance due to construction noise and vibration.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-84	Requirement to inform residents of the works where moderate effects to human perception are predicted.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-85	Once a Contractor is appointed, further assessment of potential construction noise impacts should be undertaken. The further assessment, based on detailed construction information, should define the requirements for primary and secondary mitigation. The results of the assessment should be set out in the detailed CEMP and any required mitigation implemented accordingly.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-86	All construction activities to be undertaken within normal working hours for construction. Whilst most HDD activities are considered likely to be complete in relatively short durations (<7 days), where any HDD work is required over an extended period, and where the potential for significant effects arises, applying BPM in accordance with the recommendations in BS 5228-1.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration

Commitment Reference	Description	Greenhouse Gases	Cultural Heritage and Archaeology	Ecology	Ornithology	Water Environment	Landscape and Visual Impact Assessment	Glint and Glare	Noise and Vibration	Socio-Economics	Traffic and Transport	Ground Conditions	Other Environmental Topics	Anticipated Securing Mechanism	Timing	Consent Granting Body	Relevant Application Documents
C-87	All construction contractors will be required to follow standard good construction practice as outlined in BS 5228-1:2009+A1:2014. The Contractor will use 'Best Practicable Means' (BPM) to ensure noise and vibration emissions are minimised and to avoid nuisance due to construction noise and vibration.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 13: Noise and Vibration
C-88	The panels will be raised ca. 0.8 – 1 m above ground level to allow for natural air circulation and the grazing of sheep													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 14: Socio-economics, Tourism and Recreation
C-89	The panels will be raised ca. 0.8 – 1 m above ground level to allow for natural air circulation and the grazing of sheep													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 14: Socio-economics, Tourism and Recreation
C-90	Wherever feasible, the Proposed Development will utilise local workforce.													Requirements	Prior to phase of construction		Chapter 14: Socio-economics, Tourism and Recreation
C-91	Liaison with public rights of way officers in the two Local Authorities will ensure that any requirements for diversions and/or temporary closures of PRow routes are supported and compliant.													Requirements	Pre-construction	Planning Inspectorate	Chapter 15: Transport and Access
C-92	A draft Travel Plan will be included as part of the PEIR, and the ES, which will encourage car sharing and alternatives to arriving by private car, including encouraging the adoption of mini buses for staff.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 15: Transport and Access

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C-93	During the detailed design and procurement, the specifications of access tracks will consider ambient temperatures. Routine maintenance will identify areas of damage which may need early replacement.													Requirements	Pre-construction	Planning Inspectorate	Chapter 15: Transport and Access
C-94	PRoWs within the PEIR Assessment Boundary will be safeguarded and kept open during all phases of the development, although the Applicant will seek to divert footpaths 040/3/1 and 404/5/1 which currently cross through parts of fields, off the field onto the more accessible lanes which run around them.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 15: Transport and Access
C-95	Agricultural Land Classification (ALC) survey will be completed to confirm the baseline ALC grades present and obtain information on the soils present.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-96	The ALC survey will inform a soil management plan containing soil management measures in general accordance with the Defra guidance and other relevant guidance such as the Institute of Quarrying 2021 Good Practice Guide for Handling Soils in Mineral Workings.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-97	Completion of a Contaminated Land (Preliminary Risk Assessment) Desk Study for ES – this ensures that the ground conditions, including the presence and location of known or potential land contamination, are well understood and communicated to those with design input to the Proposed Development at a sufficiently early stage of the design, helping to avoid the need for significant design changes in response to unexpected ground conditions later.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions

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C-98	Compliance with industry good practice including LCRM for the assessment of risks from contaminated land.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-99	The detailed design of the access roads will be based on ground conditions identified through a range of surveys.													Requirements	Pre-construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-100	<p>Elements of the Proposed Development which require soil sealing or removal of topsoil during construction and where topsoil cannot be reinstated will be kept to the minimum footprint required for the safe operation of the Proposed Development. The use of pile foundations for the modules and inverters will minimise ground disturbance during operation and decommissioning of the modules and inverters. Existing tracks will be used wherever possible, for temporary and permanent access routes.</p> <p>Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure and help to minimise soil compaction. This measure and other good practice for the protection of soil resources during construction forms the Outline Soil Management Plan (oSMP) included in the outline oCEMP which will be submitted to support the ES.</p> <p>Permanently displaced soil will be reused within the PEIR Assessment Boundary where practicable. Soils that cannot be reused in the PEIR Assessment Boundary will be protected from damage during handling and storage to enable their potential use offsite.</p>													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-101	During temporary development work or maintenance activities in fields, vehicles with low ground pressure will be used wherever possible. The piling rig used for construction of the modules will be a compact tracked rig to minimise ground pressure.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions

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														Requirements			
C-102	Wherever possible, vehicles will use defined temporary or permanent access routes where topsoils have been removed to protect them from damage. In fields, where vehicle or plant access is necessary, and if ground conditions require it (e.g., in response to wet weather conditions), a temporary trackway of either metal, wood, or plastic, will be used to access the working areas. This will be removed once construction/ maintenance/ decommissioning was complete.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-103	Topsoil stripping for temporary access roads will occur in phases and be timed to minimise the period where subsoils are left exposed. Where topsoils require temporary storage in stockpiles, excess vegetation should be removed prior to stripping; for grassland it should be cut or grazed short and arable crops should have been harvested. Reinstatement of temporarily excavated soils will be completed on a phased basis to minimise the period of temporary soil storage in stockpiles. Where it is known that topsoils will need to be stored for longer than six months, stockpiles should be seeded with a suitable seed mix.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-104	Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure and help to minimise soil compaction. This measure and other good practice for the protection of soil resources during construction forms the Outline Soil Management Plan (oSMP) included in the outline oCEMP which will be submitted to support the ES													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-105	Compliance with industry good practice including LCRM for the assessment of risks from contaminated land is an embedded measures for all stages of the Proposed Development. Temporarily excavated soils will be stored local to the point of excavation wherever possible to enable soils to be returned to where they came from.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions
C-106	During construction, vehicle maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. These areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) will comply with industry good practice, be bunded, have appropriate containment and segregation. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions

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	<p>contaminants into groundwater following any leakage/spillage. If fluids are required for horizontal directional drilling these will be restricted to bentonite-based muds which are not classed as environmentally hazardous. All aspects of the Proposed Development from construction to operation and decommissioning will comply with the Health and Safety at Work etc. Act 1974 and regulations made under the Act, and The CDM Regulations 2015. Risks to construction workers will be managed through compliance with the requirement for risk assessments and method statements for all construction related activities and the use of appropriate working methods, training and Personal Protective Equipment (PPE).</p> <p>The design for the Proposed Development will comply with good practice in structural design including compliance with the Eurocodes and relevant British Standards. The design will account for the expected ground conditions and design loads, accounting for the effects of climate change. The design of the Proposed Development will be completed in accordance with The CDM Regulations 2015 .</p>																
<p>C-107</p>	<p>Ground investigation in accordance with British Standards Institution (BS) 5930 will be used to determine ground conditions across the Site.</p> <p>Underground electrical cables installed for the Project will not be oil-filled.</p> <p>Buried cables will be protected from damage/ deterioration by the use of sand/ soil cushioning to avoid them being in contact with sharp stones/ objects, and placement of marker tape above the cables will help to alert anyone digging to their presence.</p>												Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 16: Ground Conditions	
<p>C-108</p>	<p>Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2016) guidance on the Assessment of Dust from Demolition and Construction 2016, version 1.1</p>												Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics: Air Quality	

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C-109	Any disposal off-site of excavated material will be undertaken in consultation with the landowner/occupier and in accordance with the Waste Management Regulations.													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics: Waste
C-110	Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2016) guidance on the Assessment of Dust from Demolition and Construction 2016, version 1.1 (Ref 2A-15)													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics
C-111	Measures necessary to avoid impact upon Utilities include: <ul style="list-style-type: none"> • Sensitively locating the Proposed Development outside of utility protected zones • The use of ground penetrating radar prior to excavation to identify any unknown utilities • Consultation and agreement of construction and demobilisation methods prior to the construction phase. 													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics
C-112	The contractor will consider the objectives of sustainable resource and waste management and seek to use material resources efficiently, reduce waste at source, reduce waste that requires final disposal to landfill and apply the principles of the waste hierarchy. This will include, where reasonably practical, working towards a cut and fill balance for excavations; segregation of construction materials onsite for appropriate re-use, recycling and recovery, with landfill as a last resort. To minimise impacts of waste on the surrounding environment, the following measures will be implemented: <ul style="list-style-type: none"> • All waste transported offsite will be delivered to the appropriately licenced receivers of such materials • Offsite pre-fabrication, where reasonably practicable, including the use of pre-fabricated structural elements, cladding units, mechanical and electrical risers and packaged plant rooms. Pre-fabrication could be utilised for the office/warehouses and control rooms associated with the primary onsite substation; • Burning of waste or unwanted materials will not be permitted onsite; • All hazardous materials including chemicals, cleaning agents and solvent containing products to be properly sealed in sealed containers at the end of each day prior to storage in appropriately protected and 													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics

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	<p>bunded storage areas;</p> <ul style="list-style-type: none"> • Materials requiring removal from the construction site will 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. An audit and careful checks will be undertaken to ensure that all carriers and facilities will be licensed, and that the appropriate permits and transfer notes are in place prior to removal of waste; and • Prior to commencement of construction, suitable recycling and landfill facilities with sufficient capacity to receive the quantities of construction waste expected will be identified. 																
C-113	<p>All works will be undertaken in accordance with the Building Regulations, NHS England-Wales Emergency Preparedness, Resilience and Response Framework, Health and Safety at Work Act 1974, Safety at Work Regulations 1999, CDM Regulations 2015, Railway Operator Regulatory Requirements, 999 emergency service response procedure and call/response procedure to report utility system failures. Details of fire, police, emergency services and hospitals will be publicised and included in the Site induction. The relevant risk assessments for safety during construction will be required and produced by the contractor prior to construction, which will be implemented to minimise the risk of accidents and disasters onsite.</p>													Requirements	Prior to phase of construction	Planning Inspectorate	Chapter 17: Other Environmental Topics
C-114	<p>Best practice avoidance and mitigation measures proposed include:</p> <ul style="list-style-type: none"> • All plant will be installed on concrete bases and/or a thick layer of sand with suitable bunding where appropriate; • The detailed operational drainage design will be carried out with the objective of ensuring that drainage of the land to the present level is maintained; • An Outline Surface Water Drainage Strategy will be prepared as an appendix to the Environmental Statement • Appropriate use of Personal Protective Equipment (PPE) and implementation and adherence to Health & Safety Protocols, Plans and Procedures; • A Pollution Response Plan will be drafted prior to the commencement of the works; • Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, include the siting of storage areas away from surface water drains, on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked up 													Requirements	Prior to phase of construction		Chapter 10: Water Environment and Chapter 17: Other Environmental Topics

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	<p>when not in use. All chemicals will be stored in accordance with their COSHH guidelines, whilst spill kits will be provided in areas of fuel/oil storage;</p> <ul style="list-style-type: none"> • All plant and machinery will be kept away from surface water bodies wherever possible. Vehicles should be well maintained to prevent accidental pollution from leaks. Static machinery and plant should include drip trays beneath oil tanks/engines/gearboxes/hydraulics, which will be checked and emptied regularly via a licensed waste disposal operator. Refuelling and delivery areas will be located away from surface water drains; • An Emergency Spillage Action Plan will be produced, which all Site staff will have read and understood, and provisions made to contain any leak/spill; • To further minimise the risks of contaminants being transferred and contaminating other soils or water, construction workers will be briefed as to the possibility of the presence of such materials; • In the event that contamination is identified, appropriate remediation measures will be taken to protect construction workers, future Site users, water resources, structures and services; • The contractor will be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water will be directed away from stockpiles to prevent erosion; • Stockpiles and material handling areas will be kept as clean as practicable to avoid nuisance from dust. Dusty materials will be dampened down using water sprays in dry weather or covered; • The length of time materials are stockpiled onsite before being removed for re-use, recycling or disposal is to be kept to a minimum and stockpiles are to be covered with tarpaulins prior to disposal; • Dust generating equipment will be located to minimise potential nuisance impacts to receptors, as far as practicable. • The risk to surface water and groundwater from runoff from any contaminated stockpiles during construction works will be reduced by implementing suitable measures to minimise rainwater infiltration and/or capture runoff and leachates, through use of bunding and/or temporary drainage systems. • These mitigation measures will be designed in line with current good practice, follow appropriate guidelines and all relevant licences/permits; • The contractor will ensure that all material is suitable for its proposed use and will not result in an increase in contamination-related risks on identified receptors, including any landscaped areas 																

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<p>and underlying groundwater;</p> <ul style="list-style-type: none"> • Any waters removed from excavations by dewatering will be discharged appropriately, subject to the relevant permits being obtained from NRW; • The contractor will implement a dust suppression/management system in order to control the potential risk from airborne contamination migrating offsite to adjacent sites; • Complaints about dust will be investigated at the earliest opportunity and appropriate action taken to control the source or remedy the impact as appropriate; • Access roads will be regularly cleaned and damped down with water; • Piling/ramming will be carried out in accordance with the NRW guidance on piling and ground investigations will inform the Foundation / Piling Works Risk Assessment which will define the appropriate piling methods and foundation design to mitigate risk; • Work will be carried out in accordance with relevant Construction Design Management Regulations 2015 details of these measures will be presented within the Health and Safety Plan prepared as part of the detailed CEMP; • A competent/licensed contractor will survey (pre-site preparation survey as defined by the Health and Safety Executive) and remove asbestos containing materials and other materials and structures contaminated with asbestos fibres; and • Specification of concrete used in foundations and building structures will be selected based on the results of the chemical composition of the Site's soil and groundwater. • Guidance is provided by the Building Research Establishment (BRE) series 'Concrete in Aggressive Ground' (2005). 																	
C-115	<p>The proposed panels are monocrystalline HJT cell panels which have the highest temperature coefficient in comparison to others on the market.</p>													Requirements	Prior to phase of construction	Planning Inspectorate	Major Accidents and Disaster

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C-116	The modules will be low-lying and on the mounting structure which will have 1-1.5 m deep foundations, subject to ground conditions. They will be installed as per manufacturer's specification and wind load testing carried out through the construction phase.													Requirements	Prior to phase of construction	Planning Inspectorate	Major Accidents and Disaster
C-117	The detailed design of the foundations will be based on ground conditions identified through a range of surveys to ensure the structure is appropriately anchored. The materials used are also resistant to corrosion and are strong enough to withstand small ground heave.													Requirements	Pre-construction	Planning Inspectorate	Major Accidents and Disaster
C-118	During the detailed design and procurement of equipment, the operating temperature ranges will be considered.													Requirements	Operation	Planning Inspectorate	Major Accidents and Disaster
C-119	Routine maintenance will identify failing components which will be replaced. Performance of modules and componentry is also monitored remotely to identify any faults or failures.													Requirements	Operation	Planning Inspectorate	Major Accidents and Disaster
C-120	The solar panels will be monitored remotely and the Site is covered by CCTV; which will allow any fire to be quickly identified													Requirements	Operation	Planning Inspectorate	Major Accidents and Disaster
C-121	Operational procedures will set out that maintenance tasks are planned around unsafe working conditions associated with climate change events.													Requirements	Operation	Planning Inspectorate	Major Accidents and Disaster
C-122	An In-combination Climate Impacts (ICCI) assessment is undertaken by assessing how identified receptors in the surrounding environment are affected by future climate parameters, informed by the future climate baseline. Inclusion of an ICCI assessment has been scoped in, but this will be addressed ES stage													Requirements	Pre-construction	Planning Inspectorate	ICCI Assessment presented in the ES

Commitment Reference	Description	Greenhouse Gases	Cultural Heritage and Archaeology	Ecology	Ornithology	Water Environment	Landscape and Visual Impact Assessment	Glint and Glare	Noise and Vibration	Socio-Economics	Traffic and Transport	Ground Conditions	Other Environmental Topics	Anticipated Securing Mechanism	Timing	Consent Granting Body	Relevant Application Documents
C-123	<p>ICCI assessment presented at ES will identify if any reported effects will be exacerbated or ameliorated by the effects of climate change and identify further mitigation where required. It will also assess embedded measures to improve the resilience of the environment within the Study Area to climate change, such as nature-based solutions.</p>													Requirements	Pre-construction	Planning Inspectorate	ICCI Assessment presented in the ES

