RWE

Lostrigg Solar
EIA Scoping Report – Main text

June 2024

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Table of Acronyms

Acronym	Definition
AADF	Annual daily flow
AADT	Annual Average Daily Flow
AAR	Average Annual Rainfall
ABC	Allerdale Borough Council
AC	Alternating Currant
ADF	Average Daily Flows
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AP	Assessment point
AQMA	Air Quality Management Area
ASR	Annual Status Report
BEIS	Business, Energy and Industrial Strategy
BESS	Battery Energy Storage System
BGS	British Geological Society
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BRE	Building Research Establishment
BRES	Business Register and Employment Survey
BS	British Standard
BSI	British Standards Institute
CBC	Copeland Borough Council
CBDC	Cumbria Biological Data Centre
CC	Cumerland Council
CCC	Cumbria County Council
CCCC	Cumberland County Conservation and Design Officer
CCTV	Closed-circuit television

Acronym	Definition
CEA	Cumulative Effects Assessment
CHES	Cumbria Historic Environment Service
CIEEM	Chartered Institute of Ecology and Environmental Management
CIEH	Chartered Institute for Environmental Health
CiFA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
CMRA	Coal Mining Risk Assessment
CMWLP	Cumbria Minerals and Waste Local Plan
CNP	Critical National Priority
COMAH	Control of Major Accident Hazards
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
CWS	County Wildlife Sites
DBA	Desk Based Assessment
DC	Direct Currant
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DLL	District Level Licence
DLUHC	Department for Levelling Up, Housing and Communities
DMRB	Design Manual for Roads and Bridges
DNA	Deoxyribonucleic Acid
DNO	District Network Operator
DTM	Digital Terrain Model
EA	Environment Agency
EBRD	European Bank for Reconstruction and Development
EC	European Commission

Acronym	Definition
EEC	European Economic Community
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ELC	European Landscape Convention
EMF	Electromagnetic Fields
ENW	Electricity North West
EPA	Environmental Protection Act
EPR	Earth Potential Rise
ES	Environmental Statement
ESR	Existing Sensitive Receptor
ESRI	Environmental Systems Research Institute
EU	European Union
FRA	Flood Risk Assessment
GCN	Great Crested Newt
GHG	Greenhouse Gas
GIS	Geographic Information System
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystems
GWP	Global Warming Potential
HCA	Homes and Communities Agency
HDD	Horizontal Directional Drilling
HE	Historic England
HER	Historic Environment Record
HEWRAT	Highways England Water Risk Assessment Tool
HFAF	Honourable Fraternity of Ancient Freemasons
HGV	Heavy Goods Vehicle
HIS	Habitat Suitability Index
HRA	Habitat Regulations Assessment

Acronym	Definition
HSE	Health and Safety Executive
IAQM	Institute of Air Quality Management
ICCI	In-Combination Climate Impacts
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
IUCN	International Union for Conservation of Nature
LAQM	Local Air Quality Management
LCA	Local Character Area
LCRM	Land Contamination Risk Management
LCT	Landscape Character Types
LDNP	Lake District National Park
LFRMS	Local Flood Risk Management Strategy
LGV	Light Goods Vehicle
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LQM	Land Quality Management
LSE	Likely Significant Effects
LVA	Landscape and Visual Appraisal
LVIA	Landscape and Visual Impact Assessment
MAFF	Ministry of Agriculture, Fisheries and Food
MMP	Materials Management Plan
NCA	National Character Area
NE	Natural England
NERC	Natural Environment and Rural Communities
NH	National Highways
NHLE	National Heritage List for England
NIHP	National Radiological Protection Board
NNR	National Nature Reserve

Acronym	Definition
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
NSN	National Site Network
NTS	Non-technical summary
NVC	National Vegetation Classification
oBFSMP	outline Battery Fire Safety Management Plan
oCEMP	outline Construction Environmental Management Plan
oCTMP	outline Construction Traffic Management Plan
oDEMP	outline Decommissioning Environmental Management Plan
oLEMP	outline Landscape and Ecological Management Plan
ONS	Office for National Statistics
OS	Ordnance Survey
oSRMP	outline Soil Resource Management Plan
PAS	Publicly Available Specification
PC	Principal Contractor
PCM	Pennine Coal Measures
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PIR	Passive infra-red
PLCM	Pennine Lower Coal Measures
PMCM	Pennine Middle Coal Measures
PPE	Personal Protection Equipment
PPG	Planning Practice Guidance
PRA	Preliminary Risk Assessment

Acronym	Definition
PV	Photovoltaic
RAG	Red, Amber, Green
RBD	River Basin District
RBMP	River Basin Management Plan
RICS	Royal Institution of Chartered Surveyors
RNAG	Reasons for Not Achieving Good
RPA	Root Protection Area
RWE	The Applicant - A multinational energy company
SAC	Special Area of Conservation
SMGP-MDSS	Stainmore Formation
SOAEL	Significant Observed Adverse Effect Level
SOM	Soil Organic Matter
SoS	Secretary of State
SPA	Special Protection Area
SPD	Supplementary Planning Document
SRN	Strategic Road Network
SSEW	Soil Survey of England and Wales
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
TG	Technical Guidance
TGN	Technical Guidance Note
TWAO	Transport and Works Act Order
UK	United Kingdom
UKCEH	UK Centre for Ecology and Hydrology
UKSHA	UK Health Security Agency
UNECE	United Nations Economic Commission Europe
UNESCO	United Nations Education, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
WEEE	Waste Electrical and Electronic Equipment Recycling

Acronym	Definition
WER	Water Environment Regulations
WFD	Water Framework Directive
WG	Warwickshire Group
WHS	World Heritage Site
WLC	Whole Life Carbon
WLCA	Whole Life Carbon Assessment
WS-SDST	Whitehaven Sandstone Formation
YG	Yoredale Group
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Purpose of the EIA Scoping Report

1.1.1.1 RWE Renewables UK Solar and Storage Ltd. (the Applicant) has commissioned this Environmental Impact Assessment (EIA) Scoping Report for Lostrigg Solar (the Proposed Development).

1.1.1.2 The Proposed Development consists of a proposed solar farm with an electrical generating capacity over 50MW, Solar photovoltaic (PV) modules and associated mounting structures, inverters, transformers, switch gear and control equipment, a substation, point of connection, energy storage equipment and underground on and off-site cabling. The Proposed Development's planning boundary (draft Order Limits), covering an area of approximately 480ha, is located in the north-west of England within the administrative boundary of Cumberland Council. The total area covered by solar panels is 228ha. A full description of the Proposed Development is provided in Chapter 2 of this EIA Scoping Report.

1.1.1.3 In accordance with Regulation 8(1)(b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) [1], the Applicant confirms that an Environmental Statement (ES) will accompany a Development Consent Order (DCO) application to be submitted to the Planning Inspectorate (PINS) for the Proposed Development.

1.1.1.4 This EIA Scoping Report has been prepared to support an application for a Scoping Opinion from the Secretary of State (SoS) for Energy Security and Net Zero (DESNZ) for the purposes of Regulation 10 of the EIA Regulations [1] for the Proposed Development.

1.1.1.5 The purpose of this EIA Scoping Report is to establish the scope, including content and extent of matters which should be covered in an ES to be prepared and submitted for the Proposed Development. It has been prepared in accordance with PINS Advice Note Seven [2] for all environmental factors (topics) set out in the EIA Regulations.

1.2 The Applicant

1.2.1.1 The Applicant is a leading solar and battery energy storage developer with one of the largest development pipelines in the UK. RWE has supplied people and companies with electricity for more than 125 years. The RWE Solar and Storage team have achieved consent for projects delivering over 1.2 Gigawatt (GW) of generating capacity across the UK and Ireland.

1.2.1.2 The Applicant is currently developing a pipeline of solar and solar with storage projects with a potential generating capacity in excess of 4GW in the UK by 2025. In addition to the 800MW consented in the UK in the last 24 months, RWE have an additional 350MW already in the planning system across 11 sites and a

programme to submit consent applications totalling in excess of 500MW in the coming year.

1.3 Need for the Proposed Development

1.3.1.1 The Proposed Development would provide new energy generating infrastructure, in line with national policy targets for decarbonisation, including meeting Net Zero targets, safeguarding energy supply and ensuring affordability.

1.3.1.2 The Energy Security Strategy [3] produced by the UK Government in April 2022 announced the intent to increase solar capacity in the UK from 14GW to 70GW by 2035. In addition, the Energy White Paper: Powering our Net Zero Future [4] outlined the need to 'build back greener' following the impact of Coronavirus, addressing the inter-generational challenge of climate change. The White Paper identifies the UK Government's aim for a fully decarbonised, reliable and low-cost power system by 2050. The 'Powering Up Britain' [5] policy paper further reiterates the Government commitment to solar energy, setting out a goal for a fivefold increase in solar power by 2035. The UK's decarbonisation target as described in The Climate Change Act (2008) [6] is to ensure that the UK net carbon account for the year 2050 is at least 100% lower than the 1990 baseline. The sixth carbon budget (2033 – 2037) has been set at 965 MtCO2e in line with the level advised by The Committee on Climate Change [7].

1.3.1.3 The Proposed Development would contribute to the UK Government's legally binding target to reach net-zero emissions by 2050 and respond to the projected increase in demand for electricity, as well as improving UK energy security and resilience in line with national strategy. The Overarching National Policy Statement for Energy (NPS EN-1) [8] designated in January 2024 establishes that the delivery of low carbon energy infrastructure, such as the Proposed Development, is of Critical National Priority (CNP).

1.4 The need for EIA

1.4.1.1 As the Proposed Development comprises the 'construction or extension of a generating station' and will have a 'capacity of more than 50MW', it is considered to be a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(a) and Section 15(2) of the Planning Act 2008 (the Act) [9]. Therefore, the Proposed Development requires a DCO application to be submitted to PINS before being determined by the SoS.

1.4.1.2 In relation to NSIPs, an EIA is required for certain developments under the EIA Regulations [1]. The EIA Regulations identify which developments are required to undergo EIA, and these are listed under either 'Schedule 1' or 'Schedule 2' of the EIA Regulations. Those developments listed under 'Schedule 1' must always be subject to EIA and 'Schedule 2' developments are only subject to EIA should it be judged, in accordance with Regulation 3(1) that the development is "likely to have significant effects on the environment by virtue of factors such as its nature, size or location". Schedule 3 of the EIA Regulations provides the selection criteria for screening to determine whether a Schedule 2 development requires EIA.

1.4.1.3 The Proposed Development is categorised as 'Schedule 2' development under Paragraph 3(a) of Schedule 2 of the EIA Regulations [1], as it comprises "industrial installations for the production of electricity, steam and hot water". It must, therefore, be considered whether, under the criteria of Schedule 3, the Proposed Development constitutes EIA development.

1.4.1.4 The Applicant considers that due to the size, nature, and location of the Proposed Development, it has the potential to have significant effects on the environment and that an EIA will be required. Accordingly, under Regulation 8(1)(b) of the EIA Regulations [1] the Applicant wishes to confirm to the SoS that an ES will be submitted with the DCO Application.

1.4.1.5 The stages of the DCO EIA process include:

- Screening (discretionary) (not formally undertaken, project deemed EIA);
- Scoping (discretionary) (the subject of this report);
- Preparation of a Preliminary Environmental Information Report (PEIR) – required for statutory consultation; and
- Preparation of an ES to accompany the DCO Application.

1.4.1.6 Further details on the approach to EIA for the Proposed Development are provided in Chapter 4 of this EIA Scoping Report.

1.5 Planning policy context

1.5.1 National policy

National Policy Statements

1.5.1.1 In accordance with Section 104(2) of the Act, the National Policy Statements (NPS) are the primary policy basis for NSIP development and the SoS is directed in the Act to determine a DCO application in accordance with the relevant NPS.

1.5.1.2 The following NPS are relevant to the Proposed Development:

- Overarching NPS for Energy EN-1 [8]
- NPS EN-3 Renewable Energy Infrastructure [10]
- NPS EN-5 Electricity Networks Infrastructure [11]

NPS EN-1

1.5.1.3 The Overarching NPS for Energy (EN-1) sets out the overall national energy policy for nationally significant energy infrastructure. It is intended to be combined with relevant technology-specific NPSs to form the primary basis for decisions by the SoS. Chapter 2 of NPS EN-1 reflects the current national policy and legislative position on energy infrastructure development, including the legally binding commitment made through the Climate Change Act 2008 to be net zero by 2050. Emphasis is made on decarbonising the power sector and ensuring security of energy supply, with reference to the Net Zero Strategy.

1.5.1.4 In addition, NPS EN-1 introduces the critical national priority (CNP) for low carbon energy infrastructure. NPS EN-1 sets out topic-specific 'assessment principles' and 'generic impacts' which set out how energy NSIP applications should be prepared by the Applicant and considered by the SoS.

NPS EN-3

1.5.1.5 NPS EN-3 is a technology-specific NPS, focusing on renewable energy generation projects. It is therefore to be considered alongside NPS EN-1 as the primary policy basis for decisions on renewable energy infrastructure DCO applications. Section 2.10 sets out policy specific to solar NSIP development, directing the approach to assessment and consideration of impacts which are additional to those detailed in NPS EN-1.

NPS EN-5

1.5.1.6 NPS EN-5 is a technology-specific NPS, focusing on infrastructure for electricity networks, to include transmissions systems (above or underground) and associated infrastructure such as substations and converter stations. It is therefore to be considered alongside NPS EN-1 as the primary policy basis for decisions on electricity network infrastructure DCO applications. It is considered to be a relevant NPS for the Proposed Development due to the inclusion of electricity network infrastructure (underground cables and an on-site substation) within the project.

1.5.1.7 NPS EN-5 sets out assessment principles specific to electricity network infrastructure, with a predominant focus on overhead lines, in addition to those detailed in NPS EN-1.

National Planning Policy Framework

1.5.1.8 The National Planning Policy Framework (NPPF) (2023) [12] sets out the Government's planning policies for England and how these are expected to be applied.

1.5.1.9 Chapter 2 of the NPPF states the purpose of the planning system is to contribute to the achievement of sustainable development. It also details how the planning system should provide ways for the UK to meet the challenge of climate change and transition to a low carbon future.

1.5.1.10 The NPPF does not contain specific policies relating to NSIPs. These are determined in accordance with the decision-making framework in the Act (as amended) and relevant NPS for major infrastructure, as well as any other matters that are relevant (which may include the NPPF).

1.5.2 Local policy

1.5.2.1 On 1st April 2023 local government in Cumbria changed. The draft Order Limits were previously covered by Allerdale Borough Council but now sit within the newly created Cumberland Council authority.

1.5.2.2 The Cumberland Council Plan (2023-2027) [13] comprises the Allerdale Local Plan (Part 1) [14] which was adopted in 2014 and sets out the strategic and development management policies that will guide development up to 2029. The plan states the Council will seek to promote and encourage the development of the renewable and low carbon energy resources given the significant wider environmental, community and economic benefits.

1.5.2.3 Cumberland Council inherited the local development plan documents of each of the former Councils including the Cumbria Mineral and Waste Local Plan documents. However, the Development Plan will form the Consolidated Planning Policy Framework until the new Cumberland Development Plan is adopted and, for the purposes of decision-making, those documents listed in Sections A and B below can only be applied to the former administrative areas only. For example, the policies contained within the adopted Allerdale Local Plan will not be applied to the other former Council areas outside of Allerdale.

1.5.2.4 Section A –

- Schedule of Documents which form the Statutory Development Plan for Cumberland
- Schedule of Adopted Statutory Development Plan Documents
- Schedule of Emerging Development Plan Documents
- Schedule of Made Neighbourhood Plans

1.5.2.5 Section B –

- Schedule of Planning Policy Documents which do not form the Statutory Development Plan for Cumberland
- Supplementary Planning Documents
- Statement of Community Involvement documents
- Conservation Area Appraisals and Management Plans
- Non Statutory Planning Guidance prepared by other organisations and bodies (which have been endorsed by the predecessor Councils)
- Guidance, advice and checklist documents

1.6 Structure of the EIA Scoping Report

1.6.1.1 The EIA Regulations set out the requirements for an Applicant who proposes to request a Scoping Opinion from the SoS. Regulation 10(3) of the EIA Regulations requires an EIA Scoping Report to include:

- *"a plan sufficient to identify the land;*
- *a description of the proposed development, including its location and technical capacity;*
- *an explanation of the likely significant effects of the development on the environment; and*

- *such other information or representations as the person making the request may wish to provide or make."*

1.6.1.2 In accordance with the EIA Regulations, this EIA Scoping Report provides information to identify the location of the Proposed Development, including a plan. It also provides a description of the Proposed Development, its indicative layout and its technical capacity. Where aspects of the Proposed Development design remain subject to further assessment and option selection, this is identified. This EIA Scoping Report provides an explanation of the likely significant effects of the Proposed Development on the environment, setting out the proposed approach and methodology for further assessment. Finally, this EIA Scoping Report provides information and representations from the Applicant in relation to environmental assessment topics that are not considered necessary to scope into further assessment.

1.6.1.3 This EIA Scoping Report is structured as follows:

- Chapter 1: Introduction (this Chapter) – provides an introduction to the Proposed Development, the need for an EIA, and the purpose and structure of this EIA Scoping Report;
- Chapter 2: The Proposed Development – provides an overview of the Proposed Development, including construction, operation and decommissioning and the draft Order Limits;
- Chapter 3: Alternatives and design iteration - describes the alternatives considered, and provides a narrative on how the Proposed Development has been developed to date;
- Chapter 4: Approach to EIA – sets out the requirements for scoping and where they are addressed in this report, the general approach to EIA, and provides definitions for some of the key terms used within the EIA process;
- Chapters 5-18: Topic chapters - sets out those environmental topics proposed to be included in the scope of the EIA, along with the methodologies and approaches to assessment proposed for those topics.
- Chapter 19: Cumulative effects - sets out the proposed approach to the cumulative effects assessment;
- Chapter 20: Structure and content of the PEIR - presents the proposed structure of the PEIR; and
- Chapter 21: Conclusion – provides a summary of this EIA Scoping Report and the issues to be scoped in/scoped out of the EIA.

1.6.1.4 Competent experts have prepared this EIA Scoping Report and will undertake the EIA and prepare the PEIR and ES. The Applicant has engaged Ove Arup and Partners Limited (Arup) and Wardell Armstrong to complete the EIA and produce the ES. Arup and Wardell Armstrong hold the Institute of Environmental Management and Assessment's (IEMA) EIA Quality Mark. See Section 4.7 of this EIA Scoping Report for further information.

2 The Proposed Development

2.1 Introduction

2.1.1.1 This chapter provides a high-level description of the location of the Proposed Development and the surrounding area, as well as an overview of the Proposed Development including a description of its main components and an outline of construction, operational and decommissioning requirements. A detailed description of the existing baseline is provided within the topic chapters (Chapters 5-18).

2.1.1.2 PINS Advice Note Seven [2] requires a Scoping Request to explain the approach to addressing uncertainty (where it remains) in relation to elements of the Proposed Development. This EIA Scoping Report is based on a preliminary design of the Proposed Development which is subject to ongoing design development and will be refined in response to the environmental and technical factors as identified as part of the EIA process, as well as consultation responses.

2.1.1.3 The final proposals for the Proposed Development, for which consent will be sought, will be detailed further within the PEIR and the ES which will support the statutory consultation and DCO application respectively.

2.1.1.4 The PINS Advice Note Seven [2] also requires a Scoping Request to outline the reasonable alternatives considered and the reasons for selecting a preferred option. This information can be found in Chapter 3 of this EIA Scoping Report.

2.2 The draft Order Limits

2.2.1.1 The draft Order Limits for the Proposed Development consider the maximum area of land potentially required for the construction, operation and decommissioning of the Proposed Development, as shown in Figure 2.1.

2.2.1.2 The draft Order Limits are based on the land anticipated to be required temporarily, with permanent rights of access, or permanently for the construction and operation of the Proposed Development, in addition to all land necessary for any works where the Proposed Development interfaces with existing utilities.

2.2.1.3 The Proposed Development is subject to ongoing design development and the draft Order Limits will be refined in response to environmental and technical factors as identified as part of the EIA process, as well as discussions with landowners and consultation responses. This process will ensure that the draft Order Limits only include land which is required to deliver the Proposed Development and any essential mitigation.

2.2.1.4 The preferred cable route options for both the 33kV and the 132kV (explained further in 2.4.5 and 2.4.8 respectively) cables are still being assessed and surveyed and the preferred cable route and final pylon location will be confirmed in advance of the DCO application submission. However, these will fall within the draft Order Limits set, the cable search areas can be found in Figure 2.2.

2.2.2 The Rochdale Envelope and use of design parameters

2.2.2.1 The design of the Proposed Development will evolve throughout the EIA process through the use of an iterative design process. The iterative design process will take into account comments made during consultation, including in response to this EIA Scoping Report, and the ES will describe how the design of the Proposed Development has been influenced by such comments.

2.2.2.2 The Applicant is proposing to use design parameters which will define a worst-case scenario for any element of the design, which is not fixed, dependent on the receptor in question.

2.2.2.3 It is, therefore, the intention of the Applicant to implement the advice within PINS Advice Note Nine: Using the 'Rochdale Envelope' [15] regarding the degree of flexibility that may be considered appropriate with an application for development consent under the Act.

2.2.2.4 In particular, the Advice Note outlines that:

- The DCO application documents should explain the need for, and the timescales associated with, the flexibility sought, and this should be established within clearly defined parameters;
- The clearly defined parameters established for the Proposed Development must be sufficiently detailed to enable a proper assessment of the likely significant environmental effects and to allow for the identification of necessary mitigation, if necessary, within a range of possibilities;
- The assessments in the ES should be consistent with the clearly defined parameters and ensure a robust assessment of the likely significant effects;
- The DCO must not permit the Proposed Development to extend beyond the clearly defined parameters which have been requested and assessed. The SoS may choose to impose requirements to ensure that the Proposed Development is constrained in this way; and
- The more detailed the DCO application is, the easier it will be to ensure compliance with the EIA Regulations.

2.2.2.5 The Advice Note also acknowledges that there may be aspects of the design that are not yet fixed, resulting in the need for the EIA to assess likely worst case variations to ensure that all foreseeable significant environmental effects of the Proposed Development are assessed.

2.2.2.6 This is of particular importance to maintain due to the ever-evolving technology and speed of development within solar PV module and energy storage markets. The Rochdale Envelope approach will be followed in the PEIR and ES.

2.3 Site description

2.3.1.1 The total area within the draft Order Limits is approximately 480ha and shown in Figure 2.1; scoping has been based upon these draft Order Limits. The entirety of

the Proposed Development is within the administrative area of Cumberland Council.

2.3.1.2 The most northerly point of the draft Order Limits is located approximately 450m to the south of Little Clifton and is bound by the A595 and Winscales Road to the west, Clifton Green and Oldfield Road to the east, agricultural land and woodland belts to the north, and agricultural land to the south. The majority of agricultural fields aforementioned consist of intensively managed grassland fields for grazing and silage production, with a small number of fields utilised for arable cropping and areas of low input grassland.

2.3.1.3 The southern area of the draft Order Limits is located approximately 220m north-east of Lillyhall Industrial Estate and 1.5km west of Branthwaite. It is bound by an unnamed road from the Lillyhall Roundabout to Branthwaite village to the south and agricultural land to its north, east and west.

2.3.1.4 The landscape features within the northern area consist of agricultural fields interspersed with individual trees, bound by hedgerows and a deciduous woodland belt either side of the Lostrigg Beck. Mature field trees and trees within fragmented hedgerows are the dominant feature of this area, alongside intact field boundaries within the eastern parcels. The arable and pasture fields are of moderate size the majority are a regular shape. Part of the land in the north of the draft Order Limits is subject to a Countryside Stewardship Scheme (Middle Tier). An overhead power line also crosses the northern area from east to west.

2.3.1.5 The landscape features immediately surrounding the northern area include the village of Little Clifton to the north and local farmholdings off Winscales Road and Clifton Green to the east and west.

2.3.1.6 The landscape features within the central area consist of agricultural fields interspersed with individual trees bound by remnants of hedgerows and some small blocks of woodlands around the edges and Lostrigg Beck. The predominantly pasture fields are of small to medium size, a number of which are an irregular shape. Part of the land surrounding Stargill Farm in the central area is subject to a Countryside Stewardship Scheme (Higher Tier).

2.3.1.7 The landscape features immediately surrounding the central area of the draft Order Limits include the village of Branthwaite to the south west and local farmholdings to the south off an unnamed road from the Lillyhall Roundabout to Branthwaite village. Grasmoor View Holiday Park is located to the west. The landscape features within the southern area consist of agricultural fields interspersed with mature trees and conifer woodland block plantations, groups of mature trees within the fields and remnants of hedgerows within and along its boundaries. The Wythemoor Sough forms the western boundary of the eastern parcel. The draft Order Limits comprises pasture fields of a small to medium size a number of which are an irregular shape.

2.3.1.8 The landscape features immediately surrounding the southern area include the Lillyhall Industrial Estate to the south-west, the village of Branthwaite to the east, Cumberland Lodge to the north-west and Potato Pot Wind Farm to the south.

2.3.1.9 The local transport network comprises Winscales Lane to the west and Clifton Green to the east, providing access to all parcels. Private access is provided to Stargill Farm and there is an unnamed road to the south.

2.3.1.10 There are five Public Rights of Way (PRoW) running through the draft Order Limits – two partially through the northern area - Footpath 241007 and Footpath 241005; one runs through the central area (Footpath 230010) and two run through the southern area – Footpath 260003 and Footpath 260001. . The central area has no PRoW running through it but PRoW Footpath 260003 is located to the south. PRoW are shown on Figure 16.2.

2.3.2 Environmental Designations

2.3.2.1 Statutory environmental designations, and other key features, are outlined on Figure 2.3.

2.3.2.2 The draft Order Limits at their nearest point are located approximately 270m west of the River Derwent and Tributaries Site of Special Scientific Interest (SSSI) and River Derwent and Bassenthwaite Lake Special Area of Conservation (SAC).

2.3.2.3 There are two Scheduled Ancient Monuments on the banks of the River Marron – the Little Clifton open heap coke producing bases and associated slag heap located approximately 400m east of the draft Order Limits and Calva Hall Bridge approximately 970m east of the draft Order Limits. There are also a number of Grade II Listed Buildings in proximity to the draft Order Limits including the Wythemoor Sough and Adjoining Barn and Stable approximately 140m south and Plunderland Farmhouse and Adjoining Barn approximately 205m north. In addition to a cluster of Grade II Listed buildings in Branthwaite village.

2.3.2.4 The majority of the draft Order Limits are located within Flood Zone 1, an area with a low probability of flooding from rivers and the sea. Some small areas of the Central Panel Area located around the Lostrigg Beck which are located within Flood Zones 2 and 3.

2.4 Description of the Proposed Development

2.4.1.1 The Proposed Development consists of a solar farm capable of generating over 50MW Alternating Current (AC) of electricity with a co-located Battery Energy Storage System (BESS), located between the villages of Little Clifton and Branthwaite to the north-east of Lillyhall Industrial Estate in north-west England. The Proposed Development comprises three Panel Areas – the Northern Panel Area, Central Panel Area and Southern Panel Area. Panel Areas are defined as an area within the draft Order Limits that contain a group of PV panels. An on-site substation would be located within the Central Panel Area and two on-site pylons would be located to the west of the Central Panel Area to connect the Proposed Development to the electricity distribution network. Figure 2.2 illustrates the indicative general arrangement of the Proposed Development.

2.4.1.2 The Proposed Development would include underground cabling between the Panel Areas and the on-site substation, as well as underground cabling between the on-site substation and the point of connection, two on-site 132kV pylons (either utilising the existing or replacement like for like) to be sited north of the on-site substation. The pylons and cabling would allow connection of the Proposed Development into the existing distribution network which runs close to the draft Order Limits. This cabling could be placed either within roads or through an off-road option. A range of supporting infrastructure is required for the Proposed Development, comprising BESS; transformers and inverters; storage containers to hold this equipment; and security measures such as fencing, CCTV and lighting.

2.4.1.3 The Proposed Development would also include environmental mitigation and enhancement measures to avoid or reduce adverse impacts on the surrounding environment and nearby communities. An indicative schematic Landscape Masterplan for the Proposed Development is shown in Figure 2.4. It has been developed in consultation with specialist EIA topic leads to devise a layout that responds to the environmental context of the draft Order Limits based on the information available at EIA Scoping stage. The detailed design specifications of the Proposed Development have not yet been finalised and will be reviewed following the outcome of the specialist assessments undertaken as part of the ES, and statutory and non-statutory consultation feedback. .

2.4.1.4 Due to rapidly changing and evolving solar and energy storage technology, the Proposed Development parameters are designed to maintain flexibility to allow the latest technology to be installed at the time of construction. However, as outlined in Section 2.2.2, the ES will assess the cautious worst-case scenario for key design parameters.

2.4.1.5 Key details on each element of the design are outlined further below.

2.4.2 Solar Panels

2.4.2.1 Solar panels generate electrical power by using a solar PV module to convert sun light into direct current (DC) electricity. Individual solar PV modules, more commonly known as solar panels, contain several PV cells wired and encapsulated by tempered glass. Solar PV modules are sealed for weatherproofing and held together by a metal frame in a mountable unit.

2.4.2.2 Individual solar PV modules are typically 2m by 1m in width and depth and can vary in height. However, as solar PV modules are rapidly developing due to innovation in technology and processing techniques for the PV cells, the dimensions of the solar PV modules available at the time of construction may vary. The ES will therefore consider a height parameter which represents the worst-case scenario in terms of identifying potential environmental effects.

2.4.2.3 It is possible to install the solar PV modules as fixed or as tracking which adjust the position of the solar PV modules to track the sun throughout the day. The exact number and arrangement of modules depends on a range of factors including the size of the system, the type of technology fixed or tracking, its location and the

direction in which the panels are installed. As technology and equipment is evolving, some flexibility in design will be required to accommodate technology advances.

2.4.2.4 Table 2-1 presents a summary of the difference between fixed and tracking solar PV modules and the design parameters to be used for the ES. The ES will provide a detailed summary of the proposed approach and assess the worst-case scenario in terms of identifying potential environmental effects.

Table 2-1 Solar Panel key parameters

Design Parameter	Fixed	Tracking
Panel Alignment	Rows of solar PV modules aligned in East-West rows with panels facing South	Rows of solar PV modules mounted on a metal tracking system aligned in North-South rows with panels rotation East-West
Angle	+/- 10° to 30°	+/- 60°
Orientation	South	East-west
Separation distance	Minimum 4m and maximum 12m between rows	Approximately 4 – 6m between rows when the solar PV modules are at full vertical tilt
Height	Maximum height of up to 3m Minimum height of the lowest part of the panel would typically be between 0.8m	Maximum height of 3m, which would vary throughout the day Minimum height of the lowest part of the panel would typically be between 0.4m-1m
Mounting structure	The mounting structure for the solar PV modules is a metal frame (usually anodised aluminium alloy) securely fixed to the ground by galvanized steel poles which are typically driven into the ground to a depth of approximately 1m.	

2.4.2.5 Typical solar PV module designs are shown on Figure 2.5 and Figure 2.6.

2.4.3 On-site supporting equipment

2.4.3.1 A range of equipment is required to support the solar PV modules to convert the electrical power generated, manage this power and export power onto the electricity distribution network. The electrical output from the solar PV modules would be exported by low voltage cabling to shipping container style storage units which would contain an inverter, transformer and BESS. The function of each of these elements are as follows:

- Inverters convert the DC generated by the solar PV modules into AC that can be exported to the electricity distribution network;

- Transformers monitor, increase and control the voltage of the electricity produced before it reaches the on-site substation. The transformers would be located adjacent to the inverters; and
- BESS would provide battery energy storage systems to allow the energy from the solar PVs to be stored then released when required and would comprise containerised battery storage systems, DC-DC converter boxes and ancillary equipment.

2.4.3.2 The inverters, transformers and BESS would be arranged together across the Proposed Development. These would be placed on compacted pad foundation and would measure approximately 3m in height, 2.5m in width and 12m in length. The typical layout of this supporting infrastructure and access is provided in Figure 2.7.

2.4.3.3 Low voltage cabling within the Panel Areas would be required to connect solar PV modules and the BESS to inverters where the voltage is transformed from the lower voltage to 33kV. Cabling from the solar PV modules to the inverters would typically be installed above ground, fixed to the mounting structure of the modules, with a small section placed underground where it leaves the solar PV modules and connects to the inverters.

2.4.3.4 The Proposed Development would utilise switchgears to control, protect and isolate electrical currents and equipment. Switchgears allow parts of the solar PV system to be de-energised safely, allowing for routine maintenance or faults to be identified and work undertaken. A typical switchgear of the style likely to be used on the Proposed Development is shown in Figure 2.8.

2.4.4 Battery Energy Storage Systems

2.4.4.1 The BESS is likely to consist of lithium-ion batteries and would allow energy to be stored within the Proposed Development, providing a balance in electricity generation where surplus electricity is produced.

2.4.4.2 A typical battery storage station is shown in Figure 2.12

2.4.5 33kV underground cabling

2.4.5.1 The 33kV cables would connect the solar PV modules and Panel Areas to the proposed on-site substation which would be located within the Central Panel Area. These 33kV cables would use routes across agricultural land, subject to survey findings, between the Northern Panel Area and the Central Panel Area and the Southern Panel Area and the Central Panel Area. Additional cable routes would be provided between the eastern and western parcels of the Northern Panel Area and the Southern Panel Area. At this stage, the location of these cable routes is yet to be fixed, but will be within the areas of search shown on Figure 2.2. If cable routing across agricultural land was not deemed feasible then an alternative route has also been identified along the A595.

2.4.5.2 The cable route options are currently being surveyed and it is the intention of the Applicant to confirm a preferred cable route prior to the submission of the DCO,

reflecting survey findings, landowner discussions and any feedback received through consultation and engagement. Should a decision not have been reached by statutory consultation stage, the PEIR will include an assessment of options.

2.4.6 On-site substation

2.4.6.1 A substation would be required for the Proposed Development to connect the Panel Areas to the electricity distribution network . The substation would also house other electrical equipment such as transformers, switchgear, and metering equipment.

2.4.6.2 The purpose of this on-site substation is to convert low voltages from electricity generation to high voltages, or vice versa, using power transformers. The on-site substation would be located in the Central Panel Area. The substation compound would be 76m in length, 70m in width with a 30m x 70m parking and turning area. The equipment within would have a maximum height of 15m (which would only relate to a communications tower, with the highest electrical equipment being 8m).

2.4.6.3 A typical substation is shown in Figure 2.9.

2.4.7 Point of connection

2.4.7.1 Two existing or replacement on-site 132kV pylons would be required for the Proposed Development to connect to the existing ENW network which runs through the draft Order Limits. The pylons would provide the point of connection for the Proposed Development to connect it to the wider Cumbrian Ring circuit and the electricity distribution network and would either utilise two of the existing 132kV pylons on-site or would be replacement (like for like) pylons located up to 50m from the existing pylons. Should replacement pylons be required the works would likely be carried out by the District Network Operator (DNO).

2.4.7.2 The on-site pylons would be located immediately north east and east of the proposed on-site substation to the west of the Central Panel Area.

2.4.7.3 A typical pylon is shown in Figure 2.13.

2.4.8 132kV underground cabling

2.4.8.1 The Proposed Development would connect to the existing electricity distribution network via the proposed on-site pylons. Underground 132kV cabling would be required to connect the Proposed Development from the on-site substation to the on-site pylons, expected to be less than 500m in length. The maximum dimension of the cable trench would be 1600mm depth x 2000mm wide. Alternatively, a cable plough would be used to lay the cable. This cable would use a route across agricultural land, subject to landowner agreement, between the Central Panel Area and the proposed on-site pylons to the west of the Central Panel Area. The cable route option is currently being surveyed, with the search areas shown on Figure 2.2. The preferred cable route and final pylon locations will be confirmed in advance of the DCO submission, but will be within the draft Order Limits set.

2.4.9 Other infrastructure

2.4.9.1 Additional infrastructure would be required to support the operation of the Proposed Development. The following equipment would be installed across the draft Order Limits as follows:

- Fencing and gates – aa perimeter security fence would be installed to enclose the operational areas of the Proposed Development. The fence is likely to be a deer fence with a maximum height of 2m. The fence would be designed in such a way to allow small animals to pass through the draft Order Limits and would also be gated to allow access to and from the draft Order Limits. Typical fencing is shown in Figure 2.10.
- CCTV – pole-mounted, infra-red security detection cameras would be mounted on poles of up to 3m in height located within the perimeter fence. It is anticipated that these cameras would have motion detection technology for recording and would be pointed directly within the draft Order Limits and away from any land outside of the draft Order Limits. A typical CCTV pole is shown in Figure 2.11.
- Lighting – in general, it is anticipated that the Proposed Development would not be lit, however, infrared security lighting would be required around key electrical infrastructure. This lighting would be sensor triggered and therefore not continuous.
- Access tracks – access to the Proposed Development during operation would be required for maintenance. A series of access tracks are proposed within the draft Order Limits to provide points of access onto the local highway network. Access tracks would be permeable to allow water to filtrate through and maintain greenfield runoff rates.
- Drainage – the detailed operational drainage design for the Proposed Development will be undertaken prior to construction. The overarching principle of the drainage strategy for the Proposed Development is to provide sustainable drainage solutions (SuDS) at source, ensuring that surface water run-off is managed as per existing conditions.
- Storage containers – it is anticipated that additional storage containers would be installed in the Proposed Development to contain extra equipment to support maintenance activities.

2.4.10 Environmental design

2.4.10.1 The design of the Proposed Development aims to avoid environmental impacts where possible and to integrate the Proposed Development into the wider landscape from the offset. This has been informed by understanding the environmental constraints of the draft Order Limits and steering development away from sensitive areas, whilst protecting space for appropriate mitigation.

2.4.10.2 An indicative landscape masterplan, Figure 2.4, has been developed at this early design stage to illustrate the intentions of use within the draft Order Limits. This

has been developed in collaboration with ecologists and landscape architects to ensure a coherent design approach and avoid loss or damage to biodiversity, nature and communities as well as to ensure a biodiversity net gain.

2.4.10.3 As part of the aforementioned approach a set of design principles is guiding the design of the Proposed Development, including:

- All mature trees, woodland blocks and hedgerow boundaries within the proposed areas for solar panels will be retained.
- Impacts on public rights of way will be minimised through the use of buffer zones and planting.
- The Proposed Development will be integrated into the wider landscape setting, with particular consideration to the Lake District National Park and World Heritage Site.
- Existing landscape structures will be enhanced, such as woodland blocks and hedges with additional planting to provide instant screening.
- A reasonable buffer between residential dwellings and the nearest panels will be maintained.
- Opportunities for continued sheep grazing under the solar panels are being explored.
- Green infrastructure along Lostrigg Beck will be enhanced which would support biodiversity net gain.
- Solar panel areas will be targeted towards lower quality agricultural land available wherever possible.

2.4.10.4 In addition, the following mitigation is already considered embedded within the design of the Proposed Development, and will be secured through the DCO. These include:

- 15m buffer from panels to ancient and veteran trees
- 15m buffer from panels to woodland
- The construction compound will be located on low diversity habitat.
- An appropriate buffer will be maintained between properties and construction areas
- Any sources of operational noise (i.e. inverters) will be located as far as reasonably possible from existing sensitive receptors, and at a minimum distance of 300m from existing sensitive receptors
- Buffers for all other trees (none ancient / veteran) and hedgerows to be determined by RPA, but at least 5m buffer for trees with potential for bats, and a minimum 8m buffer between solar panels and hedgerows (reduced to 5m from panels for internal hedges)
- Minimum 10m offset from all infrastructure (including fencing) from bank top of all riparian boundaries and watercourses
- 30m buffer from badger sett locations

- Fencing to be designed to let small mammals pass through (excluding that around the on-site substation)
- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions
- Access tracks will be permeable using compacted gravel to allow water to filtrate through and maintain greenfield runoff rates
- If below ground archaeology constraints arise through further site investigation the mounting structure of solar panels will utilise options such as ballast slabs, anchor, or block which sit on the ground surface
- Any access tracks, cable routing and fencing will be located to pass through existing gates and gaps in hedgerows where feasible
- The new / replacement pylons will be replaced like for like and will be no taller than existing
- Routing for construction and operation vehicles will avoid routing through local villages
- The placement of BESS and other infrastructure will avoid historic mine entries and compressible ground
- Existing hedgerows in poor condition / gappy will be reinforced with planting / management where feasible
- No significant lighting proposed, demand responsive motion sense lights only, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact
- Opportunities for advanced planting will be explored to provide early establishment and maximise visual screening
- Large areas of panels will be avoided where feasible, broken up by hedgerow planting along historic field boundaries to maximise landscape integration
- Deer fencing to be offset from PRoW by a minimum of 5m
- Where possible, underground cables would be installed using a cable plough or trenching. These are considered the most efficient and least impactful methods of cable installation, causing minimal disruption to the ground by cutting, installing and back-filling in one operation

2.5 Construction methodology

2.5.1 Construction programme

2.5.1.1 It would take up to 24 months to construct the Proposed Development following the granting of the DCO. A cautious worst-case scenario for the construction programme will be assessed and presented in the ES, in accordance with the design parameter approach.

2.5.1.2 The final programme will be dependent on the detailed layout design and potential environmental constraints on the timing of construction activities.

2.5.1.3 The installation of solar PV modules does not involve any complex construction process or practices and, therefore, risk of delay beyond the programme is to be included within the ES and would largely be driven by adverse weather conditions. Many component parts of the Proposed Development would arrive on-site ready to be installed. It is anticipated that Abnormal Indivisible Loads (AILs) would be required to enable construction of the on-site substation and the ES would confirm the anticipated number and suggested routing of these movements.

2.5.2 Construction activities

2.5.2.1 The activities that are likely to be required for the construction of the Proposed Development are outlined below and it is anticipated that these activities would take place over several key stages.

2.5.2.2 The stages of construction for a typical Panel Area are set out below with broad estimates for the time taken for each stage. It is the Applicant's preference to construct the three Panel Areas concurrently, however, a detailed programme will be provided within the PEIR. A 24 month period for construction has been set for the purposes of EIA scoping until further detail is understood, although in reality the construction period is expected to be shorter.

2.5.2.3 The typical stages of the construction of each Panel Area with approximate timing is set out in Table 2-2.

Table 2-2 Typical Panel Area construction stages

Stage	Description	Approximate time frame per panel area
Stage 1	Enabling / Preparatory works Mobilisation; and Enabling works	2 months
Stage 2	Foundations	4-5 months
Stage 3	Module delivery and installation	
Stage 4	Commissioning	2 months
Stage 5	Site Reinstatement and Habitat Creation	

2.5.3 Construction staff and hours of work

2.5.3.1 Working hours during the construction phase would be 08.00-18.00 Monday to Friday, 08.00-14.00 Saturday with no activities on Sunday or Bank/Public Holidays. It is anticipated there would be around 30 – 50 staff working on average with a peak of workers during Stage 3 for a limited period of time.

2.5.4 Plant and Proposed Development access

2.5.4.1 It is anticipated that the principal plant required to install the solar PV modules would include:

- Excavator;
- Mobile crane;
- Crawled Dozer;
- Push press piling rig;
- Power generator;
- Telehandler;
- Truck; and
- Vibrating roller.

2.5.4.2 Access into each of the Panel Areas would be required to facilitate construction, as well as allowing ongoing maintenance access from the local highway network. The requirements for access are accounted for within the draft Order Limits and at this stage of the Proposed Development, it is anticipated that access would be from existing access points.

2.5.5 Construction compound

2.5.5.1 It is anticipated that one construction compound per panel area would be required for the construction of the Proposed Development. The compound would typically measure 60m in length and 30m in width. A 'Durabase Mat System' or a similar non-ground penetrating mat system would be used within the compound.

2.5.5.2 The temporary construction compound would contain construction worker welfare facilities, a site office, an appropriate number of parking spaces, wheel wash area, plant and machinery storage, Heavy Goods Vehicle (HGV) / delivery turning area and waste storage areas.

2.5.5.3 For security and safety purposes, any live construction areas would be closed to the public throughout the construction phase. Site security staff would patrol the Proposed Development in addition to hazard warning signs and CCTV.

2.5.6 Waste management

2.5.6.1 The Proposed Development is likely to generate waste consisting of general construction waste, including packaging waste from materials and construction materials from access roads and supporting infrastructure. No excavation or transport of cut off site is required by the Proposed Development. During operation, it is anticipated that waste generation would be minimal. Waste from the decommissioning of the Proposed Development would be disposed of responsibly and undertaken in alignment with the future principles of recycling available at that time. Construction, operation and decommissioning of the Proposed Development is, therefore, expected to generate minimal waste arisings.

2.5.6.2 An outline Construction Environmental Management Plan (oCEMP) and outline Decommissioning Environmental Management Plan (oDEMP) will be submitted alongside the DCO application and will include the principles required to be adhered to in relation to waste management. The final plans will be secured through the DCO and signed off by the local planning authority.

2.5.7 Construction lighting and energy use

2.5.7.1 Temporary construction lighting would be intermittently used throughout the construction phase for select operations in isolated locations only and at the construction compounds. Construction lighting may be used within the Panel Areas during night time hours in the winter if works require this.

2.5.8 Stage 1

2.5.8.1 Preparatory works would be the first stage of construction and includes activities to enable and prepare the draft Order Limits for the construction of the Proposed Development. The types of activities that may be required during this stage are likely to include:

- Establishment of and / or works to the Proposed Development access point(s);
- Installation of any temporary / permanent culverts under water courses / ditches;
- Installation of any necessary tree and hedgerow or other habitat protection measures in line with the Arboricultural and ecological Impact Assessments and Tree Protection Plans;
- Ground clearance activities;
- Construction of any access tracks and laydown areas with the Panel Areas - this will be one of the first items within the construction programme to ensure that the majority of the construction traffic enters the Panel Areas from their new access points;
- Establishment of construction compounds at each Panel Area;
- Establishment of mobilisation areas, running tracks and temporary construction compounds for cable installation;
- Erection of security fencing around the Proposed Development perimeter, as well as access gates;
- Installation of security measures such as CCTV;
- Delivery of plant and machinery to the Proposed Development; and
- Delivery of materials to enable first stages of construction.

2.5.8.2 The design has been informed by utilities searches. However, there are still a number of utilities crossing the draft Order Limits which could not be avoided. Prior to construction, the design team and Principal Contractor (PC) would review the utilities plans and use them to inform the plans for the proposed works to ensure all known utilities are avoided. Necessary offsets to known assets will be taken into account in the design.

2.5.9 Stage 2 and 3

2.5.9.1 Following the preparatory works, construction of the Proposed Development would commence, including foundations, and module delivery and installation.

2.5.9.2 The types of activities that may be required during these stages are likely to include:

- Solar PV module installation;
- Installation of solar PV module support structures;
- Mounting of solar PV modules;
- Installation of supporting infrastructure, such as inverters, transformers, battery stations and switchgear;
- Installation of the BESS;
- Construction of the on-site substation;
- Construction of the on-site pylons (if required);
- Installation of storage containers;
- Cable installation;
- Clearance activities such as stripping of topsoil, trenching (if required), storage and capping of soil;
- Installation of construction drainage with pumping (if required);
- Installation of cabling across the solar PV module areas and connection to the inverters; and
- Installation of cables between inverter platforms, transfer stations and collecting stations and onto the point of connection and the proposed on-site pylon.

Panel Area installation and supporting infrastructure

2.5.9.3 The following activities would be required to install the solar PV modules:

- Import of components to the draft Order Limits;
- Site preparation and civils for the on-site substation;
- Piling and erection of solar PV module support structures, with foundations to a depth of circa 1m;
- Mounting of solar PV modules – this would be undertaken by hand;
- Trenching and installation of electric cabling;
- Transformer, inverter and switchgear foundation excavation and construction;
- Installation of transformers, inverters and switchgears. Cranes would be used to lift equipment into position;
- Installation of the substation; and
- Installation of control systems, monitoring and communication.

Cable installation

2.5.9.4 The following activities would be required to construct the cable routes:

- Site preparation;
- Cable ploughing, trenching and installation of electric cabling; and

- Reinstatement works where necessary.

2.5.9.5 It is anticipated that underground cables would be installed using a cable plough or trenching, wherever possible. This is considered to be the most efficient and least impactful method of cable installation, causing minimal disruption to the ground, by cutting, installing and back-filling in one operation. The underground cables would be located in existing gaps in hedgerows wherever feasible, however the ES would assume the loss of some hedgerows as a worst case. Trees and hedgerows to be removed as part of the Proposed Development will be included in the Arboricultural Impact Assessment which will support the DCO application.

2.5.9.6 Only in instances where the cable plough or trenching cannot be used alternative methods, such as horizontal directional drilling (HDD), would be used in more constrained locations such as going underneath water courses and roads.

2.5.9.7 An oCEMP will be submitted as part of the DCO application to set out the measures, commitments and actions identified in the ES to manage environmental effects during construction. These measures, commitments and actions would be carried forward to a CEMP to be approved in accordance with a DCO Requirement.

2.5.9.8 The CEMP would be produced by the PC and agreed with the relevant local planning authorities prior to commencement of construction at stage one.

2.5.10 Stage 4

2.5.10.1 Following construction, the Proposed Development would go through a stage of testing prior to being commissioned and the first electricity generated and supplied to the grid. This is likely to involve mechanical and visual inspection of the Proposed Development, as well as electrical and equipment testing.

2.5.11 Stage 5

2.5.11.1 A programme of landscape and habitat reinstatement and creation would commence during the construction phase. Generally, the implementation of landscape and habitat mitigation and enhancement works will follow on from the main construction activities in each part of the site. This is to avoid any abortive damage to proposed environmental features from construction. For example, it is anticipated that areas under the panels and in the adjacent landscape buffers around each panel area would be seeded with a locally suitable diverse meadow mix and managed mix. This is intended to significantly improve the ground flora, benefiting both biodiversity and soil structure over time. This will also give the added benefit of reducing the burden of soft landscape maintenance requirements.

2.5.11.2 Opportunities will be sought for any advance planting and seeding, which could take place during or even before the stages outlined above. Examples of this might include early planting of new or reinforcement hedgerow on the periphery of the site, or planting of woodland blocks or trees in areas where construction activities will not create a conflict.

2.5.11.3 The establishment maintenance of these measures will initially be carried out by the contractor for up to two years following construction. Following after care maintenance, ongoing management of the landscape and ecological mitigation measures will be undertaken for a period of 15 years in accordance with an Outline Landscape and Ecological Management Plan (oLEMP) to be submitted as part of the DCO application. Figure 2.4 presents an initial idea of the landscape, biodiversity, and cultural heritage mitigation and enhancements to be created in a coordinated design for the Proposed Development.

2.6 Operational activities

2.6.1.1 The design life of the Proposed Development is 40 years.

2.6.1.2 During the operational phase of the Proposed Development on-site activities would be limited and restricted to maintenance activities, replacement of any components that fail, monitoring activities and vegetation management. The Panel Areas would be surrounded by a 2m deer fence. In addition, the Proposed Development would be monitored with pole-mounted CCTV cameras along the perimeter fencing.

2.6.1.3 At this stage of the Proposed Development it is anticipated that access during operation would be from existing accesses wherever possible.

2.7 Decommissioning

2.7.1.1 As previously outlined, the design life of the Proposed Development is 40 years.

2.7.1.2 AtAt the end of its operational life, the Proposed Development would require decommissioning. The process of decommissioning would involve the removal of all solar infrastructure, including the solar PV modules, cabling within the Panel Areas and on-site supporting equipment, to be recycled or disposed of in accordance with good practice and processes at that time. Any requirements to leave certain infrastructure, for example access tracks, would be discussed and agreed with landowners as part of the decommissioning process.

2.7.1.3 The draft Order Limits would be returned to its original use as far as possible and practical with areas of established mitigation left in situ where possible and in agreement with the landowner.

2.7.1.4 Up to 99% of materials in a solar PV module are recyclable, with the number of solar panel recycling plants in the UK increasing. Companies which are aligned with the Waste Electrical and Electronic Equipment Recycling (WEEE) Regulations 2013 such as Recycle solar in Scunthorpe, Solar Recycling Solutions in Dartford and Waste Experts based in Huddersfield are all Approved Authorised Treatment Facilities for solar waste [16].

2.7.1.5 Decommissioning is expected to take between of 6 to 12 months and could be undertaken in phases.

2.7.1.6 The effects of decommissioning are often similar to, or less than, than the construction effects. The assessment undertaken as part the ES will be based on assumptions as to how decommissioning would take place and these assumptions are likely to change over time as practices for decommissioning evolve.

2.7.1.7 An oDEMP will be submitted in support of the DCO and set out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions would be carried forward to a detailed DEMP which will be secured through a requirement in the DCO.

2.7.1.8 The DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning works and would include timescales and methods for transportation of materials.

2.8 Management plans

2.8.1.1 A key control in limiting the impacts upon the environment from the Proposed Development will be to include a suite of management plans with the DCO application which will be in place throughout construction, operation and decommissioning.

2.8.1.2 The management plans detailed in Table 2-3 are intended to be prepared and will be submitted in outline form alongside the DCO. The final versions of these will be secured as part of the DCO requirements, with final versions required to be signed off by Cumberland Council.

2.8.1.3 It is noted that further management plans may be identified as the Proposed Development progresses and as such this list is not exhaustive.

Table 2-3 Management plans

Management Plan	Purpose	Stage
Outline Construction Environmental Management Plan	Sets out how negative environmental impacts will be minimised during construction.	Construction
Outline Construction Traffic Management Plan	Sets out how construction traffic and staff vehicles will be managed during construction.	Construction
Outline Soil Resources Management Plan	Sets out the overall approach to managing soil resources affected by the Proposed Development.	Construction
Outline Battery Fire Safety Management Plan	Sets out the key measures to minimising the chances of a battery fire event and fire spread in the event of a fire. Sets out the proposed operational response to a fire event.	Operation
Outline Landscape and Ecological Management Plan	Sets out the management of the landscape and ecological features of the Proposed Development.	Construction Operation Decommissioning
Outline Public Rights of Way Management Plan	Sets out how PRoWs would be managed to ensure they remain safe to use, and disruption to users of the PRoW is minimised.	Construction Operation Decommissioning
Outline Decommissioning Environmental Management Plan	Sets out how negative environmental impacts will be minimised decommissioning.	Decommissioning
Archaeological management strategy	Sets out how archaeological remains, both known and currently unknown, will be managed during construction.	Construction

3 Alternatives and design iteration

3.1 Introduction

3.1.1.1 This chapter provides an overview of the alternatives considered for the Proposed Development at this EIA Scoping stage of the design development process, as well as the proposed approach for the assessment of alternatives as part of the ES.

3.2 Legislative and policy context

3.2.1.1 The consideration of alternatives is undertaken within the context of legislative requirements and the national policy context for nationally significant energy projects.

3.2.1.2 Regulation 14(2)(d) of the EIA Regulations [1] states that the ES must include:

3.2.1.3 "A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment."

3.2.1.4 Paragraph 2 of Schedule 4 to the EIA Regulations further states that the following information must be included in the ES:

3.2.1.5 "A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects".

3.2.1.6 The NPS EN-1 [8] states at paragraph 4.3.9:

3.2.1.7 "As in any planning case, the relevance or otherwise to the decision making process of the existence (or alleged existence) of alternatives to the proposed development is, in the first instance, a matter of law. This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option from a policy perspective. Although there are specific requirements in relation to compulsory acquisition and habitats sites, the NPS does not change requirements in relation to compulsory acquisition and habitats sites."

3.2.1.8 It confirms that there is no general requirement within the NPS to consider alternatives, or to establish that the Proposed Development represents the best option. NPS EN-1 does however identify in paragraph 4.3.10 and 4.3.22 the need to comply with any policy or legal requirement to consider alternatives, including those relating to the preparation of an ES or specific legislative requirements under the Conservation of Habitats and Species Regulations 2017 (as amended).

3.2.1.9 This chapter has been prepared in compliance with the requirements of the EIA Regulations to provide a description of the reasonable alternatives studied by the Applicant at this EIA Scoping stage of the design development process, as well as the proposed approach for the assessment of alternatives as part of the ES. This approach is also in accordance with NPS EN-1.

3.3 Approach to alternatives at EIA Scoping stage

3.3.1.1 To date the Applicant has considered reasonable alternatives in relation to three key aspects of design: site selection, Panel Area layout and cable route options.

3.3.2 Site selection

3.3.2.1 The location of the Proposed Development was selected through a staged process to ensure that a site could be identified which would be suitable for solar energy generation and feasible to deliver, whilst avoiding and minimising the potential for harm to the environment and communities.

3.3.2.2 The key stages for site selection were:

- Stage 1: Identifying the search area
- Stage 2: Consideration of environmental and planning constraints.
- Stage 3: Land availability by agreement.
- Stage 4: Initial identification of Panel Areas.

3.3.2.3 The staged assessment process defined the location and maximum extent of the Proposed Development, taking into account irradiance and yield, grid connection capacity , environmental and planning constraints, the availability of land through agreement and initial identification of Panel Areas.

3.3.2.4 In doing so, the site selection process discounted a wide range of alternatives that would not have resulted in a viable development. A detailed account of the site selection process will be provided in the ES.

3.3.3 Panel Area layout

3.3.3.1 Once the location of the Proposed Development and draft Order Limits was determined, the Applicant considered a range of alternatives for the proposed location and layout of the Panel Areas. The indicative layout of Panel Areas as proposed within this EIA Scoping Report have been developed and refined taking account of the following factors:

- Environmental designations, constraints and baseline;
- Outcome of initial environmental assessments;
- Engagement with landowners and impacts on property;
- Capacity required to meet the Grid Connection Agreement; and

- Likely or potential mitigation requirements.

3.3.3.2 An initial Landscape and Visual Appraisal (LVA) was undertaken to inform the selection and refinement of the land parcels which might be taken forward for development. The LVA helped to identify risks, constraints and opportunities. It has been prepared by a team of landscape architects at Arup based on a detailed desk study and fieldwork carried out in Spring 2023. As part of this a RAG (Red, Amber, Green) assessment was used to identify parcels of land within the draft Order Limit and to appraise their sensitivity and risk with regards to potential effects on landscape character and visual amenity as a result of the Proposed Development.

3.3.3.3 This process has resulted in the preferred option for the Panel Area locations. The process has also discounted areas of land within the draft Order Limits against the factors outlined above.

3.3.3.4 The Panel Areas and overall design of the Proposed Development will be further developed and refined ahead of the DCO application submission and following the consultation processes and conclusion of environmental surveys. The ES will provide a detailed account of the refinement and design process, identifying how alternatives were considered in selecting the preferred option.

3.3.4 Underground cables route options

3.3.4.1 At this EIA Scoping stage, the draft Order Limits includes an area of search for the underground cables. This area of search is primarily located in off-road locations between the Northern and Central Panel Areas and the Central and Southern Panel Areas. An on-road route along Winscales Road and the A595 is also being considered at this stage.

3.3.4.2 The areas of search within the draft Order Limits have been defined taking into account viability, cost, environmental, technical and landowner options and the aim is to define cable routes prior to submission of the DCO on the basis of ongoing survey work, landowner agreement and any feedback received during the consultation and engagement process.

3.3.4.3 The EIA Scoping Report has been prepared on the basis of the draft Order Limits as a whole, including the land required for all cable route options and therefore represents a worst-case scenario. It is expected that the draft Order Limits related to the cable routes would reduce prior to the submission of the DCO application. Further detail on how the cable route options are selected, alternatives considered and the rationale for the final selected options will be provided in the ES.

3.4 Approach to consideration of alternatives in the ES

3.4.1.1 Regulation 14(2)(d) of the EIA Regulations outlines the approach that an ES must take to consideration of alternatives. The ES will therefore describe the reasonable alternatives that the Applicant has considered in developing the design of the Proposed Development. It will explain the main reasons for the options selected and

how the effects of the development on the environment and sensitive receptors were taken into account as part of the options selection process.

3.4.1.2 The analysis of alternatives will focus on the following aspects of option selection:

- Site selection;
- Alternative site layouts;
- Underground cable route alternatives;
- Substation siting alternatives;
- Consideration of energy storage facilities and other supporting infrastructure;
- Alternative solar technologies; and
- Alternative environmental design.

3.4.1.3 A 'no development' alternative would not provide the additional renewable electricity generation that would be delivered by the Proposed Development and has therefore not been considered further and will not be considered in the ES.

3.4.1.4 In providing a description of reasonable alternatives studied by the Applicant, the ES will demonstrate the rationale for the preferred design of the Proposed Development, taking into account its effects on the environment and sensitive receptors.

4 Approach to EIA

4.1 Introduction

4.1.1.1 The need for EIA for the Proposed Development is set out in Section 1.4.

4.1.1.2 An EIA assesses the likely significant environmental effects of a proposed development, either beneficial or adverse. The EIA process is reported in an ES for consideration by the determining authority (in this case, the SoS) when determining a planning application.

4.1.1.3 The EIA process includes the following key characteristics:

- Systematic – the EIA comprises a series of tasks that are defined by regulation, guidance and accepted industry practice;
- Analytical – the EIA must be used to inform the decision-making rather than promote the project itself;
- Consultative – the EIA process must allow for and provide opportunity for interested parties and statutory consultees to provide feedback on the project and assessments undertaken; and
- Iterative – the EIA process must allow for environmental concerns to be addressed during the planning and design stages of the project.

4.1.1.4 This chapter of the EIA Scoping Report outlines the general approach to EIA for the Proposed Development.

4.2 EIA guidance

4.2.1.1 The EIA will be carried out in accordance with the requirements of the EIA Regulations [1]. In addition, the approach to the EIA will have regard to the guidance and advice provided within the following:

- Overarching National Policy Statement for Energy (NPS EN-1) [8];
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) [10];
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) [11];
- National Planning Policy Framework [12];
- PINS Advice Note Six: Preparation and Submission of Application Documents [17];
- PINS Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements [2];
- PINS Advice Note Nine: Rochdale Envelope [15];

- PINS Advice Note Seventeen: Cumulative Effects Assessment Relevant to NSIPs [18]; and
- PINS Advice Note Eighteen: The Water Framework Directive [19].

4.3 The purpose and process of EIA

4.3.1 Purpose

4.3.1.1 The purpose of the EIA process is to identify, describe and assess the direct, indirect, cumulative, transboundary, temporary, permanent, beneficial and adverse likely significant effects of a project on the environment. This is achieved by establishing the baseline conditions and undertaking an assessment to identify the significance of the likely environmental effects of the Proposed Development, which considers the magnitude of the impact (degree of change) and the importance, sensitivity or value of the impacted receptor or resource. Mitigation is considered and applied to avoid, prevent or reduce any potential effects, where appropriate, and an assessment of the residual effects (after mitigation) is carried out to establish whether there are any effects which are significant in EIA terms.

4.3.1.2 The Proposed Development is categorised as a 'Schedule 2' 'EIA development under the EIA Regulations, with the potential for likely significant effects due to its nature and size. The Applicant is therefore choosing to proceed with an EIA on the basis that it is an EIA development and is obtaining an EIA Scoping Opinion from SoS.

4.3.1.3 Based on information contained in this EIA Scoping Report and taking into account representations made by regulators, the Scoping Opinion will confirm the expected basis upon which an EIA will be undertaken for the Proposed Development. The EIA will identify the likely significant environmental effects of the Proposed Development and report these within an ES.

4.1.1 Process

4.3.1.4 The EIA process, as outlined in Regulation 5 of the EIA Regulations [1] and PINS Advice Note Seven [2], is used to identify the likely significant effects on the environment that could occur as a result of a Proposed Development. The information gathered through EIA is taken into account by the decision-making body (the SoS) when determining an application for development consent.

4.3.1.5 The main stages of the EIA process are as follows:

- EIA Screening: screening is normally undertaken to determine whether a proposed development constitutes 'EIA development', where it is unclear if a project requires an EIA to be undertaken;
- EIA Scoping: the EIA Scoping Report (this document) sets out the proposed scope of the Proposed Development's EIA. It also presents the data collected and the proposed assessment methodology and approach that will be used for

the EIA. The EIA Scoping Report is issued to consultees by PINS on behalf of the SoS for comment on the scope, methodology and approach proposed;

- PEIR: the PEIR sets out the information that "*is reasonably required for the consultation bodies to develop an* informed view of the likely significant environmental effects of the development" (Regulation12(2)(b) of the EIA Regulations) as set out in PINS Advice Note Seven, Section 8.3); and
- ES: the ES presents the results of the EIA undertaken for the Proposed Development. It sets out the likely significant effects that would result if the Proposed Development was implemented, and any proposed mitigation to reduce those significant effects. The ES is submitted as part of the application for development consent and is taken into account during the decision-making process.

4.3.1.6 The EIA process will be undertaken in accordance with the requirements of the EIA Regulations and PINS Advice Note Seven. The ES will provide the following relevant information as outlined in Part 14(2)(a)-(f) EIA Regulations and Schedule 4. A summary is listed below:

- A description of the Proposed Development comprising information on the site, its location, design, size and other relevant features of the development;
- A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A description of the baseline environment and likely evolution without the implementation of the development;
- A description of the factors likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, and landscape;
- A description of the likely significant effects of the development on the environment;
- A description of the forecasting methods or evidence used to identify and assess effects on the environment;
- A description of any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of adverse effects of the development on the environment from added risk of major accidents and/or disasters; and
- A non-technical summary of the information above, and a list of references.

4.3.1.7 Schedule 4 provides additional detail with what is required in the ES.

4.3.2 Approach

4.3.2.1 The ES will set out details on the methodology and approach, along with the overall conclusions of the EIA process. It will also outline the main parameters and

detailed design aspects of the Proposed Development against which the assessment will be undertaken.

4.3.2.2 Development parameters will be determined and fixed for the purposes of the EIA through an iterative approach taking into account baseline environmental information, the evolving design and any associated technical requirements.

4.3.2.3 The EIA will assess the construction, operational and decommissioning phases of the Proposed Development.

4.3.3 EIA Scoping

4.3.3.1 This section summarises the key requirements of scoping under the EIA Regulations [1].

4.3.3.2 Regulation 10(1) of the EIA Regulations provides that any 'person who proposes to make an application for an order granting development consent may ask the SoS to confirm in writing its opinion as to the scope and level of detail of the information to be provided in the environmental statement'. The request made under Regulation 10(3) must include the following (more information is provided in Table 4-1):

- A plan sufficient to identify the land (Refer to Figure 2.1);
- A description of the proposed development, including its location and technical capacity (see Chapter 2 The Proposed Development);
- An explanation of the likely significant effects of the development on the environment (See Chapters 5-18); and
- Such other information or representations as the person making the request may wish to provide or make.

Table 4-1 Scoping information required

Recommended information for inclusion in the EIA Scoping Report	Relevant section in this Scoping Report
The Proposed Development	
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g. design parameters	Chapter 2: The Proposed Development
Reference plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	Figure 2.2
EIA approach and topic area	

Recommended information for inclusion in the EIA Scoping Report	Relevant section in this Scoping Report
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	Chapter 3: Alternatives and design iteration
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	Chapter 4: Approach to EIA Chapter 21: Conclusion
A detailed description of the aspects and matters proposed to be scoped out if further assessment with justification provided	Certain aspects of environmental topics scoped in within Chapters 5 – 18 are scoped out of further assessment within the summary of assessment scopes
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspect or matter	Chapters 5 to 18
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g. Criteria for determining sensitivity and magnitude	Chapters 5 to 18
Information Sources	
References to any guidance and best practice to be relied upon	Chapters 5 to 18
Evidence of agreement reached with consultation bodies e.g. the statutory nature conservation bodies or local authorities	Chapters 5 to 18
An outline of the structure of the proposed ES	Chapter 20

4.4 Overview of approach to assessment

4.4.1.1 This section of the EIA Scoping Report sets out further detail on certain aspects of the assessment methodology that will be adopted in the EIA. The following general methodology will apply to all assessments undertaken unless otherwise specified within the individual topic methodologies.

4.4.2 Baseline conditions and data collection

4.4.2.1 An important step in the EIA process is to establish a baseline against which to assess the effects of the Proposed Development.

4.4.2.2 The ES will include a description of the current baseline and the future baseline for each environmental topic.

4.4.2.3 The future baseline scenario will describe the changes from the current baseline scenario as far as natural changes can be established, although it is noted without the Proposed Development that the draft Order Limits would continue to be used for agricultural purposes. Information relating to the existing environmental baseline will be collected through field and desktop study, including:

- Online/digital resources;
- Data searches, e.g., Local Biological Record Centres, Historic Environment Record, etc.;
- Baseline surveys; and
- Available environmental information submitted in support of other planning applications for development in the vicinity of the Proposed Development.

4.4.2.4 For each environmental topic chapter, the methods of baseline data collection will be discussed with the relevant consultees.

4.4.3 Spatial and temporal scope

4.4.3.1 Spatially, the area over which effects could occur may be wider than the draft Order Limits. The appropriate study area will be determined for each environmental topic individually. Specific study areas will be defined in each topic section and will allow for assessment of indirect as well as direct effects, together with off-site factors such as traffic routes, where relevant.

4.4.3.2 Specific temporal periods will be defined for the assessment of baseline conditions and the impacts of the Proposal Development. In doing so, consideration will be given to the likely durations of construction, operational and decommissioning activities. Where relevant, consideration will be given to the duration for environmental design measures to become established and effective. Timeframes for which mitigation measures are likely to have achieved their desired outcome will be defined within the ES.

4.4.3.3 The assessment will consider effects at the construction, operation and decommissioning phases. The definitions of these are presented below and in Table 4-2:

- Construction phase: this relates to all works associated with construction (site preparation and installation);
- Operational phase: this relates to effects once the Proposed Development is installed and in use; and
- Decommissioning phase: this relates to effects after operation has ceased.

4.4.3.4 The potential effects arising as a result of the Proposed Development will be assessed against three baseline scenarios as shown in Table 4-2.

Table 4-2 Baseline scenarios

Baseline scenarios	Description
Construction phase (current baseline)	The construction phase is proposed to take place over 24 months, commencing once the DCO application has been granted. The baseline environment at the commencement of construction is assumed to be the same as the existing baseline environment at the time of the preparation of the ES.
Operation phase (future baseline)	The opening year when the Proposed Development is to become operational, and a future operational year scenario (if relevant to topic) after the opening year when mitigation measures are likely to have achieved their desired outcome. The Proposed Development is assumed for purposes of assessment to be operational for 40 years.
Decomissioning phase (future baseline)	The decommissioning year will take place following the operation of the Proposed Development, 40 years from the date of operation. Decommissioning is expected to take approximately 12 months.

4.4.4 Identification of receptors

4.4.4.1 Receptors are defined as the physical resource or 'user group' that would experience an effect. The environmental effect would depend on the spatial relationship between the source of the effect and the receptor. Some receptors will be more sensitive to certain environmental effects than others. The baseline studies will identify the potential environmental receptors.

4.5 Assessment of effects

4.5.1 Effect prediction

4.5.1.1 Some environmental topic assessments will use calculations and modelling to determine the predicted impacts of the Proposed Development on receptors in order to assess the significance of effects. Others will be based on the expert judgement of the assessment team and initial assessments, taking into account relevant technical advice and guidance.

4.5.1.2 Each environmental topic assessment will present a clear justification for the strategy adopted and estate all relevant assumptions to allow independent review.

4.5.2 Significance of effects

4.5.2.1 The EIA will identify the significance of environmental effects (beneficial or adverse) arising from three phases (construction, operation and decommissioning) of

the Proposed Development. The significance of effects will be determined by reference to the criteria set out for each environmental topic.

4.5.2.2 Residual effects are the effects that remain following the implementation of proposed mitigation measures.

4.5.2.3 The approach to assessing and assigning significance to an environmental effect is derived from a variety of sources including:

- Legislative requirements, including the EIA Regulations [1];
- National policy, including Overarching National Policy Statement for Energy (NPS EN-1) [8] National Policy Statement for REI Renewable Energy Infrastructure (NPS EN-3) [10]; and National Planning Policy Framework [12];
- Local planning policy and relevant planning practice guidance;
- Topic specific guidelines, standards and codes of practice;
- Advice from statutory consultees and other stakeholders; and
- Expert judgement of the EIA team.

4.5.2.4 The likely effect that the Proposed Development may have on identified environmental receptors will be influenced by a combination of the sensitivity or value of the receptor and the predicted magnitude of impact from the baseline conditions.

4.5.2.5 Assignment of environmental sensitivity of a receptor will generally depend on the vulnerability, recoverability and value of the receptor. The environmental sensitivity (or importance) will be as stipulated in individual topic chapters.

4.5.2.6 The categorization of the magnitude of impact will take into account the following factors:

- Extent;
- Duration;
- Frequency; and
- Reversibility.

4.5.2.7 Impacts will be defined as either beneficial or adverse. Magnitude of impact will be specified individual topic chapters. The overall significance of the effect will be assigned by the interaction of both sensitivity of the receptor and magnitude of impact. The level of significance will be determined in each of the environmental topic assessments and will consider relevant topic-specific legislation, planning policy and guidance. The criteria for significance of effect will be as stipulated in individual topic chapters. Significant effects are generally defined as those that are of Moderate or Major significance. Significance conclusions for residual effects will incorporate confirmed design and mitigation measures.

4.5.3 Cumulative and in-combination effects

4.5.3.1 Cumulative effects are the result of multiple actions on environmental receptors or resources over time and are generally additive or interactive (synergistic) in

nature. Two categories of cumulative effects are typically considered within the cumulative effects chapter of an ES:

- In-combination effects from the interrelationship between different environmental effects of the Proposed Development (intra-project)
- Cumulative effects from the interrelationship between different projects along with the Proposed Development (inter-project)

4.5.3.2 In-combination effects, or intra-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by noise and dust effects resulting from the construction phase activities of a single development.

4.5.3.3 Cumulative effects, or inter-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development (using the same geographical area at the same time) may result in significant cumulative effects on the surrounding highway network.

4.5.3.4 Chapter 19 provides an overview of the approach to undertaking the cumulative and in-combination effects assessment.

4.5.4 Limitations and assumptions

4.5.4.1 In accordance with the EIA Regulations, any difficulties encountered during assessment work that could affect the assessment and limitations and assumptions used for individual assessment areas will be set out in the ES.

4.5.5 Overview of proposed EIA Scope

4.5.5.1 An overview of the topics considered for the proposed scope of the EIA is presented in Table 4-For each topic, the potential for likely significant effects on the environment has been considered for the construction, operation and decommissioning of the Proposed Development. Individual topic chapters provide detail on the specific aspects scoped in and out under each phase of the Proposed Development.

4.5.5.2 Construction effects relate to effects that arise as a result of the construction process. For example, the effects of access from construction vehicles, land take, and the effects of noise and dust from the use of construction plant and machinery. These effects tend to be temporary in nature.

4.5.5.3 Once constructed, the design life of the Proposed Development is 40 years. Following the operational phase the Proposed Development would require decommissioning. The land within the draft Order Limits would be returned to its original use as far as possible.

Table 4-3 Summary of proposed scope of the EIA

Environmental Topic	Construction	Operational	Decommissioning	Location in EIA Scoping Report
Agricultural land and soils	Scoped in	Scoped in	Scoped in	Chapter 5
Air Quality	Scoped out	Scoped out	Scoped out	Chapter 6
Biodiversity	Scoped in	Scoped out	Scoped in	Chapter 7
Climate change	Scoped in	Scoped in	Scoped in	Chapter 8
Cultural Heritage	Scoped in	Scoped in	Scoped out	Chapter 9
Electric, magnetic and electromagnetic fields	Scoped out	Scoped out	Scoped out	Chapter 10
Ground conditions	Scoped out	Scoped out	Scoped out	Chapter 11
Human health	Scoped out	Scoped out	Scoped out	Chapter 12
Landscape and visual	Scoped in	Scoped in	Scoped in	Chapter 13
Major accidents and disasters	Scoped out	Scoped out	Scoped out	Chapter 14
Noise and vibration	Scoped in	Scoped in	Scoped in	Chapter 15
Socio-economics	Scoped in	Scoped in	Scoped in	Chapter 16
Traffic and transport	Scoped out	Scoped out	Scoped out	Chapter 17
Water resources and flood risk	Scoped in	Scoped in	Scoped in	Chapter 18

4.5.6 Standalone assessments

4.5.6.1 In addition to the ES, a number of standalone assessments will accompany the DCO application for the Proposed Development, these include:

- Agricultural Land Classification Report;
- Arboricultural Impact Assessment;
- Biodiversity Net Gain Report;
- Coal Mining Risk Assessment;
- Drainage Strategy;
- Flood Risk Assessment;
- Glint and Glare Assessment;
- Geo-environmental Preliminary Risk Assessment; and
- Transport Statement.

4.5.6.2 The findings of these will support the ES where applicable, and feed into the mitigation proposals for the Proposed Development.

4.6 Mitigation measures and monitoring

4.6.1.1 The Proposed Development will include a range of environmental mitigation types. Mitigation will be defined within each environmental topic chapter and fall into the following categories:

- Embedded mitigation – Measures that form part of the engineering design, developed through the iterative design process. The first stage of assessment is undertaken with embedded mitigation in place.
- Good practice – Standard approaches and actions commonly used on infrastructure projects to avoid or reduce environmental impacts, and typically applicable across the whole project. Management plans will incorporate standard good practice to be applied. The first stage of assessment is undertaken with good practice in place.
- Further mitigation – Any additional project specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the EIA Regulations. Further mitigation will be identified by environmental topic specialists, where required, considering the embedded mitigation and good practice commitments. The residual effects assessment is undertaken with further mitigation in place.

4.6.1.2 Where appropriate, monitoring procedures will be identified to address any likely residual significant adverse effects in order to measure the effectiveness of the mitigation proposed.

4.6.1.3 Mitigation will be secured through its inclusion in the design, and DCO requirements.

4.7 Competent experts

4.7.1.1 In accordance with the EIA Regulations, as amended, paragraph (14), a Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who undertook the EIA.

4.7.1.2 The introductory and summary chapters of this EIA Scoping Report (Chapters 1 to 4, and 19 to 21) have been prepared by Arup, drawing on material provided by the Applicant, which includes engineers, designers and external consultants. The design details contained in this document have been approved by the Applicant.

4.7.1.3 The topic-specific chapters of this EIA Scoping Report (Chapters 5 to 18) and their corresponding appendices have been prepared by Arup and Wardell Armstrong, as summarised in Table 4-4.

4.7.1.4 Both Arup and Wardell Armstrong are members of the IEMA EIA Quality Mark. The EIA Quality Mark is a scheme operated by IEMA that allows organisations that lead the co-ordination of statutory EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed. The EIA Quality Mark is a voluntary scheme.

Table 4-4 Competent Authors

Chapter	Author
Chapter 1: Introduction	Arup
Chapter 2: The Proposed Development	Arup
Chapter 3: Alternatives and design iteration	Arup
Chapter 4: Approach to EIA	Arup
Chapter 5: Agricultural land and soils	Wardell Armstrong
Chapter 6: Air quality	Wardell Armstrong
Chapter 7: Biodiversity	Wardell Armstrong
Chapter 8: Climate change	Wardell Armstrong
Chapter 9: Cultural heritage	Wardell Armstrong
Chapter 10: Electric, magnetic and electromagnetic fields	Wardell Armstrong
Chapter 11: Ground conditions	Wardell Armstrong
Chapter 12: Human health	Arup
Chapter 13: Landscape and visual	Arup
Chapter 14: Major accidents and disasters	Arup
Chapter 15: Noise and vibration	Wardell Armstrong
Chapter 16: Socio-economics	Arup
Chapter 17: Traffic and transport	Arup
Chapter 18: Water resources and flood risk	Arup
Chapter 19: Cumulative effects	Arup
Chapter 20: Structure and content of the PEIR	Arup
Chapter 21: Conclusion	Arup

4.8 Consultation

4.8.1.1 Effective and meaningful engagement and consultation with stakeholders is an essential aspect of developing the design of the Proposed Development and of undertaking a comprehensive EIA.

4.8.1.2 As advised by the Department for Levelling Up, Housing and Communities (DLUHC) guidance on pre-application consultation for major infrastructure projects [20],the Applicant's approach to engagement and consultation will be

iterative to enable stakeholders to gain understanding of the proposals early on in the process and to have genuine opportunities for influence.

4.8.1.3 The Applicant will have regard to the guidance provided in PINS Advice Note Three [21] in taking a precautionary approach to identifying relevant consultees for the Proposed Development and ensuring compliance with the requirements of the EIA Regulations, the Act and the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009.

4.8.1.4 The Applicant will also ensure that reporting on engagement and consultation activities is carried out in accordance with PINS Advice Note Fourteen [22] and PINS NSIP 2024 Pre-application Prospectus [23], with the submission of a Consultation Report as part of the DCO application which evidences how consultation has been carried out and how feedback has been taken into account in developing the proposals.

4.8.1.5 Stakeholder engagement for the Proposed Development will seek to achieve the following aims:

- Engaging early to allow stakeholders and the public to shape the project's design at a formative stage;
- Commit to understanding local issues that are important for communities;
- Ensure community involvement is central to the project's ongoing design; and
- Create a project that benefits the local area for the next 40 years (the design life).

4.8.1.6 Consultation with stakeholders will be undertaken throughout the EIA process to gather feedback on the emerging project proposals, baseline survey methodologies and results and assessment methodology. It is intended that non-statutory consultation and engagement activities will be undertaken to inform the design of the Proposed Development and its environmental assessment ahead of commencing pre-application statutory consultation as required under the Act and the EIA Regulations.

4.8.1.7 Compliance with the requirements of the Act and the EIA Regulations will be evidenced in the Consultation Report and ES submitted with the DCO Application, in addition to details of the non-statutory engagement undertaken throughout the design and assessment of the Proposed Development.

4.8.2 Consultation to date

4.8.2.1 Consultation with statutory consultees and stakeholders has already commenced to help inform the content of this EIA Scoping Report and the design of the Proposed Development.

4.8.2.2 A number of meetings have taken place with the following stakeholders to provide an introduction to the Proposed Development and seek initial views:

- Cumberland Council

- National Highways
- The Planning Inspectorate

4.8.2.3 The Applicant has also been in regular discussions with local landowners affected by the Proposed Development.

4.8.2.4 The Applicant has launched a website for the Proposed Development prior to the submission of this EIA Scoping Report, which provides information to the wider community and the opportunity to contact the Applicant with any queries or for further information. Non-statutory engagement activities, to include representatives of the local community and relevant interest groups, will be undertaken following the submission of this EIA Scoping Report.

5 Agricultural land use and soils

5.1 Introduction

5.1.1.1 This chapter outlines the scope and proposed methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of agricultural land use and soils.

5.1.1.2 It sets out the current baseline understanding of the relevant agricultural land use and soil receptors, and the proposed approach to the assessment of the Proposed Development's impacts during construction, operation, and decommissioning.

5.1.1.3 The following aspects have been considered as part of the scope and methodology for agricultural land use and soils:

- Agricultural land – considers permanent and temporary loss of agricultural land due to a change in land use and management
- Agricultural holdings / farm businesses – impacts to the viability of agricultural holdings / farm businesses as a result of the loss of agricultural land.
- Damage to soil resource - disturbance and/or damage to soil functions as a result of handling
- Loss of soil resource – considers the susceptibility of the soil resource to erosion from soil handling and management
- Soil organic matter and soil carbon – Considers the impact of soil and land management on Soil Organic Matter (SOM)/soil carbon levels and its implications on soil health

5.1.1.4 This chapter is supported by the following figures:

- Figure 5.1 Provisional ALC Grades
- Figure 5.2: Soil Associations

5.2 Relevant legislation, policy, standards and guidance

5.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for agricultural land use and soils and have informed the scope of the assessment.

5.2.2 Legislation

Table 5-1 Agricultural land use and soils - Legislation

Legislation	Relevance to assessment
Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [24]	**Schedule 4 –** "Information for inclusion in environmental statement: A description of the factors specified in regulation 5(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape" **Schedule 5 -** "The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— land, soil, water, air and climate"

5.2.3 Policy

Table 5-2 Agricultural land use and soils - Policy

Policy	Relevance to assessment
National Planning Statement for Energy Infrastructure, Overarching National Policy Statement for energy (EN1) [25]	**EN1, 5.11.4 –** Development of land will affect soil resources, including physical loss of and damage to soil resources, through land contamination and structural damage. Indirect impacts may also arise from changes in the local water regime, organic matter content, soil biodiversity and soil process. **EN1, 5.11.12 –** Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5). **EN1, 5.11.13 –** Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed. **EN1, 5.11.14 –** Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large

	quantities of soils are surplus to requirements or are affected by contamination (for guidance, see the Defra Code of practice for the sustainable use of soils on construction sites) **EN1, 5.11.15 –** Developments should contribute to and enhance the natural and local environment by preventing new and existing developments from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability **EN1, 5.11.23 –** Although in the case of most energy infrastructure there may be little that can be done to mitigate the direct effects of an energy project on the existing use of the proposed site (assuming that some of that use can still be retained post project construction) applicants should nevertheless seek to minimise these effects and the effects on existing or planned uses near the site by the application of good design principles, including the layout of the project and the protection of soils during construction. **EN1, 5.11.34 –** **The Secretary of State should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. Where schemes are to be sited on best and most versatile agricultural land the Secretary of State should take into account the economic and other benefits of that land. Where development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.**
National Planning Statement for Energy Infrastructure, National Policy Statement for renewable energy infrastructure (EN-3) [26]	**EN3, 2.10.10 –** Solar also has an important role in delivering the government's goals for greater energy independence. The British Energy Security Strategy states that government expects a five-fold increase in combined ground and rooftop solar deployment by 2035 (up to 70GW). It sets out that government is supportive of solar that is "co-located with other functions (for example, agriculture, onshore wind generation, or storage) to maximise the efficiency of land use" **EN3, 2.10.29 –** While land type should not be a predominating factor in determining the suitability of the site location applicants should, where possible, utilise suitable previously developed land, brownfield land, contaminated land and industrial land. Where the proposed use of any agricultural land has been shown to be necessary, poorer quality land should be preferred to higher quality land avoiding the use of "Best and Most Versatile" agricultural land where possible. 'Best and Most Versatile agricultural land is defined as land in grades 1, 2 and 3a of the Agricultural Land Classification **EN3, 2.10.30 –** Whilst the development of ground mounted solar arrays is not prohibited on Best and Most Versatile agricultural land, or sites designated for their natural beauty, or recognised for ecological or archaeological importance, the impacts of such are expected to be

	considered and are discussed under paragraphs 2.10.73 – 92 and 2.10.107 – 2.10.126. **EN3, 2.10.31 –** It is recognised that at this scale, it is likely that applicants' developments will use some agricultural land. Applicants should explain their choice of site, noting the preference for development to be on suitable brownfield, industrial and low and medium grade agricultural land. **EN3, 2.10.33 –** The Agricultural Land Classification (ALC) is the only approved system for grading agricultural quality in England and Wales and, if necessary, field surveys should be used to establish the ALC grades in accordance with the current, or any successor to it, grading criteria and identify the soil types to inform soil management at the construction, operation, and decommissioning phases in line with the Defra Construction Code. **EN3, 2.10.34 –** Applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination. This should be in line with the ambition set out in the Environmental Improvement Plan to bring at least 40% of England's agricultural soils into sustainable management by 2028 and increase this up to 60% by 2030. **EN3, 2.10.81 –** Where soil stripping occurs, topsoil and subsoil should be stripped, stored, and replaced separately to minimise soil damage and to provide optimal conditions for site restoration. Further details on minimising impacts on soil and soil handling are above at paragraphs 2.10.33 and 2.10.34. **EN3, 2.10.127 –** The Defra Construction code of practice for the sustainable use of soils on construction sites provides guidance on ensuring that damage to soil during construction is mitigated and minimised. Mitigation measures focus on minimising damage to soil that remains in place, and minimising damage to soil being excavated and stockpiled. The measures aim to preserve soil health and soil structure to minimise soil carbon loss and maintain water infiltration and soil biodiversity. Mitigation measures for agricultural soils include use of green cover, multispecies cover crops - especially during the winter- minimising compaction and adding soil organic matter. **EN3, 2.10.145 –** The Secretary of State should take into account the economic and other benefits of the best and most versatile agricultural land. The Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to minimise impacts on soils or soil resources.
National Planning Statement for Electricity Networks Infrastructure (EN-5) [27]	**2.9.25 –** The Secretary of State must consider "the Applicant's commitment, as set out in their ES, to mitigate the potential detrimental effects

	of undergrounding works on any relevant agricultural land and soils, particularly regarding Best and Most Versatile land. Such a commitment must guarantee appropriate handling of soil, backfilling and return of the land to the baseline Agricultural Land Classification, thus ensuring no loss or degradation of agricultural land".
National Planning Policy Framework, 2023 [28]	**Paragraph 88 –** Planning policies and decisions should enable: b) the development and diversification of agricultural and other land-based rural businesses; **Paragraph 180 –** Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. **Footnote to Paragraph 181 –** Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality. The availability of agricultural land used for food production should be considered, alongside the other policies in this Framework, when deciding what sites are most appropriate for development. **The glossary of the NPPF gives the following definition for best and most versatile (BMV) agricultural land –** Best and most versatile agricultural land: Land in grades 1, 2 and 3a of the Agricultural Land Classification.
Allerdale Local Plan (Part 1) Strategic and Development Management Policies, 2014 [29]	**Strategic Objective, SO1g –** Sustainable and effective use and re-use of land and buildings and protect the most versatile agricultural land from development. **Strategic Objective, SO6d –** Ensure high levels of water, and air quality are retained and where necessary improved, and safeguard agricultural land. **Policy S2 Sustainable development principles –**

	Support local food production and farming to reduce the area's food miles by avoiding significant development on the best and most versatile agricultural land where possible; Protect soils, water sources and water quality, and ensure they are resilient to climate change; **Policy S19 Renewable energy and low carbon technology –** The Council will take a positive view where; Potential benefits to the local economy and the local community, including agriculture and other land based industries are considered. **Policy S24 Green Infrastructure –** Promote improvements in air, water and soil quality and more sustainable drainage and flood mitigation solutions; **Policy S36 Air, Water and Soil Quality –** Unless adequate mitigation measures can be secured, development proposals will be resisted that would have a demonstrable direct and/or indirect adverse impact on; b) The characteristics of surrounding soils and substrata - through either physical (compaction, erosion) or chemical (pollution, contamination); Whilst having regard for the economic and other benefits of the best and most versatile land, where development is considered necessary, the Council will seek to ensure the use of poorer quality land in preference to that of a higher quality.
Cumberland Consolidated Planning Policy Framework January 2023, Cumberland Council [30]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

5.2.4 Standards and guidance

Table 5-3 Agricultural land use and soils - Standards and guidance

Standards and guidance	Relevance to assessment
Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049), 2012, Natural England [31]	Provides guidance on the application of the Agricultural Land Classification Guidelines, including survey methodology.
Code of Practice for the Sustainable Use of Soils on Construction Sites, 2009, Department for Environment, Food and Rural Affairs [32]	Provides guidance on the conservation of soil for beneficial reuse at development sites, safeguarding both the mass of the soil resource and its functional capacity. The application of this code of practice is voluntary, however it is referenced in NPS, EN1.
A New Perspective on Land and Soils in Environmental Impact Assessment, 2022, Institute of Environmental Management & Assessment [33]	Provides an assessment methodology for assessing impacts on land and soil; as well as support in defining mitigation and management measures.

5.3 Consultation

5.3.1.1 The following stakeholders will be consulted with regards to agricultural land use and soils as part of the assessment process:

- Natural England
- Cumberland Council
- Landowners and tenants to obtain additional soils and land use site-specific information

5.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES where relevant to agricultural land use and soils.

5.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

5.4 Study area

5.4.1.1 The study area is restricted to the draft Order Limits.

5.5 Baseline conditions

5.5.1 Desktop sources used

5.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Soil Survey of England and Wales (1984) Soils and their Use in Northern England (Sheet 1) [34]
- Natural England (updated 2024) Provisional Agricultural Land Classification Mapping. [35]
- Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map North West Region (ALC014) [36]
- MAFF (1990) Agricultural Land Classification. Dean Moor, Branthwaite [37]
- The Meteorological Office (1989) Climatological Data for Agricultural Land Classification [38]
- Cranfield University (2015) Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report [39]

5.5.2 Surveys undertaken and proposed

5.5.2.1 No surveys have been completed at the time of writing this scoping report, however a detailed (1 point per ha) Agricultural Land Classification (ALC) survey is underway and once completed will inform the PEIR and the ES.

5.5.2.2 The survey is following the methodology specified in the MAFF (1988) guidelines [40]. This survey will inform on the agricultural capability of land and the distribution of ALC grades. The ALC survey will also provide the site-specific information required for the assessment of impacts on the soil resource and inform a soil management plan to ensure the soil resource is not damaged or lost as a result of the Proposed Development. The survey will be targeted towards the likely panel areas, and cable route corridors once locations are confirmed. Soil samples taken to confirm soil texture as part of the ALC assessment will also be analysed for SOM to determine the baseline SOM sensitivity for the different soils and land management within the draft Order Limits.

5.5.3 Existing baseline

5.5.3.1 The draft Order Limits cover an area of 480ha.

5.5.3.2 The available baseline information for agricultural land and the soil resources within the draft Order Limits are detailed below.

Agricultural Land Classification (ALC)

5.5.3.3 Natural England (NE) provisional ALC mapping [35] indicates the draft Order Limits primarily consists of Grade 4 agricultural quality land, refer to Figure 5.1

Provisional Agricultural Land Classification. A small 7.23 ha area of provisional Grade 3 agricultural land occurs in the northern extent of the draft Order Limits.

5.5.3.4 The draft Order Limits occur within an area of low likelihood of BMV land (<=20% area BMV) in the NE BMV likelihood mapping for the region [36].

5.5.3.5 No post-1988 ALC surveys have previously been conducted within the draft Order Limits. A detailed ALC survey for a site approximately 2.5km south-east of the draft Order Limits found areas of Subgrade 3b, Grade 4, and Grade 5 quality agricultural land. Another post-1988 survey [37] conducted 3km south-west of the draft Order Limits contained areas of Subgrade 3a, Subgrade 3b, and Grade 4 agricultural land, confirming the presence of BMV land in the vicinity of the draft Order Limits.

5.5.3.6 A review of the ALC climatological data [38] show that the northern extent of the draft Order Limits has an average annual rainfall (AAR) of 1140 mm, 256 field capacity days (FCDs), and is limited to Subgrade 3a by Climate. The AAR and number of FCDs for the centre of draft Order Limits is calculated to be 1259 mm and 275 days, respectively. Climate limits the centre of draft Order Limits to Subgrade 3b. The southern extent of the draft Order Limits has an average AAR of 1159 mm, 259 FCDs, and is limited to Subgrade 3a by Climate.

Soil resources

5.5.3.7 The draft Order Limits contain areas of two soil associations: Brickfield 3 (713g) and Restored Opencast Coal Workings (92c) [34]. A description of the characteristics of these two soil associations is provided in Table 5-4.

5.5.3.8 The Brickfield 3 (713g) soil association consists of fine loamy and clayey gley soils with slowly permeable subsoils. Soil Survey of England and Wales (SSEW) mapping indicates that this association is predominantly found in the northern and eastern part of the draft Order Limits, refer to Figure 5.2 Soil associations.

5.5.3.9 The Soil Survey of England and Wales mapping [34] indicates the soils formed by restoring opencast coal workings (92c) mostly occur in the southern part of the draft Order Limits refer to Figure 5.2 Soil associations.

Table 5-4 The Soil Associations based on the Soil Survey of England and Wales (1984) [34]

Soil Association	713g – Brickfield 3	92c Disturbed soils (Opencast coal workings)
Geology	Drift from Palaeozoic sandstone and shale	Carboniferous shale and sandstone and associated drift
Soil series	Brickfield, Dunkeswick, Hallsworth	N/A
Soil characteristics	Fine loamy and clayey surface-water gley soils with slowly permeable subsurface horizons. Brickfield soils are clay loam throughout profile. The Dunkeswick series is differentiated from Brickfield by a clay horizon beginning at a depth of 40-80cm. Hallsworth soils are clayey to the surface or base of the topsoil.	Restored opencast coal workings. The soils are characterised by a distinct mineral fine loamy or clayey surface horizon formed in at least 40 cm of artificially displaced material. The main land use is as permanent grassland. Compaction results in slowly permeable and seasonally waterlogged soils which are also susceptible to water erosion. The soils are often stony resulting in droughtiness.
Soil water regime	Slowly permeable seasonally waterlogged (Wetness Class IV) but can be improved through drainage to Wetness Class III where the annual rainfall is <900mm.	Soils of this association are prone to waterlogging near the surface due to compaction. These soils are also susceptible to droughtiness due to thin topsoils and a high stone content.
Erodibility*	Small risk	Moderate risk

* Based on Cranfield University (2015) [39]

Agricultural land use

5.5.3.10 The agricultural fields within the northern extent of the draft Order Limits consist of intensively managed grassland fields for grazing and silage production, fields for arable cropping and areas of low input grassland in the Countryside Stewardship (Mid-tier) scheme.

5.5.3.11 Within the central area, the agricultural fields are mainly intensive pasture land with some areas of low input grassland in the Countryside Stewardship (Mid-Tier) scheme.

5.5.3.12 To the southern extent of the draft Order Limits the area consists of intensively managed grassland fields for grazing and silage production.

Typical soil organic matter levels

5.5.3.13 Typical SOM levels based on climate, agricultural land use and soil types has been summarised in Table 5-5 below. This data is taken from AHDB's Soil Health Score-card protocol [41], and Defra Report SP0306 Critical levels of soil organic matter [42]. This data will be used to help define the SOM receptors present within the Draft Order Limits once SOM results and soil texture have been determined from laboratory analysis of soil samples taken during the ALC survey. The categories used form this data set will be both Cropped and Grassland management, in High Rainfall climate.

Table 5-5 Typical soil organic matter levels based on climate, production and soil type

Management	Climate	Soil Group		
		Light	Medium	Heavy
		S, LS, SZL, ZL	MCL, SCL, ZCL, HCL,	C, SC, ZC
Cropped	Low Rainfall	2.2 - 3.2	3.4 - 5.0	4.5 - 6.5
	Mid Rainfall	3.1 - 4.5	4.1 - 6.0	5.3 - 7.6
	High Rainfall	3.8 - 6.1	5.1 - 7.5	6.3 - 8.8
Grassland	All Climates	5.0 - 7.9	6.5 - 9.3	7.7 - 10.5

Low Rainfall - East England

Mid Rainfall - North East England, Midlands, South England

High Rainfall - South West England, North West England, Wales

Sensitive receptors

5.5.3.14 The following sensitive receptors have been identified:

Agricultural land

5.5.3.15 The agricultural land within the draft Order Limits is mostly provisionally Grade 4, with smaller areas of Grade 3 land. Based upon Table 2 of the IEMA guidance, Grade 4 (non-BMV) land translates to a low sensitivity for agricultural land. The provisional ALC mapping does not discriminate between Subgrade 3a and Subgrade 3b. If Subgrade 3a (BMV) land was found to be present onsite these areas would be a 'high sensitivity' for the receptor 'land'. If Subgrade 3b (non-BMV) land was identified these areas would be a 'medium sensitivity' for the receptor 'land'. The Natural England BMV Likelihood maps show that the draft Order Limits occur within an area of low likelihood of BMV land (<=20% area BMV), therefore for the purposes of this scoping assessment a 'medium' sensitivity has been applied as a worst-case scenario for the receptor 'agricultural land'.

Soil resource

5.5.3.16 Table 4 of the IEMA guidance [33] details the sensitivity of topsoil and subsoil to structural damage based upon soil texture, field capacity days and wetness class. Soils of the Brickfield 3 association typically feature loamy and clayey soils of Wetness Class IV which in combination with the 258 FCD correlates to a 'high sensitivity' based upon Table 4 of the IEMA guidance [33]. Where the disturbed soils associated with opencast coal workings are identified, soils are likely to be prone to waterlogging near the surface due to compaction. Based upon the soil associations present on site, the soil resource receptor is likely to have a 'high' sensitivity classification with regards to structural damage.

5.5.3.17 Based upon the soil associations present [34], the soil resource within the draft Order Limits is likely to be at a low and moderate risk of erosion (see Table 14). The

Brickfield 3 (713g) consist of fine loamy and clayey soils with a low risk of erosion from water. The disturbed soils (92c) are listed as being moderately susceptible to water erosion. For the purposes of this assessment, the risk of erosion has been classed as moderate.

Soil organic matter and soil carbon

5.5.3.18 Based upon the topsoil descriptions of the soil associations present, and the current agricultural land use and management there is a range of sensitivities for soil organic matter and soil carbon receptors. For low input grassland fields with medium textured soils the sensitivity is 'low'. For intensive grassland fields with medium textured soils the sensitivity is 'medium'. For fields in arable cropping and assuming the soils have a typical SOM level for the soil type and cropping, the sensitivity is 'high'. The baseline for SOM will be confirmed with the use of the SOM results from the laboratory analysis of samples taken during the ALC survey.

5.5.4 Future baseline

5.5.4.1 Future baseline considerations for agricultural land use and soils include factors such as change in soil functionality due to climatic factors and future land use changes arising from pressures of development on agricultural land and changing agricultural practices.

5.5.4.2 The current methodology for ALC grading uses a climatological dataset from 1941 to 1980 to determine climatic limitations. Unless there is a change to the ALC methodology for determination of climatic limitations, there will be no change in baseline ALC grading of the draft Order Limits due to future changes in climate.

5.5.4.3 Based on the UKCP18 [43] climate change regional (12km) projection data for the North West England Region, it is suggested that the region will experience an increase of mean temperature of 1.06°C in winter and 1.42°C in summer compared to the 1981-2000 baseline. It is also suggested that precipitation is estimated to increase by 8.18mm in winter and decrease by -10.1mm in summer. These changes in climate have the potential to impact on agricultural land use and soil management. Potential impacts include; reduced soil working days as a result of increased winter rainfall; increased duration of livestock housing in winter; greater drought pressure during summer from increased temperatures and lower summer rainfall.

5.6 Potential impacts

5.6.1 Construction

- Agricultural holdings / farm businesses – potential effects on the overall viability of the farm holdings as land is taken out of production.
- Agricultural land along with associated soil functions will be taken out of production during the construction phase, as a result of laying temporary access tracks and a temporary construction compound, installation of the solar panels, laying cables in trenches, and the construction of the onsite substation, BESS and associated infrastructure.

- Structural damage to the soil resource as a result of trafficking the land within the draft Order Limits and from the disturbance, movement and storage of soil.
- Loss of soil resource through erosion.
- Loss of SOM from the disturbance, movement and storage of soil.

5.6.2 Operation

- Continued use of land within the draft Order Limits during the operational phase for certain agricultural functions under the panels, such as grazing, may be possible and are being explored.
- All adverse impacts on soils and agricultural land are anticipated to first occur during the construction phase of the Proposed Development.
- Potential beneficial impacts on the soil resource resulting from changes in agricultural land use and soil management during the operational phase.

5.6.3 Decommissioning

- Potential impacts upon the soil resource during decommissioning are considered to be the same or less to those experienced during the construction phase.
- Land will be returned to agricultural use after the decommissioning phase.

5.7 Design, mitigation and enhancement measures

5.7.1 Design principles

5.7.1.1 The Proposed Development is being designed with regard to a set of design principles. Relevant to agricultural land use and soils these include:

- Opportunities for continued sheep grazing under the solar panels are being explored.
- Solar panel areas will be targeted towards lower quality agricultural land available wherever possible.

5.7.2 Embedded measures

5.7.2.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

5.7.2.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to agricultural land use and soils already committed to include:

- Access tracks will be permeable using compacted gravel to allow water to filtrate through and maintain greenfield runoff rates.

- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions.

5.7.2.3 Further embedded measures are likely to include:

- Where possible, underground cables would be installed using a cable plough or trenching. These are considered the most efficient and least impactful methods of cable installation, causing minimal disruption to the ground by cutting, installing and back-filling in one operation.
- Measures to provide continued access to surrounding agricultural land and property, with revised access arrangements and tie-ins to the road network for private means of access and new access tracks if required.
- Design refinement, where practical, to target development towards lower quality agricultural land, and avoid or reduce fragmentation of residual agricultural land.
- Good practice measures will be adopted, including use of the DEFRA 'Construction Code of practice for the sustainable use of soils on construction sites' [32] which provides guidance on ensuring that damage to soil during construction is mitigated and minimised.

5.7.3 Further mitigation

5.7.3.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for agricultural land use and soils will be defined through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to agricultural land use and soils may include:

- Replacement of field boundary features, if lost
- Maintaining the integrity of agricultural land drainage systems
- Maintaining provision of water for livestock
- Restoring temporarily acquired agricultural land to its former land use and quality
- Regenerative soil management practices

5.7.4 Management plans

5.7.4.1 A set of management plans will additionally be in place for the Proposed Development, relevant to agricultural land use and soils including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Soil Resource Management Plan (oSRMP)

5.7.4.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

5.7.4.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

5.8 Likely significant effects

5.8.1 Construction

5.8.1.1 The landowners involved in the Proposed Development have signed up by voluntary agreement to lease their land to the Proposed Development and have therefore considered the potential effects on the overall viability of the farm holdings. This includes the potential impacts on agricultural tenants who utilise the land at present and agreement is in place that these tenancies would end should the application for development consent be successful. It is therefore proposed that potential effects on the wider farm holdings / farm businesses is **scoped out** of the assessment.

5.8.1.2 It is assumed that any impact on agricultural land associated with the piling of the panel arrays into the ground is temporary and reversible. While it is assumed that these elements would be removed at decommissioning, the IEMA guidance [33] states that "temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils". Appropriate soil management measures will be implemented during the construction phase to ensure the soil resource is suitably protected during construction. These soil management measures will be set out in the outline CEMP and outline Soil Resource Management Plan to ensure any disturbance to soils is mitigated.

5.8.1.3 The elements of the design that have the potential to have a permanent impact (in the worst-case scenario) during construction are those that involve soil disturbance, soils stripping and sealing (hardstanding development). These include the construction compounds, on-site substation, permanent access tracks, cable installation and the BESS and its associated infrastructure. Based upon Table 3 of the IEMA guidance [33], there would be a 'moderate' magnitude of change associated with the Proposed Development if these design elements were to occupy an area of between 5 and 20 ha resulting in a "Moderate or Large" effect in the worst-case scenario. An oSRMP will be prepared to ensure effective mitigation and management of all proposed construction activities that will involve soil disturbance throughout the construction phase.

5.8.1.4 Table 5-6 summarises the potential significance of impacts on the soil resource (in terms of damage and loss) and agricultural land associated with the Proposed Development. Based upon the potential receptor sensitivity of the soil resource and agricultural land, and the potential magnitude of change associated with the Proposed Development, there is the potential for significant effects on these receptors during the construction phase. Therefore, these elements have been **scoped in** for further assessment. It is noted that detailed baseline survey data will confirm receptor sensitivity.

5.8.2 Operation

5.8.2.1 Providing that best practice soil management measures are implemented through the preparation of the Outline Soil Resource Management Plan and Outline Landscape and Ecological Management Plan, during the operational phase there would be no significant negative impacts on the soil resource onsite. All negative impacts on soils and agricultural land are anticipated to occur during the construction phase of the Proposed Development in their first instance. It is anticipated that during the operational phase there will be opportunities to retain compatible agricultural uses (e.g. grazing) under the panels and this will be established in the outline Landscape and Ecological Management Plan. Therefore, negative impacts on agricultural land and soils due to loss and damage during the operational phase have been **scoped out** of further assessment.

5.8.2.2 Potential beneficial impacts upon soil organic matter as a receptor arising from reducing the intensity of agricultural land use during the operational phase will be assessed. A change of land use for certain areas from arable cropping and intensive grassland production to low input grassland increases the potential to build SOM levels and reduces the sensitivity of SOM as a receptor. Therefore, impacts on SOM have been **scoped in** for further assessment.

5.8.3 Decommissioning

5.8.3.1 It is assumed that potential significant effects on the soil resource and Soil Organic Matter are the same or less as those identified during the construction phase. Therefore, impacts on the soil resource with regards to structural damage and loss through erosion, and impacts on Soil Organic Matter, during the decommissioning phase of the proposed development have been **scoped in** for further assessment.

5.8.3.2 The land will be returned to agricultural use at the end of the decommissioning phase.

Table 5-6 Potential significant effects associated with the Proposed Development

Receptor	Likely receptor sensitivity (subject to survey)	Potential magnitude	Potential significance (moderate or above considered significant in EIA terms)
Construction			
Agricultural land	Low to High (Medium as a worst case)	Moderate (worst case scenario assumes 5 to 20 ha of permanent impact)	Potential significant effect
Soil resource (Damage to soil)	High		Potential significant effect
Soil resource (Loss of soil)	Medium		Potential significant effect
Soil Organic Matter	Low to High (Medium as a worst case)		Potential significant effect
Operation			
Agricultural land	Low to High (Medium as a worst case)	Negligible	Effect unlikely to be significant
Soil resource (Damage to soil)	High		Effect unlikely to be significant
Soil resource (Loss of soil)	Medium		Effect unlikely to be significant
Soil Organic Matter	Low to High (Medium as a worst case)	Major	Potential significant effect
Decommissioning			
Agricultural land	Low to High (Medium as a worst case)	Moderate (worst case scenario assumes 5 to 20 ha of permanent impact)	Potential significant effect
Soil resource (Damage to soil)	High		Potential significant effect
Soil resource (Loss of soil)	Medium		Potential significant effect
Soil Organic Matter	Low to High (Medium as a worst case)		Potential significant effect

5.9 Proposed assessment methodology

5.9.1.1 A detailed ALC survey is being undertaken in order to confirm the ALC gradings and to identify if any BMV land is present for areas within the draft Order Limits.

The survey will be targeted towards the likely panel areas, and cable route corridors once known. Additionally, the ALC survey will provide a detailed baseline identifying the soil characteristics present onsite suitable to identify any sensitive soil receptors and to inform any soil management priorities.

5.9.1.2 The sensitive receptors identified for inclusion in the Soils and Agricultural Land ES Chapter are:

- Agricultural land – considers permanent and temporary loss of agricultural land due to a change in land use and management
- Damage to Soil Resource - disturbance and/or damage to soil functions as a result of handling
- Loss of Soil Resource – considers the susceptibility of the soil resource to erosion from soil handling and management
- Soil Organic Matter and Soil Carbon – Considers the impact of soil and land management on Soil Organic Matter (SOM)/Soil Carbon levels and its implications on Soil Health
- The results of the detailed soil surveys will be used to establish the baseline in relation to soils and agricultural land at the draft Order Limits.

5.9.1.3 The 2022 IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment' (IEMA 2022) [33] will be used to assess the potential impacts and associated risks that may occur as a result of the Proposed Development. Magnitude of change will be estimated based upon the footprint of the Proposed Development and will take into account areas of permanent land take (involving soil sealing). The significance criteria is outlined in the section below.

Significance Criteria

5.9.1.4 Table 5-7 is based upon Table 2 of the IEMA guidance [33]. Based on the IEMA system, the sensitivity of soils will therefore be based on the land's ability to provide food and fuel. This has been assessed using the ALC system, with higher grades assigned higher sensitivities. The receptor sensitivity criteria for 'Land' are outlined in Table 5-7.

Table 5-7 Receptor Sensitivity (Agricultural Land)

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

5.9.1.5 The effect of the permanent and temporary elements of the Proposed Development on the identified soil resources will be assessed in terms their sensitivity to damage and loss of soil resource. The assessment criteria combine standard industry approaches, the IEMA guidance [33] and professional experience. The receptor sensitivity criteria of soil resources to 'Structural Damage' are shown in Table 5-8, which has been adapted from Chapter 9: Table 4 of the IEMA guidance [33].

Table 5-8 Receptor Sensitivity (Soil Resources – Structural Damage)

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

5.9.1.6 The receptor sensitivity of the soil resource to loss through erosion is shown in Table 5-9.

Table 5-9 Receptor Sensitivity (Soil Resources –Loss)

Receptor	Sensitivity	Justification
Soils with high risk of erosion and organic soils (peat)	High	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g., use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion (organo-mineral soils: i.e., peaty soils or peaty gleys, peat < 50 cm)	Medium	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g., when above their plastic limit – the moisture state where soil begins to behave as a plastic material). The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	Low	These soils are generally more resistant to damage and may be appropriately managed by standard good practice construction measures.

5.9.1.7 The receptor sensitivity for Soil Organic Matter is shown in Table 5-10.

Table 5-10 Receptor Sensitivity (Soil Organic Matter)

Receptor	Sensitivity	Justification
Peat soils	Very high	Peatlands are critical for mitigating the impacts of climate change and are the largest natural terrestrial carbon store. Damaged peatlands are a major source of greenhouse gas emissions therefore it is critical to ensure their protection
Soils below typical SOM levels for climate and soil type in Cropping production		Soils in cropping production can have high levels of soil disturbance during cultivation activities leading to loss of SOM through oxidation of organic carbon. Soils in cropping production with organic matter levels below typical levels indicate a loss in SOM has occurred and a change in management practice is required to reverse the degradation of soil quality
Soils undergoing significant disturbance as a result of construction activities (excavation, stripping, movement, spreading and storage)		High levels of soil disturbance increases aeration and leads to a loss of organic carbon through oxidisation. There is also an increased potential for soil erosion.
Organo-Mineral (Peaty Soils)	High	Soils that are an important shallow store of organic carbon and have a significant role in the mitigation of climate change. Disturbance of these soils will cause the potential loss of significant levels of organic carbon.
Soils at or above typical SOM levels for climate and soil type in Cropping production		Soils in cropping production can have high levels of soil disturbance during cultivation activities leading to loss of SOM through oxidation of organic carbon. Soils in cropping production with organic matter levels at or above typical levels are at risk of organic matter loss over time with no change to soil management practices
Mineral soils with SOM >5% (non agricultural production)	Medium	Mineral soils typically above average SOM levels for their soil type but have low chance of carbon losses due to negligible soil disturbance activities
Mineral Soils in intensive grassland production		Intensive grassland production has lower soil disturbance than cropped systems but still has processes that lead to soil organic carbon losses such as fertiliser inputs which increases organic matter turnover and surface disturbance from livestock compaction.
Mineral soils with SOM <5% (non agricultural production)	Low	Mineral soils with lower-than-average SOM levels. These soils have a low contribution to mitigating climate change through storage of carbon and negligible impact of loss of organic carbon from a low chance of soil disturbance.
Mineral Soils in low input systems - permanent grassland, rough grazing		Low chance of soil disturbance based on management practices, SOM levels are likely to be maintained or increase leading to improved soil quality

5.9.1.8 The magnitude of change criteria for agricultural land and soil resources is presented in Table 5-11, which has been adapted from Chapter 9: Table 3 of the IEMA guidance [33].

Table 5-11 Magnitude of Change

Magnitude	Justification
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20 ha or loss of soil-related features (including effects from 'temporary developments'*). or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha, or gain in soil-related features.
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*). or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20ha, or gain in soil-related features.
Minor	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features. Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

*Temporary developments can result in a permanent impact if resulting disturbance or land use change results in permanent damage to soils.

5.9.1.9 Table 5-12 has been adapted from Chapter 9: Table 5 of the IEMA guidance [33] and presents the classification of effects for loss of land (agricultural), and loss and damage of soil resources. Where effects are determined as Very Large, Large, or Moderate, the effect will be considered as Significant in EIA terms. Where effects are determined as Slight, or Neutral, the effect will be considered Not Significant in EIA terms. Where effects are established to fall within a 'Slight or Moderate' category based on their magnitude and sensitivity, professional judgement and sound reasoning will be used to determine their ultimate significance category.

Table 5-12 Level of effects

		Nature of impact (magnitude/probability/ reversibility)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Nature of Receptor (sensitivity/value /importance)	**Very High**	Neutral	Slight	Moderate or large	Large or Very Large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Slight	Neutral or slight	Neutral or slight	Slight

*Professional judgement will be used to determine the significance of the effect in the particular circumstances. Note: Effects have the potential to be adverse or beneficial.

5.10 Assumptions, limitations and uncertainties

5.10.1.1 There is currently no detailed soil and ALC survey data available to inform the scoping report, but this data is being collected and will inform the EIA. The publicly available baseline information has been used to inform the receptor sensitivity of the soil resource and agricultural land onsite in order to identify potential significant impacts.

5.11 Summary

Table 5-13 Agricultural land use and soils scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Agricultural land	Scoped in	Scoped out	Scoped in	Detailed ALC and soil survey currently being undertaken
Agricultural holdings / farm businesses	Scoped out	Scoped out	Scoped out	None
Soil resource (Damage to soil)	Scoped in	Scoped out	Scoped in	Detailed ALC and soil survey to be undertaken
Soil resource (Loss of soil)	Scoped in	Scoped out	Scoped in	Detailed ALC and soil survey to be undertaken
Soil Organic Matter and Soil Carbon	Scoped in	Scoped in	Scoped in	Detailed ALC and soil survey to be undertaken

6 Air Quality

6.1 Introduction

6.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of air quality.

6.1.1.2 It sets out air quality receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

6.1.1.3 The following aspects have been considered as part of the scope and methodology for air quality:

- Dust and particulate matter generation during the construction and decommissioning phases
- Impact of emissions from development-generated traffic in the construction, operational and decommissioning phases

6.2 Relevant legislation, policy, standards and guidance

6.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for air quality and have informed the scope of the assessment.

6.2.2 Legislation

Table 6-1 Air Quality - Legislation

Legislation	Relevance to assessment
The Environment Act 2021 [44]	Required the UK government to prepare a national Air Quality Strategy. The latest air quality strategy was published in 2023 to fulfil the statutory requirement of the of the Environment Act 1995 as amended by the Environment Act 2021. The strategy sets out the actions local authorities are expected to take in support of long-term air quality goals, including ambitious new PM2.5 targets.
The Air Quality Standards Regulations 2010 [45]	Transposes the EU limit values set out within the Ambient Air Quality Directive 2008/50/EC into UK legislation. These are largely the same as the Air Quality Standards and Objectives defined in earlier Air Quality Regulations as *"the maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale.".* *See also the Air Quality (Amendment of Domestic Regulation)* (EU Exit) Regulations 2019 [46]. This instrument amends domestic legislation that implements EU air quality legislation to ensure it continues to be operable after the withdrawal of the UK from the EU.
Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [47]	5(2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (c)land, soil, water, air and climate.

6.2.3 Policy

Table 6-2 Air Quality - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [48]	Sets broad national policy approach. Section 5.2 addresses air quality outlining approach to assessment of impacts and determining requirement for mitigation (if required).
National Policy Statement for renewable energy infrastructure (EN-3) [49]	Establishes policy specific to renewable energy schemes (including solar). EN-3 does not include further requirements for air quality in relation to solar schemes, beyond those general requirements of EN-1 for all energy infrastructure schemes.
National Planning Policy Framework, December 2023 [50]	Defines how air quality is considered in relation to the planning process, at paragraph 192: *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs and CAZs, and the cumulative impacts from individual sites in local areas.* *Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan."*
Allerdale Local Plan (Part 1) Strategic and Development Management Policies, July 2014 [51]	Local Plan currently in use, defines local planning policy in Allerdale Borough Council. Section S36 defines approach to Air, Water and Soil Quality; section relevant to air quality as follows: *"The quality of air and water resources within the Plan Area will be protected and opportunities for enhancement will be pursued. Unless adequate mitigation measures can be secured, development proposals will be resisted that would have a demonstrable direct and/or indirect adverse impact on;* *a) Air quality and/or atmospheric conditions."*
Cumberland Consolidated Planning Policy Framework January 2023, Cumberland Council [52]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.
Department of Environment , Food and Rural Affairs, Air Quality Strategy: Framework for Local Authority Delivery, August 2023 [53]	Establishes the framework for air quality management in England. Air quality standards and objectives are set out for eight pollutants which may potentially occur at levels that give cause for concern. The strategy also provides details of the role that local authorities are required to take in working towards improvements in air quality, known as the Local Air Quality Management (LAQM) regime. The current strategy supersedes the previous 2007 strategy in England only and provides a framework to enable local authorities to make the best use of their powers and make improvements for their communities. It also includes guidance on the new fine particulate matter targets for England

6.2.4 Standards and guidance

Table 6-3 Air Quality - Standards and guidance

Standards and guidance	Relevance to assessment
Department for Communities and Local Government, Planning Practice Guidance: Air Quality (November 2019) [54]	States that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impacts in an area where air quality is known to be poor, or where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of legislation (including that applicable to wildlife). Where a proposed development is anticipated to give rise to concerns about air quality, an appropriate assessment needs to be carried out. Where the assessment concludes that the proposed development (including mitigation) will not lead to an unacceptable risk from air pollution, prevent sustained compliance with national objectives or fail to comply with the requirements of the Habitats Regulations, then the local authority should proceed to decision with appropriate planning conditions and/or obligations
Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance, August 2022 (LAQM.TG(22)) [55]	LAQM.TG(22) defines the air quality monitoring, data processing and assessment methodologies for Local Air Quality Management, and defines the assessment requirements and approaches for different pollutants and sources.
Institute for Air Quality Management (IAQM), Guidance on the Assessment of Dust from Demolition and Construction (January 2024) [56]	Provides assessment methodologies for assessment of the impacts of construction dust with emphasis on classifying levels of risk, in order to allow mitigation measures appropriate to the level of risk to be identified.
IAQM, Land-Use Planning and Development Control: Planning for Air Quality (January 2017) [57]	Sets out assessment methodologies for assessment of impacts of developments on local air quality, especially in relation to the impacts of development-generated road traffic on pollutant concentrations at existing receptor locations.

6.3 Consultation

6.3.1.1 The following stakeholders will be consulted with regards to air quality as part of the assessment process:

- The Environmental Health Officer (EHO) at Cumberland Council (CC)

6.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to air quality.

6.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

6.4 Study area

6.4.1.1 In relation to construction dust, as well as dust emissions during the decommissioning phase, existing human sensitive receptors located within 250m of the draft Order Limits and/or within 50m of the route that construction vehicles will take (up to 500m from the draft Order Limits access points) have been identified.

6.4.1.2 For the construction, operational and decommissioning phases, traffic data has been reviewed against the EPUK/IAQM criteria in order to determine the extent of the road network to be included within the air quality study area. Existing Sensitive Receptor locations have been identified within 200m of the roads that will be affected by development-generated traffic.

6.5 Baseline conditions

6.5.1 Desktop sources used

6.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- DEFRA Local Air Quality Management webpages [58]
- Cumberland Council Air Quality Annual Status Report [59]
- DEFRA MAGIC Mapping Tool [60]

6.5.2 Surveys undertaken and proposed

6.5.2.1 No surveys are required in respect of air quality.

6.5.3 Existing baseline

Current Baseline Conditions

6.5.3.1 The draft Order Limits are located within the administrative area of Cumberland Council (CC) which is responsible for the management of local air quality within the district. CC was formed from the mergers of Allerdale Borough Council (ABC), Carlisle City Council (CCC) and Copeland Borough Council (CBC) effective from 1st April 2023; the draft Order Limits were previously located within Allerdale Borough Council.

6.5.3.2 The most recent Air Quality Annual Status Report (ASR) (June 2023) was prepared by ABC but issued after the formation of CC. The ASR states that there are currently no Air Quality Management Areas (AQMAs) declared within the former ABC area. The nearest AQMA is located in Carlisle approximately 40km to the north-east, and therefore the draft Order Limits are not located in or near to any existing AQMA or known area of concern for air quality in relation to human health.

6.5.3.3 The former ABC undertook air quality monitoring by means of nitrogen dioxide (NO_2) diffusion tubes at 18 locations in 2022 [59] (the most recent available published data). The closest location is an urban location in Workington (ref. DT2), approximately 2.9 km to the west of the draft Order Limits, which reported an annual mean concentration for NO_2 of 22.0 µg/m^3, which is well below the annual mean objective of 40 µg/m^3.

6.5.3.4 In order to provide information on the local background air quality in the absence of data being available from a representative background monitoring location, background pollutant concentrations have been obtained from the 2018-based default concentration maps provided by Defra on their Local Air Quality Management web pages [58]. The background concentrations used in the assessment are detailed in Table 6-4.

Table 6-4 Background Pollutant Concentrations at the Proposed Development Site

Grid Square	2024 Background Concentrations (µg/m^3)			
	Oxides of Nitrogen (NO_x)	Nitrogen Dioxide (NO_2)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)
303500, 525500	5.01	4.03	7.60	4.67

6.5.4 Future baseline

6.5.4.1 It is assumed that future baseline pollutant concentrations within the draft Order Limits would reduce compared to the present level, continuing the current trend. Emissions due to road traffic, especially those of NO_2, are gradually declining owing to changes in the composition of the vehicle fleet with improving emission performance of newer vehicles and the increasing uptake of low-emission vehicles and electric vehicles (EVs).

6.6 Potential impacts

6.6.1 Construction

6.6.1.1 During the construction phase of development, there is the potential for dust soiling and human health effects as a result of dust and particulate matter (PM_{10}) emissions. These effects may be experienced at existing sensitive receptors as a result of demolition, earthworks and construction, and through the track-out of dirt and mud onto the public highway.

6.6.1.2 During the construction phase there is the potential for air quality effects on concentrations of NO_2, PM_{10} and $PM_{2.5}$ particularly at existing sensitive receptors within 200 m of the proposed routes as a result of emissions from construction and Non-Road Mobile Machinery (NRMM) vehicles.

6.6.2 Operation

6.6.2.1 During the operational phase of the Proposed Development, there is the potential for emissions from operational vehicles servicing the Proposed Development impacting upon local air quality.

6.6.3 Decommissioning

6.6.3.1 The decommissioning phase of the Proposed Development will comprise activities similar to the construction phase and as such impacts felt are expected to be the same.

6.7 Design, mitigation and enhancement measures

6.7.1 Embedded measures

6.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

6.7.1.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to air quality already committed to include:

- An appropriate buffer will be maintained between properties and construction areas.
- Routing for construction and operation vehicles will avoid routing through local villages.

6.7.1.3 In addition, the following documents will be produced and feed into the definition of embedded mitigation measures:

- Construction dust assessment, with recommended mitigation measures following best practice measures set out in IAQM guidance. These will then be implemented into the Outline Construction Environmental Management Plan / Outline Decommissioning Management Plan (oCEMP / oDEMP). Examples of such measure include:
  - plan site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable;
  - ensuring all vehicles switch off engines when stationary – no idling vehicles; and
  - avoiding the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

6.7.1.4 A Construction Traffic Management Plan (CTMP) will also be prepared which will include detail regarding routing of construction traffic away from sensitive receptors in order to limit vehicle emission impacts at these locations.

6.7.2 Further mitigation

6.7.2.1 Further mitigation are actions that require site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for air quality will be defined through the PEIR/ES once the level of significance of effects is known.

6.7.2.2 It is considered that with appropriate site-specific construction and decommissioning dust mitigation in place, the residual effects on receptor locations during the construction and decommissioning phases are anticipated to be not significant and as such further mitigation is unlikely to be required.

6.7.2.3 It is not anticipated that there will be any specific requirements for mitigation measures associated with the operational phase of the Proposed Development, but this will be confirmed on review of data against air quality guidance criteria.

6.7.3 Management plans

6.7.3.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to air quality including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Construction Traffic Management Plan

6.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

6.7.3.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

6.8 Likely significant effects

6.8.1 Construction

6.8.1.1 During the construction phase of development, there is the potential for dust soiling and human health effects as a result of dust and particulate matter (PM_{10}) emissions from both construction processes and the operation of NRMM on-site. This will be considered through undertaking a Construction Dust Assessment in line with relevant IAQM guidance in order to identify likely impacts and appropriate mitigation measures to be applied accordingly.

6.8.1.2 An oCEMP will be produced as part of the DCO application, which will include construction dust assessment and mitigation measures and follow the best practice measures set out in the IAQM guidance. These measures, commitments and actions will be carried forward to a CEMP which will be produced by appointed construction contractor and agreed with the relevant local planning authorities prior to the commencement of construction.

6.8.1.3 It is anticipated that with the implementation of suitable site-specific mitigation measures through the oCEMP, the residual effects of construction dust and particulates on existing sensitive receptors will not be significant.

6.8.1.4 Anticipated traffic generation will be below the applicable IAQM thresholds for detailed assessment, namely a change of 500 Annual Average Daily Traffic (AADT) movements overall, or 100 AADT for HGVs. For construction it is anticipated that a total of 26 trips (52 two-way movements), covering both HGVs (18 HGV trips (36 two-way movements) per day) and workers (8 car/LGV trips (16 two-way movements) per day) travelling to site, will be added onto the network per day. In addition an oCTMP will support the DCO application and include measures such as appropriate traffic planning and HGV management. It is therefore considered that the impact of emissions from construction vehicles on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing sensitive receptors will not be significant.

6.8.1.5 As a result an assessment of effects upon air quality during construction is **scoped out** from further assessment.

6.8.2 Operation

6.8.2.1 Traffic generation in the operational phase will be substantially lower than the Air Quality assessment criteria within IAQM guidance (one trip expected per month) and as such, it is considered that the impact of emissions from development-generated traffic in the operational phase on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing sensitive receptors will not be significant.

6.8.2.2 As a result an assessment of effects upon air quality during operation is **scoped out** from further assessment.

6.8.3 Decommissioning

6.8.3.1 The decommissioning phase of the Proposed Development will comprise activities similar to the construction phase and are not expected to result in any greater effects on air quality.

6.8.3.2 The potential limited effects of the Proposed Development on local air quality during decommissioning are associated with dust and traffic associated with movement of materials, as well as particulate emissions from NRMM.

6.8.3.3 An oDEMP will be produced as part of the DCO application, which will include a commitment to produce a decommissioning dust assessment in alignment with the construction dust assessment submitted with the oCEMP. The oDEMP will also include mitigation measures and follow the best practice measures set out in the IAQM guidance. These measures, commitments and actions will be carried forward to a DEMP which will be produced by appointed construction contractor and agreed with the relevant local planning authorities prior to decommissioning.

6.8.3.4 It is anticipated that with the implementation of suitable site-specific mitigation measures through the oDEMP, the residual effects of decommissioning dust and PM_{10} on existing sensitive receptors will not be significant.

6.8.3.5 Decommissioning is likely to give rise to the same level of trip forecast as the construction phase. And as such anticipated traffic generation will be below the applicable IAQM thresholds for detailed assessment, namely a change of 500 Annual Average Daily Traffic (AADT) movements overall, or 100 AADT for HGVs. It is therefore considered that the impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing sensitive receptors resulting from emissions from vehicles associated with decommissioning activities will not be significant.

6.8.3.6 As a result an assessment of effects upon air quality during decommissioning is **scoped out** from further assessment.

6.9 Proposed assessment methodology

6.9.1.1 The ES will not contain an assessment on air quality as all aspects have been **scoped out** of further assessment. However, a construction and decommissioning dust assessment will be undertaken to identify site specific mitigation measures required to be adopted, and will feed into the oCEMP and oDEMP that support the DCO application.

6.9.1.2 The construction phase dust assessment will be undertaken in accordance with the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction (January 2024)' [56]. The assessment will consider the potential dust soiling, human health and ecological effects (where applicable) at existing sensitive receptor locations, as a result of demolition, earthworks, construction and the trackout of dirt and mud onto the public highway.

6.10 Assumptions, limitations and uncertainties

6.10.1.1 In accordance with the methodology detailed in the IAQM guidance [56], the construction phase assessment will assume that no mitigation measures are applied, except those required by legislation such as on-site activities to operate in accordance with the Environmental Permitting Regulations 2010, i.e. Process Guidance Notes 3/16 and 3/1. Further information relating to legislation to control dust emissions from construction sites is provided in Sections 4.1 and 7.1 of the IAQM guidance.

6.10.1.2 A construction and decommissioning dust assessment will be undertaken and identify further site-specific measures relating to the construction and decommissioning phases, these will be fed into the oCEMP and oDEMP.

6.10.1.3 Screening criteria to determine whether the level of traffic generation in the construction, operational and decommissioning phase requires detailed assessment has been applied as per the appropriate IAQM guidance [57]; this methodology assumes no mitigation. In addition, an oCTMP will support the DCO application and include measures such as appropriate traffic planning and HGV management.

6.11 Summary

Table 6-5 Air Quality scoping summary

Aspect	**Construction**	**Operation**	**Decommissioning**	**Any required surveys?**
Dust and particulate matter	Scoped out - construction dust assessment will support the DCO application	Scoped out	Scoped out	-
Vehicle emissions	Scoped out	Scoped out	Scoped out	-

7 Biodiversity

7.1 Introduction

7.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of biodiversity.

7.1.1.2 It sets out ecological receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

7.1.1.3 The following broad aspects have been considered as part of the scope and methodology for biodiversity:

- Impacts to statutory and non-statutory designated sites
- Loss of habitat
- Impacts to protected and notable species

7.1.1.4 This chapter is supported by the following figures:

- Figures 7.1: Site location plan
- Figure 7.2: Statutory conservation sites
- Figures 7.3: Non-statutory conservation sites
- Figure 7.4: Habitat plan

7.1.1.5 This chapter is supported by the following appendices:

- Appendix 7.1 Preliminary Ecological Assessment

7.2 Relevant legislation, policy, standards and guidance

7.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for biodiversity and have informed the scope of the assessment.

7.2.2 Legislation

Table 7-1 Biodiversity - Legislation

Legislation	Relevance to assessment
The Environment Act 2021 [61]	Makes provision about targets, plans and policies for improving the natural environment, for statements and reports about environmental protection, about nature and biodiversity and for

Legislation	Relevance to assessment
	conservation covenants amongst others. It also sets out Biodiversity Net Gain requirements.
The Wildlife and Countryside Act 1981 (as amended) [62]	The primary mechanism for legislative protection of wildlife within Britain. It prohibits certain methods of killing or taking wild animals, amends laws relation to protection of certain mammals and restricts the introduction of certain animals and plants.
The Conservation of Habitats and Species Regulations 2017 [63]	The Habitat Regulations provides legal protection to UK Special Protection Areas (SPAs), and wetlands of international importance as designated under the Ramsar Convention.
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 [64]	The requirement for assessment of impacts on Natura 2000 sites is set out within this legislation, with the ultimate aim to 'maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest'.
The Habitats and Birds Directive in relation to Natura 2000 sites. [65] [66]	The overall objective is to ensure that over 1000 selected species and habitat types are maintained, or restored, to a favourable conservation status within the EU. In addition to halting the further decline or disappearance of such species and habitats, the Directive aims to allow them to recover and thrive over the long-term. Member States must designate, protect and manage core areas for habitat types listed in Annex I and species listed in annex II of the Habitats Directive. Sites are selected on scientific grounds using the criteria laid down in the Directive and are known collectively as Natura 2000 sites.
The Countryside and Rights of Way Act 2000 [67]	The Act strengthens protection for Sites of Special Scientific Interest (SSSI) and provides a basis for conservation of biological diversity
The Natural Environment and Rural Communities Act (NERC) 2000 [68]	Section 40 of the Natural Environment and Rural Communities (NERC) Act imposes a legal duty on Planning Authorities to 'have regard' to the conservation of biodiversity when considering planning applications. Section 41 of the NERC Act requires the Secretary of State to publish a list of species and habitats of principal importance for conserving biodiversity in the UK.
The Hedgerow Regulations 1997 [69]	It is an offence to remove or destroy certain hedgerows without planning consent or permission from the Local Planning Authority. These regulations do not apply to any hedgerow within the curtilage of, or marking the boundary of the curtilage of, a dwelling house.
The Protection of Badgers Act 1992 [70]	It is illegal to wilfully kill or injure a Badger, or attempt to do so and to intentionally or recklessly interfere with a Badger sett.
Infrastructure Planning (Environmental Impact Assessment) Regulations [71]	5(2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (b)biodiversity with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

7.2.3 Policy

Table 7-2 Biodiversity - Policy

Policy	Relevance to assessment
National Policy Statement for Energy (EN-1) [72]	This guidance sets out overarching government policy on the need for nationally significant infrastructure projects (NSIPs), how applications for energy infrastructure will be assessed and the way in which impacts and mitigation will be judged.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [73]	This guidance sets out government policy on nationally significant renewable energy infrastructure projects (NSIPs).
National Policy Statement for Electricity Networks Infrastructure (EN-5) [74]	Section 2.9 states details on the impacts to biodiversity and what mitigation the Applicant should consider.
National Planning Policy Framework (2023) [75]	The NPPF requires the Planning Authority to have a responsibility to promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan.
The Environmental Improvement Plan (EIP) 2023 [76]	The plan sets out how the government will work with landowners, communities and business to deliver goals for improving the environment at interim targets.
Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services (2020) [77]	This strategy sets out the strategic direction for biodiversity policy for the next decade on land (including rivers and lakes) and at sea, in relation to international and EU commitments.
Allerdale Local Plan (adopted 2014) Policy S2: Sustainable Development Principles [78]	Policy S2: Sustainable Development Principles 'The Local Plan will promote sustainable development as a core principle running through the entire plan. All development within the Plan Area, regardless of scale or nature, will be assessed against this policy….'
Allerdale Local Plan (adopted 2014) Policy S19: Renewable Energy and Low Carbon Technologies [78]	'The Council will seek to promote and encourage the development of renewable and low carbon energy resources given the significant wider environmental, community and economic benefits. Proposals where impacts (either in isolation or cumulatively) are, or can be made acceptable will be permitted….'
Allerdale Local Plan (adopted 2014) Policy S33: Landscape [78]	'The landscape character and local distinctiveness of the Plan Area shall be protected, conserved and, wherever possible, enhanced…'
Allerdale Local Plan (adopted 2014) Policy S35: Protecting and Enhancing Biodiversity and Geodiversity [78]	Conditions for biodiversity will be maintained and improved and important geodiversity assets will be protected. Nationally and internationally protected sites and species will be afforded the highest level of protection. A high priority is also given to the protection of locally identified biodiversity or ecologically valuable assets. The Council will seek positive improvements to the quality of the natural environmental through sustainable development resulting in net gains for biodiversity across the Plan Area. Developments, projects and activities will be expected to:

Policy	Relevance to assessment
	a) Protect and enhance key ecological habitats and wildlife corridors and stepping stones including watercourses and wetlands; b) Maintain, and where appropriate enhance, conditions for priority habitats and species identified in the Cumbria and UK Biodiversity Action Plan Priority Species and habitats or the Cumbria Biodiversity Data Centre at Tullie House; c) Maintain and where appropriate enhance recognised geodiversity assets identified in the Local Geodiversity Action Plan for Cumbria; d) Protect soil and water resources in line with Policy S36; e) Contribute to Allerdale's green infrastructure network in line with Policy S24; f) Protect existing trees, hedgerows and woodland (including ancient trees and hedgerows) that are considered important to the local community, contribute positively to the character of the area and/or are of a nature conservation value. Development that present significant economic or social benefits for the local community may be permitted where the Council, in consultation with relevant partner organisations are satisfied that any necessary impacts can be mitigated or compensated through appropriate habitat creation, restoration or enhancement on site or elsewhere secured via planning conditions, agreements or obligations. Where a development poses significant harm to an irreplaceable habitat which cannot be mitigated or compensated for, permission will be refused.
Allerdale Local Plan (adopted 2014) Policy S36: Air, Water and Soil Quality [78]	The quality of air and water resources within the Plan Area will be protected and opportunities for enhancement will be pursued. Unless adequate mitigation measures can be secured, development…'
Cumberland Consolidated Planning Policy Framework [79]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

7.2.4 Standards and guidance

Table 7-3 Biodiversity - Standards and guidance

Standards and guidance	Relevance to assessment
Guidelines for Preliminary Ecological Appraisal, 2nd ed. CIEEM 2017 [80]	Approaches to survey scope and methodology are undertaken in accordance with best practice guidance.
Guidelines for Ecological Impact Assessment in the UK and Ireland CIEEM, 2016. [81].	Approaches to assessment are undertaken in accordance with best practice guidance.

Standards and guidance	Relevance to assessment
UKHab Habitat Classification Version 2.0. UKHab 2023. [82]	Classification criteria for habitats.
The Statutory Biodiversity Metric User Guide November 2023 [83]	Draft guidance regarding the use of the Statutory Metric in the assessment of Biodiversity Net Gain.
Bird Survey Guidelines for Assessing Ecological Impacts. Bird Survey & Assessment Steering Group. 2023 [84]	Guidance on the methodology/approach to breeding and wintering bird surveys.
Bat Surveys for Professional Ecologists. 2023. [85]	Approaches to survey scope and methodology are undertaken in accordance with best practice guidance.
Surveying Badgers (1989) [86]	Guidance on the methodology/approach to survey badger.
Monitoring the Otter (2003) [87]	Guidance on the methodology/approach to survey otter.
Water Vole Conservation Handbook (2011) [88]	Best practice guidelines to survey water vole.
How to survey ponds for aquatic macroinvertebrate families (2015). Surveying terrestrial and freshwater invertebrates for conservation evaluation (2007) [89] [90]	Survey guidance on best practice to survey terrestrial and aquatic invertebrates.
Froglife (1999) Advice Sheet 9. Reptile Survey. An Introduction to planning, conducting and interpreting surveys for snake and lizard conservation [91]	Guidelines on reptile surveys.
Technical advice note for field and laboratory sampling of great crested newt environmental DNA (2014) [92]	Guidance on methodology used to complete eDNA surveys for Great Crested Newts (GCN).

7.3 Consultation

7.3.1.1 The following stakeholders will be consulted with regards to biodiversity as part of the assessment process:

- Natural England will be consulted regarding potential impacts to SSSI and Natura 2000 sites via the statutory process triggered via the use of 'Impact Risk Zones'.
- Cumberland Council will be consulted regarding ecology assessments generally including specific issues relating to the Biodiversity Net Gain (BNG) process in particular. This will include confirmation of policies to be used in consideration of strategic significance.
- Historical biological data will be sought from Cumbria Biological Data Centre (CBDC) regarding protected species and habitats records. Data will also be sought from local groups including local raptor study groups, Butterfly Conservation, local bat and badger groups. Individual local recorders may also be consulted for records as required.

7.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to biodiversity.

7.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

7.4 Study area

7.4.1.1 The proposed study area to inform the relevant assessments covers the draft Order Limits, plus varying zones of influence (ZoI) where applicable. These are:

- 20km radius from the draft Order Limits for Statutory designated sites of International/European importance that may be functionally linked, including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites.
- 2km radius from the draft Order Limits for all other statutory and non-statutory designated sites, as well as parcels of known ancient woodland (to include felled or replanted ancient woodland).
- 2km radius from the draft Order Limits for records of protected and notable species.
- 50m radius from the draft Order Limits for badger survey*
- Up to 50m radius from the draft Order Limits for breeding bird surveys,
- Waterbodies within 250m of the draft Order Limits for GCN surveys*.
- Linear waterbodies within 200m of the draft Order Limits for otter and water vole surveys*.

7.4.1.2 Whilst the entire draft Order Limits are subject to baseline data collection, those areas more likely to host panels are subject to a greater degree of survey effort at this stage than other areas of the draft Order Limits to avoid abortive work, noting that once cable routing is confirmed these too will be surveyed in greater detail. For the purposes of this scoping assessment, the draft Order Limits have been divided into five discrete areas on Figure 7.1 Site location plan, with individual fields within each of these areas identified via an alpha-numeric code. Area 1 includes fields A1-A5, Area 2 includes A6 – A20, Area 3 is labelled A21-A40, Area 4 is A41-A48 and Area 5 includes A49 and A50. Field numbers are displayed on Figure 7.6 Field Reference Location Plan.

* Where access is available.

7.5 Baseline conditions

7.5.1 Desktop sources used

7.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Cumbria Biological Records Centre (CMRC [93])
- Mapping and Analysis of Geographic Information from the Countryside (MAGIC [94])
- Satellite imagery (Google Earth, 2024 [95])

7.5.2 Surveys undertaken and proposed

7.5.2.1 The following surveys have been completed at the time of writing:

- Habitat mapping and protected species habitat assessments (including badger, bats, breeding and wintering birds, invertebrates, otter and water vole, reptiles, GCN, fish) to inform Preliminary Ecological Appraisal (refer to Appendix 7.1);
- Breeding bird surveys (partially complete); and
- Wintering bird surveys.

7.5.2.2 The following surveys are planned to be undertaken, and will inform the PEIR / ES:

- Breeding bird surveys (3x remaining visits);
- Great crested newt (GCN) Habitat Suitability Index (HSI) and eDNA sampling;
- Seasonal nighttime bat walkover (formerly known as bat activity surveys);
- Bat static/automated monitoring;
- Badger survey;
- Invertebrate survey;
- Reptile survey; and
- NVC survey.

Breeding and Wintering Bird Surveys

7.5.2.3 A single year of bird surveys will be undertaken to characterise the assemblage and a single non breeding survey period (January – March inclusive) plus a single breeding survey period (March – June). The results to date do not suggest that a second year/season of surveys will be required, given the absence of species which are qualifying features of the SPA/Ramsar sites, and the separation distance to coastal sites with waterbird assemblages. A further three survey visits will be undertaken with during late May and early June. The final survey visit will be undertaken during mid June 2024. It is not proposed to undertake specific nocturnal/crepuscular surveys although data will be supplemented by records of owl species recorded during the proposed bat activity transects. No species have been recorded on site to date which may require individually targeted survey effort.

Nighttime Bat Walkover

7.5.2.4 Activity surveys comprising 3 x walked transects (Spring, Summer and Autumn) will be done, together with sampling from the collection of data from automated bat detectors placed within representative habitats and sampling bat activity over 5 consecutive days each month during the period May – September 2024 (inclusive). The automated detectors will be deployed within both linear and open habitats (simultaneously) such that impacts from the construction and installation of the panel arrays (within open areas) can be compared to activity levels at linear habitats such as hedgelines/streams and woodland edge, which will be retained. The detector locations will be rotated to maximise spatial coverage.

7.5.2.5 Bat roost surveys are not proposed to be undertaken as there was limited bat roost potential identified on the draft Order Limits during the preliminary walkover survey.

7.5.3 Badger Survey

7.5.3.1 Badger surveys will be undertaken during the period April – September (inclusive). The surveys will involve searches for signs of presence including dung pits, latrines, hairs, prints and feeding signs/remains. The survey will also seek to confirm the status of any recorded setts (active or disused) and to classify the sett with respect to its function within the social group.

Invertebrate Survey

7.5.3.2 Invertebrate surveys including butterfly transects (6 survey visits May- July) will be undertaken to assess the distribution of such species as well as habitat assessments and selected sampling across a range of terrestrial invertebrate groups. This will include checking of larval food plants for key butterfly species. Habitat assessment and sampling for other groups will be undertaken based on Natural England's 'Pantheon'[1] system

Great Crested Newt Survey

7.5.3.3 Habitat suitability assessments and eDNA sampling will be undertaken for all suitable waterbodies within the draft Order Limits and a surrounding buffer of 250m where access is available.

Reptile Survey

7.5.3.4 Reptile surveys using artificial cover objects are being undertaken during the active season over seven survey visits. The survey results are not available at the time of writing.

[1] Pantheon is a database tool developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data.

NVC Survey

7.5.3.5 NVC surveys will be undertaken during the summer of 2024 in order to assess the value of the vegetated habitats in key parts of the draft Order Limits.

7.5.4 Existing baseline

7.5.4.1 A Preliminary Ecological Appraisal (PEA) (refer to Appendix 7.1) of the draft Order Limits undertaken in April 2024 has been used to inform the ecological baseline conditions. A suite of further surveys are proposed, as above, which will fully inform the baseline level biodiversity upon completion.

7.5.4.2 The location and extent of habitats within the draft Order Limits are displayed on Figure 7.4 Provisional Habitat Plan. In general terms the draft Order Limits are dominated by sheep grazed pasture (modified grassland), with some arable land, stands of less intensively managed grassland, especially in the central parts of the draft Order Limits, conifer plantations and semi-natural woodland blocks and hedgerows. The Lostrigg Beck is a dominant component, running south - north through the draft Order Limits, its confluence with the River Marron is some 2Km to the north at Bridgefoot. The River Marron is itself a tributary of the River Derwent.

Designated Sites

7.5.4.3 The location of all designated conservation sites, both statutory and non-statutory, displayed on Figure 7.2 Statutory Sites and Figure 7.3 Non Statutory Sites, and outlined in Table 7-4, Table 7-5, and Table 7-6 below. [94] [93]. At this stage it is not possible to determine functional linkage between the designated conservation sites and habitats within the draft Order Limits (although they are expected to be limited), this will be determined at PEIR stage.

Table 7-4 Internationally designated sites within 20km of the draft Order Limits.

Site	Approximate distance to draft Order Limits	Reasons for designation
Upper Solway Flats and Marshes Ramsar	16.7km north	The whole estuarine complex is a site of national and international importance for wintering wildfowl and wading birds including the entire Svalbard breeding population of the goose *Branta leucopsis* and is a vital link in a chain of west coast estuaries used by migrating birds. The site is also noted for its populations of breeding birds, natterjack toad *Bufo calamita* and invertebrates. Qualifying species (as identified at designation) with peak counts in winter include: Pink-footed goose , *Anser brachyrhynchus, Barnacle goose , Branta leucopsis,* Svalbard , Northern pintail *Anas acuta, Red knot Calidris canutus islandica, Dunlin Calidris alpina, Bar-tailed godwit , Limosa lapponica*, Eurasian curlew , *Numenius arquata*, Common redshank *Tringa tetanus*. Species with peak counts in spring include: ringed plover *Charadrius hiaticula.*

Site	Approximate distance to draft Order Limits	Reasons for designation
Clints Quarry SAC	12.2km northeast	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts a large population of GCN *Triturus cristatus*.
Solway Firth SPA	3.4km west	The site qualifies under Article 4.1 by supporting internationally or nationally important wintering populations of three Annex 1 species: whooper swan *Cygnus cygnus*, barnacle geese *Branta leucopsis* and golden plover *Pluvialis apricaria*. The Upper Solway Flats and Marshes qualifies under Article 4.2 as a Wetland of International Importance, by regularly supporting over 20,000 water birds. It also qualifies under Article 4.2 by regularly supporting internationally important wintering populations of eight migratory waterfowl species (pink-footed geese *Anser brachyrhynchus,* pintail *Anas acuta*, scaup *Aythya marila,* oystercatcher *Haematopus ostalegus*, knot *Calidris canutus*, bar-tailed godwit *Limosa lapponica*, curlew *Numenius Arquata* and red shank *Tringa tetanus*, as well as nationally important wintering populations of eight other species. The Upper Solway Flats and Marshes also support important assemblages of breeding birds characteristic of saltmarshes, and wintering birds typical of estuarine habitats
River Derwent & Bassenthwaite Lake SAC	120m east	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea.* (Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels) • Water courses of plain to montane levels with the *Ranunculion fluitantis* and C*allitricho-Batrachion vegetation*. (Rivers with floating vegetation often dominated by water-crowfoot) The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II: • Atlantic salmon *Salmo salar* • Brook lamprey *Lampetra planeri* • Floating water-plantain *Luronium natans* • Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia* • Otter *Lutra lutra* River lamprey *Lampetra fluviatilis*
River Ehen SAC	8.5km south	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II: • Freshwater pearl mussel *Margaritifera margaritifera* Atlantic salmon *Salmo salar*

Site	Approximate distance to draft Order Limits	Reasons for designation
Solway Firth SAC	16.7km north	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Estuaries • Fixed dunes with herbaceous vegetation (grey dunes). (Dune grassland) • Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats) • Perennial vegetation of stony banks. (Coastal shingle vegetation outside the reach of waves) • Reefs • Salicornia and other annuals colonising mud and sand. (Glasswort and other annuals colonising mud and sand) • Sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks) The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II: • River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus*
Lake District High Fells SAC	10.5km east	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: • Alkaline fens. (Calcium-rich springwater-fed fens) • Alpine and Boreal heaths. (Alpine and subalpine heaths) • Blanket bogs • Calcareous rocky slopes with chasmophytic vegetation. (Plants in crevices in base-rich rocks) • European dry heaths • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels. (tall herb communities) • *Juniperus communis* formations on heaths or calcareous grasslands. (Juniper on heaths or calcareous grasslands) • Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath) • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. (Western acidic oak woodland) • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea.* (Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels)

Site	Approximate distance to draft Order Limits	Reasons for designation
		• Siliceous alpine and boreal grasslands. (Montane acid grasslands) • Siliceous rocky slopes with chasmophytic vegetation. (Plants in crevices on acid rocks) • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*). (Acidic scree) • Species-rich Nardus grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe). (Species-rich grassland with mat-grass in upland areas) The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II: Slender green feather-moss *Drepanocladus (Hamatocaulis) vernicosus*
North Pennines and Dale Meadows SAC	5.8km east	The site encompasses the range of variation exhibited by Mountain hay meadows in the UK and contains the major part of the remaining UK resource of this habitat type. A wide range of rare and local meadow species are contained within the meadows, including globeflower Trollius europaeus, the lady's-mantles Alchemilla acutiloba, A. monticola and A. subcrenata, and spignel Meum athamanticum.

Table 7-5 Nationally designated sites within 2km of the draft Order Limits

Site	Approximate distance to draft Order Limits	Reasons for designation
River Derwent and Tributaries SSSI	120m east	Diverse aquatic and marginal floral communities, invertebrates and migratory fish species plus European otter *Lutra lutra*.

Table 7-6 Non-statutory designated sites within 2km of the draft Order Limits

Site	Approximate distance to draft Order Limits	Reasons for designation
Lower Lostrigg Beck (CWS)	Within draft Order Limits	One of the least disturbed river communities in the area, with neutral grassland, scrub and woodland. Species include great burnet Sanguisorba officinalis, oxeye daisy Leucanthemum vulgare, common spotted orchid Dactylorhiza fuchsii, betony Stachys officinalis, reed canary grass Phalaris arundinacea, marsh woundwort Stachys palustris and skullcap Scutellaria galericulata.
Oily Johnnies Willow Patch (CWS)	Immediately adjacent to draft Order Limits.	Extensive area of willow scrub (Salix viminalis, Salix pentandra and hybrids). Grassland has marsh valerian, devil's-bit scabious, meadowsweet and Sphagnum spp.
River Marron at Little Clifton (CWS)	0.4km east	A variety of habitats including woodland, scrub and neutral grassland. Species include oxeye daisy Leucanthemum vulgare, yellow rattle Rhinanthus minor and saw-wort Serratula tinctoria. This site straddles the River Eden and Tributaries Site of Special Scientific Interest (SSSI)
Wythenmoor (CWS)	0.4km south	The site is a wet woodland of the National Vegetation Classification (NVC) type W3 bay willow - bottle sedge Salix pentandra - Carex rostrata. The woodland comprises a mix of very wet areas with standing water and swamp vegetation, and drier patches where purple moor grass and ferns dominate the flora. The wettest areas are dominated by mature grey willow Salix cinerea; beneath the trees, the flora comprises abundant bottle sedge with frequent common valerian Valeriana officinalis, wild angelica Angelica sylvestris, and marsh bedstraw Galium palustre. Species that are occasional include water mint Mentha aquatica, ragged robin Lychnis flos-cuculi, marsh marigold Caltha palustris, and star sedge Carex echinata. Bog moss Sphagnum sp. is occasional to locally frequent within these wet areas.
Broomy Hill (CWS)	0.5 km east	Wet grassland with soft Juncus effusus, jointed Juncus articulatus, sharp flowered rush Juncus acutiflorus, valerian Valeriana officinalis and wild angelica.
Old Railway (River Maron) (CWS)	0.1 km east	Areas of species rich grassland with yellow rattle, ladies mantle Alchemilla sp., great burnet Sanguisorba officinalis, valerian and common spotted orchid.
Smithybanks Wood (CWS)	7 km east	The site is situated at an altitude of 60m above sea level. Part of the site is listed in the Cumbria Ancient Woodland Inventory. The flat part of the site directly adjacent to the river is wet woodland, Alder/Willow carr of the National Vegetation Classification (NVC) type W7 alder-ash-yellow pimpernel Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum grading into M28 yellow flag--meadowsweet Iris pseudacorus-Filipendula ulmaria mire in the more open parts the

Site	Approximate distance to draft Order Limits	Reasons for designation
		wood. The steeper slope on the eastern side of the site is drier, and supports oak woodland of the NVC type W10e pedunculate oak-bracken-bramble Quercus robur-Pteridium aquilinum-Rubus fruticosus, sub community Acer pseudoplatanus-Oxalis acetosella.
Corney Flat Marsh (CWS)	1.0 km east	An 3.5 ha field with species rich marshy grassland and species rich unimproved neutral grassland. Grey willow is scattered throughout.
Alcan Wildlife Area (CWS)	1.0 km south	An industrial site located north of Distington. The site supports a mosaic of species -rich grassland, semi-improved grassland and scrub. There are also several ponds on the site which support a population of breeding palmate newts Lissotriton helveticus
Marshy Grassland (Stainburn) (CWS)	1.4 km west	Species include rush species Juncus spp, horsetail Equisetum sp., spike-rush, yellow rattle, with angelica and bittersweet Solanum dulcamara in the ditches.
Hollins Wood (Branthwaite) (CWS)	1.3 km east	Woodland dominated by birch Betula pendula, alder Alnus glutinosa and ash Fraxinus excelsior.
Lostrigg Beck Site of Invertebrate Significance	450m	No information available
Special Roadside Verge - MP K3 (2)	10m	No information available
Special Roadside Verge - MP K3 (4)	0.9km	No information available
Special Roadside Verge - MP K3 (3)	1km	No information available
Special Roadside Verge – MP K1 (1)	1.2km	No information available
Disused Railway Bridgefoot (CWS)	1.5km	A disused railway line with gill woodland. Species include common spotted orchid *Dactylorhiza fuchsii*, wild angelica, pignut *Conopodium majus*, *perforateHypericum perforatum*, square stalked and slender St John's Wort. Meadow areas have yellow rattle, lady's mantle, meadowsweet, yarrow and greater bird's-foot trefoil *Lotus pedunculatus*.
Struthers Wood Ancient Woodland	1.2km	Ancient and semi-natural replanted woodland
Station Wood Ancient Woodland	1.7km	No information available
Coldfitz Wood Ancient Woodland	1.7km	No information available
Branthwaite Edge Wood Ancient Woodland /Jackie Planting (CWS)	2.0km	The site is marked on the Ancient Woodland inventory as ancient semi-natural Broad-leaved woodland. This is one of the largest areas of semi-natural woodland in West Cumbria. At the top of the hill slope there is a degraded mire. The woodland has a mixed canopy, silver birch is the most frequent species which

Site	Approximate distance to draft Order Limits	Reasons for designation
		dominates the canopy in places, along with frequent sessile oak Quercus petraea and rowan Sorbus aucuparia. The shrub layer is well developed in places with frequent hazel Corylus avellana, bramble Rubus fruticosus agg. and honeysuckle Lonicera periclymenum, holly Ilex aquifolium is occasional.
High Wood Ancient Woodland	2.0km	No information available

Habitats

7.5.4.4 At the time of writing, areas within the draft Order Limits have been subject to a provisional UKHab[2] habitat classification survey. It is proposed that broad scale mapping will be refined over the course of the 2024 ecology survey period such that a definitive habitat map will be available to accompany the PEIR.

7.5.4.5 The draft Order Limits as a whole are dominated by sheep grazed pasture and modified grassland, with Lostrigg Beck flowing centrally through the northern and central parcels.

7.5.4.6 Area 1 (A1-A5) is characterised by sheep grazed modified grassland.

7.5.4.7 Area 2 (A6-A20) lies on the opposite side of Lostrigg Beck and is similar in character but also has a single field of arable farmland.

7.5.4.8 Area 3 (A21-A40), the area in the vicinity of Stargill Farm, includes sheep grazed pasture, mature conifer plantations, pasture grazed by cattle, redundant arable land and a relatively diverse area of tussocky, damp grassland. This habitat (A32,A33,A34,A35) includes stands of purple-moor grass and rush pasture (A35) which is a 'Priority' habitat (NERC s.41). This area is structurally diverse including wetter areas dominated by soft and sharp-flowered rush *Juncus acutiflorus* and tufted hair-grass *Deschampsia cespitosa*. The larval food plants of marsh fritillary butterfly *Euphydryas aurinia* – devil's-bit scabious *Succisa pratensis* are also present in this area.

7.5.4.9 The two southern parcels of land (Area 4 and 5) within the draft Order Limits are dominated by modified grassland, managed by sheep or horse grazing.

7.5.4.10 Within the remaining areas of the draft Order Limits, there is a large area of tussocky, damp grassland resembling the habitats within Area 3. This area lies to the west of Area 3 and the A595 Winscales Road, and is subject to cattle and horse grazing.

[2] https://ukhab.org/

Protected and notable species

7.5.4.11 The following taxa and/or species are considered to be present or potentially present within the draft Order Limits, based on the findings of the PEA:

- Bats;
- Breeding birds;
- Wintering birds;
- Badger *Meles meles*;
- Otter and water vole *Arvicola amphibius*;
- Amphibians, including GCN;
- Reptiles;
- Fish;
- Invertebrates; and
- Protected and notable plants.

7.5.4.12 The desk study data provided by CBRC [93] suggests the potential presence of the following species within 2km: common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*, Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, noctule *Nyctalus noctula*, and whiskered/Brandt's Bat *Myotis* spp. Recent records (within the previous 10 years) have been supplied for common and soprano pipistrelle and noctule only.

Breeding and wintering birds

7.5.4.13 Breeding bird surveys are partially completed at the time of writing, with surveys being undertaken over visits in early and mid April and early May.

7.5.4.14 The recorded assemblage to date includes a total of 59 species recorded using the habitats within the draft Order Limits. Of these, 30 are notable, being either red or amber listed as Birds of Conservation Concern, NERC s.41 Priority species or by being of schedule 1 or EU Annex 1 status. The draft Order Limits are likely to be of County importance to breeding birds in general terms based on the diversity of species recorded.

7.5.4.15 Of the species noted to date, barn owl *Tyto alba* have been recorded in the northern extent of the draft Order Limits within viable breeding habitat and so are likely to have at least one territory within the draft Order Limits.

7.5.4.16 A peak survey count of five male grasshopper warbler *Locustella naevia* has been recorded within the central area to the east of Stargill farm (A35 and A36).

7.5.4.17 Red listed finches including greenfinch *Chloris chloris*, lesser redpoll *Acanthis cabaret*, linnet *Acanthis cabaret* and house sparrow *Passer domesticus* have also been recorded across the draft Order Limits.

7.5.4.18 Skylark *Alauda arvensis* appear to be occupying breeding territory in low numbers again principally to the east and west (A24 and A37) of Stargill Farm.

7.5.4.19 Starling *Sturnus vulgaris* have also been recorded feeding on the pasture in various locations across the draft Order Limits.

7.5.4.20 A flock of three curlew *Numenius arquata* have been observed on one occasion to date feeding on the damp pasture in the south of the draft Order Limits (A50 and A51) although there is no evidence of breeding.

7.5.4.21 Wintering bird surveys were completed in early 2024. The preliminary results of the wintering bird surveys, indicate that the Site is of Local value to wintering birds overall. No target species, i.e. species cited in the designation for the Solway Firth SPA; species listed on Schedule 1 of the WCA; species listed on s41 of the NERC act, species listed on Annex 1 of the European Birds Directive; or BoCC Red List were recorded.

7.5.4.22 There are local records of hen harrier *Circus cyaneus* from data supplied by CBDC [93]. The data includes four separate records all from the month of February 2010 from 'Lillyhall Stargill area', a record from November 2010 from 'Dean Moor', two records from January and February 2010 from 'Maryport' plus a single record from May 2013 from 'Schoose Wood, Near A66'. All of these records are within 2Km of the draft Order Limits although the exact location of observations remains unknown at the time of writing [96]. It is considered that the draft Order Limits does not provide suitable habitat for breeding hen harrier, given the absence of moorland/heath although it does provide viable wintering habitat. This however is limited to the central parts of the draft Order Limits which supports tall/tussocky grassland, to the east of and in the vicinity of Stargill Farm (A35, A36).

Badger

7.5.4.23 Two active setts have been recorded by the badger surveys undertaken during April 2024. A main sett is present beyond the boundary of Area 4 within a stand of broad-leaved woodland. An outlier sett is also present just beyond the boundary of Area 3.

7.5.4.24 There are no records from CBRB within the last 10 years.

Otter and water vole

7.5.4.25 Suitable habitat for otter exists primarily along and within the Lostrigg Beck and Wythemoor Sough as well as minor watercourses within the draft Order Limits.

Reptiles

7.5.4.26 There are recent records of slow worm supplied by CBRC [93] and historical records of common lizard *Zootoca vivipara* within the study area. Suitable habitats for both species are present within the draft Order Limits, extensively within the tussocky grassland areas to the east of Stargill Farm (A35 and A36), and along boundary and linear features such as ditch/river banks and woodland edge. The more tightly grazed grassland fields elsewhere within the draft Order Limits are not considered to be suitable for this group, given the absence of cover.

Amphibians, including GCN

7.5.4.27 There are records of GCN from land within 250m of the draft Order Limits, to the south of Branthwaite Road [94] [93]. Given the presence of suitable terrestrial habitat within the draft Order Limits, for the purposes of this report it is assumed that GCN are reasonably likely to be present. Natural England District Level Licence (DLL) mapping for the Site also suggests likely presence given that the draft Order Limits lies within their 'Amber' zone, defined as "….*amber zones have great crested newt populations, habitats and dispersal routes*" [96].

Fish

7.5.4.28 CBRC [93] have provided recent records of Atlantic salmon *Salmo salar* and brown/sea trout *Salmo trutta* from the River Marron, within study area. There are sections of the Lostrigg Beck which may be suitable spawning locations for either species. There are also recent records of European eel *Anguilla anguilla*.

Invertebrates

7.5.4.29 The desk study includes a number of records of notable butterfly species including marsh fritillary *Euphydryas aurinia*, small heath *Coenonympha pamphilus* and small pearl-bordered fritillary *Boloria selene*. There are potentially suitable habitats for all species within the draft Order Limits with larval foodplants including devil's-bit scabious (marsh fritillary) *Succisa pratensis* and common dog-violet *Viola riviniana* (small pearl-bordered fritillary) and finer grasses (small heath) present, especially in the wetter parts of the draft Order Limits within the damp tussocky grassland to the east of Stargill Farm (A32,A33,A34,A35).

Protected and notable plants

7.5.4.30 There are no records of notable flora with the exception of petty whin *Genista anglica* (IUCN 'red listed') and bluebell *Hyacinthoides non-scripta* (listed on Wildlife and Countryside Act Schedule 8) [62] [93]. The damp grassland habitat to the east of Stargill farm (A35 and A36) are potentially suitable for petty whin, and the stands of woodland within the draft Order Limits support bluebell.

7.5.5 Future baseline

7.5.5.1 The future baseline conditions for biodiversity are expected to remain as the current existing baseline in the absence of the Proposed Development proceeding due to them being dominated by relatively stable management practices involving relatively limited management intervention. It is anticipated that the protected species baseline would be subject to ongoing fluctuations in-line with shifting population distribution associated with a range of factors including climate change.

7.6 Potential impacts

7.6.1 Construction

7.6.1.1 The following potential impacts on ecological features could occur during the construction of the Proposed Development:

- Direct impacts to non-statutory designated sites within the draft Order Limits, i.e. Lower Lostrigg Beck CWS .
- Indirect impacts on statutory and non-statutory designated sites located in proximity to the draft Order Limits;
- Loss of habitat to accommodate the substation and other infrastructure related to the Proposed Development;
- Modification of Priority habitats such as purple moor grass and rush pasture;
- Temporary loss/damage of habitat to accommodate cable routes, and construction compound for example hedgerow/ditch crossings;
- Loss of habitat used by foraging GCN and incidental harm and mortality to GCN;
- Loss of habitat used by foraging and hibernating reptiles and incidental harm and mortality of reptiles;
- Loss of breeding/foraging habitat and displacement/disturbance of ground-nesting bird species;
- Displacement/disturbance and loss of foraging habitat used by wintering bird species including hen harrier;
- Potential disturbance and displacement to any roosting bats occupying retained trees;
- Disturbance to foraging/commuting bats;
- Disturbance to occupied badger setts and incidental harm and injury to badgers;
- Fragmentation of habitat by security fencing not being permeable to species such as brown hare and badger;
- Indirect impacts via incidental sediment release and pollution of Lostrigg Beck and other watercourses resulting in harm to fish, otter and water vole;
- Disturbance and damage of riparian habitats potentially supporting otter and water vole;
- Modification of habitats potentially supporting notable terrestrial invertebrates especially key butterfly species; and
- Deterioration and direct loss of protected and notable plant species.

7.6.2 Operation

7.6.2.1 The following potential impacts on ecological features could occur during the operational phase of the Proposed Development:

- Impacts to bats through intermittent site lighting and impacts to ground nesting birds during maintenance operations (via vehicle movements); and
- Potential increase in botanical, birds and invertebrate species-richness due to managing habitats and enhancing field boundaries for the benefit of biodiversity.

7.6.3 Decommissioning

7.6.3.1 The Proposed Development will be decommissioned and removed at the end of its operational life. Potential impacts are likely to be similar to those outlined for construction and are not repeated here.

7.7 Design, mitigation and enhancement measures

7.7.1 Design principles

7.7.1.1 The Proposed Development is being designed with regard to a set of design principles, controlled via the CEMP. Relevant to biodiversity these include:

- All mature trees, woodland blocks and hedgerow boundaries within the proposed areas for solar panels will be retained.
- Green infrastructure along Lostrigg Beck will be enhanced which would support biodiversity net gain.

7.7.2 Embedded measures

7.7.2.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

7.7.2.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to biodiversity already committed to include:

- 15m buffer from panels to ancient and veteran trees
- 15m buffer from panels to woodland
- The construction compound will be located on low diversity habitat.
- Buffers for all other trees (none ancient / veteran) and hedgerows to be determined by RPA, but at least 5m buffer for trees with potential for bats, and a minimum 8m buffer between solar panels and hedgerows (reduced to 5m from panels for internal hedges)
- Minimum 10m offset from all infrastructure (including fencing) from bank top of all riparian boundaries and watercourses.
- 30m buffer from badger sett locations.

- Fencing to be designed to let small mammals pass through (excluding that around the on-site substation).
- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions.
- Any access tracks, cable routing and fencing will be located to pass through existing gates and gaps in hedgerows where feasible.
- Existing hedgerows in poor condition / gappy will be reinforced with planting / management where feasible.
- No significant lighting proposed, demand responsive motion sense lights only, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact.
- There will be limited nighttime construction activity. Working hours during the construction phase would be 08.00-18.00 Monday to Friday, 08.00-14.00 Saturday, this will reduce impacts to foraging/commuting bats which will not be subject to lighting impacts other than for a short period potentially during spring/autumn when bat activity at dusk may overlap with end of day and start of day working.
- Construction access will use existing access points wherever possible, hence there will be no further habitat loss.

7.7.2.3 Further embedded measures are likely to include:

- Refinements to the final design and construction strategy to minimise habitat loss as far as possible.

7.7.3 Further mitigation

7.7.3.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for Biodiversity will be defined through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to may include:

- Timing construction activities that will directly impact habitat to avoid the bird breeding season, to avoid disturbance impact to nesting birds (or provision of ECoW to check for the presence of active nests, establish appropriate buffer zones and monitor disturbance);
- Ensuring all open excavations are either ramped or fenced such that unintended entrapment of fauna does not occur.
- Provision of Ecological Clerk of Works (ECoW) to minimise impacts to GCN, reptiles and nesting birds during construction, via conducting searches of habitats in advance and establishing temporary buffer zones etc;
- Establishment of a sensitive lighting plan covering construction and operational lighting to ensure lighting of suitable bat commuting, foraging and roosting habitats and otter/water vole habitat is minimised;

- Installation of mammal 'gates' or similar access features within perimeter fencing to maintain cross site connectivity for terrestrial mammals; and
- Measures to avoid pollution or sediment transfer during construction.

7.7.4 Management plans

7.7.4.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to biodiversity including:

- Outline Construction Environmental Management Plan (oCEMP);
- Outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology; and
- Outline Decommissioning Environmental Management Plan (oDEMP).

7.7.4.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

7.7.4.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

7.8 Likely significant effects

7.8.1 Construction

7.8.1.1 Indirect effects to Internationally designated sites cannot be ruled out at this stage but will be fully considered in the PEIR, although there is expected to be limited interaction based on distances between sites and the Proposed Development in the majority of cases. These may include habitat loss if the draft Order Limits includes Functionally Linked Land, for example. Indirect effects to Internationally designated sites are therefore **scoped in** for further assessment.

7.8.1.2 If development, such as cable routing, cannot avoid crossing Lower Lostrigg Beck CWS located within the draft Order Limits then a potentially significant effect, adverse at County level, could arise due to temporary loss of riparian habitats lying adjacent to the river corridor. This effect may be permanent depending on the design. Effects upon non-statutory designated sites, specifically Lower Lostrigg Beck CWS, are therefore **scoped in** for further assessment.

7.8.1.3 Areas of the Proposed Development may interact within purple moor grass and rush pasture (Priority habitat) (A35). The construction works would result in the deterioration of this habitat through soil/vegetation disturbance. This effect would potentially be significant and adverse at up to Regional level. Effects upon priority habitats are therefore **scoped in** for further assessment.

7.8.1.4 Most habitat losses are expected to be minimal and would be re-instated following construction, associated primarily with the construction compound. However, the creation of new access routes could involve habitat loss for the life of the Proposed Development, although these would avoid key habitats. Overall potential adverse effects are potentially adverse at Local level. Direct loss/deterioration of linear habitats such as watercourses, hedgerows will be avoided by an appropriate trenchless technique where feasible, with indirect impacts such as accidental pollution and sediment transfer being controlled via standard environmental protection measures set out within an CEMP (following the principles set out in the oCEMP). Effects associated with habitat loss are therefore **scoped in** for further assessment.

7.8.1.5 Impacts to ground nesting bird species via displacement will be assessed in full following the conclusion of breeding and wintering bird species. It is currently possible that the construction of the Proposed Development may modify habitats supporting red listed birds of conservation concern, including grasshopper warbler and skylark. This may potentially lead to the displacement of birds and the loss of effective nesting opportunities and hence an effect that is potentially significant and adverse of up to County level. Regarding hen harrier, there is no evidence of wintering on site and as such no adverse effect would be apparent, however additional data is being requested from Cumbria Bird Club. Effects upon breeding and wintering birds are therefore **scoped in** for further assessment.

7.8.1.6 Impacts to key invertebrate species including marsh fritillary may arise where areas of tussocky grassland (A32,A33,A34,A35) which supports the larval foodplant of marsh fritillary could be directly impacted and/or lost by the construction of the Proposed Development. Invertebrate surveys are being undertaken and impacts will be considered in the PEIR and final ES. In the event that populations of marsh fritillary are identified within an area proposed for construction of the Proposed Development this is likely to displace marsh fritillary populations (their larvae being dependant on an open aspect and high light levels for their development) and a reduction available habitat. Potential impacts are significantly adverse at Regional level. Similarly, the potential presence of notable plant species such as petty whin will be considered following the completion of detailed botanical surveys, if present this species is likely to be displaced leading to a potentially significant adverse effect at up to Regional scale. Effects upon invertebrates are therefore **scoped in** for further assessment.

7.8.1.7 Indirect impacts to other receptors including bats, badger, otter and watervole, amphibians, reptiles, fish and protected plant species are considered in regard to habitat loss and indirect impacts. This is will primarily be controlled and mitigated through measures outlined within the CEMP (following principles outlined in the oCEMP). Effects upon bats, badger, otter and watervole, amphibians, reptiles, fish and protected plant species are therefore **scoped in** for further assessment.

7.8.2 Operation

7.8.2.1 During operation potentially significant effects may occur to statutory and non-statutory designated sites (their associated faunal assemblages where populations are reliant on habitats within the draft Order Limits), breeding and wintering birds

and bats. The extent of any functional linkage to statutory sites cannot be ascertained until surveys and assessments are complete, currently there is no survey evidence to suggest that a significant adverse effect will occur. Effects to statutory and non-statutory designated sites are therefore **scoped in** for further assessment on a precautionary basis.

7.8.2.2 With regard to breeding and wintering birds limited disturbance due to permanent lighting and movement of maintenance vehicles/staff may be apparent. This is will primarily be controlled and mitigation through measures outlined within the oCEMP however until the completion of surveys significant effects cannot be ruled out. Effects to breeding and wintering birds are therefore **scoped in** for further assessment on a precautionary basis.

7.8.2.3 Potentially significant operational effects also include adverse effects to bats from site lighting, for which a sensitive lighting plan would be required. This plan would include design modification to any aspects of the lighting scheme which may cause excessive luminance of features such as woodland edge, hedgerows and watercourses. Further, it is noted that no significant lighting is proposed, instead demand responsive motion sense lights will be utilised, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact. Following such mitigation significant adverse effects are not anticipated however cannot be ruled out until the completion of bat surveys. Effects to bats are therefore **scoped in** for further assessment on a precautionary basis.

7.8.2.4 Potentially significant increases in botanical, birds and invertebrate species-richness may be achieved due to managing habitats and enhancing field boundaries for the benefit of biodiversity. It is anticipated that at least Local level benefits will be accrued.

7.8.2.5 Adverse impacts to priority habitats, badger, otter and water vole, amphibians, reptiles, fish, invertebrates, and protected and notable plants are **scoped out** of the operational assessment. No direct impacts are anticipated and any indirect impacts will be adequately mitigated through embedded design measures and the oLEMP.

7.8.3 Decommissioning

7.8.3.1 Potential impacts are likely to be similar to those outlined for construction and therefore aspects **scoped in** for assessment will follow those assessed for construction. Mitigation will be similar to that required during the construction phase and will be set out within the oDEMP.

7.9 Proposed assessment methodology

7.9.1.1 The assessment will be based on the Guidelines for Ecological Impact Assessment in the UK and Ireland produced by CIEEM [81]. The assessment will contain a detailed description of the baseline conditions, following completion of surveys and collection of historical desk study data. Consultation from statutory bodies and interested parties will be reviewed and included in the assessment. The assessment will document the valued features including habitats, species and conservation

sites within influencing distance of the proposed development, and will include an assessment of the ecological value of these within the context of the draft Order Limits.

7.9.1.2 Potential effects resulting from the construction, operation and decommissioning of the Proposed Development will be assessed and reported in terms of their significance for the integrity and conservation status of all relevant, valued ecological features.

7.9.2 Assigning value

7.9.2.1 The first stage in the assessment would be to evaluate the ecological features by applying a geographical frame of reference from Site to International level, using the following aspects of value:

- Designations;
- Biodiversity value;
- Potential value;
- Secondary or supporting value;
- Social value;
- Economical value;
- Legal protection and;
- Multi-functional features.

7.9.3 Assigning magnitude of impact

7.9.3.1 The next stage is to predict and characterise the likely change and impact on the ecological receptors identified. This assessment would include consideration of the following factors:

- Whether the change is positive or negative;
- The magnitude or severity of the change;
- The extent of the area subject to a predicted impact;
- The duration and timing of the impact;
- Whether the impacts are reversible, with recovery through natural regeneration, or through the implementation of mitigation measures or if no recovery is possible within a reasonable timescale or there is no capacity/capability to reverse the impact; and
- The frequency of the impact.

7.9.3.2 The assessment of potential impacts will be undertaken with the inclusion of embedded mitigation for the Proposed Development. Residual impacts will be defined as those following all applied mitigation at which point the significance of the predicted effects will be described (residual significance). The degree of confidence in assessment will also be provided according to the degree of certainty (certain, probable or unlikely).

7.9.4 Identifying significance of effects

7.9.4.1 The assessment of significance of effects is determined in relation to the concept of 'integrity' which is defined as 'the coherence of a feature's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified'. The significance of effect will also be stated in relation to a geographical context. Thus, an impact will be assessed as significant at the level at which the integrity of the ecological receptor is affected. An impact may be significant at a lower geographical level below that at which the receptor was deemed to be valuable, e.g., the loss of a common species may not affect the integrity of a SSSI valued at National level, but it may still be a significant impact at the Local or Site level.

7.9.5 Habitats Regulations Assessment

7.9.5.1 If habitats within the draft Order Limits are determined, following conclusion of surveys, to be functionally linked to the relevant European designations, then a HRA will be undertaken, this will be separate to the EIA. A screening assessment (Stage 1) will be used initially to determine whether the Proposed Development will have any Likely Significant Effects (LSE) on the qualifying features of the designations.

7.9.5.2 In the event that LSE cannot be ruled out, a Stage 2 Appropriate Assessment will be provided. The Appropriate Assessment will consider whether, following the application of mitigation the Proposed Development will result in adverse impacts to the integrity of the designation(s), in relation to the sites features and conservation objectives. The HRA will follow best practice guidance and case law.

7.10 Assumptions, limitations and uncertainties

7.10.1.1 Assumptions have been made with regard to the potential/likely presence of protected and notable species based on the presence of recent records/ desk study data, presence of suitable habitat and know patterns of geographical distribution. Information relating to the presence of statutory and non-statutory conservation sites is in place at the time of writing and baseline habitat data has been subject to provisional mapping and UKHab classification.

7.11 Summary

Table 7-7 Biodiversity scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Statutory Designated Sites	Scoped in	Scoped in	Scoped in	Covered under relevant qualifying species sections below.
Non-statutory	Scoped in	Scoped in	Scoped in	Covered under relevant species sections below.

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Designated Sites				
Priority Habitats	Scoped in	Scoped out	Scoped in	UKHab classification across site and NVC habitat classification for key habitats of highest botanical diversity.
Bats	Scoped in	Scoped in	Scoped in	Seasonal activity surveys with monthly static detectors.
Breeding birds	Scoped in	Scoped in	Scoped in	Breeding bird surveys are ongoing (6 visits will be undertaken).
Wintering birds	Scoped in	Scoped in	Scoped in	Wintering bird surveys now completed (3 visits).
Badger	Scoped in	Scoped out	Scoped in	Single survey visit to assess levels of use, identify sett locations and classify active setts. All to be avoided by 30m protective buffer and suggest planning condition requiring checking surveys in advance of construction/decommissioning.
Otter and water vole	Scoped in	Scoped out	Scoped in	Presence along Lostrigg Beck and tributaries is assumed, appropriate buffer in place to prevent harm during construction/decommissioning.
Amphibians	Scoped in	Scoped out	Scoped in	DLL will be used in accordance with Natural England guidance, plus ECoW during construction/decommissioning.
Reptiles	Scoped in	Scoped out	Scoped in	Reptile presence/absence survey using artificial refugia, for key habitats only.
Fish	Scoped in	Scoped out	Scoped in	Appropriate buffer in place to prevent harm during construction/decommissioning.
Invertebrates	Scoped in	Scoped out	Scoped in	6 x transects and checking of larval food plants for key butterfly species. Habitat assessment and sampling for other groups. Assessment of general habitat favourability based on Natural England's Pantheon system
Protected and notable plants	Scoped in	Scoped out	Scoped in	UKHab classification across site and NVC habitat classification for key habitats of highest botanical diversity.

8 Climate Change

8.1 Introduction

8.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of climate change.

8.1.1.2 It sets out relevant climate change receptors and the approach to the assessment of the Proposed Development's impacts during construction, operation, and decommissioning.

8.1.1.3 The following aspects have been considered as part of the scope and methodology for climate change:

- Effects of the Proposed Development on climate. The Greenhouse Gas (GHG) assessment considers the change in GHG emissions due to the Proposed Development through an assessment of whole life carbon.
- Vulnerability of the Proposed Development to climate change. A review of the resilience of the Proposed Development to the potential effects arising from projected changes in future climate.
- In-Combination Climate Change Impacts (ICCI): An assessment of the potential impacts of future climate conditions to act in-combination with the impacts of the Proposed Development on other environmental receptors - the in-combination climate change impact assessment ensures that environmental receptors that are vulnerable to other impacts from the Proposed Development and climatic factors are considered in the context of the changing climate.

8.2 Relevant legislation, policy, standards and guidance

8.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for climate change and have informed the scope of the assessment.

8.2.2 Legislation

Table 8-1 Climate Change - Legislation

Legislation	Relevance to assessment
The Climate Change Act 2008, as amended by the Climate Change Act (2050 Target Amendment) Order 2019 [97]	The amendment in this Order has the effect that the minimum percentage by which the net UK carbon account for the year 2050 must be lower than the 1990 baseline is increased from 80% to 100%.
Infrastructure Planning (Environmental Impact Assessment) Regulations [98]	5(2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (c) land, soil, water, air and climate;

8.2.3 Policy

Table 8-2 Climate Change - Policy

Policy	Relevance to assessment
National	
Overarching National Policy Statement for Energy (EN-1) [99]	Overarching National Policy Statement for Energy (EN-1) highlights the importance of decarbonizing electricity grid and role of renewable technologies within that. Solar power has been categorized as one of the most affordable electricity supplies as it is not reliant on fuel supply. Section 4.10 of this sets out the generic considerations that applicants should consider in order to ensure that electricity networks infrastructure is resilient to the effects of climate change. It states that "applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario. These results should be considered alongside relevant research which is based on climate change projections". Section 4.10 of EN-1 advises that the "resilience of the project to the effects of climate change must be assessed in the Environmental Statement (ES) accompanying an application".
National Policy Statement for Renewable Energy Infrastructure (EN-3) [100]	Para 2.4.11 of National Policy Statement for Renewable Energy Infrastructure (EN-3) states "Solar photovoltaic (PV) sites may also be proposed in low lying exposed sites. For these proposals, applicants should consider, in particular, how plant will be resilient to: • increased risk of flooding; and

Policy	Relevance to assessment
	• impact of higher temperatures."
National Policy Statement for Electricity Networks Infrastructure (EN-5) [101]	Section 2.3 of National Policy Statement for Electricity Networks Infrastructure (EN-5) on Climate change adaptation and resilience states that applicants should consider any impact on the development from flooding, effects of wind and storms on overhead lines, storms, ground and coastal movements and droughts.
National Planning Policy Framework [102]	The NPFF highlights national transition to low carbon future in a changing climate and emphasizes the need for the increased supply of renewable and low carbon energy. Relevant policies to climate change, can be found in Chapter 14, 'Meeting the challenge of climate change, flooding and coastal change'. Paragraph 157 states that the planning system should, inter alia, "support the transition to a low carbon future in a changing climate", "shape places in ways that contribute to radical reductions in GHG emissions, minimise vulnerability and improve resilience", and "support renewable and low carbon energy and associated infrastructure". Paragraph 158-164 provides instructions on planning requirements for new developments in relation to climate change.
UK Climate Change Risk Assessment [103]	The UK Climate Change Risk Assessment identifies 61 climate risks cutting across multiple sectors of society. Its purpose is to help identify the range of potential significant and costly impacts that the UK will be subject to unless significant further action is taken now. It seeks to continue to raise ambitions on adaptation to ensure the UK is resilient to the challenges of a warming world
Third National Adaptation Programme (NAP3) [104]	NAP3 set out the actions that government and others will take to adapt to the impacts of climate change from 2023 to 2028. NAP3 sets out actions for infrastructure (including energy). It recognises "as the energy system decarbonises and other infrastructure systems electrify to meet the UK's net zero targets, the exposure of the energy system to climate hazards will change. Continuing to embed climate resilience in both the current and future energy systems is therefore essential to securing our energy supply."
The Clean Growth Strategy [105]	This strategy document sets out key policies and proposals to accelerate clean growth. It projects power sector emissions, taking into account the clean growth pathway between 1990 and 2050.
UK's Nationally Determined Contribution [106]	The UK's Nationally Determined Contribution was updated in 2022. The UK commits to reducing economy-wide GHG emissions by at least 68%, compared to 1990 levels.
Sixth Carbon Budget [107]	The Sixth Carbon Budget, provides ministers with advice on the volume of greenhouse gases the UK can emit during the period 2033-2037.
British energy security strategy [108]	This strategy sets out how Great Britain will accelerate homegrown power for greater energy independence.
Local	

Policy	Relevance to assessment
Cumberland Consolidated Planning Policy Framework [109]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.
Allerdale Local Plan (Part 1) Strategic and Development Management Policies July 2014 [110]	This Local Plan sets out planning policies within Allerdale district, within which the Proposed Development is located. Policy S2 Sustainable Development Principles, "The Council will ensure that the impact of new development on climate change is mitigated and that a comfortable, resilient and liveable environment is achieved across the Plan Area by adapting to the effects of climate change;… Protect, maintain and re-connect the range and vitality of habitats and species to allow species to adapt to climate change and create viable ecological network within and out with the Plan Area" "Strategic Objective SO1e Supporting and encourage construction methods that seek to reduce energy consumption, use renewable energy sources, minimise waste and encourage recycling." Strategic SO1f Promote renewable and low carbon energy production in the Plan Area". Policy S19 Renewable Energy and Low Carbon Technologies "The Council will seek to promote and encourage the development of renewable and low carbon energy resources given the significant wider environmental, community and economic benefits… Renewable energy proposals are expected to provide supporting evidence including landscape, visual and environmental assessments and to demonstrate that any negative impacts have been made acceptable. Where mitigation is required to make impacts acceptable these will, where necessary be secured through Planning Obligations."

8.2.4 Standards and guidance

Table 8-3 Climate Change - Standards and guidance

Standards and guidance	Relevance to assessment
Allerdale Borough Council Climate Action Plan (Update for 2022/2023) [111]	In 2021, Allerdale Borough implemented Climate Change Action Plan. This present Council's operations and wide community activities that will be undertaken to address climate change. One of the Allerdale commitment is to 'deliver strategic green infrastructure'.
Environmental Impact Assessment: Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022), Institute of Environmental Management and Assessment [112]	This is the most recent guidance available and is applicable to the UK. It is also considered to be the most holistic method of assessing GHG emissions as it applies a whole lifecycle methodology, incorporating not just the construction and operational phase of a development, but also the decommissioning/end of life and beyond asset lifecycle stages. The whole lifecycle methodology allows for a

Standards and guidance	Relevance to assessment
	more robust 'worst case scenario' to be applied which is proportionate to the nature and scale of the Proposed Development.
Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2020), Institute of Environmental Management and Assessment [113]	This guide will be applied to the assessment of resilience of the Proposed Development to climate change as this is the most recent available and is applicable to the UK.
The European Investment Bank (EIB) 'EIB Project Carbon Footprint Methodologies. Methodologies for the Assessment of Project GHG Emissions and Emissions Variations' (2023) , Version 11.3, European Investment Bank [114]	The EIB Project Carbon Footprint Methodologies (2023) guidance is used to expand upon the IEMA guidance to establish the baseline scenarios for the assessment. This goes into greater detail in terms of a baseline methodology and allows for easier comparison of impacts where there is no prior development in an area.
European Commission, 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (2013) Publications Office [115]	The guidance aims to improve the way in which climate change and biodiversity are integrated in Environmental Impact Assessments (EIAs) carried out across the EU. It is recommended to carry out the assessment before the development consent is granted. The Directive has introduced minimum requirements, main obligations of developers, assessment content, step by step methodology and provisions on the participation of competent authorities and the public. The guideline advises to; "assess climate change and biodiversity synergies and cumulative effects, which can be significant; consider long-term trends, with and without the proposed project; follow an integrated approach during the entire course of impact assessment; include extreme climate situations which may adversely affect the implementation and operation of a project".
Royal Institution of Charted Surveyors (RICS), 'Whole life carbon assessment for the built environment' (2nd Edition, Version 2, 2023) [116]	The document provides a comprehensive guideline for industry professionals to calculate and report the quantity of carbon impacts expected throughout all life cycle stages of a project, from manufacturing, transport, installation, use and end of life. This also considers assessment of the potential benefits and loads occurring beyond the system boundary. The solar farms fall under the category of 'Power-generation plants' in infrastructure assets/civil engineering works which are applicable for such assessments as listed in annex D of the guideline. It mentioned that 'All those undertaking the role of WLC assessor must follow the mandatory requirements included in this methodology in order for the WLCA to be compliant with this standard.' The timeline of the assessment is required to undertake the assessment 'during the early design, technical design, construction and post-completion phases of a project, in order to be integrated into the decision-making framework for a project".

Standards and guidance	Relevance to assessment
BSI - PAS 2080:2023 'Carbon Management in Buildings and Infrastructure' (2023), The Green Construction Board, Construction Leadership Council, the British Standards Institution [117]	This provides guidance for whole life carbon management in infrastructure and any development to be in line with government's Net Zero 2050 pathway.
United Nations Economic Commission Europe's (UNECE), 'Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources' (2022); United Nations [118]	The report presents an assessment of various electricity generation technologies and their associated environmental impacts across its various metrices such as health, ecosystems, and resource requirement through their life cycle. It also provides an update on existing data and the status of the technology in the international context. It gives information on global statics of PV solar, comparison of different life cycle inventories, specific environmental impacts associated with each PV technology such Si- based or thin film based, ground mounted or rood mounted etc. The document also provides information on energy storage, comparison of lifecycle impacts of selected electricity storage options which could be useful in the design stage and during considering alternatives that have a minimum carbon footprint.

8.3 Consultation

8.3.1.1 The following stakeholders will be consulted with regard to climate change as part of the assessment process:

- Cumberland Council low carbon team

8.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to climate change.

8.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

8.4 Study area

Greenhouse gas emissions

8.4.1.1 The study area for this topic differs from other technical disciplines, which focuses on the impact within the defined boundary. In line with IEMA guidance [112], a reference study period for the Proposed Development will be chosen as the basis for the GHG emissions assessment based on the expected service and construction period. The study period will be 24 months for construction, 40 years for operation and 12 months for decommissioning of the Proposed Development.

8.4.1.2 Climate change is a global phenomenon and the Proposed Development will impact global GHG concentrations. Therefore, within a climate change context, the key sensitive receptor to the impacts of the Proposed Development will be the global climate. This receptor differs from others listed within an EIA context as it is not at a distinct local scale but a global one. The study area will consider all the GHG emissions that arise throughout the lifecycle of the Proposed Development.

8.4.1.3 In terms of GHG emissions, all sources of GHG emissions will have a permanent, long-term, and adverse effect on the climate by contributing to (human-enhanced) global warming. Therefore, a different approach to defining the extent of the study area is required for the assessment of impacts. The assessment will consider the whole lifecycle emissions from the Proposed Development that will contribute to global climate change based on the information available at the planning stage. A 'cradle to grave' system boundary will be applied to cover the whole lifecycle of the development. These lifecycle modules have been simplified in the diagram in Plate 8-1, but include the following:

- before use stage (pre-construction, product, and construction process stage);
- use stage;
- end of life stage, and
- beyond asset life cycle (benefits and loads beyond the system boundary).

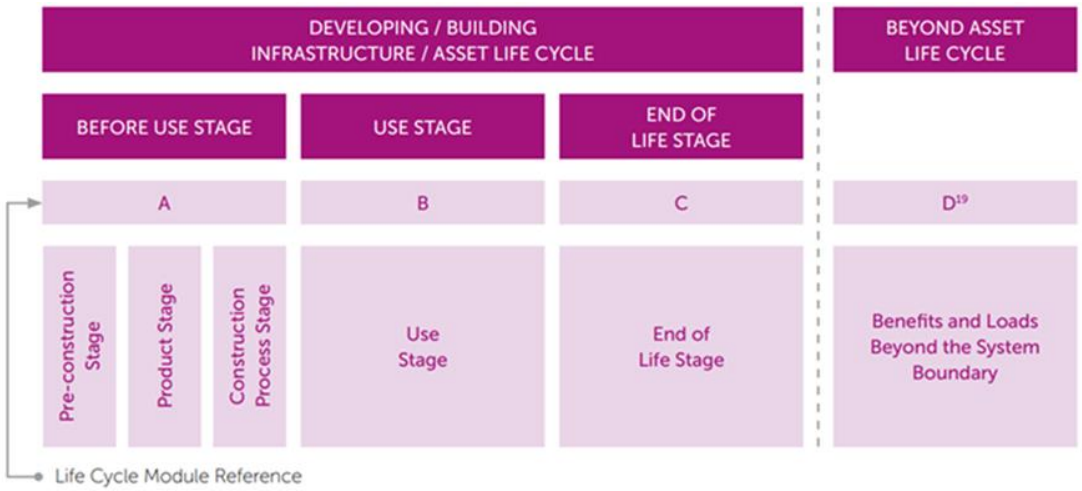


Plate 8-1 Simplified modular lifecycle stages for EIA GHG emissions assessment

Climate Resilience

8.4.1.4 In terms of climate resilience, the location of a site has a considerable influence when assessing vulnerability and adaptability to future climate change. Site location features within the draft Order Limits that may have the potential to cause, mitigate, or be at risk from climate change will be identified during the assessment.

8.4.1.5 As with the assessment of GHG emissions, the study period will be 43 years to encompass the construction, operation and decommissioning of the Proposed Development.

8.5 Baseline conditions

8.5.1 Desktop sources used

Greenhouse gas emissions

8.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area for the GHG emissions assessment:

- UK local authority and regional GHG emissions national statistics [119]

Climate Resilience

8.5.1.2 The following desktop sources have been used to inform the existing baseline conditions of the study area for the assessment of climate resilience:

- Current climate data from the UK Met Office will be used to determine the existing baseline for the vulnerability of the Proposed Development to climate change [120].
- The projected climate data for the North West of England region – UK Climate Projections 2018 (UKCP18), for high emissions scenario (RCP8.5), and 50% probability of occurrence [121].

8.5.2 Surveys undertaken and proposed

8.5.2.1 No surveys are required with respect of the climate change impact assessment.

8.5.3 Existing baseline

Greenhouse gas emissions

8.5.3.1 The draft Order Limits comprises largely Grade 4, with some Grade 3 agricultural land, which typically emits emissions in the form of methane (CH_4) and nitrous oxide (N_2O) from the soils. TA number of properties are also present. However, these will not be used as part of the development and so will not be included in this assessment.

8.5.3.2 Baseline emissions will also include emissions that may be avoided as a result of the Proposed Development, i.e., existing emissions from the generation of grid electricity if the Proposed Development does not go ahead. This will be a cumulative total of all emissions avoided over the lifetime of the Proposed Development, assuming 100% of the energy generated by the Proposed Development is displacing energy generated by fossil fuels.

Climate resilience

8.5.3.3 In terms of climate resilience, the current baseline is a temperate oceanic climate with warm summers and milder winters. The average temperature in Little Clifton,

near where the draft Order Limits are located, is 9.4°C. The region experiences an average rainfall of 1109mm per year [122].

8.5.4 Future baseline

Greenhouse gas emissions

8.5.4.1 In terms of the GHG emissions assessment, the future (sectoral) baseline will represent a typical 'business as usual' development of a similar type built elsewhere to minimum regulatory standards.

Climate resilience

8.5.4.2 In terms of the assessment of resilience, the future climate baseline is based on the UK climate change projections for a regional 25km grid surrounding the draft Order Limits. An initial review of UKCP18 [123] data, covering the full study period, and specifically focused on the north west England region, within which the Proposed Development is located, suggest that the region will experience an increase in mean temperature of 1.96°C during winter and 2.83°C in summer compared to a 1981-2000 baseline. In the same period, precipitation is estimated to increase by 17.9% in winter and decrease by 22.2% in summer.

8.5.4.3 The Proposed Development is not considered to be in a location that would be subject to future sea level rise [124].

8.6 Potential impacts

8.6.1 Greenhouse gas emissions

8.6.1.1 The potential impact of the Proposed Development is the release of GHG emissions from its lifecycle stages (refer to Plate 8-1), which will have a major adverse and significant impact due to the high sensitivity of the receptor (global climate) GHG emissions. For this assessment, it is considered that any increase or decrease in GHG emissions compared to the baseline has the potential to impact the global climate.

Construction

8.6.1.2 GHG emissions will be released into the atmosphere as a result of the construction of the Proposed Development. The embodied carbon of solar photovoltaic panels is likely to result in the biggest proportion of whole lifecycle emissions.

8.6.1.3 Table 8-4 summarises all the potential impacts of the Proposed Development during the construction stage.

Table 8-4 Summary of the potential impacts and emission sources.

Activity	Emission source and Impact
Raw material extraction and manufacturing of the materials and components required to build the Proposed Development	The embodied GHG emissions from fossil fuel energy are used to extract and manufacture materials and components.
Transportation of the materials to the manufacturing centre and draft Order Limits by Heavy Goods Vehicle (HGV)	Emissions from diesel, petrol, or other fuels are used in construction vehicles to transport materials and components.
Construction activities to build Proposed Development.	Emissions from construction compounds used on the draft Order Limits due to energy consumption, such as electricity and other fuels from plant, vehicles, and generators.
Use of construction infrastructure, including construction worker welfare facilities, a site office, wheel wash area, plant and machinery storage, waste storage areas	Emissions from energy consumption such as gas and electricity in temporary built infrastructure.
Disposal and treatment of construction waste	Emissions from diesel or other fuel use in HGV or other vehicles to transport waste to appropriate waste centre.
Land use change	Release of emissions from carbon sink as a result of soil disruption
Water use and treatment	Emissions from the provision of clean water on the draft Order Limits and energy use for wastewater treatment.
Use of construction machinery and equipment	Emissions from energy consumption such as electricity, diesel, and other fuels for machinery and equipment.
Site workers and managers travel to and from the draft Order Limits.	Emissions from fuel use in vehicles by construction workers and visitors.

Operation

8.6.1.4 Whilst the small release of long-term (over 40 years) GHG emissions into the atmosphere as a result of the operation of the Proposed Development will have some negative effects on the global climate, it is expected that the transition to renewable energy production enabled by the Proposed Development will far outweigh this in beneficial terms.

8.6.1.5 Table 8-5 summarises the potential impact of the Proposed Development and the source of emissions during the operation phase.

Table 8-5 Summary of the potential impacts and emission sources.

Activity	Emission source and impact
Maintenance of the solar array	Release of GHG emissions from energy consumption, material use, and waste generation as a result of ongoing site maintenance on a regular basis.
Travel to the Proposed Development for maintenance purposes.	Release of emissions from vehicles used to travel to the Proposed Development for maintenance operations.

Generation of renewable electricity	Offset the use of fossil fuels and reduce the carbon intensity of the National Grid, lowering emissions at the national level.

Decommissioning

8.6.1.6 GHG emissions will be released into the atmosphere as a result of the decommissioning of the Proposed Development.

8.6.1.7 Table 8-6 summarises the impact of the Proposed Development.

Table 8-6 Summary of the potential impacts and emission sources.

Activity	Impact
On-site decommissioning activity	Consumption of energy on-site for decommissioning purposes.
Transportation and disposal of waste materials	Release of emissions from transportation of waste
Worker travel	Release of emissions from the vehicles used by workers.

8.6.2 Climate resilience

8.6.2.1 The Proposed Development could potentially be affected by the impacts of climate change. Table 8-7 shows the potential impacts of climate change on the Proposed Development and how they can affect the Proposed Development , these are applicable across all phases; construction, operation, and decommissioning.

Table 8-7 Potential Impacts on Proposed Development across all phases

Parameter	General impact
Extreme weather events	Storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	Heat stress of materials and structures.
Increased frequency of heavy precipitation events	Heavy rainfall could cause land subsidence and damage to structures or drainage systems during periods of heavy rainfall
Increase in strong wind events	High winds could damage structures or assets or cause damage via falling trees or debris
Sea level rise	Potential to be impacted by flooding caused by sea level rise.

8.7 Design, mitigation, and enhancement measures

8.7.1 Embedded measures

8.7.1.1 Embedded measures are modifications to the design of a scheme made during the pre-application phase that are an inherent part of the design and do not require additional action to be taken.

8.7.1.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to climate change already committed to include:

- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions.
- Access tracks will be permeable using compacted gravel to allow water to filtrate through and maintain greenfield runoff rates.
- No significant lighting proposed, demand responsive motion sense lights only, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact.
- Additional planting and/or enhancement of existing habitats will seek to use native species that are climate resilient.

8.7.1.3 Further embedded measures are likely to include:

- Avoidance of critical infrastructure from within the flood zone and ensuring that solar PV modules are raised above the predicted maximum flood depth for the 100 year plus climate change scenario.
- Low carbon design specifications such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles.
- Use of recycled materials during construction wherever possible.

8.7.1.4 In addition, a Flood Risk Assessment (FRA) will be undertaken to consider the risk of potential extreme flood events as a result of climate change, and identify suitable mitigation to be embedded into the design.

8.7.2 Further mitigation

8.7.2.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation of climate change will be defined through the PEIR/ES once the effects of the Proposed Development are known. Options for further mitigation for the Proposed Development relevant to climate change impact assessment may include:

- Potential for agrivoltaics, seeking the dual use of areas of land for solar energy production and agriculture. This may help increase provision for biodiversity, including climate-resilient landscaping.
- Exploring plant optimisation techniques.

8.7.3 Management plans

8.7.3.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to climate change impact assessment, including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology

- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Battery Fire Safety Management Plan

8.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

8.7.3.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

8.8 Likely significant effects

Greenhouse gas emissions

8.8.1.1 The Proposed Development will generate GHG emissions as a result of the Proposed Development's whole life cycle (i.e., construction, operation, and decommissioning).

8.8.2 Construction

8.8.2.1 The likely significant effect of the Proposed Development is the release of short-term GHG emissions over the 24-month construction period from the associated activities required to build the Proposed Development.

8.8.2.2 The embodied carbon within construction activities will form the largest proportion of whole life cycle emissions and, as noted in IEMA guidance [112], all emissions of carbon contribute to climate change. In isolation, the construction emissions alone are not expected to be consistent with "*aligning project emissions with a science-based 1.5 ° C compatible trajectory, and achieving net zero by 2050*", even though, when considered as part of the project as a whole, they are likely to facilitate the overall project being assessed as meeting this requirement.

8.8.2.3 Since the release of short-term GHG emissions could impact the global climate permanently and in the long term, the assessment of construction emissions is scoped in.

8.8.3 Operation

8.8.3.1 Once operational, solar farms will convert sunlight into electricity (direct current) through the use of photovoltaic (PV) cells, which are converted to alternating current and exported to the national grid. As the fuel source is sunlight, there are no GHG emissions associated with the operation of the Site, except those from operations and maintenance vehicles associated with cleaning, repairing and maintaining the panels, electrical infrastructure and wider site, and other onsite grid connected electrical equipment such as security cameras and Supervisory Control and Data Acquisition (SCADA) equipment.

8.8.3.2 The 'In Use' lifecycle stage for solar PV panels is likely to result in an emissions reduction when compared with alternative technologies (e.g., combined cycle gas turbines (CCGT)) that deliver an equivalent amount of energy.

8.8.3.3 The operational element of the Proposed Development is, therefore, expected to have a positive impact on climate change with no further mitigation measures required.

8.8.3.4 However, the IEMA [112] definition of a beneficial impact is where "*the project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact*." Since solar panels will contribute towards net zero requirements but not sequester carbon then under this definition the development would be assessed as having a negligible impact rather than a beneficial one.

8.8.4 Decommissioning

8.8.4.1 The release of short-term (over 12 months) emissions into the atmosphere as a result of the decommissioning of the Proposed Development will have permanent and long-term effects on global climate.

8.8.4.2 The precise decommissioning effects are difficult to predict as it is not certain what technologies will be in use at the time of decommissioning. If it is assumed that current technologies, such as machines and vehicles powered by internal combustion engines, remain the primary plant used for removing components from site, then there are likely to be comparable decommissioning emissions to those released during construction. This would represent a worst-case scenario as electric plant or hydrogen-fuelled HGVs may be in use by that time. Given the uncertainty the worst-case scenario is likely the best choice for the assessment and hence, a likely carbon-intense decommissioning phase, with potential to impact the global climate permanently and in the long term, would be assessed, leading to this being scoped in.

Climate resilience

8.8.4.3 The Proposed Development is assumed to have a design of life of 40 years, plus the time required to construct and decommission. Climate conditions are expected to change significantly over this period, with the potential to negatively impact the Proposed Development, affect the efficiency of solar generation, and potentially increase frequency or repair and replacement.

8.8.4.4 Climate parameters considered relevant to the Proposed Development that may give rise to a significant effect in terms of the vulnerability of the Proposed Development to climate change are outlined in Table 8-8.

Table 8-8 Likely Significant Effects of Climate Change that may affect the Proposed Development.

Parameter	Scoped in/ out	Scoping conclusion
Extreme weather events	Scoped in	The Proposed Development may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	Scoped in	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	Scoped in	The Proposed Development may be vulnerable to changes in precipitation. Heavy rainfall could cause land subsidence and damage to structures or drainage systems during periods of heavy rainfall
Increase in strong wind events	Scoped in	The Proposed Development may be vulnerable to changing wind patterns. High winds could damage structures or assets or cause damage via falling trees or debris
Sea level rise	Scoped out	The Proposed Development is not located in an area that is susceptible to sea level rise [124].

8.8.5 In-combination climate change impact assessment

8.8.5.1 ICCI assessment identifies how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Proposed Development. The climate parameters relevant to the Proposed Development are detailed in Table 8-9 below together with the rationale for scoping.

8.8.5.2 On the basis of the information presented in Table 8-9, an ICCI assessment is proposed to be scoped out.

Table 8-9 Climate parameters for the in-combination climate change impact of the Proposed Development

Parameter	Scoped in/ out	Rationale for Scoping conclusion
Temperature change	Scoped out	Projected temperature increases in combination with the Proposed Development are not expected to have a significant impact upon environmental receptors identified by other topic disciplines.
Sea level rise	Scoped out	The Proposed Development is not located in an area that is susceptible to sea level rise.
Precipitation change (frequency and magnitude of precipitation events)	Scoped out	Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding or changes to groundwater levels. However, no significant impacts on surface water or groundwater levels are expected as a result of

Parameter	Scoped in/ out	Rationale for Scoping conclusion
		precipitation changes, in combination with the Proposed Development, as the flow of precipitation to ground will not be significantly hindered as a result of the Proposed Development. The Proposed Development, in combination with projected changes in precipitation, is also not expected to have a significant impact upon receptors identified by other environmental disciplines.
Wind	Scoped out	Projected changes in wind patterns in combination with the Proposed Development are not expected to have a significant impact upon environmental receptors identified by other topic disciplines.

8.9 Proposed assessment methodology

8.9.1 Greenhouse gas emissions

8.9.1.1 IEMA (2022) [112] will act as the primary guidance for the climate change assessment, as this is the most recent available and is applicable to the UK. It is also considered to be the most holistic method of assessing GHG emissions, as it applies a whole life cycle methodology, incorporating not just the construction and operational phase of development, but also the decommissioning/end of life and beyond asset life cycle stages, allowing a more robust "worst case scenario" to be applied.

Scope of assessment

8.9.1.2 The scope of the climate change impact assessment is considered to be those activities associated with the Proposed Development that either directly or indirectly release GHG emissions that contribute to climate change effects, irrespective of their source, and across all relevant project lifecycle stages (whole lifecycle carbon emissions). The system boundary applied for this assessment will be Cradle-to-Gate as this is proportional to the nature and scale of the Proposed Development.

8.9.1.3 A reference study period will be selected as the basis of the GHG emissions assessment based on the expected service life of the construction asset, and this will form the temporal boundary for the assessment.

8.9.1.4 The objective of the assessment is to ensure the minimum overall lifetime carbon emissions and the maximum lifetime resource efficiency, and to demonstrate how the Proposed Development will mitigate the impact it will have on climate change through the release of GHG emissions in the longer term.

Setting a baseline

8.9.1.5 A baseline is a reference point against which the impact of a new project can be compared. In addition to the current emissions baseline, it is necessary to establish

a second (sectoral) emissions baseline against which the project can be meaningfully compared. This is represented by a typical 'Business as Usual' (BaU) development of a similar type built elsewhere to minimum regulatory standards, where assumptions are made on current or future GHG emissions. These are summarised as baselines A and B below:

A. GHG emissions within the boundary of the GHG quantification but without the proposed project; or

B. GHG emissions arising from an alternative project design and/or BaU for a project of this type.

8.9.1.6 This assessment considers both forms of baseline represented by points A and B to provide a meaningful comparison of impacts associated with the project. As stated in the IEMA guidance [112], the goal of establishing a baseline is assessing and reporting the proposed project's net GHG impact. The EIB 'Project Carbon Footprint Methodologies' (2022) guidance will be used to establish the baseline scenario, as this goes into greater detail in terms of baseline methodology for assessing GHG emissions from projects.

8.9.1.7 The current baseline represents existing GHG emissions before construction and operation of the Proposed Development, and should account for expected land use change resulting in the release of previously sequestered carbon (such as the disturbance of soils). The baseline will represent a realistic worst-case scenario as per best practise. Where alternative baselines have been considered early in the project life cycle, the EIA will also include a qualitative assessment of the emissions impact of these alternative baselines.

8.9.1.8 The future baseline will capture construction emissions, as well as both direct and indirect operational and user GHG emissions associated with the proposed development, irrespective of their source as recommended by the updated IEMA guidance [112]. This will be proportionate to the scale of the Proposed Development.

8.9.1.9 The approach to setting a credible baseline for this assessment is endorsed by a recent Technical Note published by European Bank for Reconstruction and Development (EBRD) in 2019. This Technical Note states that this type of baseline is appropriate since "it is recognised that 'something' must be done" and allows for a comparison of relative effect.

8.9.1.10 This assessment method for setting a baseline is a slightly different approach to other technical disciplines which describe a 'no development scenario' as the future baseline for the assessment of impacts within the ES Chapters, however, it is still compliant with the requirements of the EIA legislation in the UK.

Estimating emissions within the system boundary

8.9.1.11 Emissions will be calculated by multiplying the activity data with the emission factors published annually by the Department for Energy Security and Net Zero (DESNZ) (formally Department of Business, Energy and Industrial Strategy (BEIS)

and the Department of Environment, Food and Rural Affairs (DEFRA), in line with IEMA (2022) best practice guidance [112]. The general equation for emission estimation is:

GHG emission factor × Activity data = GHG emission or removal

8.9.1.12 Activities where expected emissions are less than 1% of the total emissions will be excluded, but only where all exclusions total up to a maximum of 5% of total overall emissions associated with the Proposed Development across all project lifecycle modules within the applied system boundary (the whole lifecycle carbon emissions).

8.9.1.13 Emissions are expressed in terms of tonnes of carbon dioxide equivalent (tCO_2e). This is a universal metric measure used to compare the emissions from various GHG on the basis of their GWP (global warming potential), by converting amounts of other gases to the equivalent amount of CO_2 with the same GWP.

8.9.1.14 In terms of CO_2e emissions, the Proposed Development as a whole is assessed for its 'relative emissions (Re)' or net emissions. This is expressed as the difference between absolute emissions generated by the proposed project and the baseline emissions for a 'typical' development of a similar type.

Relative Emissions (Re) = Absolute Emissions (Ab) – Baseline Emissions (Be)

8.9.1.15 The relative emissions are then used a reference point in combination with industry expertise on carbon reduction targets to evaluate the project against the defined significance criteria.

8.9.1.16 This methodological approach is recommended by the EIB (2023) and is fully compatible with the EIA regulations.

Significance

8.9.1.17 The significance of the impacts associated with the Proposed Development will be assessed in line with the criteria set out within the IEMA guidance (2022) [112]. Where GHG emissions cannot be avoided, the goal of the EIA process is to reduce the project's residual emissions at all stages.

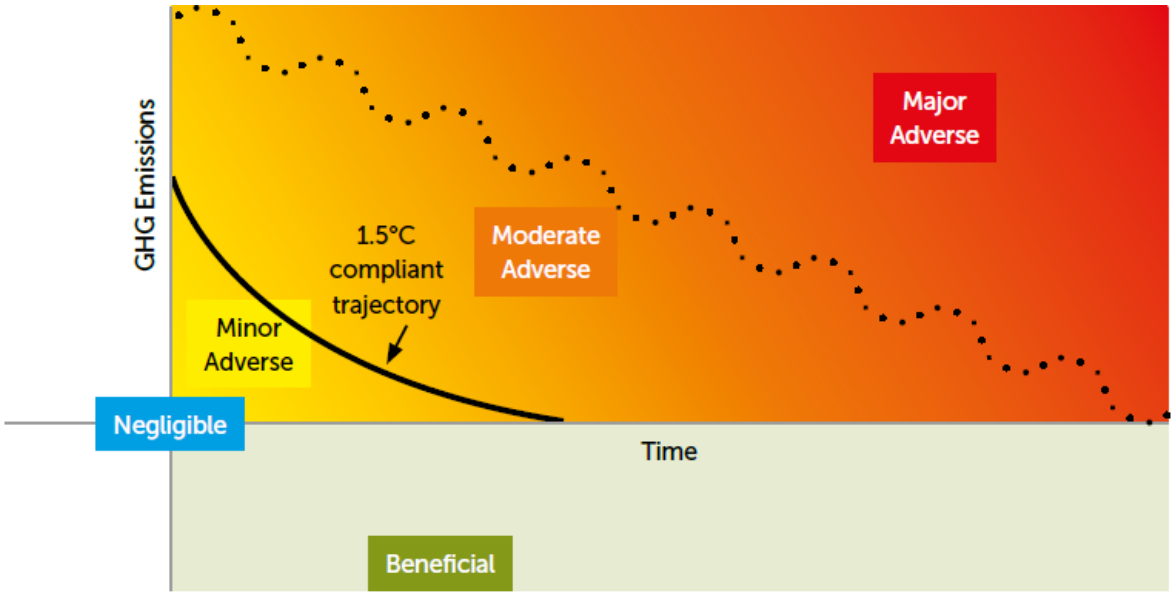


Plate 8-2 Different levels of significance plotted against the UK's net zero compatible trajectory (Source: IEMA 2022 [112])

8.9.1.18 All sources of GHG emissions will contribute to global climate change. The atmospheric concentration of GHG emissions is defined by IEMA (2022) [112] as being of high sensitivity to further emissions. Therefore, all emissions are considered to have an adverse and permanent impact on climate change in both the short, medium, and long term.

8.9.1.19 With consideration of the guidance of the IEMA (2022) [112], minor adverse and negligible effects are not considered to be significant. Impacts are only considered to be minor adverse if the project's GHG impacts are fully consistent with existing and emerging policy requirements and good practice. Impacts are only considered to be negligible if the development goes well beyond existing policy and design standards. It needs to be viewed as well 'ahead of the curve' for the net zero trajectory and have minimal residual emissions. Projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

8.9.2 Climate resilience

8.9.2.1 IEMA's guidance [113] presents a methodology for the consideration of climate change resilience and adaption in the EIA process, which will be followed in the EIA.

8.9.2.2 The aim of the second part of the assessment will be to assess the vulnerability of the Proposed Development to global climate change, which will highlight the potential risk of major accidents, and to identify adaptation and resilience measures to mitigate risk.

8.9.2.3 The first stage of the assessment is to is review the future climate projections published by the Met Office (through the UK Climate Projections (UKPC18) website), which includes variables such as annual mean temperatures and annual changes in summer and winter precipitation.

8.9.2.4 It is proposed that the draft Order Limits are assessed for climate projections under four different future climate scenarios, to cover the life of the development in varying future conditions. These range from RCP2.6 where atmospheric emission concentrations are strongly reduced through to the worst-case scenario, RCP8.5, where emission concentrations continue to rise, unmitigated. A range of probability levels are available, although this study will use the 50% probability level (i.e. a central estimate with less uncertainty).

8.9.2.5 The principal steps that will be undertaken are to:

- Define the current climate at the site and surrounding region;
- Assess the future climate scenario for the site and region;
- Qualitatively assess, using professional judgement, how any sensitive receptors identified across other EIA topics are likely to be affected by the future climate scenario described above; and
- Consider and identify the resilience and adaptive measures associated with the scheme's design or management to mitigate the risk to receptors and the development as a whole.

8.9.2.6 Assessing the impacts of climate change on a development varies from the assessment of impacts arising from the scheme in other EIA topics, since it focusses on the global impact of an external factor (climate change) on the development, rather than the local impact of the development on receptors in a confined geographical location. The resilience of the Proposed Development to climate change would be assessed based on the susceptibility and vulnerability of a range of different receptors.

8.9.2.7 Potential receptors within elements of the project relevant to the location, nature and scale of the development will be identified and receptor groups are expected to include:

- Infrastructure receptors (including equipment and building operations).
- Human health receptors (e.g. construction workers, site users and building occupants).
- Environmental receptors (e.g. habitats and species).
- Climatic systems (e.g. water cycle).

8.9.2.8 The extent of the study area for an assessment of vulnerability to climate change are the features within and surrounding the draft Order Limits, which include:

- Users of A595 adjacent to the draft Order Limits
- A595 and other public, private and country side roads within and surrounding the Site;
- Residential areas surrounding the draft Order Limits; and
- Species and habitats within the draft Order Limits.

8.9.2.9 Following the IEMA guidance (2020) [113], the assessment of resilience will use a combination of probability and consequence to reach a reasoned conclusion on the

magnitude of the effect of climate change on the Proposed Development, including the risk of vulnerability to increased heatwaves, flooding, and extreme weather. It is likely that if the probability and/or consequence of the effect is high, then the magnitude of the effect will also be high.

8.9.2.10 A likelihood category is detailed in Table 8-10.

Table 8-10 Definitions of the likelihood of the climate impact affecting the receptors

Likelihood category	Description (probability and frequency of occurrence)
Very High	The event occurs multiple times during the lifetime of the project (assumed 43 years), e.g. approximately annually, typically 43 events.
High	The event occurs several times during the lifetime of the project (43 years), e.g. approximately once every five years, typically 7 events.
Medium	The event occurs limited times during the lifetime of the project (43 years), e.g. approximately once every 15 years, typically 2 events.
Low	The event occurs during the lifetime of the project (43 years), e.g. once in 43 years.
Very Low	The event may occur once during the lifetime of the project (43 years).

8.9.2.11 Consequence of impact will be determined as indicated in Table 8-11.

Table 8-11 Consequence of climatic impact and the description of varying consequence of impact on the receptor

Consequence of impact	Description of impact
Extreme Adverse	National-level (or greater) disruption lasting more than 1 week.
Major Adverse	National-level disruption lasting more than 1 day but less than 1 week.
Moderate Adverse	Or Regional-level disruption lasting more than 1 week.
Minor Adverse	Regional-level disruption lasting more than 1 day but less than 1 week.
Negligible	Regional-level disruption lasting less than 1 day.

Significance

8.9.2.12 The significance of the impacts of the climate change on the Proposed Development will be determined using the significance matrix for climate resilience as shown in Table 8-12. Effects that are Moderate or Major/Substantial are considered Significant, these can be adverse or beneficial.

Table 8-12 Significance Criteria for Climate Resilience

Climate resilience significance matrix		Measure of likelihood				
		Very low	Low	Medium	High	Very high
Measure of Consequence (Impact)	Negligible	Negligible (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)	Minor (Not Significant)	Minor (Not Significant)
	Minor	Negligible (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Moderate (Significant)	Moderate (Significant)
	Moderate	Minor (Not Significant)	Minor (Not Significant)	Moderate (Significant)	Moderate (Significant)	Moderate (Significant)
	Major	Minor (Not Significant)	Moderate (Significant)	Moderate (Significant)	Moderate (Significant)	Moderate (Significant)
	Extreme	Minor – Moderate (Not Significant)	Moderate (Significant)	Moderate - Major (Significant)	Major (Significant)	Major (Significant)

8.10 Assumptions, limitations and uncertainties

8.10.1.1 The following limitations and assumptions have been identified:

- Uncertainties associated with probabilistic climate change projections are outside of the Applicant's control and cannot be fully mitigated. The Applicant can implement measures to reduce the impacts and increase climate resilience according to global and regional climate projections that are relevant to the scale of the Proposed Development. Further investigation may be required into possible mitigation measures that can be implemented.

8.11 Summary

Table 8-13 Climate Change scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Greenhouse gas emissions	Scoped in	Scoped in	Scoped in	No
Climate resilience	Scoped in	Scoped in	Scoped in	No
ICCI	Scoped out	Scoped out	Scoped out	No

9 Cultural Heritage and Archaeology

9.1 Introduction

9.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from Proposed Development, as described in Chapter 2, in respect of cultural heritage and archaeology.

9.1.1.2 It sets out cultural heritage and archaeological receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

9.1.1.3 The following aspects have been considered as part of the scope and methodology for cultural heritage:

- Direct impacts to designated buried archaeological remains
- Direct impacts to non-designated buried archaeological remains
- Indirect impacts to the setting of designated heritage assets
- Indirect impacts to the setting of non-designated heritage assets.

9.1.1.4 This chapter is supported by the following figures:

- Figure 9.1: Designated heritage assets
- Figure 9.2: Non-designated heritage assets

9.2 Relevant legislation, policy, standards and guidance

9.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for cultural heritage and have informed the scope of the assessment.

9.2.2 Legislation

Table 9-1 Cultural Heritage and Archaeology - Legislation

Legislation	Relevance to assessment
Ancient Monuments and Archaeological Areas Act 1979 [125]	Protects designated heritage assets comprising Scheduled Monuments, Protected Wrecks, Listed Buildings and Conservation Areas. Nationally significant archaeological sites, monuments and structures are protected under the Act.

Legislation	Relevance to assessment
Planning (Listed buildings and Conservation Areas) Act 1990 [126]	Provides for the listing of buildings of special architectural or historic interest, the management of change to listed buildings through the listed building consent process, and action against unauthorised works or deliberate damage to listed buildings.
Historic Buildings and Ancient Monuments Act 1953 [127]	Provides for the preservation and acquisition of buildings of outstanding historic or architectural interest and their contents and related property.
Infrastructure Planning (Environmental Impact Assessment) Regulations [128]	5 (2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors – (d) material assets, cultural heritage and the landscape.

9.2.3 Policy

Table 9-2 Cultural Heritage and Archaeology - Policy

Policy	Relevance to assessment
Department for Energy Security & Net Zero Overarching National Policy Statement for Energy (EN-1) [129]	Section 5.9 warns that energy infrastructure activities may harm heritage assets on and below the surface, and that the applicant should undertake an assessment of any likely significant heritage impacts of the proposed development as part of the EIA, and describe these along with how the mitigation hierarchy has been applied in the ES
Department for Energy Security & Net Zero National Policy Statement for Renewable Energy Infrastructure (EN-3) [130]	This National Policy Statement (NPS), taken together with the Overarching National Policy Statement for Energy (EN-1), provides the primary policy for decisions by the Secretary of State on applications they receive for nationally significant renewable energy infrastructure.
National Planning Statement for Electricity Networks Infrastructure (EN-5),	The potentially very disruptive effects of undergrounding on local communities, habitats, archaeological and heritage assets should be considered.
National Planning Policy Framework (NPPF; DLUHC) [131]	The NPPF endorses the conservation and enhancement of the historic environment, defines the role of the planning system as to promote and achieve sustainable development and involves protecting and enhancing our 'natural, built and historic environment' (ibid. para:20).
Cumberland Consolidated Planning Policy Framework [132]	Until the formation of a new Cumberland Development Plan, the framework summarises the statutory and non-statutory documents relevant to the local area, including infrastructure such as renewable energy. It also includes polices for the built and historic environment.
Allerdale Local Plan (Part 1) 2014 [133]	Part 1 sets out the strategic and development management policies that will guide development up to 2029. Under the built and historic environment, relevant strategic policies comprise S27 Heritage assets. It states that The Council will work with partners to seek the conservation and enhancement of all designated or non-designated heritage assets within the Plan Area. Only proposals which do not harm any positive qualities of the heritage asset(s) will be approved, unless there is a clear and convincing public benefit to the proposal that will outweigh the harm caused to the asset(s).
Allerdale Local Plan (Part 2) 2020 [134]	Part 2 identifies or 'allocates' land to deliver the strategy and contains additional supporting policies to guide development. However, the policies maps reveal that the Proposed Development is not included within any of the allocations.
Conservation Areas Supplementary Planning Document January 2016 [135]	The purpose of this Supplementary Planning Document (SPD) is to provide help and guidance to the public and developers when considering proposals for development in a Conservation Area, by assisting in identifying its main qualities and characteristics so that its 'special interest' can be protected and reinforced.

9.2.4 Standards and guidance

Table 9-3 Cultural Heritage and Archaeology - Standards and guidance

Standards and guidance	Relevance to assessment
Managing Significance in Decision-Taking in the Historic Environment [136]	The guidance seeks to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the National Planning Policy FRA
Standards and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists; CIfA 2020) [137]	The guidance seeks to define good practice for the execution and reporting of desk-based assessment in line with the regulations of CIfA.
The Setting of Heritage Assets (Historic England 2017) [138]	The document sets out guidance on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas, and landscapes.
Statements of Heritage Significance (Historic England 2017) [139]	The document explores the assessment of significance of heritage assets as part of a staged approach to decision-making in which assessing significance precedes designing the proposals.
Planning Practice Guidance: Historic environment, 2019 [140]	Advises on enhancing and conserving the historic environment.
Conservation Principles, Policies and Guidance, 2010 [141]	Sets out a method for thinking systematically and consistently about the heritage values that can be ascribed to a place.
Code of conduct: professional ethics in archaeology, 2014 [142]	Standards of ethical and responsible behaviour in the conduct of archaeological affairs.

9.3 Consultation

9.3.1.1 The following stakeholders will be consulted with regards to cultural heritage and archaeology as part of the assessment process:

- Cumbria Historic Environment Service (CHES)
- Cumberland County Council Conservation and Design Officer (CCCC&DO)
- Cumbria Historic Environment Record (HER)
- Historic England (HE).

9.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to cultural heritage and archaeology.

9.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

9.4 Study area

9.4.1 Designated Heritage Assets Study Area

9.4.1.1 The assessment of designated heritage assets, including World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Historic Parks and Gardens, Registered Battlefields, and Conservation Areas obtained from Historic England GIS datasets, will be searched within a radius of 3km from the draft Order Limits (Figure 9.1). This distance is deemed appropriate for the purposes of assessing the effects of the Proposed Development on the significance[3] of these assets through change to their setting and is informed by professional judgement accordingly.

9.4.1.2 The English Lake District World Heritage Site (WHS) lies beyond the 3km radius of the Proposed Development, and s4.3km to the east. Despite the distance, the World Heritage Site nevertheless has the potential to incorporate viewpoints of the Proposed Development. The Proposed Development thus has the potential to affect the setting on the World Heritage Site, which is thus included within the Scoping Report. The English Lake District World Heritage Site does not include any buffer zone.

9.4.2 Non-Designated Heritage Assets Study Area

9.4.2.1 The Cumbria Historic Environment Record (HER) will be consulted for non-designated heritage assets within the Proposed Development and a wider search area of 1km radius from the Proposed Development boundary (Figure 9.2). Besides identifying heritage assets that may be directly affected by the Proposed Development, this search boundary is expected to provide sufficient data to represent the archaeological character of the area.

9.5 Baseline conditions

9.5.1 Desktop sources used

9.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Cumbria Historic Environment Record (consulted April 2024)
- GIS datasets (Historic England consulted April 2024)
  - World Heritage Sites

[3] It is noted that 'significance' relates to importance of a receptor.

- Scheduled Monuments
- Listed Buildings
- Conservation Areas
- Registered Parks and Gardens
- Registered Battlefields.

- Geophysical survey conducted by GeoQuest Associates in 2004 [143]

9.5.2 Surveys undertaken and proposed

9.5.2.1 A geophysical survey commenced on 22nd April 2024 and is ongoing.

9.5.2.2 It is noted that the existing baseline draws upon a previous geophysical survey conducted by GeoQuest Associates in 2004 [14].

9.5.3 Existing baseline

Designated heritage assets

9.5.3.1 Designated heritage assets are illustrated on Figure 9.1 Designated heritage assets.

9.5.3.2 The English Lake District World Heritage Site (WHS), which lies 4.3Lkm to the east of the Proposed Development, is a designated heritage asset and included within the Scoping Report on the basis of it incorporating viewpoints of the Proposed Development, which could result in a change in setting.

9.5.3.3 There are no designated heritage assets present within the draft Order Limits. However, within the 3km study area, there are the following designated heritage assets:

- Four Scheduled Monuments
- One Registered Park and Garden
- Two Grade I Listed Building
- Five Grade II* Listed Building
- 45 Grade II Listed Buildings
- One Conservation Area

9.5.3.4 Within 1km these comprise:

- Scheduled Monument Little Clifton open heap coke producing bases and associated slag heap (NHLE 1018072), which dates from the 18th century
- Scheduled Monument and Grade II Listed Calva Hall Bridge (NHLE 1003051/ NHLE 1138225), which dates to the 17th century given that it bears the inscription 'HFAF 1697';
- Grade II listed Wythemoor Sough and adjoining barn and stable (NHLE 1327185), dating to the mid or late 18th century

- Grade II listed Plunderland Farmhouse and adjoining barn (NHLE 1327184)., incorporating a lintel dated and inscribed 'A. S. 1739'
- Grade II listed Wadsworth Farmhouse (NHLE 1145203), dated and inscribed 'R. & M. W. 1735, 1794'

Non-Designated Heritage Assets

9.5.3.5 Non-designated heritage assets are illustrated on Figure 9.2 Non-designated heritage assets.

9.5.3.6 The following non-designated heritage assets are within the draft Order Limits:

- Winscales deserted medieval village, Winscales (HER 3079)
- Moredimple boundary stone (HER 4466)
- Farmstead site, Little Clifton (HER 5328)
- Lostrigg, Great Clifton (HER 5329)
- Workington Rifle Range (HER 12409)
- Wythemoor House linear cropmarks, Winscales (HER 16624)
- Gale House field system, Winscales (HER 16625).

9.5.3.7 The following non-designated heritage assets are located at the border with, or within the immediate vicinity of the draft Order Limits:

- Quarry Hill Quarry (HER 11486)
- Wythemore Pit, Winscales (HER 12407)
- Wythemore Colliery, Winscales (HER 16626).

Historic background

9.5.3.8 There is limited evidence for early prehistoric activity within the study area, with only sherds of pottery and flint pieces recovered from molehills at Holm Farm, which stands 600m to the north (HER 43997). In contrast, there is more extensive evidence for the exploitation of the area in the Bronze Age, particularly from Branthwaite 700m to the south-east. Stream clearance in 1954 revealed a trough-like structure of bog oak, the so-called 'Branthwaite Boat', which may represent either an abandoned dug-out canoe and crannog, trough for cooking meat, dating to the Bronze Age (HER 4304). A Bronze Age palstave has also been recovered from Branthwaite (HER 1043), whilst Bronze Age axes are recorded at Oldfield to the east, and Winscales to the west (HERs 1057 & 1054).

9.5.3.9 The course of Parton Roman road, which provided direct access between Papcastle and the coastal fort at Moresby, lies on a north-east to south-west alignment 900m to the south-west of the draft Order Limits (HER 1008). It echoes the route of the A595 Winscales Road and was turnpiked by the Whitehaven Turnpike Trust in 1739 in order to serve the hinterland of Whitehaven and Carlisle with the growing mining and sea trade. The course of a second Roman road is suggested from Papcastle to Moresby over Wythemoor (HER 4672). It was revealed as a bed of metalling 28 cm

deep during trial trenching 500m to the south-east of the draft Order Limits. In contrast, no Anglo-Saxon remains are recorded in the study area.

9.5.3.10 Medieval occupation evidence was focussed upon known settlements in the area, including Great Clifton to the north, which once boasted a 12th century church. However, further medieval settlement is attested by a possible deserted medieval village at Winscales and within the south-western corner of the draft Order Limits (HER 3079) (Figure 9.2). Earthworks indicative of the possible deserted medieval village were visible in 1985, yet no earthworks were identified during an archaeological desk-based assessment and geophysical survey conducted by GeoQuest Associates in 2004 [143].

9.5.3.11 There is relatively extensive evidence for post-medieval activity in the vicinity of the draft Order Limits. Within the centre of the draft Order Limits stood the former 16th century Moredimple boundary stone (HER 4466). The HER database also records Calva Hall packhorse bridge at Dean and 700m to the east of the draft Order Limits (HER 3050). Its centre parapet stone bears the inscription 'HFAF 1697'. The same bridge is also designated a Scheduled Monument and Grade II listed structure (NHLEs 1003051 & 1138225).

9.5.3.12 The area surrounding the draft Order Limits incorporates a small number of former farmsteads, which may have origins in the post-medieval period. Fell View (HER 44048) was built *c*. 1730 only 400m to the north, whilst a second farmstead site has been identified at Little Clift (HER 5328), within the draft Order Limits. By 1865, the latter consisted of a farmstead known as 'Moor House'.

9.5.3.13 The farmstead of Lostrigg (HER 5329) also lies within the draft Order Limits, to the northern extent. The HER database reveals that in an enclosure award of 1817 this parcel of land was given to the rectory in Workington in exchange for Glebe Lands which JC Curwen took over in Workington. In 1865 there was a farmstead called 'Winger' which was established in the late 18th century and abandoned in the late 19th century. By 1926 nothing was shown on the site but a much smaller ruined building.

9.5.3.14 The post-medieval period is also represented by industrial features, including High Mill in Branthwaite (HER 4176) and Little Clifton coke ovens to the east of the draft Order Limits at Oldfield Bridge, which are also designated a Scheduled Monument (HER 5653; NHLE 1018072).

9.5.3.15 Industry also thrived throughout the early modern period, as presented by Crossbarrow Pottery in Clifton (HER 11440) and Westray Colliery in Great Clifton (HER 11496). The early modern period may also be characterised by the provision of public amenities, which include the National School at Chapel Brow Manor in Little Clifton (HER 44196), the development of the Whitehaven, Cleator & Egremont Branch of the L & NW & Furness Joint Railway (HER 11612), which extends within 20m to the east of the draft Order Limits, as well as associated railway bridge (HERs 44185 & 44186).

9.5.3.16 Further industrial features dating to the late 19th century comprise Branthwaite Paper Mill (HER 41813), a water-powered corn mill at Bridgefoot (HER 44188), and

Hunday Quarry near Winscales (HER 19968). Only 100m to the south of the draft Order Limits lies Wythemore Pit (HER 12407), which opened in the late 19th century and closed in 1886.

9.5.3.17 Limited modern remains are recorded in the study area, and attest to its predominantly rural character. St Luke's Church in Great Clifton (HER 1056) was rebuilt in 1900 on the fabric of a 12th century church, whilst the village also includes a modern bee house at Croft House (HER 19140). Two disused factories at Workington also date to the 20th century (HER 12408), whilst Wythemore Colliery was opened in 1904 only 200m to the south of the draft Order Limits, but went into liquidation in 1913 (HER 16626).

9.5.3.18 The study area also includes a large number of undated remains, which suggest the potential for further archaeological remains and an increased understanding of the local cultural heritage. The majority are regarded as industrial in character, including Winscales bell pit (HER 3995), Bridgefoot Forge (HER 11610) and Oldfield Water Corn Mill (HER 11611), yet The Cut Stone Monument (HER 11488) is an undated standing stone. Quarry Hill Quarry (HER 11486) remains undated, but lies to the immediate east of the draft Order Limits, whilst the undated and disused Workington Rifle Range (HER 12409) lies within the draft Order Limits itself.

9.5.3.19 The southern extent of the draft Order Limits incorporate the extent of Wythemoor House linear cropmarks (HER 16624). The undated features consist of parallel linear cropmarks, possibly overlying ridge and furrow; and field boundary. Further, Gale House field system (HER 16625) is also present. They comprise undated cropmarks and earthworks of former field boundaries and ridge and furrow.

9.5.4 Future baseline

9.5.4.1 The future baseline for cultural heritage and archaeology is expected to remain as the current existing baseline in the absence of the Proposed Development proceeding, as the resource will not be altered or increased. A future baseline would comprise greater records of the wider resource in the surrounding area along with a refined calibration of understanding of the significance of that resource. This is provided that the present agricultural land-use were to continue. Normal farming activities would potentially have some continuing attritional influence on any buried remains that may be present as a consequence of regular ploughing in arable fields.

9.6 Potential impacts

9.6.1 Construction

9.6.1.1 The baseline collected to date has indicated that the draft Order Limits contains a total of seven archaeological features, which may date from the medieval period, at the earliest, through to the modern period. Furthermore, three further archaeological features are recorded in the immediate vicinity of the Proposed Development.

9.6.1.2 Direct impacts occur during construction and are typically caused by physical disturbance associated with the Proposed Development through activities including, but not limited to:

- Topsoil stripping;
- Ground reduction;
- Establishment of compounds and haul roads;
- installation of the driven module mounting structures;
- excavation associated with all foundations;
- Piling;
- works associated with the installation of underground cables;
- excavation for access tracks;
- hard and soft landscaping;
- any additional construction works, which require excavation.

9.6.1.3 There will be no direct impacts outside of the footprint of these construction activities.

9.6.1.4 The construction phase of the Proposed Development will have a potential indirect impact upon the English Lake District World Heritage Site. Mitigation measures such as the appropriate siting of the Proposed Development's compound and mounting structures, and screening would help to reduce this impact.

9.6.1.5 The impacts below detail those which can be anticipated at the scoping stage. Further impacts may be identified during additional baseline data collection undertaken as part of the PEIR / ES stage.

9.6.2 Operation

9.6.2.1 The operation phase of the Proposed Development will have the potential to indirectly impact upon the significance of a number of non-designated heritage assets resulting from change to their setting.

9.6.2.2 The Proposed Development has the potential to indirectly impact on the significance of the three archaeological features recorded on the border of, or within the immediate vicinity of the draft Orders Limit, namely Quarry Hill Quarry (HER 11486), Wythemore Pit (HER 12407), and Wythemore Colliery (HER 16626) as a result of change to their setting.

9.6.2.3 There is a potential for indirect impacts to the significance of designated heritage assets within the vicinity of the draft Order Limits as a result of the Proposed Development. Potential impacts would arise from potential acoustic changes to the setting of nearby heritage assets during operation as a result of any noisy infrastructure onsite, however this is expected to be minimal and sited appropriately. The presence of the Proposed Development may also impact the setting of heritage assets from a visual perspective.

9.6.2.4 This includes potential impact upon the setting of the English Lake District World Heritage Site, two Scheduled Monuments, comprising Little Clifton open heap coke producing bases and associated slag heap (NHLE 1018072), as well as Scheduled Monument Calva Hall Bridge (NHLE 1003051/Grade II listed NHLE 1138225). Grade II listed Wythemoor Sough and adjoining barn and stable (NHLE 1327185) and Grade II listed Plunderland Farmhouse and adjoining barn (NHLE 1327184) may also be indirectly impacted.

9.6.2.5 An assessment of the significance, including the contribution made by setting, of potentially sensitive assets which will be undertaken within the Archaeological and Heritage Assessment and reported in the PEIR/ ES Chapter.

9.6.2.6 It is anticipated that potential effects to the significance of designated heritage assets would be less than substantial in effect with those effects arising from the presence of solar panels being temporary in nature. In the medium and long-term, inclusion of screening and retention of the borders of the Proposed Development could assist in minimising potential intervisibility with nearby assets.

9.6.2.7 An Archaeological and Heritage Assessment will be prepared to identify, confirm, and assess the predicted potential direct impacts to potential archaeological remains and to confirm/assess the predicted potential indirect impacts to designated heritage assets from the Proposed Development. This would include reference to field observations and primary and secondary resources.

9.6.3 Decommissioning

9.6.3.1 At the end of the operational life of the Proposed Development, the solar PV modules and associated infrastructure will be removed to decommission the Proposed Development. It is anticipated that no further adverse indirect impacts to the significance of designated heritage assets would result from the restoration works.

9.6.3.2 No direct impacts to the potential archaeological resource are anticipated to result from the decommissioning phase.

9.6.3.3 This is predicated upon:

- the assumption that no further land take will be required for decommissioning, and therefore no additional physical disturbance can be caused to any heritage assets through intrusive works; and
- the understanding that decommissioning will remove all elements of the Proposed Development at the end of the operational life of the Proposed Development, and thus return the landscape to its previous state.

9.7 Design, mitigation and enhancement measures

9.7.1 Design principles

9.7.1.1 The Proposed Development is being designed with regard to a set of design principles. Relevant to cultural heritage and archaeology, these include:

- All mature trees, woodland blocks and hedgerow boundaries within the proposed areas for solar panels will be retained.
- The Proposed Development will be integrated into the wider landscape setting, with particular consideration to the Lake District National Park and World Heritage Site.
- Existing landscape structures will be enhanced, such as woodland blocks and hedges with additional planting to provide instant screening.

9.7.2 Embedded measures

9.7.2.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

9.7.2.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to cultural heritage and archaeology already committed to include:

- Maximum panel height of 3m
- If below ground archaeology constraints arise through further site investigation the mounting structure of solar panels will utilise options such as ballast slabs, anchor, or block which sit on the ground surface.
- The new / replacement pylons will be replaced like for like, i.e. will be no taller than existing and in close proximity to current location.
- Routing for construction and operation vehicles will avoid routing through local villages.
- No significant lighting proposed, demand responsive motion sense lights only, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact.
- Opportunities for advanced planting will be explored to provide early establishment and maximise visual screening.
- Large areas of panels will be avoided where feasible, broken up by hedgerow planting along historic field boundaries to maximise landscape integration.

9.7.2.3 Further embedded measures are likely to include:

- Avoidance of physical disturbance through design, including appropriate stand-offs between heritage assets and the construction and relocation and/or mini-misation of module mounting structures, foundations and underground cables within areas known to include archaeological remains. Geophysical survey will help to inform embedded mitigation measures.
- Appropriate buffers between heritage assets and the construction works will be established as part of the PEIR / ES.

9.7.2.4 An environmental masterplan will be developed incorporating screening mitigation and filter planting.

9.7.3 Further mitigation

9.7.3.1 Further mitigation are actions that require further activity in order to achieve a reduction in significance of effect, as well as anticipated outcome. Further mitigation for cultural heritage and archaeology will be defined through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to cultural heritage and archaeology may include:

- archaeological preservation by record / set piece archaeological excavations and evaluation of any archaeological remains to be disturbed by the Proposed Development, that cannot be avoided

9.7.4 Management plans

9.7.4.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to cultural heritage and archaeology including:

- an Archaeological Management Strategy;
- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Construction Traffic Management Plan.

9.7.4.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

9.7.4.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

9.8 Likely significant effects

9.8.1.1 The impacts below detail those which can be anticipated at the scoping stage, and will be reviewed / adjusted at PEIR/ES. These have been considered for the

construction and operational stages and are based on information gained from the known baseline position at this time. Further impacts including may be identified during additional baseline data collection undertaken as part of the PEIR/ES.

Impact prediction confidence

9.8.1.2 The criteria for impact prediction confidence is set out in Table 9-4.

Table 9-4 Confidence Level

Confidence Level	Description
High	The predicted impact is either certain i.e., a direct impact, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted impact and its levels are best estimates, generally derived from first principles of relevant theory and experience of the assessor. More information may be needed to improve confidence levels.

9.8.2 Construction

9.8.2.1 Ground disturbance would have the potential to affect heritage assets of archaeological/historic interest both directly and indirectly. All assets within the draft Order Limits are **scoped in** to further assessment. Predicted construction impacts are summarised in Table 9-5.

Table 9-5 Predicted construction impacts [144]

Nature of impact	Receptor (importance)	Significance of effect	Confidence level
Setting impact	English Lake District World Heritage Site (very high)	Unlikely to be significant	Low *
Ground disturbance	Winscales deserted medieval village, Winscales (HER 3079) (low to medium)	Potentially significant	Low *
Ground disturbance	Moredimple boundary stone (HER 4466) (low)	Potentially significant	Low *
Ground disturbance	Farmstead site, Little Clifton (HER 5328) (low)	Unlikely to be significant	Low *
Ground disturbance	Lostrigg, Great Clifton (HER 5329) (low)	Unlikely to be significant	Low *
Ground disturbance	Workington Rifle Range (HER 12409) (low)	Unlikely to be significant	Low *
Ground disturbance	Wythemoor House linear cropmarks, Winscales (HER 16624) (low to medium)	Potentially significant	Low *
Ground disturbance	Gale House field system, Winscales (HER 16625) (low to medium)	Potentially significant	Low *

*further research and field observations will be required to inform the level of impact with a greater degree of confidence, where this is possible.

9.8.2.2 Direct impacts to buried archaeological remains would be **scoped in** for further assessment due to the potential for the Proposed Development to give rise to potentially significant effects during operation on a number of non-designated heritage/archaeological remains assets. The potential for other 'unknown' assets would also be assessed as part of this.

9.8.3 Operation

9.8.3.1 There is a potential for indirect impacts to the significance of heritage assets within the study area through changes to their settings. For this assessment, the search area applied would be within 1km for designated heritage assets, and 200m for non-designated heritage assets of an archaeological nature. Predicted operation impacts are summarised in Table 9-6.

Table 9-6 Predicted operational impacts

Nature of impact	Receptor (importance)	Significance of effect	Level of Harm (NPPF)	Confidence level
Setting impacts	Little Clifton open heap coke producing bases and associated slag heap (NHLE 1018072) (high)	Unlikely to be significant	No harm	Low *
Setting impacts	Calva Hall Bridge (NHLEs 1003051 & 1138225) (high)	Unlikely to be significant	No harm	Low *
Setting impacts	Wythemoor Sough and adjoining barn and stable (NHLE 1327185) (medium to high)	Unlikely to be significant	No harm	Low *
Setting impacts	Plunderland Farmhouse and adjoining barn (NHLE 1327184) (medium to high)	Unlikely to be significant	No harm	Low *
Setting impacts	Wadsworth Farmhouse (NHLE 1145203) (medium to high)	Unlikely to be significant	No harm	Low *
Setting impacts	Quarry Hill Quarry (HER 11486) (low)	Unlikely to be significant	No harm	Low *
Setting impacts	Wythemore Pit (HER 12407) (low)	Unlikely to be significant	No harm	Low *
Setting impacts	Wythemore Colliery (HER 16626) (low)	Unlikely to be significant	No harm	Low *

*further research and field observations will be required to inform the level of impact with a greater degree of confidence, where this is possible.

9.8.3.2 Potential indirect impacts on both designated and non-designated heritage assets will be **scoped in** for further assessment.

9.8.3.3 An assessment of direct impacts to buried archaeological remains is scoped out of further assessment as no groundworks, and therefore direct impacts, will occur during operation.

9.8.4 Decommissioning

9.8.4.1 Impacts to heritage assets during the decommissioning phase of the Proposed Development are not anticipated. It is anticipated that all impacts will have occurred during the construction phase (direct) and operation phase (indirect). As such an assessment of impacts upon heritage assets during decommissioning is **scoped out**.

9.9 Proposed assessment methodology

9.9.1.1 The assessment would be undertaken with due regard to the guidelines on desk-based assessment prepared by the Chartered Institute for Archaeologists [145], and

guidelines on assessing the significance of assets (Historic England) [146] and assessing the contribution of setting (Historic England) [147].

9.9.1.2 The cultural heritage assessment will be supported by the following technical appendices:

- an Archaeological Desk Based Assessment (DBA); and
- the results of a geophysical survey.

9.9.1.3 In ascribing levels of significance (importance) to heritage assets, the Design Manual for Roads and Bridges (DMRB), LA 104 Environmental Assessment and Monitoring, Revision 1 (Highways England) [148] will be used, see Table 9-7. Whilst this is not a highway scheme, this guidance is considered best practice within the industry from ascribing levels of significance.

Table 9-7 Establishing the significance (importance) of heritage assets

Value (Sensitivity)	Typical Description
Very High	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale, and limited potential for substitution
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

9.9.1.4 In respect of identifying the importance of setting to the identified significance of a heritage asset, Historic England's good practice guidance presented in the *Setting of Heritage Assets (2017)* will be utilised; specifically, the five-step approach to assessment which is set out below:

- Step 1 – Identify which heritage assets and their settings are affected
- Step 2 – Assess the degree to which these settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated
- Step 3 – Assess the effects of the proposed development, whether beneficial or harmful, on that significance or on the ability to appreciate it
- Step 4 – Explore ways to maximise enhancement and avoid or reduce harm

- Step 5 – Make and document the decision and monitor outcomes.

9.9.1.5 A non-exhaustive list provided within the document (2017:11) identifies themes such as the following which should be considered when assessing setting and its contribution to significance:

- Physical surroundings:
  - topography
  - aspect
- Functional relationships and communications:
  - history and degree of change over time
  - sense of enclosure, seclusion, intimacy or privacy.
- Experience:
  - views from, towards, through, across and including the asset
  - intentional inter-visibility with other historic assets and natural features
  - sense of enclosure, seclusion, intimacy or privacy.

9.9.1.6 The guidance within this Historic England publication will be used alongside the DMRB methodology for assessing the significance of impacts; see Table 9-8 and Table 9-9.

9.9.1.7 The magnitude of impact is measured from the condition that would prevail in a 'do nothing' scenario and it is assessed without regard to the importance of the receptor [148].

9.9.1.8 Heritage assets are susceptible to numerous forms of development during the construction process and as a consequence of the operational life of the proposed development. These can be either direct (physical) impacts or indirect (non-physical) impacts.

9.9.1.9 The worst magnitude of impact would be complete physical removal of the heritage asset. In some instances, it is possible to discuss percentage loss when establishing the magnitude of impact. However complex receptors will require a much more sophisticated approach [148].

Table 9-8 Establishing the magnitude of impact

Magnitude of impact (change)	Typical description	
Major	Adverse	Loss of resource/quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.

Magnitude of impact (change)	Typical description	
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either

9.9.1.10 The predicted significance of effect will be determined through a standard method of assessment based on professional judgement, considering both the heritage significance of the asset and the magnitude of change as detailed in Table 9-8. The significance categories are defined in Table 9-10. Very Large to Moderate effects are considered significant in the context of the EIA Regulations, while neutral and slight effects are considered not significant.

9.9.1.11 Effects can be beneficial or adverse, and the duration of an effect can be permanent or temporary in nature. Temporary effects generally make reference to effects limited to the construction phase of the Proposed Development.

9.9.1.12 All effects derived from direct impacts are permanent. Effects which are derived from indirect impacts are long term, but fully reversible upon decommissioning.

Table 9-9 Establishing the significance of effect

		Magnitude of impact				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Value/Importance	**Very High**	Neutral	Slight	Moderate/ large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral/ slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table 9-10 Descriptions of Effect Significance Categories

Effect Significance Category	Typical description
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

9.10 Assumptions, limitations and uncertainties

9.10.1.1 The baseline assessment has been based on information readily available at the time of undertaking the assessment and relies on the accuracy of secondary source data. There is always some degree of uncertainty in relation to these sources.

9.11 Summary

Table 9-11 Cultural Heritage and Archaeology scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Direct impacts to buried archaeological remains	Scoped in	Scoped out	Scoped out	Geophysical survey
Potential indirect impacts to the setting of designated heritage assets	Scoped out	Scoped in	Scoped out	Walkover survey
Potential indirect impacts to the setting of non-designated heritage assets	Scoped out	Scoped in	Scoped out	Walkover survey

10 Electromagnetic fields

10.1 Introduction

10.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of electromagnetic fields.

10.1.1.2 It sets out electromagnetic fields receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

10.1.1.3 Electromagnetic fields arise from the generation, transmission, distribution and use of electricity. They occur around all electronic infrastructure. In relation to the Proposed Development the most significant sources are from electricity cables and associated infrastructure which connect the Proposed Development to the grid.

10.1.1.4 Electromagnetic fields comprise electric and magnetic fields. Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, shrubs and buildings easily block electric fields. Magnetic fields are produced by the flow of electric current; however, unlike electric fields, most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source. Electromagnetic fields can have both direct and indirect effects on human health.

10.2 Relevant legislation, policy, standards and guidance

10.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for electromagnetic fields and have informed the scope of the assessment.

10.2.2 Legislation

Table 10-1 Electromagnetic fields - Legislation

Legislation	Relevance to assessment
The Control of Electromagnetic Fields at Work Regulations 2016 [149]	Set exposure limits on electromagnetic fields (EMFs) to ensure the safety of employees.

10.2.3 Policy

Table 10-2 Electromagnetic fields - Policy

Policy	Relevance to assessment
National Policy Statement for Electricity Networks Infrastructure (EN-5) [150] (Whilst this NPS is not targeted towards renewable energy as EN-3 is, the general detail on EMF limits is considered relevant)	The International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 relating to exposure to electromagnetic fields. In March 2004, the National Radiological Protection Board (now part of NIHP CRCE), published advice on limiting public exposure to electromagnetic fields. The advice recommended the adoption in the UK of the EMF exposure guidelines published by ICNIRP in 1998. Paragraphs 2.9.55 - 2.9.58 are of particular relevance which mentions that applications should show evidence of compliance with these guidelines and sets out likelihood of harm from EMF.
Cumberland Consolidated Planning Policy Framework Cumberland Council [151]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

10.2.4 Standards and guidance

Table 10-3 Electromagnetic fields - Standards and guidance

Standards and guidance	Relevance to assessment
Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz), 2020 (updating the 1998 version), International Commission on Non-Ionizing Radiation Protection **[152]**	Underground cables at voltages up to and including 132 kV are not capable of exceeding the ICNIRP exposure guidelines.
Advice on Limiting Exposure to Electromagnetic Fields (0-300 GHz), Volume 15, No 2, 2004, National Radiological Protection Board **[153]**	The Board of NRPB has recommended the adoption in the UK of the guidelines of the ICNIRP for limiting exposures to electromagnetic fields (EMFs) between 0 and 300 GHz.
Power lines: demonstrating compliance with EMF public exposure guidelines, a voluntary code of practice, 2012, Department for energy and climate change **[154]**	The guidelines state that overhead powerlines at voltages up to and including 132KV, underground cables at voltages up to and including 132kV and substations at and beyond the publicly accessible perimeter are not capable of exceeding the ICNIRP exposure guidelines for electromagnetic fields.

10.3 Consultation

10.3.1.1 Electricity North West, the utility provider relevant to the land within the- draft Order Limits, would be engaged with throughout the Proposed Development to inform design and construction controls.

10.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to electromagnetic fields.

10.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

10.4 Study area

10.4.1.1 The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source. It is considered appropriate to restrict the study area to the draft Order Limits and any immediately adjacent residential receptors.

10.5 Baseline conditions

10.5.1 Desktop sources used

10.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Readily available mapping of the draft Order Limits, including Bing maps.

10.5.2 Surveys undertaken and proposed

10.5.2.1 No surveys are required in respect of electromagnetic fields.

10.5.3 Existing baseline

10.5.3.1 The Proposed Development will be located on agricultural land.

10.5.3.2 The residential receptors of Stargill Farm, Caple How, Furnace House, and Whythemoor House are located within the draft Order Limits. Small sections of Public Rights of Way (PRoW) which recreational receptors use run through the draft Order Limits.

10.5.3.3 Brackenbarrow, Outgang Farm and Fairview House along with a small number of other residential properties, not named on base mapping, are immediately adjacent.

10.5.4 Future baseline

10.5.4.1 The future baseline for electromagnetic fields is expected to remain as the current existing baseline in the absence of the Proposed Development proceeding, bar any pressure from potential future developments occurring within the draft Order Limits introducing new human receptors.

10.6 Potential impacts

10.6.1.1 The Proposed Development will use cables and infrastructure with a maximum voltage up to and including 132kV. Furthermore, the existing overhead lines within the draft Order Limits are also 132kV. The Proposed Development proposes to use or replace one/two pylons associated with this overhead line but maintain its current capacity.

10.6.1.2 The substation and battery energy storage system would not be publicly accessible. Employees accessing the on-site substation and BESS would be protected under exposure limits set in the Control of Electromagnetic Fields at Work Regulations 2016.

10.6.1.3 In light of this there are not expected to be any potential impacts related to electromagnetic fields to human receptors both within and immediately adjacent to the Proposed Development.

10.7 Design, mitigation and enhancement measures

10.7.1 Embedded measures

10.7.1.1 There are no relevant embedded measures to note for the topic of electromagnetic fields.

10.7.2 Further mitigation

10.7.2.1 No further mitigation is expected to be required for the topic of electromagnetic fields.

10.7.3 Management plans

10.7.3.1 A suite a management plans will be in place for the Proposed Development, relevant to electromagnetic fields including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Decommissioning Environmental Management Plan (oDEMP)

10.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

10.7.3.3 Both of these will include mitigation measures to protect against any interference with below ground utilities during construction and decommissioning. Specific mitigation relating to EMFs however are not expected to be necessary.

10.7.3.4 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

10.8 Likely significant effects

10.8.1.1 No likely significant effects are expected for the topic of electromagnetic fields. Assessment is therefore proposed to be **scoped out.**

10.9 Proposed assessment methodology

10.9.1.1 Further assessment is proposed to be **scoped out.**

10.10 Assumptions, limitations and uncertainties

10.10.1.1 The assumption of scoping out the topic of electromagnetic fields is based on the fact that cabling will not exceed 132kV and the substation and battery energy storage system are not publicly accessible.

10.11 Summary

Table 10-4 Electromagnetic fields scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Electromagnetic fields	Scoped out	Scoped out	Scoped out	None

11 Ground Conditions

11.1 Introduction

11.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of Ground Conditions.

11.1.1.2 It sets out Ground Conditions receptors of relevance and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

11.1.1.3 A Desk Study and Preliminary Risk Assessment (PRA) has been undertaken that supports information in this scoping chapter.

11.1.1.4 The following aspects have been considered as part of the scope and methodology for Ground conditions:

- Human health
- Ecological receptors
- Controlled Waters
- Infrastructure

11.1.1.5 This chapter is supported by the following appendices:

- Appendix 11.1 Geoenvironmental desk study and PRA

11.2 Relevant legislation, policy, standards and guidance

11.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for Ground Conditions and have informed the scope of the assessment.

11.2.2 Legislation

Table 11-1 Ground Conditions - Legislation

Legislation	Relevance to assessment
Environmental Protection Act (EPA) 1990: Part 2A Contaminated Land Statutory Guidance [155]	Provides key definitions and overall legislative framework for assessment relating to the contamination of land and Controlled Waters.
The Control of Asbestos Regulations 2012 [156]	Relevant to the risks from exposure to asbestos in soils.
The Contaminated Land (England) Regulations 2006 [157]	Relate to the designation and remediation of contaminated land.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 [158]	Requirement to ensure that the development will not cause damage to ecosystems, Controlled Waters or land.
The Control of Pollution (Oil Storage) Regulations 2001 [159]	Relate to the environmentally safe storage of diesel/petrol fuels.
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 [160]	Provides legislative context for the protection of organisms within the surface water bodies of England and Wales.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [161]	Provides legislative context for compliance with Water Framework Directive (WFD).
Infrastructure Planning (Environmental Impact Assessment) Regulations [162]	4 (1) A description of the development, including in particular— (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases

11.2.3 Policy

Table 11-2 Ground Conditions - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [163]	Sets out the overall government's policy for delivering major energy infrastructure, with a further five policy statements specific to the nature of work. The relevant paragraphs for Ground Conditions are 5.11.4, 5.11.5, 5.11.8, 5.11.14, 5.11.17 and 5.11.18.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [164]	Provides the primary policy for decisions on applications with respect to renewable energy infrastructure. The relevant paragraphs for Ground Conditions are 2.10.34, 2.10.60 and 2.10.92.
National Planning Policy Framework [165]	Sets out the governments planning policies for England and how these should be applied. Chapter 11 Making effective use of land paragraph 124 (c) and Chapter 15 Conserving and enhancing the natural environment Paragraph 180 (a, e, and f) and paragraphs 189 - 194 are considered the most relevant to Ground Conditions
Allerdale Local Plan (Part 1) [166]	297. States that where development is proposed on a site known to be contaminated or have the potential to be contaminated as a result of industrial activity (e.g. Gasworks, petrol stations, filled ground, steelworks, railway land), a preliminary risk assessment will be required.
Cumberland Consolidated Planning Policy Framework [167]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

11.2.4 Standards and guidance

Table 11-3 Ground Conditions - Standards and guidance

Standards and guidance	Relevance to assessment
Environment Agency Land Contamination Risk Management (LCRM), 2023 [168]	Assess and manage the risk from land contamination through a stage risk-based approach. Stage 1 Risk Assessment is relevant to this EIA Scoping Report.
BS 10175:2011+A2:2017. Investigation of potentially contaminated sites – Code of practice [169]	Sets out best practice for the investigation of sites that have the potential to contain contamination.
CL:AIRE, The Definition of Waste: Development Industry Code of Practice,2011 [170]	Provides guidance for how waste soils are to be dealt with and disposed of.
BS8576:2013. Guidance on investigation for ground gas – Permanent Gases and Volatile Organic Compounds [171]	Guidance on the monitoring and sampling of ground gases including volatile organic compounds and carbon dioxide, methane and oxygen. Relevant as a result of historical mining activity onsite.
BRE Special Digest 1: 2005. Concrete in Aggressive Ground [172]	Guidance on specification of concrete for installation in natural ground and in brownfield locations.
CIRIA Publication C552: 2001. Contaminated Land Risk Assessment: A Guide to Good Practice [173].	Guidance on the risk assessment of contaminated land.
CIRIA Publication C665:2007. Assessing risks posed by hazardous ground gases to buildings [174]	Outlines methods of analysing the potential risks from ground gases and site classification.
CIRIA Publication C733: 2014. Asbestos in soil and made ground: a guide to understanding and managing risks [175].	Guidance on risk assessment and risk management for sites that contain made ground and soils potentially contaminated by asbestos.
CL:AIRE:2016. Control of Asbestos Regulations 2012 Interpretation for Managing and Working with Asbestos in Soils in Construction and Demolition Materials [176].	Guidance on the legal requirements of Control of Asbestos Regulations 2012.
Environment Agency: 2009. Updated Technical Background for CLEA Model [177]	Update on the Contaminated Land Exposure Assessment (CLEA) model and the rationale for the generic land use scenarios to derive soil guideline values.
Environment Agency 2018. The Environment Agency's approach to groundwater protection [178]	Guidance on how the Environment Agency manages and protects groundwater, and how they can deliver on government policy.
CL:AIRE Good Practice for Risk Assessment for Coal Mine Gas Emissions, 2021 [179]	Guidance on understanding and undertaking coal mine gas risk assessment.
Land Quality Management and the Chartered Institute for Environmental Health: 2014. The LQM/CIEH S4ULs for Human Health Risk Assessment [180]	Outlines suitable for use levels for Human Health, based on toxicological data and modelling.

11.3 Consultation

11.3.1.1 The following stakeholders will be consulted with regards to Ground Conditions as part of the assessment process:

- Coal Authority will be consulted to provide any information about the mining operations that have historically been undertaken within the draft Order Limits, and any objections to the Proposed Development; and
- Environment Agency will be consulted to provide data with respect to Lostrigg Beck, located within the draft Order Limits, and its potential interaction with the Proposed Development.

11.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to Ground Conditions.

11.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

11.4 Study area

11.4.1.1 The study area includes all potential contaminated land sites that intersect the draft Order Limits and those sites that have plausible pollutant linkages that may impact the draft Order Limits, typically within 250m of the draft Order Limits, however, contamination pollution linkages are considered on a case-by-case basis.

11.4.1.2 The study area used to assess the potential impacts on geology and hydrogeology considers features within the draft Order Limits as well as hydrogeological features and sensitive receptors within 500m of the draft Order Limits.

11.5 Baseline conditions

11.5.1 Desktop sources used

11.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- British Geological Society (BGS) GeoIndex Onshore, 2020 [181]
- Defra Magic Map, 2024 [182]
- UK Radon Maps (UKHSA, 2022) [183]
- The Coal Authority Interactive Map, 2023 [184]
- Groundsure Enviro and Geo Insight Report, 2024 (included in the Desk Study and Preliminary Risk Assessment)

- Coal Authority Consultants Coal Mining Report, 2024 (included in the Desk Study and Preliminary Risk Assessment)

11.5.2 Surveys undertaken and proposed

11.5.2.1 The following surveys have been completed at the time of writing:

- A site walkover inspection was undertaken on the 29 – 30th April 2024 to inform an understanding of the baseline conditions.

11.5.2.2 The following surveys are planned to be undertaken:

- Utilise source record plans for mine entries or mine abandonment plans (if available) to determine the most probable location of any mine entries. Based on this information the use of a geophysical or physical survey could be deemed necessary to identify any mine shafts. A specific site investigation and watching brief may also need to be undertaken.

11.5.3 Existing baseline

11.5.3.1 The draft Order Limits are predominately agricultural land which is separated by hedges. Lostrigg Beck dissects the northern and central portion of the draft Order Limits in a north-south direction. Deciduous woodland belts are on either side of Lostrigg Beck and within the northern portion as well as block conifer plantations within the southern portion of the draft Order Limits. During the walkover settlement potentially associated with the mine shafts was evident within the northern area of the draft Order Limits (however parts of the northern part of the draft Order Limits were inaccessible during the site walkover). A number of recorded mine shafts are present in the southern portion of the draft Order Limits. At time of walkover, areas of localised settlement were observed, which could be indicative of ground loss or collapse associated with mine entries.

Historical Land Use

11.5.3.2 Historically, the draft Order Limits comprised undeveloped fields and moorland with sporadic buildings. Evidence of historical ground workings are evident through records of quarries and collieries within the study area.

Geology

11.5.3.3 BGS mapping has recorded Made Ground[4] to be present within the draft Order Limits. The extent of the recorded Made Ground is shown on the constraints plan (Figure 11.1). The geological map shows the superficial deposits are Devensian Till (unsorted glacial deposits consisting of clay, sand, gravel and boulders) across the draft Order Limits with the exception of the channel formed by Lostrigg Beck that has deposited Alluvium (clay, silt, sand and gravel) and within the south of the draft Order limits where the opencast mining has removed the Till. The solid

[4] Made Ground is an area where the pre-existing (natural or artificial) land surface is raised by artificial deposits.

geology beneath the draft Order Limits primarily consists of Pennine Middle Coal Measures with areas of Pennine Lower Coal Measures in the south.

11.5.3.4 BGS mapping identifies the draft Order Limits to be present in an area of intense geological faulting primarily trending from north-west to south-east.

Hydrogeology

11.5.3.5 The majority of the draft Order Limits are underlain by the superficial deposits of Devensian Till classified as a Secondary Undifferentiated Aquifer with Alluvium along Lostrigg Beck being classified as a Secondary A Aquifer. The underlying solid strata of the Pennine Middle Coal Measures and Pennine Lower Coal Measures Formation are classified as a Secondary A Aquifer.

11.5.3.6 There are no active groundwater abstraction licences within influencing distance of draft Order Limits and does not lie within a source protection zone.

Landfill Sites

11.5.3.7 There is one landfill on the draft Order Limits southern boundary known as Lillyhall Stage 3 Landfill Site (EPR/GP3037SJ).

11.5.4 Future baseline

11.5.4.1 Excluding potential future development pressures that may come forward, the future baseline for ground conditions is largely expected to remain as per the current existing baseline.

11.5.4.2 Climate change may result in drier seasonal periods which could result in wildfire occurrence, contaminant breakdown and drying out of surface soils. During wetter seasonal periods which could result in an increase percolation of rainwater and increase of groundwater level. Due to the historic mining legacy, there are a high number of untreated mine shafts within the draft Order Limits that have the potential to collapse.

11.6 Potential impacts

11.6.1.1 Conceptual Site Model

11.6.1.2 Current best practice in the assessment of contaminated land risk assessment is to develop a Conceptual Site Model (CSM) that describes all the potential sources, pathways and receptors and the relationships between them. The CSM for the draft Order Limits has been developed for the proposed end use (i.e. solar arrays and associated infrastructure).

Sources

11.6.1.3 The Northern part of the draft Order Limits was mined for coal with shallow underground workings, and sporadic unspecified pits identified in the Groundsure and Coal Authority reports. A significant number (206No.) of mine shafts are also

recorded throughout the northern and southern portion of the Draft Order Limits (as shown on Figure 11.1), with some of these evident during the walkover. Of the c.206No. shafts identified in the Coal Authority Report, 4No. have been filled to an unknown specification, 1No. has been subsequently worked as opencast and the remaining are untreated. An area of open cast workings and an unspecified pit were identified within the central portion of the draft Order Limits as highlighted by grey hatching within Figure 11.1, which have been subsequently backfilled to an unknown specification and material. Given the presence of landfilling in close proximity to the draft Order Limits, the presence of landfill within the former opencast area cannot be discounted. Other key sources of Made Ground, as a result of previous activities, and a rifle range (highlighted pink within Figure 11.1).

11.6.1.4 A landfill was identified on the draft Order Limits southern boundary, in an area of former opencast. No further off-site sources have been identified.

Pathways

11.6.1.5 The potential pathways are identified below:

- Direct ingestion of soil and soil derived dust
- Dermal contact with soil and soil derived dust
- Inhalation of dust with elevated concentration of determinands
- Surface water flow
- Mine water migration
- Vertical and lateral migration of leachable contaminants
- Inhalation of mine gas and ground gases
- Explosive atmospheres from mine gas and colliery spoil
- Combustion of colliery spoil
- Sulphate attack on structural concrete from colliery spoil

Receptors

11.6.1.6 The potential receptors relating to Ground Conditions are:

- Construction workers and nearby land users, such as farmers, in relation to human health risks from contamination
- Lostrigg Beck located within the draft Order Limits
- Groundwater within the superficial deposits and bedrock underlaying the draft Order Limits which has been classified as a Secondary A Aquifer
- Any ecological receptors that may be present within the draft Order Limits
- Grazing of livestock during the operational phase
- Maintenance workers during the operational phase
- Infrastructure associated with Proposed Development

11.6.2 Construction

11.6.2.1 The nature of construction activities (e.g. excavation of trenches for cable routes) will give rise to close contact with dust/soil. There is potential for soil contamination associated with former site usage to present a risk to human health and/or ecological receptors.

11.6.2.2 The construction phase also has the potential to increase the risk of contaminant leaching (both physical and chemical) to groundwater and surface water run-off to the Lostrigg Beck.

11.6.2.3 The creation of excavations and trenches during the construction phase increases the risk of exposure to hazardous ground gases for construction workers.

11.6.2.4 Construction activities and movement / stockpiling of soils (if required) have the potential to create dusts and / or release asbestos fibres (if present).

11.6.2.5 Activities within the construction phase of the Proposed Development (e.g. piling, excavation and movement of heavy machinery or plant) have the potential to destabilise any untreated mine shafts within influencing distance of the works, leading to collapse.

11.6.2.6 Former opencast mined areas have the potential to result in excessive total or differential settlements due to the presence of potentially thick deposits of fill material and buried highwall slopes.

11.6.2.7 Areas of abandoned underground mine workings at shallow depth (including those at shallow depth beneath the base of any former opencast excavation) also have the potential to give rise to excessive total or differential settlements, and may result in catastrophic ground loss at the surface.

11.6.2.8 However, the Proposed Development of solar arrays is typically lightweight and able to be simply adjusted in the event that settlement associated with the performance of thick opencast backfill deposits or general mining related subsidence occurs.

11.6.2.9 In the event of catastrophic ground loss due to the collapse of mine workings or mine entries, it is likely that the impacts to the whole development would be minor and isolated to a small extent of the proposed solar arrays, it is extremely unlikely this would impact upon residential receptors which are not located within the solar array areas.

11.6.2.10 The risk of damage to sensitive infrastructure within the development, such as inverter / sub-stations, battery storage and control kiosks, could be mitigated by the siting of sensitive infrastructure outside the likely zone of influence to any mine entry and away from former opencast highwalls.

11.6.3 Operation

11.6.3.1 Destabilisation and collapse of mine shafts during the operational phase could occur as a result of activities within the construction phase causing structural damage. Impacts would be typically localised and extremely unlikely this would impact upon residential receptors which are not located within the solar array areas.

11.6.3.2 The operational phase is not considered to have an effect on the grazing stock, operational workers, Lostrigg Beck and/or groundwater.

11.6.4 Decommissioning

11.6.4.1 Similar to construction, activities within the decommissioning phase such as the movement of heavy machinery or plant, have the potential to destabilise any untreated mine shafts within the vicinity of the works, leading to collapse. Impacts would be typically localised and extremely unlikely this would impact upon residential receptors which are not located within the solar array areas. Decommissioning is considered unlikely to interact with any shallow underground mine workings and opencast mining.

11.6.4.2 The decommissioning phase has the potential to increase the risk of contaminant leaching (both physical and chemical to groundwater and surface water runoff to the Lostrigg Beck, where excavation works are undertaken.

11.6.4.3 The re-excavation of cable trenches during the decommissioning phases may also increase the risk of exposure to hazardous ground gases for construction workers and may increase the risk of spontaneous combustion where coal bearing ground is exposed to the air. The removal of infrastructure from the Proposed Development, such as solar array 'pins'/piles have the potential to expose Made Ground and contaminated soils.

11.7 Design, mitigation and enhancement measures

11.7.1 Embedded measures

11.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

11.7.1.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to Ground Conditions already committed to include:

- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions.

- The placement of BESS and other infrastructure will avoid historic mine entries and compressible ground.
- Minimum 10m offset from all infrastructure (including fencing) from bank top of all riparian boundaries and watercourses.

11.7.1.3 Further embedded measures are likely to include:

- The final design considering mine shaft locations to minimise impacts.
- Ensuring that a heavy-duty trackmat road is laid, that spans any known mine shafts that cannot be avoided. This is applicable during the installation and decommissioning phases.

11.7.2 Further mitigation

11.7.2.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for Ground Conditions will be defined through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to Ground Conditions may include:

- Treatment/capping of relevant mine shafts, where adapting the masterplan is not possible.
- Arisings from cable routes to be stockpiled separately and an appropriate distance from other material, until laboratory analysis has confirmed suitability for re-use or waste classification for disposal. Excavations and storage of stockpiles to be undertaken in accordance with an appropriate materials management plan (MMP) and under DoWCoP (Definition of Waste: Code of Practice).

11.7.3 Management plans

11.7.3.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to Ground Conditions including:

- Outline Construction Environmental Management Plan (oCEMP)
- Outline Decomissioning Environmental Management Plan (oDEMP)

11.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process. In particular, construction/decommissioning workers would be provided with appropriate personal protective equipment and required to follow best practice measures with regards to limiting the risks associated with ground contamination and instability.

11.7.3.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

11.8 Likely significant effects

11.8.1 Construction

11.8.1.1 The draft Order Limits, particularly to the northern and southern extents, have a significant number of recorded mine entries which may provide constraints to the Proposed Development and the safe occupation of the working areas within the draft Order Limits during construction due to potential risks of instability, mine gas and mine water emissions. An assessment of historic mining legacy, and the effects upon the Proposed Development and construction workers, is proposed to be **scoped out** of further assessment within the EIA on the basis that a coal mining risk assessment has been committed to be undertaken to understand and mitigate these risks further, and as such significant effects in EIA terms are unlikely to result. The coal mining risk assessment will be completed and agreed with the Coal Authority prior to consent for the development being granted.

11.8.1.2 Assuming the implementation of the CEMP (following the principles outlined in the oCEMP) ensuring the appropriate Personal Protective Equipment (PPE) and use of best practice measures are in place, potential harm to human health from exposure to soil contamination (including dust or vapours originating from the soil is not expected to be significant and is **scoped out** of further assessment).

11.8.1.3 Excavations for the Proposed Development, such as for cable routes will be minimal, and deep /extensive foundations will not be required. As a result, significant adverse effects on groundwater quality and surface water due to the disturbance/mobilisation of pre-existing contamination within the ground is expected to be a low risk, and managed through best practice measures in the CEMP (following the principles outlined in the oCEMP). In addition, sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions. An assessment of effects upon ground water quality and surface water as a result of contaminant leaching are therefore **scoped out** of further assessment.

11.8.2 Operation

11.8.2.1 As a result of the works undertaken as part of the construction phase, collapse of untreated mine shafts could occur during the operational phase causing structural damage to the Proposed Development, and potential death or injury to livestock and operational workers within these areas. Whilst this requires further assessment through a coal mining risk assessment and agreement with the Coal Authority, the requirement for further assessment as part of an Environmental Statement can be **scoped out.**

11.8.2.2 There could be potential adverse effects on livestock grazing due to accumulation of any contamination in soils. Three unspecified pits are located within the Panel Areas, two of these pits are within the draft Order Limits within the Northern Panel Area and as such are unlikely to provide a contaminant linkage. A further pit was located within the Central Panel Area but this was considered to be small and

was infilled by 1981 and, therefore, is unlikely to pose a significant risk to livestock. As a result, these are not likely to change from the current baseline and can be **scoped out** of further assessment.

11.8.3 Decommissioning

11.8.3.1 Similar to construction, activities within the decommissioning phase such as the movement of heavy machinery or plant have the potential to destabilise any untreated mine shafts within the working areas, leading to collapse. The undertaking and approval of a coal mining risk assessment prior to consent being granted, enables this to be **scoped out.**

11.8.3.2 The removal of solar array 'pins'/piles have the potential to expose Made Ground and contaminated soils that have the potential risk to human health. However the oDEMP will provide the mitigation measures required and ensure this risk remains low, and therefore is **scoped out** of assessment.

11.9 Proposed assessment methodology

11.9.1.1 Further assessment of ground conditions is **scoped out** of assessment. However, it is recognised that there are existing recorded risks to ground stability from coal mining legacy hazards. It is therefore appropriate for the Proposed Development to assess and mitigate these risks in the interests of public safety. The potential mining legacy risks to the Proposed Development are to be considered in a Coal Mining Risk Assessment (CMRA) prepared under separate cover. The CMRA will follow the 'Risk Based Approach to Development Management' guidance for developers, issued by the Coal Authority.

11.10 Assumptions, limitations and uncertainties

11.10.1.1 The Scoping Report is limited to Desk Based information only, with a site walkover undertaken over a two day period, where only select aspects of the draft Order Limits were inspected.

11.11 Summary

Table 11-4 Ground Conditions scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Human health	Scoped Out	Scoped Out	Scoped Out	No surveys necessary.
Historic mining legacy	Scoped Out	Scoped Out	Scoped Out	Coal Mining Risk Assessment and geophysical/physical surveys as appropriate.
Controlled waters	Scoped Out	Scoped Out	Scoped Out	No surveys necessary.
Ecological Receptors / grazing livestock	n/a	Scoped Out	n/a	No surveys necessary.

12 Human health

12.1 Introduction

12.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of human health.

12.1.1.2 It sets out human health receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

12.1.1.3 The following aspects have been considered as part of the scope and methodology for human health:

- Impacts on population health as a result of changes to health determinants such as access to health, social care and other social infrastructure, access to open space and nature, neighbourhood amenity, accessibility and active travel, community safety, access to work and training, social cohesion and climate change.

12.2 Relevant legislation, policy, standards and guidance

12.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for human health and have informed the scope of the assessment.

12.2.2 Legislation

Table *12-1 Human health - Legislation*

Legislation	Relevance to assessment
Infrastructure Planning (Environmental Impact Assessment) Regulations [185]	5(2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (a)population and human health;

12.2.3 Policy

Table 12-2 Human health - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [186]	The direct impacts on health may include • increased traffic • air or water pollution • dust, odour • hazardous waste and substances • noise • exposure to radiation, and • increases in pests As described in the relevant sections of this NPS and in the technology specific NPSs [*note that there are no specific mentions in EN-3 relevant to health], where the Proposed Development has an effect on humans, the ES should assess these effects for each element of the Proposed Development, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.
National Planning Statement for Electricity Networks Infrastructure (EN-5) [187]	2.9.46 states that electricity cables can have direct and indirect effects on human health.
Allerdale Borough Council Local Plan, Part 1 [188]	Policy S32 Safeguarding amenity - Support will be given for proposals which make a positive contribution to the area by maintaining or improving the quality of the environment and amenity. The development of new housing or other environmentally sensitive development will normally be resisted in locations where there is potential to incur statutory nuisance or poor standards of residential amenity by virtue of impacts such as air pollution, noise, smell, dust, vibration, light or other pollution. Proposals will not be supported where they would: a. Result in pollution or hazards which prejudice the health and safety of communities and their environments, including nature conservation interests and the water environment which cannot be overcome by appropriate mitigation measures.
Cumberland Consolidated Planning Policy Framework Cumberland Council [189]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

12.2.4 Standards and guidance

Table 12-3 Human health - Standards and guidance

Standards and guidance	Relevance to assessment
Planning Practice Guidance: Healthy and safe communities, 2022 [190]	Guidance on promoting healthy and safe communities, particularly Paragraph: 004 Reference ID:53-004-20190722.

12.3 Consultation

12.3.1.1 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to human health.

12.3.1.2 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

12.4 Study area

12.4.1.1 The study area considers the draft Order Limits and any immediately adjoining receptors relevant to human health, and more generally the Cumberland Council local authority area, specifically the area covered previously by the previous Allerdale local authority area ahead of the change in unitary boundaries, within which the draft Order Limits is located .

12.5 Baseline conditions

12.5.1 Desktop sources used

12.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Office for National Statistics, Census 2021 [191]

12.5.2 Surveys undertaken and proposed

12.5.2.1 No surveys are required in respect of human health.

12.5.3 Existing baseline

12.5.3.1 Allerdale local authority area (now part of the larger Cumberland Unitary Authority as of April 2023) has a population of 96,100 in 2021. As of 2021, Allerdale is the third least densely populated of the North West's 39 local authority areas.

12.5.3.2 Land uses on and in the areas surrounding the Proposed Development are focused on agricultural activities with dispersed settlements which support local services. The town of Workington is around 3.5 km west, providing a typical supply of local services expected of a large town.

12.5.3.3 There are no health, social care and other social infrastructure within or immediately adjoining the draft Order Limits [192].

12.5.3.4 Members of the public can access open space and nature through a limited network of public rights of way through and immediately adjoining the draft Order Limits.

12.5.3.5 Neighbourhood amenities within and immediately adjoining the draft Order Limits are limited given the rural nature of the area. The small communities of Branthwaite and Little Clifton are in close proximity but not immediately adjacent, and provide a selection of neighbourhood amenities. The Lillyhall Industrial Estate is in close proximity to the draft Order Limits to the south-west, providing employment opportunities.

12.5.3.6 There are no rail stations in close proximity to the draft Order Limits. A bus route [193], the 218, runs along the road to the south of the draft Order Limits, A595 at Lillyhall Industrial Estate To Branthwaite, Winscale. There is also a route, the 600 and 34C, running up the A595 immediately west of the draft Order Limits. These are correct at the time of writing.

12.5.3.7 There are no cycle networks within or immediately adjoining the draft Order Limits.

12.5.3.8 There have been less than 10 reported crimes [194] in the last 6 months at locations immediately adjoining the draft Order Limits. No crimes have been reported within the draft Order Limits.

12.5.3.9 In 2022, the latest data available [195], there were two serious road traffic accidents along the A595. No other road traffic accidents occurred within or adjoining the draft Order Limits.

12.5.3.10 Employment opportunities immediately adjoining and within the draft Order Limits include agricultural / land holding associated employment, tourism (associated with Grassmoor View Holiday Park and Cumberland Lodge), and building related (skip hire and roofing services). Lillyhall Business Park is in close proximity to the south-west, but not immediately adjacent. Training opportunities exist at Energy Coast University Technical College to the west of Lillyhall Industrial Park.

12.5.3.11 The area around the draft Order Limits is rural, with dispersed small villages including Branthwaite and Little Clifton. According to ONS [196], rural areas appear to have stronger community relations than urban areas, and as such social cohesion may be expected to be high.

12.5.3.12 For topic specific baseline conditions of relevance to human health, refer to the following sections of the EIA Scoping Report:

- Chapter 6 Air quality
- Chapter 8 Climate change
- Chapter 10 Electric, magnetic and electromagnetic fields
- Chapter 11 Ground conditions
- Chapter 13 Landscape and visual
- Chapter 14 Major accidents and disasters
- Chapter 15 Noise and vibration
- Chapter 16 Socio-economics
- Chapter 17 Traffic and transport
- Chapter 18 Water resources and flood risk

12.5.4 Future baseline

12.5.4.1 Considerations for human health include factors such as areas of proposed new development, which may have the potential to influence the demographic characteristics of an area, or the likely routes and journeys people will need to make in the future. The future baseline also considers health service proposals, for example if new health facilities are proposed. Current health trends are also relevant, for example, to consider the future needs of an ageing population.

12.5.4.2 The influence of climate change will also affect health priorities and health risks in the future. This may include the risks to health from increased heatwaves or other extreme weather events. General climate change trends projected over UK land for the 21st century in UKCP18 [197] are broadly consistent with earlier projections (UKCP09) showing an increased chance of warmer, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes.

12.6 Potential impacts

12.6.1 Construction

12.6.1.1 The construction of the Proposed Development has the potential for limited impacts on human health. These impacts are likely to principally relate to the following construction effects:

- potential impacts on neighbourhood quality and residential amenity, air quality, noise and lighting due to construction activity and traffic
- employment opportunities from construction

12.6.2 Operation

12.6.2.1 The design and operation of the Proposed Development has the potential for limited impacts on human health. These impacts are likely to principally relate to the following effects:

- neighbourhood quality and residential amenity, air quality, noise and lighting impacts due to operational activity and traffic
- access to open space and nature
- community safety, such as risks from BESS fire
- climate change

12.6.3 Decommissioning

12.6.3.1 The decommissioning of the Proposed Development has the potential for limited impacts on human health. These impacts are likely to principally relate to the effects of decommissioning activity associated with air quality, noise, lighting and traffic.

12.7 Design, mitigation and enhancement measures

12.7.1 Embedded measures

12.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

12.7.1.2 The Proposed Development is currently evolving through an iterative design process. Relevant embedded measures for the Proposed Development, of relevance to human health, are outlined in the following chapters of the EIA Scoping Report:

- Chapter 6 Air quality
- Chapter 8 Climate change
- Chapter 10 Electric, magnetic and electromagnetic fields
- Chapter 11 Ground conditions
- Chapter 13 Landscape and visual
- Chapter 14 Major accidents and disasters
- Chapter 15 Noise and vibration
- Chapter 16 Socio-economics
- Chapter 17 Traffic and transport
- Chapter 18 Water resources and flood risk

12.7.2 Further mitigation

12.7.2.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for the Proposed Development, of relevance to human health, is outlined in the following chapters of the EIA Scoping Report:

- Chapter 6 Air quality
- Chapter 8 Climate change
- Chapter 10 Electric, magnetic and electromagnetic fields
- Chapter 11 Ground conditions
- Chapter 13 Landscape and visual
- Chapter 14 Major accidents and disasters
- Chapter 15 Noise and vibration
- Chapter 16 Socio-economics
- Chapter 17 Traffic and transport
- Chapter 18 Water resources and flood risk

12.7.3 Management plans

12.7.3.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to human health including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Construction Traffic Management Plan
- outline Battery Fire Safety Management Plan

12.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

12.7.3.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

12.8 Likely significant effects

12.8.1 Construction

12.8.1.1 The construction of the Proposed Development has the potential for limited impacts on human health. Assessment of potential impacts however, and inclusion of appropriate mitigation measures will be covered elsewhere in the PEIR/ES and within supporting documentation, including:

- Noise, landscape and visual, and socio-economics chapters of the PEIR/ES.
- Construction dust assessment
- oCEMP
- outline Construction Traffic Management Plan

- outline Battery Fire Safety Management Plan

12.8.1.2 As it is not anticipated that the construction of the Proposed Development would result in significant effects to human health, and as the assessment and mitigation of construction effects will be considered elsewhere in the ES, a separate human health ES chapter is not considered to be required, and is therefore **scoped out**.

12.8.2 Operation

12.8.2.1 The operation of the Proposed Development has the potential for limited impacts on human health.

12.8.2.2 The ES will include an assessment of climate change, landscape and visual (including views and amenity impacts), noise and socio-economics in the respective chapters which will include impacts relevant to health determinants. Any mitigation measures required during the operation of the Proposed Development would be reported within these assessments or supporting documentation.

12.8.2.3 This scoping exercise has identified that any likely air quality impacts could be mitigated and would not be significant and are therefore **scoped out** of the ES (see Chapter 6 Air quality).

12.8.2.4 This scoping exercise has also identified that operational traffic will be minimal with occasional maintenance visits taking place which would have limited impacts on the local road network. Operational traffic has therefore been **scoped out** of the EIA (see Chapter 17 Traffic and transport).

12.8.2.5 Information obtained from these assessments will be used to inform the design of the Proposed Development to ensure the avoidance of any effects on human health during the operational phase. In addition, the design of the Proposed Development, and its supporting infrastructure, would be maintained to operate safely so as not to present a risk to human health.

12.8.2.6 As the assessment and mitigation of operational effects will be considered elsewhere in the ES or supporting assessments, and it is not anticipated that the operation of the Proposed Development would result in significant effects of human health, a separate human health ES chapter is not considered to be required.

12.8.3 Decommissioning

12.8.3.1 The operation of the Proposed Development has the potential for limited impacts on human health.

12.8.3.2 This scoping exercise has identified that any likely air quality, noise and traffic and transport impacts could be mitigated and would not be significant and are therefore **scoped out** of the ES (see Chapter 6 Air quality, Chapter 15 Noise and vibration and Chapter 17 Traffic and transport).

12.8.3.3 An outline Decommissioning Environmental Management Plan (oDEMP) will be in place and will incorporate standard industry best practice. This will include measures to manage decommissioning traffic.

12.8.3.4 As it is not anticipated that the decommissioning of the Proposed Development would result in significant effects of human health, and/or the assessment and mitigation of construction effects will be considered elsewhere in the ES, a separate human health ES chapter is not considered to be required.

12.9 Proposed assessment methodology

12.9.1.1 The assessment of human health, as a separate ES chapter, is **scoped out** of further assessment.

12.9.1.2 The relevant topics and suite of management plans will cover the required aspects associated with human health, that being:

- Neighbourhood quality and residential amenity – Chapter 12 Landscape and visual, outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- Air quality – Chapter 6 Air quality, oCEMP, oLEMP, including general operational measures alongside those specific to landscape and ecology, oDEMP
- Noise – Chapter 15 Noise and vibration, o oCEMP, ooLEMP, including general operational measures alongside those specific to landscape and ecology, oDEMP
- Lighting – Chapter 12 Landscape and visual,oCEMP,, oLEMP, including general operational measures alongside those specific to landscape and ecology
- Open space and nature - Chapter 12 oLEMP, including general operational measures alongside those specific to landscape and ecology
- Community safety - oLEMP, including general operational measures alongside those specific to landscape and ecology, outline Battery Fire Safety Management Plan
- Climate change – Chapter 8 Climate change, oLEMP, including general operational measures alongside those specific to landscape and ecology

12.10 Assumptions, limitations and uncertainties

12.10.1.1 There are no explicit assumptions, limitations and uncertainties to note.

12.11 Summary

Table 12-4 Human health scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Human health	Scoped out	Scoped out	Scoped out	None required

13 Landscape and visual

13.1 Introduction

13.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of the topic landscape and visual amenity, herein referred to as the Landscape and Visual Impact Assessment (LVIA).

13.1.1.2 It sets out LVIA receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

13.1.1.3 There are clear differences between landscape effects and visual effects and the following distinctions have been made:

- Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities, and landscape character.
- Visual effects relate to changes to existing views of identified visual receptors (people), from the loss or addition of features within their view due to the Proposed Development.

13.1.1.4 Landscape effects and visual effects will therefore be assessed and reported separately.

13.1.1.5 The following aspects have been considered as part of the scope and methodology for the LVIA:

- Landscape character receptors - National Character Areas (NCA) and Local Character Area (LCA)
- Visual receptors (residential, recreational and transport)
- Cumulative landscape effects
- Cumulative visual effects
- Night-time lighting

13.1.1.6 The LVIA will be undertaken with reference to other environmental topics, including biodiversity, cultural heritage, arboriculture and glint and glare assessments.

13.1.1.7 This chapter is supported by the following figures:

- Figure 13.1: Landscape Designations
- Figure 13.2: Landscape Receptors
- Figure 13.3: Visual Receptors

13.1.1.8 This chapter is supported by the following appendices:

- Appendix 13.1: Landscape and visual appraisal

13.2 Relevant legislation, policy, standards and guidance

13.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for the LVIA and have informed the scope of the assessment and design of the Proposed Development.

13.2.2 Legislation

Table 13-1 Landscape and visual - Legislation

Legislation	Relevance to assessment
European Landscape Convention (ELC) [198]	Paragraph 2.1 of Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3) states that: "*The UK has signed and ratified the European Landscape Convention (ELC) since 2002, when the last edition of this guidance was published. The recognition that government has thus given to landscape matters raises the profile of this important area and emphasises the role that landscape can play as an integrating framework for many areas of policy. The ELC is designed to achieve improved approaches to the planning, management and protection of landscapes throughout Europe and to put people at the heart of this process.*" The ELC defines landscape as: *"…an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.*"
Infrastructure Planning (Environmental Impact Assessment) Regulations [199]	5 (2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (d) material assets, cultural heritage and the landscape

13.2.3 Policy

Table 13-2 Landscape and visual - Policy

Policy	Relevance to assessment
Overarching National Policy Statement (NPS) for Energy (EN-1) [200]	NPS EN-1 recognises that virtually all nationally significant energy infrastructure projects will have adverse effects on the landscape. It sets out the requirements for applicants to carry out a landscape and visual impact assessment, including cumulative effects in accordance with relevant guidance. Content should

Policy	Relevance to assessment
	include effects on landscape character, landscape components and visibility during construction and operation. NPS EN-1 notes the need for careful siting and criteria for good design which takes account of potential impacts on landscape and visual amenity in order to minimise negative effects and recognising opportunities for enhancement.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [201]	NPS EN-3 sets out relevant considerations for applicants with regards to renewable energy infrastructure, including solar farm development and its potential impacts on landscape and visual amenity, including visual impacts from public rights of way, visual impacts of security and lighting measures and the need to mitigate these as far as possible. In the cases of solar farm development, it states in paragraph 2.10.95 that whilst it may be the case that the development covers a significant surface area, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography, the area of a zone of visual influence could be appropriately minimised.
National Policy Statement for electricity Networks Infrastructure (EN-5) [202]	2.10 (2.10.5) states out the principal opportunities for mitigating adverse landscape and visual impact of electricity network infrastructure including "selection of the most suitable type and design of support structure in order to minimise the overall visual impact on the landscape. In particular, ensuring that towers are of the smallest possible footprint and internal volume".
National Planning Policy Framework [203]	Chapter 15 requires planning decisions to "contribute to and enhance the natural and local environment, by: a) [inter alia] protecting and enhancing valued landscapes…" and "b) recognising the intrinsic character and beauty of the countryside" (paragraph 180a) Chapter 12 requires planning decisions to ensure developments "…are sympathetic to local character" (paragraph 135c)
Allerdale Local Plan [204]	In April 2023 the two-tier authority system in Cumbria was replaced by two new unitary authorities; Cumberland Council and Westmorland and Furness Council. Cumberland Council covers the former area of Allerdale Borough Council, in which the Proposed Development is located. Cumberland Council inherited the local plan documents of each of the former councils. These documents will continue to be used, in the relevant former council areas, until they are replaced by new Cumberland Local Plan documents. The local plan for Allerdale therefore consists of; • Allerdale Local Plan (Part 1) Strategic and Development Management Policies (2014), adopted in 2014 and

Policy	Relevance to assessment
	establishes strategic and development policies for the former Allerdale area; • Allerdale Local Plan (Part 2) (2020); adopted in 2022 and identifies land to deliver the strategy and contains additional supporting policies; and • Cumbria Minerals and Waste Local Plan 2015-2030 (CMWLP). In relation to the principle of solar development, Policy S19 is of greatest relevance, alongside a series of other strategic policies that relate to the location of the Proposed Development. **Policy S19 Renewable Energy and Low Carbon Technologies** states "t*he Council will seek to promote and encourage the development of renewable and low carbon energy resources given the significant wider environmental, community and economic benefits. Proposals where impacts (either in isolation or cumulatively) are, or can be made acceptable will be permitted.* *The Council will take a positive view where:* *a) Proposals (either in isolation or cumulatively):* *i) Do not have an unacceptably adverse impact on the amenity of local residents (such as air quality/emissions, noise, odour, water pollution, shadow flicker);* *ii) Do not have significant adverse impact on the location, in relation to visual impact and impact on the character and sensitivity of the surrounding landscape;* *iii) Do not have an adverse effect on any European/International protected nature conservation site (including SACs, SPAs and Ramsar sites, candidate SACs, potential SPAs and proposed Ramsar sites) including its qualifying habitats and species, either alone or in-combination with other plans or projects.* *iv) Do not have a significant adverse effect on any National nature conservation site (Site of Special Scientific Interest; National Nature Reserve), except where the benefits of the development clearly outweigh both the impact on the site and any broader impacts on the wider network of National sites.* *v) Do not result in loss or harm to a Local nature conservation site, including habitats or species supported by Local Sites, unless it can be demonstrated that there is a need for the development in that location and that the benefit of development outweighs the harm or loss.*

Policy	Relevance to assessment
	iv) Do not have unacceptably adverse impact on heritage assets and their settings; … *c) Appropriate operational requirements are addressed (including accessibility and suitability of road network, ability to connect to the grid, proximity of any relevant feedstock);* *d) Appropriate measures are included for the removal of structures and the restoration of sites, should sites become non-operational;* *e) Potential benefits to the local economy and the local community, including agriculture and other land based industries are considered"* **Policy S2 Sustainable Development Principles** states that *"the Local Plan will promote sustainable development as a core principle…."* and *"encourage the development or renewable and low carbon energy resources in appropriate locations given the potential wider environmental, community and economic benefits; …"* **Policy S4 Design Principles** "*Achieving high quality design for all development is a key objective of the Local Plan. Good design relates not only to the appearance of a development but to how it functions within its location and to how it contributes towards a sustainable community*." Proposals must "*[inter alia] enhance, protect and integrate effectively with the historic and natural environment."* **Policy S6a Workington and Policy S6c Cockermouth** sets out area-based policies for broad areas within Allerdale, within which the Proposed Development is located. Policy S6c Cockermouth requires "…*development to have regard for the landscape character of the locality, with particular focus on the setting of the Lake District National Park."* **Policy S33 Landscape** states that *"the landscape character and local distinctiveness of the Plan Area shall be protected and conserved, and where possible, enhanced."* It notes that the Cumbria Landscape Character Assessment Toolkit will be used to inform the detailed assessment of individual proposals. **Policy S24 Green Infrastructure** which seeks to promote *"the creation, enhancement, maintenance and protection of a range of green infrastructure assets that contribute to a diverse network of natural and man-made green and blue spaces, links, habitats and landscapes, which is accessible to all."* **The Allerdale Local Plan (Part 2)** [205]**, Policy Map**, identifies Lostrigg Beck as Green Infrastructure. **Policy SA52** states development proposals *"are expected to consider the existing green infrastructure network, as shown on the Policies Map, at an early stage in the design process, incorporating existing assets on-site*

Policy	Relevance to assessment
	and securing opportunities to strengthen and connect with the wider green infrastructure network." and *"…incorporate a layout that provides pedestrian and/or wildlife linkages to the existing Network in circumstances where the development site lies adjacent and connectivity is feasible."* **DM17 Trees, Hedgerows and Woodland** states "*wherever possible, existing trees, hedgerows and woodland that are considered important to the local community, contribute positively to the character of the area and/or are of nature conservation value will be protected."*
Cumberland Consolidated Planning Policy Framework [206]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.
Lake District National Park Local Plan [207]	**Policy 01: National and international significance of the Lake District** states "*The extraordinary harmony and beauty of the Lake District landscape and its Special Qualities, including the attributes of Outstanding Universal Value, will be conserved and enhanced…*" and "*…all development proposals should protect or enhance the authenticity, integrity and significance of the Lake District".* **Policy 05: Protecting the spectacular landscape** states *"we will conserve and enhance the extraordinary beauty and harmony of the Lake District landscape, its Special Qualities and attributes of Outstanding Universal Value.* *We will achieve this by supporting development:* • *that ensures the highest level of protection is given to the landscape, and* • *where the type, design, scale and level of activity maintains local distinctiveness, sense of place, and where appropriate, tranquillity.* *Decisions will be guided by the Lake District Landscape Character Assessment recognising the distinctive characteristics identified in the Landscape Character Types and Areas of Distinctive Character, the World Heritage Site Nomination Document and the Historic Landscape Characterisation.* *We will use development opportunities to reduce or remove existing landscape detractors."* **Policy 06: Design and development** states "*We want to achieve design excellence in all development, to be inspired by and contribute to local distinctiveness, to be resilient to climate change and extreme weather events, and reduce carbon emissions."*

Policy	Relevance to assessment
	It requires that [inter alia] "*development must:* • *reinforce the importance of local character by having regard to scale, height, density, layout, appearance and materials;* • *not have an unacceptable impact on the amenity of adjoining residents and users of the proposed development, due to visual intrusion, overlooking, overshadowing, overbearing effect, noise, light pollution or other adverse impacts;* and [inter alia] *"development should:* • *be inspired by the natural environment and use innovative design and local materials to reflect local distinctiveness;* • *avoid or minimise light pollution;* • *conserve, enhance or create new Local Green Space."*

13.2.4 Standards and guidance

Table 13-3 Landscape and visual - Standards and guidance

Standards and guidance	Relevance to assessment
An Approach to Landscape Character Assessment [208]	Informs the methodology for defining and describing the landscape character baseline.
Assessing landscape value outside national designations, Technical Guidance Note 02/21 [209]	Informs the methodology for assessing the value attached to the landscape and whether a landscape can be considered "valued landscape" in the context of NPPF paragraph 180(a).
Design Principles for National Infrastructure [210]	Informs the development of design principles.
Guidelines for Landscape and Visual Impact Assessment, 3rd edition [211]	Underpins the methodology for undertaking LVIAs.
Infrastructure, Technical Guidance Note 04/20 [212]	Background information for the planning and design process for infrastructure projects for landscape.
Planning Practice Guidance (PPG), Natural Environment (Landscape) [213]	Sets out the benefits of landscape character assessments and the importance of considering Green Infrastructure in the early stages of schemes.
Planning Practice Guidance, Renewable and Low Carbon Energy [214]	Sets out that planning has an important role in the delivery of new renewable and low carbon energy infrastructure. The PPG identifies several LVIA considerations, including visual impact, mitigation through screening and glint and glare.
Visual Representation of Development Proposals, Technical Guidance Note 06/19 [215]	Informs the process for producing visualisations and photomontages.

13.3 Consultation

13.3.1.1 The following stakeholders will be consulted with regards to the LVIA as part of the assessment process:

- Landscape officer at Cumberland Council, including consulting on viewpoints
- Lake District National Park Authority and Partnership

13.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES where relevant to LVIA.

13.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

13.4 Study area

13.4.1.1 The study area for the LVIA is illustrated on Figure 13-1 Landscape designations.

13.4.1.2 The first stage of defining the study area was informed by detailed desk study, including the preparation of a computer-generated Zone of Theoretical Visibility (ZTV). A ZTV is defined in GLVIA3 [211] as "*a map, usually digitally produced, showing areas of land within which, a development is theoretically visible.*" ZTVs do not indicate how much of the Proposed Development will be visible. The purpose of the ZTV is to:

- Identify the theoretical extents of visibility of the Proposed Development i.e., areas from which it would not be visible and areas from which it could potentially appear in existing views
- Assist in the identification of the study area
- Identify areas of landscape and visual receptors likely to be affected by the Proposed Development
- Identify locations that are representative of the views experienced by visual receptors at different locations within the study area (representative viewpoints)
- Inform the design, including the extent and type of proposed mitigation.

13.4.1.3 ZTV's have been modelled using the 'Viewshed' tool in ESRI ArcGIS Pro.

13.4.1.4 A bare earth ZTV was prepared using digital terrain model (DTM) data with a resolution of 2.5m. This ZTV represents a worst-case scenario as it does not include features such as existing buildings or vegetation which can screen or filter views. It does not include surface features and is based on the current maximum parameters of the proposed solar panels (maximum 3m height). This identified an initial area of search extending to approximately 8km. Figure 13-3 Visual receptors, shows areas from which the Proposed Development is theoretically visible or not visible. An assumed viewing height of 1.6m above ground level has been used to

simulate the eye level of a person at the top of the range set out in paragraph 6.11 of GLVIA3 to represent the worst-case scenario.

13.4.1.5 Initial fieldwork was undertaken on 21 April 2023 as part of an earlier landscape and visual appraisal. Fieldwork for this scoping report was then carried out on 29 and 30 April 2024 to test the assumptions made through the desk study. This identified further existing features including landform, built development and vegetation which limit potential landscape and visual interactions with the Proposed Development.

13.4.1.6 The desk study and fieldwork carried out to date show that intervening landform, buildings and vegetation generally limit the extent of views to within 3km of the draft Order Limits, this is referred to as the core study area. A wider study area of 8km has been included to consider the potential visibility of the Proposed Development from the higher ground within the Lake District National Park. Beyond this distance, significant landscape and visual effects are not likely. This judgement is informed by an understanding of the wider landscape character and views and experience of working on similar solar farm projects.

13.4.1.7 The geographical extent of the study area proposed is sufficiently wide to enable the assessment of potentially significant landscape and visual effects, in accordance with GLVIA3. The study area may be refined as more detailed analysis is undertaken and following consultation with local planning authorities (LPAs). The justification for its final extent will be set out in the PEIR and ES.

13.5 Baseline conditions

13.5.1 Desktop sources used

13.5.1.1 The desktop sources that have been used to inform the existing landscape and visual baseline conditions of the study area are set out in Table 13-4.

Table 13-4 Data sources

Data	Source
Ordnance Survey Mapping	Ordnance Survey [216]
Aerial Imagery	Google Earth Pro [217]
LiDAR Digital Terrain Map – 1m resolution	EA
National Character Area profile 7 West Cumbria Coastal Plain	Natural England (2014) [218]
National Character Area profile: 8. Cumbria High Fells	Natural England (2012) [219]
National Character Area profile: 6 Solway Basin	Natural England (2014) [220]
Cumbria Landscape Character Guidance and Toolkit, Part 1, Landscape Character Guidance	Cumberland Council (2011) [221]
Lake District National Park Landscape Character Assessment and Guidelines	Lake District National Park (revised 2021) [222]

Data	Source
The Lake District National Park Partnerships Management Plan 2020 – 2025, A National Park and World Heritage Site	Lake District National Park Partnership (Oct 2021) [223]
Public rights of Way	OS 1:25,000 [216]
Allerdale Local Plan (Part 1) and policy maps	Allerdale Borough Council (2014) [204]
Allerdale Local Plan (Part 2)	Allerdale Borough Council (2020) [205]
National designations relevant to landscape	MAGIC geographic environmental information by Defra [224]

13.5.2 Surveys undertaken and proposed

13.5.2.1 The following surveys have been completed at the time of writing:

- Initial landscape and visual fieldwork as part of the site selection study in April 2023 and to inform this scoping report in 2024.

13.5.2.2 The following surveys are planned to be undertaken, and will inform the PEIR / ES:

- Landscape and visual fieldwork and viewpoint photography in winter
- Landscape and visual fieldwork and viewpoint photography in summer

13.5.2.3 Fixed-point photography will be captured for each viewpoint and measured surveys will be carried out for viewpoints where photomontages are proposed.

13.5.2.4 The LVIA will also be informed by arboricultural surveys, which will record the extent, type and condition of trees within and surrounding the draft Order Limits. The results of these surveys, along with habitat surveys, including hedgerow surveys, will inform an assessment of landscape features and the mitigation and enhancement measures embedded in the design.

13.5.3 Existing baseline

Site context

13.5.3.1 Within the wider context, the draft Order limits are located within the open countryside between the town of Workington and the Lake District National Park (LDNP) and World Heritage Site. Workington lies approximately 2km to the west and the LDNP approximately 4.3km to the east.

13.5.3.2 Locally, the draft Order Limits are contained by Winscales Road (A595) to the west, a local road between Lillyhall Business Park and the village of Branthwaite to the south and the valley of the River Marron between Branthwaite and Little Clifton to the east.

13.5.3.3 The draft Order limits comprise an undulating topography with Lostrigg Beck running through the centre of the draft Order Limits creating a deep meandering valley to the south of Little Clifton.

13.5.3.4 The land use within the draft Order Limits is predominantly rough grazing including on areas of moorland with some arable farming in places. There are bands of woodland along watercourses, woodland blocks, woodland shelterbelts, and hedges along historic field boundaries.

13.5.3.5 Five individual properties lie within the draft Order Limits, namely Furnace House, Caple How, Stargill, Whyclose and Wythemoor House.

13.5.3.6 A number of PRoW's are located within the draft Order Limits, notably two which cross through the Proposed Development, connecting the A595 with the local road to the south. The local road Clifton Green between Little Clifton and Furnace House is also used as a walking route by local residents.

Landscape designations

13.5.3.7 The Lake District National Park is situated within the wider study area, approximately 4.3km to the east of the draft Order Limits. Initial fieldwork indicates that, due to the distance, there are unlikely to be significant landscape and visual effects on the National Park. However, views from the National Park will be assessed as part of the PEIR and ES to confirm this.

13.5.3.8 Paragraph 5.10.7 of NPS EN-1 [200] states that National Parks "*have been confirmed by the government as having the highest status of protection in relation to landscape and natural beauty*". This is reflected in their statutory status and high level of policy protection. Section 11A(2) of the National Parks and Access to the Countryside Act 1949 and section 85 of the Countryside and Rights of Way Act 2000 state that relevant authorities must seek to further the purposes for which these areas are designated, including with respect to proposals that are situated outside National Park boundaries, but which might have an impact on them. The Proposed Development would be located within the setting of the LDNP and the PEIR and ES will therefore assess the potential effects on the designated area and its setting with reference to its statutory purposes and special qualities.

13.5.3.9 There are no local landscape designations within the study area.

Other designations

13.5.3.10 Other designations of relevance to the LVIA within the study area are listed in Table 13-5 and illustrated on Figure 2.6 for SSSI, SAC and semi-natural ancient woodland and Figure 13.1 for all other designations.

13.5.3.11 Ecological, heritage and policy designations are included because of their contribution to landscape character and visual amenity, in particular their contribution to landscape value. Further detail regarding these designations is provided in Chapter 7 Biodiversity and Chapter 9 Cultural Heritage.

Table 13-5 Other designations

Other designations and key landscape features within the study area	Direction and approximate nearest distance from the draft Order Limits
Open Access Land and Registered Common Land near Oilys restaurant	0m to the east
Open Access Land and Registered Common Land near Wythemoor House	10m to the south
Open Access Land at Dean Moor	2.8km to the south
English Lake District World Heritage Site (WHS)	4.3km to the east
Workington Hall Registered Parks and Gardens	Approximately 2km to the west of the draft Order Limits, to the east of Workington
Several amenity green spaces	Nearest being 1.1km north at Bridgefoot, 1.5km west at Workington Golf Club, 750m south east at Branthwaite
Little Clifton open heap coke producing bases and associated slag heap Scheduled Monument	200m to the east
Calva Hall Bridge Scheduled Monument	830m to the east
Greysouthen Conservation Areas	1.300 km to the north-east
Many listed buildings, the nearest being Plunderland Farmhouse And Adjoining Barn to the north, Packhorse Bridge North Of Calva Hall to the east and Wythemoor Sough And Adjoining Barn And Stable to the south	220m, 830m and 55m respectively
Ecological designations (SSSI and SAC)	100m to the east along the River Marron
Harrington Reservoir Local Nature Reserve	2.5km to the west
Several semi-natural ancient woodland	Nearest being 780m east,1.8km south, 1.1km west, 2km north
National Cycle Network route 71	2.3km to the north
National Cycle Network route 72	2.2km to the west

Landscape character

13.5.3.12 GLVIA3 [211]defines landscape receptors as "*aspects of the landscape resource that have the potential to be affected by a proposal*". Landscape receptors have been identified via a review of published landscape character assessments, maps and aerial photography, relevant planning policy and fieldwork surveys.

13.5.3.13 Landscape character is defined by GLVIA3 as *"a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."*

13.5.3.14 Published landscape character assessments at the national, regional and local level have been reviewed to identify Landscape Character Types (LCT) and Landscape Character Areas (LCA). These are mapped in Figure 13-2 Landscape receptors.

13.5.3.15 The geographical extent of LCAs in published assessments at the national level are generally large and extend beyond the study area. As explained in paragraph 5.14 of GLVIA3, "broad-scale assessments at national or regional level can be helpful in setting the landscape context, but are unlikely to be helpful on their own as the basis for LVIA". LCAs defined at the national and regional scale will therefore be included to provide context but effects on these receptors will not be assessed.

13.5.3.16 The LCAs that will be referred to in the LVIA as landscape receptors are listed in Table 13-6. The baseline landscape character will be mapped and described in detail in the PEIR and ES, with reference to the published landscape character areas.

Table 13-6 Published landscape character assessments and relevant character areas within the study area

Landscape character assessment	Relevant character areas/sub-types	Corresponding character types of the Lake District National Park Landscape Character Assessment and Guidelines	Approximate distance from the draft Order Limits
National – Natural England National Character Area (NCA) profiles	NCA 7: West Cumbria Coastal Plain		Within the draft Order Limits and the 3km study area
Local – Cumbria Landscape Character Assessment	Ridge and Valley (5a)		Within the draft Order Limits
	Rolling Lowland (5c)	Lowland (D)	Small area to the north within the draft Order Limits
	Urban Fringe (5d)		Small area to the south within the draft Order Limits
	Broad Valleys (8b)	Upland Valley (H)	560m north
	Open Moorland (9a)		1km south
	Ridges (9d)		850m south-east
	Rolling Fringe (12b)	Upland Limestone Farmland (I)	1.7km east

13.5.3.17 The Landscape Character Assessment for Cumbria [221] defines LCTs and sub-types. The character types defined within the LDNP Landscape Character Assessment [222] which lie within the 3km study area, namely Lowland (D), Upland Valley (H) and Upland Limestone Farmland (I) will also be used to inform the baseline of the LCAs. The boundaries of the LCT defined within the LDNP Landscape Character Assessment align with the boundaries of the landscape character sub-types of the Landscape Character Assessment for Cumbria. For the LVIA the Applicant will define location-specific LCAs based on these LCTs and their boundaries so that they remain consistent with the published assessments. Preliminary LCA Names and descriptions are provided below in Table 13-7.

13.5.3.18 In undertaking our baseline assessment of the value and character of the north-western edge of the LDNP and its setting, the LDNP Landscape character Assessment will be used with specific reference made to:

- The Lake District National Park Landscape Character Sub Types (Rugged Angular Slate High Fell (G), Upland Valley (H), High Fell Fringe (J))
- Lake District National Park Areas of Distinctive Character shown on Figure 3.4 (Setmurthy Common and Embleton (Area 6) and Loweswater (Area 8))

Landscape features

13.5.3.19 Key landscape features which contribute to the character and the value attached to the landscape include existing field boundaries and other vegetation within the draft Order Limits, including hedgerows, trees and woodland, which may be directly affected by the Proposed Development. The LVIA will describe the patterns of landcover and the loss, alteration or addition of landscape features within the draft Order Limits with reference to the Arboricultural Impact Assessment and habitat surveys being undertaken.

Landscape receptors

13.5.3.20 A summary of the landscape receptors within the 3km core study area are set out in Table 13-7 and grouped into statutory designations, Landscape Character Areas (LCAs) and landscape features within the draft Order Limits.

Table 13-7 Landscape receptors

Receptor ID	Receptor name	Description
Statutory designations		
LDNP	Landscape of the Lake District National Park	The Lake District is England's largest National Park and most of the area is also covered by the English Lakes UNESCO World Heritage Site. The landscape is protected because of its beautiful countryside, wildlife and cultural heritage. It is a distinct mountainous area with narrow, glaciated valleys radiating from the central mountain area with their steep hillsides and narrow lakes.
Landscape Character Areas		
NCA7:	National Character Area West Cumbria Coastal Plain	Undulating landscape with open views to the hills in the Lake District National Park, lowland rivers, pastoral farmland, occasional woodlands including plantations and shelter belts, hedgerows and few hedgerow trees, dispersed settlements and isolated farmsteads
5ai	Ridge and Valley Workington to Cockermouth	Landscape of ridges and valleys, regular shaped medium to large pastures bound by hedges, interspersed with native woodlands, tree clumps and plantations, scattered farms and villages
5aii	Ridge and Valley east of Workington	
5aiii	Ridge and Valley south of Workington	
5ci	Rolling Lowland Greysouthen to Dean	Open undulating and gently rolling low-lying topography, dissected by meandering river valleys, dominated by pasture, hedges and hedgerow trees on lower ground, pockets of woodland, arable fields, scrub and marginal land, dispersed and nucleated settlements and scattered farmsteads.

Receptor ID	Receptor name	Description
5di	Lillyhall and Winscales Urban Fringe	Around the edges of towns like Workington, urban influences on agricultural land, recreation, large scale buildings and industrial estates, wooded valleys, restored woodland and some semi-urbanised woodland
8bi	Broad Valleys Workington to Cockermouth	Wide, deep valleys with open floodplains, slow-moving river on the broad valley floor, valley sides are generally covered by a mixture of predominantly pastoral farmland and woodland, rural farmland, pockets of scrub, woodland and conifer plantations, hedges and stone walls, transport infrastructure along linear valley corridors, settlement pattern consists of small nucleated and linear settlements and large towns on the valley floor
9ai	Dean Open Moorland	High mostly open landscape, undulating pasture, open rough moorland, areas of deciduous woodland
9di	Dean Moor Ridges	Distinct ridges, heathland moorland, pastures with distinctive stone walls, prominent woodland and small belts
12b	Ullock Rolling Fringe	Large-scale undulating topography, large fields of improved pasture, stone walls, hedges and fence boundaries, generally very sparse tree cover, some large scale conifer plantations, small streams and rivers, openness of the landscape facilitates panoramic views in places, settlement pattern consists of small villages and dispersed farmsteads, A network of secondary roads connects the scattering of villages and farms
Landscape features of value within the draft Order Limits		
WVLB	Wooded valley along Lostrigg Beck	Areas of varying width containing deciduous woodland and scrub with small clearings along the meandering Lostrigg Beck
FT	Individual field trees	Small number of individual, native, broadleaf field trees growing within open pasture and arable fields
SMW	Small woodland blocks	Small woodland blocks and belts, some deciduous, some conifers
HG	Network of hedgerows	Network of rectilinear hedgerows dividing fields into small to medium size pastures and arable fields, some with hedgerow trees
ML	Areas of moorland	On higher ground near Stargill and Caple How, generally used for rough grazing pasture, defined by predominantly semi-natural upland vegetation such as rush and purple moor grass
URL	Undulating rural landscape	Primarily used for sheep grazing with some cattle grazing and one large arable field in the north, small to medium size fields

Views and visual amenity

13.5.3.21 Across the study area, views are generally limited in extent by varying topography and a network of hedgerows, trees and woodlands. Due to the greatly varying topography of the wider area, there are also several elevated views which may be

affected, including but not limited to, viewpoints at Dean Moor and within the Lake District National Park.

13.5.3.22 A preliminary ZTV is shown in Figure 13-3 Visual receptors. This has been prepared to inform this Scoping Report, based on the design information currently available. As certain features of the Proposed Development are unknown at this stage, such as the location of ancillary buildings and structures, these have not been included in the ZTV. Further ZTVs will be produced to support the PEIR and ES.

13.5.3.23 The preliminary ZTV gives an indication of the potential visibility of the proposed current maximum parameters of 3m height for the solar panels scheme's solar panels, considering the influence of screening vegetation and buildings. This indicates that the Proposed Development is likely to be most visible from elevated locations to south of the draft Order Limits at Branthwaite and east of the draft Order Limits at Dean and Greencastle Brow. The ZTV also indicates that visibility of the Proposed Development generally reduce beyond 2km from the draft Order Limits, where landform and woodland increasingly limit views with the exception of views within the Lake District National Park.

13.5.3.24 The ZTV has been analysed to understand the locations, types and potential numbers of visual receptors who may be affected by views of the Proposed Development. Visual receptors with a high susceptibility to change include local communities, users of PRoW and visitors to public open spaces, recreational or cultural destinations where enjoyment of the countryside is important to the experience. There are several villages as well as isolated properties within the study area where there are potential views of the Proposed Development, including at Branthwaite and Dean. There are also a number of footpaths traversing the landscape.

Visual receptor groups

13.5.3.25 Visual receptors are defined in GLVIA3 as "*individuals and/or defined groups of people who have the potential to be affected by a proposal*". This includes, for example, residents, users of public rights of way and motorists.

13.5.3.26 Visual receptors likely to experience views of the Proposed Development have been identified through interrogation of the ZTV, desktop analysis of maps and Google Earth, and fieldwork surveys. Where a collection of visual receptors in the same category are likely to experience similar views, they have been grouped. These are set out in Table 13-8.

Table 13-8 Visual receptors

Receptor type	Receptor or receptor group
Residents	Local community of Dean and Branthwaite and residents of single houses within the landscape such as Furnace House, Quarry Hill, Caple How, Fairview and Gale Brow, Cumberland Lodge and Gale House, Wythemoor House, Stargill, Lucy Close Farm, Outgang Farm, Calva Hall, Oldfield, Oldfield Mill, Mayfield, Springfield, Lamb Hill and Greencroft

Motorists/transport	People travelling on road to the south of the draft Order Limits and Greencastle Brow
Recreational users	Users of PRoW, Open Access Land, NCN as well as local cycle and walking routes within the site and at locations across the study area who may be affected by views of the Proposed Development. This will include recreational users within the LDNP.

Viewpoints

13.5.3.27 Representative viewpoints will be used to assist in describing the baseline view and the effects likely to be experienced by visual receptor groups. These viewpoints have been selected on the basis that they cover a range of viewing distances, elevations and orientations from locations with different viewing experiences of the Proposed Development. In some cases, a viewpoint may therefore be representative of more than one visual receptor group. These viewpoints are set out in Table 13-9 and are shown in Figure 13-3 Visual receptors. The selection of representative viewpoints has been informed by the following criteria:

- Accessibility to the public
- Number and sensitivity of people who may be affected
- Viewing direction, distance, openness and elevation
- Nature of the viewing experience.

Table 13-9 Proposed viewpoints

No.	Viewpoint location	Description	Visual receptors
1	Furnace House	Partial close up view of the northern part of the draft Order Limits. Glimpsed, rural view of medium size pastures and arable fields within the draft Order Limits, bound by rectilinear hedgerows with field trees. Residential view from Furnace House partially obstructed by farm sheds and outbuildings as well as boundary vegetation.	Residential receptors at Furnace House Recreational receptors along Clifton Green
2	PRoW south west of Little Clifton	Partial view of the northern part of the draft Order Limits which is visible in the distance beyond the tree belt at Lostrigg Beck. Rural view of pasture and arable field divided by hedgerow visible within the draft Order Limits. Wind turbines visible on the horizon beyond the site.	Recreational receptors along PRoW south west of Little Clifton
3	Quarry Hill	Panoramic, rural view across arable fields within the northern part of the draft Order Limits towards the distant hills of the Lake District National Park. Large pylons and overhead power lines cross the landscape within the fore and middle ground of the view.	Residential and recreational receptors
4	Caple How	Panoramic, rural view across arable fields and pastures within the northern part of the draft Order Limits towards the distant hills of the Lake District National Park. Large pylons and overhead power lines cross the landscape within the fore and middle ground of the view.	Residential receptors at Caple How Recreational receptors along PRoW
5	Fairview	Rrual view across arable fields and pasture within the central part of the draft Order Limits towards the distant hills of the Lake District National Park. View is partially	Residential receptors at Fairview

No.	Viewpoint location	Description	Visual receptors
		screened by hedgerows and trees within the foreground. Large pylons and overhead power lines cross the landscape within the fore and middle ground of the view.	
6	Gale House	Panoramic, rural view across pastures within the southern part of the draft Order Limits towards the distant hills of the Lake District National Park. Small wood pole power lines cross the landscape in the foreground. Three large wind turbines which lie to the south of the site can be seen within the middle ground of the view.	Residential receptors at Gale House Recreational receptors along PRoW
7	Road south of the site	View looking north up a pasture within the southern part of the draft Order Limits. It's a rural view of a rolling landscape. Post and wire fencing and small wood pole powerlines cross this field. A tree belt can be seen on the horizon. To the east hills of the Lake District National Park are visible in the distance.	Recreational receptors along PRoW Transport receptor
8	Hill south west of Branthwaite	Panoramic views across a rural landscape of rolling pastures with the southern part of the draft Order Limits visible in the distance. A dense network of hedgerows and woodland belts dividing the pastures into medium size fields. A number of large wind turbines can be seen on the horizon to the west of the site. The edge of Branthwaite as well as the village Dean are visible to the north. To the east hills of the Lake District National Park are visible in the distance.	Recreational receptors along PRoW
9	Branthwaite	Glimpsed views of the central part of the draft Order Limits in the distance. It's a rural view across rolling pastures and arable fields with hedgerows, field trees and woodland belts. Large pylons and overhead power lines are visible within the site. A number of large wind turbines can be seen on the horizon to the west of the site.	Residential receptors at Branthwaite
10	Dean	Panoramic view across a rural landscape with rolling hills and pastures bound by hedgerows and woodland belts. Large parts of the central and norther part of the draft Order Limits is be visible. Whilst pylons and overhead lines can be seen within the site, the area of large wind turbines is visible beyond the site on the horizon.	Residential receptors at Dean
11	Oldfield Mill	View of a small area of the northern part of the draft Order Limits within the mid ground of the view. This is an enclosed view across the valley floor of the River Marron with small to medium size pastures and arable fields, hedgerows and hedgerow trees, tree lined water course and a woodland plantation. Within the southern part of the view fields sizes are larger with remnants of hedgerows. Large pylons and overhead power lines are crossing the site in the distance whilst small wood pole powerlines run along the valley floor. Rotating blades of some of the large wind turbines to the west of the draft Order Limits can be seen above the horizon.	Residential receptors at Oldfield Mill Recreational receptors along PRoW
12	Springfield	Panoramic view looking west across the valley of the River Marron. The view shows a rural landscape with pastures, hedgerows and hedgerow trees and predominately	Residential receptors at Springfield

No.	Viewpoint location	Description	Visual receptors
		broadleaf woodland. Large areas of the central and norther part of the draft Order Limits is be visible in the distance. Large pylons and overhead powerlines can be seen crossing the valley. Numerous wind turbines to the west of the site are visible along large parts of the horizon of the view.	
13	Dean Moor	Panoramic view from high ground across a large elevated pasture within the foreground of the view. The view is looking down onto a rolling landscape of predominately pastures bound by hedgerows and woodland belts below. From this location large parts of the draft Order Limits is visible. Detracting elements within the view are the large three large wind turbines to the south of the site within are visible in the midground of the view and the numerous wind turbines beyond the draft Order Limits in the distance. There are also large pylons and overhead powerlines crossing the landscape.	Recreational receptors Transport receptor
14	Knock Murton	Panoramic, long distance view from a peak within the Lake District National Park. The view is looking down across the predominantly Lowland landscape, largely made up of pastures with some arable fields, hedgerows, tree lines, broadleaf and conifer woodlands interspersed with some small villages and isolated farmsteads. From this location large parts of the draft Order Limits is visible. The large wind turbines to the south and west of the site are clearly visible. Within the background of the view hills beyond the Solway Firth form the horizon.	Recreational receptors

Visual representations

13.5.3.28 Photographs taken during fieldwork surveys will be provided in the PEIR / ES to help demonstrate the nature of baseline views including the extent of existing screening. These photographs will be presented as Type 1 annotated photographs.

13.5.3.29 Type 4 photomontages will also be provided from a selection of viewpoints to illustrate the likely extent and nature of changes in baseline views in winter and summer, these will be provided in the ES. All photographs and photomontages have been prepared in accordance with Landscape Institute TGN 06/19 [215].

13.5.3.30 Locations selected for photomontages are viewpoints 2, 3, 4, 6, 7, 12 and 14, these can be seen on Figure 13.3 Visual receptors.

13.5.4 Future baseline

13.5.4.1 The future baseline will include committed developments of a similar type and scale to the Proposed Development that will be delivered prior to commencement of construction.

13.5.4.2 The planning and committed status of the nearby proposed Dean Moor solar NSIP and other solar farms will be confirmed for inclusion and or exclusion from the future baseline during PEIR and the ES stages.

13.5.4.3 Change in vegetation due to average growth, management or climate change is not considered to be noticeable within the timescale of the Proposed Development.

13.6 Potential impacts

13.6.1.1 The Proposed Development has the potential to affect landscape and visual receptors during construction, in operation and during decommissioning.

13.6.2 Construction

13.6.2.1 The assessment of landscape and visual construction effects will identify and assess the temporary impacts which arise because of activities and elements that are unique to the construction phase. Sources of temporary construction impacts (the construction activities and processes) on landscape and visual receptors include:

- Localised alterations to surface landform and vegetation resulting in impacts on landscape features, landscape character and views.
- The presence of construction machinery and activity to construct or remove panels, substations, inverters, pylons, security fencing and associated structures, potentially affecting tranquillity and views.
- Temporary lighting during construction, the nature of which is currently not determined, and which may therefore result in impacts on landscape character.

13.6.3 Operation

13.6.3.1 Sources of potentially significant temporary and permanent operational effects (e.g. the loss or changes to existing landscape features or characteristics, or the addition of new infrastructure or features within the landscape or view) on landscape and visual receptors include:

- The presence and massing of the solar panels and associated structures, resulting in impacts on landscape character and views.
- Changes to land cover and new planting across the draft Order Limits.
- Demand responsive lighting only, however the nature of which is currently not determined, and which may therefore result in impacts on landscape character.

13.6.3.2 The Proposed Development is expected to be in existence and operated and maintained for a duration of 40 years.

13.6.4 Decommissioning

13.6.4.1 Landscape and visual impacts arising from decommissioning of the Proposed Development are considered to be no greater than those identified during the

construction phase and are therefore assessed as construction effects as a reasonable worst-case scenario.

13.6.4.2 The Proposed Development is assumed to be substantially reversible leaving little sign of its existence once decommissioned.

13.7 Design, mitigation and enhancement measures

13.7.1.1 The LVIA will be key to achieving the criteria for good design set out in section 4.7 of the NPS EN-1 and this has been a key consideration from the outset. The Proposed Development is being designed with regard to a design vision and a set of design principles, informed by the LVIA. These are currently under development and will be summarised in the PEIR/ES.

13.7.1.2 The most effective mitigation for adverse landscape and visual effects is to avoid impacts at source as part of the design process, for example through the siting of infrastructure. This has been considered as part of the optioneering process. Where effects cannot be avoided, the hierarchy is that impacts should be minimised, rectified, reduced or finally offset. All landscape mitigation is therefore considered embedded and primary. This will be supported by a comprehensive reinstatement strategy and appropriate management measures for landscape and ecology. Beneficial effects will be maximised wherever practicable, for example through the design of multi-functional green infrastructure which provides a range of ecosystem services to deliver aspects of Biodiversity Net Gain.

13.7.1.3 Mitigation principles to avoid or minimise potential construction effects will focus on reducing the duration and footprint of construction activity, locating development in the least prominent positions and wherever practicable maximising the distance from nearby visual receptors. Other measures which will be considered include positioning the works to make use of existing natural features such as landform and vegetation to screen views.

13.7.1.4 The Proposed Development will be designed to avoid or minimise the loss of existing landscape features of value, such as trees, woodland, and hedgerows wherever practicable. In particular, all mature trees, woodland blocks and hedgerow boundaries within the proposed areas for solar panels will be retained. Any loss will be mitigated with replacement planting as close to the location, type and character of the existing vegetation to reduce effects resulting from such losses. The design will also identify opportunities for landscape restoration and enhancement, by introducing planting which repairs or reinforces existing vegetation patterns and contributes to biodiversity net gain.

13.7.1.5 Loss of ancient woodland will be avoided, wherever practicable in line with section 5.4.32 of NPS EN-1, which states that "*the Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of ancient or veteran trees found outside ancient woodland, unless there are wholly exceptional reasons for the development, and a suitable compensation strategy exists*".

13.7.1.6 Landscape mitigation planting is proposed to reinstate vegetation lost as a consequence of construction and to alleviate landscape and visual effects of the Proposed Development. It will take time for this planting to establish a provide its intended function. Therefore, landscape and visual effects will be assessed at year 1 and year 15 or operation. Effects which persist at year 15 of operation will be considered residual effects. Opportunities for advanced planting will be sought where this is practicable as this would allow for early establishment of mitigation.

13.7.1.7 The LVIA is informing the iterative design process of the Proposed Development, specifically with regards to the siting, layout and colour tones of the solar panels and associated structures to reduce their visibility and perceived scale and mass within the landscape, as well as identifying mitigation to reduce landscape and visual effects. The LVIA is also informing the identification of opportunities for new green infrastructure such as new habitats and permissive recreational routes.

13.7.1.8 The Applicant will set out the design vision, objectives, functions, principles and inter-relationships between different environmental elements within supporting documents of the DCO. Information will be included to explain how these elements will be designed to integrate with the wider nature network, through the detailed design and how they will be implemented, maintained and monitored. This will include consideration of siting relative to existing landscape character, landform and vegetation, as set out in paragraph 4.7.6 of NPS EN-1. The type, extent and functions of the proposed mitigation will be illustrated set out on plans which will accompany the DCO application.

13.7.1.9 The relevant landscape and visual mitigation and enhancements, and how the LVIA has informed the design process to minimise negative effects, will be summarised in the PEIR and ES.

13.7.2 Design principles

13.7.2.1 The Proposed Development is being designed with regard to a set of design principles. Relevant to the LVIA these include:

- All mature trees, woodland blocks and hedgerow boundaries within the proposed areas for solar panels will be retained.
- Impacts on public rights of way will be minimised through the use of buffer zones and planting
- The Proposed Development will be integrated into the wider landscape setting, with particular consideration to the Lake District National Park and World Heritage Site.
- Existing landscape structures will be enhanced, such as woodland blocks and hedges with additional planting to provide instant screening.
- A reasonable buffer between residential dwellings and the nearest panels will be maintained.
- Green infrastructure along Lostrigg Beck will be enhanced which would support biodiversity net gain

13.7.3 Embedded measures

13.7.3.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, which are an inherent part of the design and do not require additional action to be taken.

13.7.3.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to LVIA already committed to include:

- 15m buffer from panels to ancient and veteran trees
- 15m buffer from panels to woodland
- Deer fencing 2m in height
- Panel height 3m
- An appropriate buffer will be maintained between properties and construction areas
- Buffers for all other trees (non- ancient / veteran) and hedgerows to be determined by Root Protection Area (RPA), but at least 5m buffer for trees with potential for bats, and a minimum 8m buffer between solar panels and hedgerows (reduced to 5m from panels for internal hedges)
- Any access tracks, cable routing and fencing will be located to pass through existing gates and gaps in hedgerows where feasible.
- The new / replacement pylons will be replaced like for like and will be no taller than existing. The location will be in close proximity to the existing if replaced.
- Existing hedgerows in poor condition / gappy will be reinforced with planting / management where feasible
- No significant lighting proposed, demand responsive motion sense lights only, using passive infra-red (PIR) technology, designed and installed in a manner which minimises impact.
- Large areas of panels will be avoided where feasible, broken up by hedgerow planting along historic field boundaries to maximise landscape integration.
- Deer fencing to be offset from PRoW by a minimum of 5m.

13.7.3.3 Further embedded measures are likely to include:

- The route of underground cabling will be designed carefully to avoid impacts on valued landscape features and habitats.

13.7.4 Further mitigation

13.7.4.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for the LVIA will be defined through the PEIR/ES once the level of significance of effects is known. However, further mitigation is unlikely to be proposed as all mitigation will be embedded into the design.

13.7.5 Management plans

13.7.5.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to this LVIA including:

- Outline Construction Environmental Management Plan (oCEMP)
- Outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- Outline Decommissioning Environmental Management Plan (oDEMP)
- Outline Construction Traffic Management Plan
- Outline Soil Resource Management Plan

13.7.5.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

13.7.5.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

13.8 Likely significant effects

13.8.1 Construction

13.8.1.1 Effects during construction will be temporary and adverse.

Effects on landscape character

13.8.1.2 Effects on landscape features within the draft Order Limits and landscape character during the construction phase could result from the presence of machinery and activity.

13.8.1.3 The West Cumbria Coastal Plain NCA (NCA 7) would receive changes to its character across a small proportion of the overall character area as a result of the disturbance caused by the construction of the Proposed Development. The construction of the Proposed Development is considered to be temporary. As the West Cumbria Coastal Plain NCA (NCA 7) has the potential to be significantly affected during the construction, the assessment of effect on this NCA is therefore **scoped in.**

13.8.1.4 The Ridge and Valley LCT (5a) would receive changes to its character across large parts of the area due to the construction activities. The construction of the Proposed Development is considered to be temporary. As the Ridge and Valley LCT has the potential to be significantly affected during the construction, the assessment of effect on this LCT is therefore **scoped in.**

13.8.1.5 The Rolling Lowland LCT (5c) and Lowland (D) and the Urban Fringe LCT (5d) would receive direct changes to only a very small proportion of the total extent of the area. However, the construction of the Proposed Development has the potential to indirectly affect the setting of surrounding landscapes. The effects of the construction of the Proposed Development is considered to be temporary. Although only a very small part of the respective LCTs would be directly affected by the construction activities of the Proposed Development, the indirect effects on its setting have the potential to be significant. Therefore, the assessment of effect on the Rolling Lowland LCT (5c) and the Urban Fringe LCT (5d) as a result of the construction activities are **scoped in.**

13.8.1.6 Within the study area the setting of the Broad Valleys LCT (8b) and Upland Valley (H), Open Moorland LCT (9a), Ridges LCT (9d) and the Rolling Fringe LCT (12b) and Upland Limestone Farmland (I) could potentially be indirectly affected by the construction of the Proposed Development. The effects of the construction of the Proposed Development is considered to be temporary. Therefore, the assessment the assessment of all LCTs within the 3km study area as a result of the construction works are **scoped in.**

Effects on views and visual amenity

13.8.1.7 Effects on views and visual amenity during the construction phase could result from the presence of machinery and activity.

13.8.1.8 Residential and recreational receptors within the study area could experience extensive changes to the character and composition of the view as a result of the construction activities. Some residential and recreational receptors would view the works close up, whilst other residential and recreational receptors would experience the works in the distance. However, for both distant and nearby receptors the construction works associated with the Proposed Development could change large parts of the landscape within the view with the works becoming a dominant feature. Therefore, the visual amenity of residential and recreational receptors has the potential to be significantly affected by these works. The assessment of effect on residential and recreational receptors as a result of the construction works are therefore **scoped in.**

13.8.1.9 Transport receptors are generally less sensitive to changes in their view as their interest or appreciation of the view is secondary to the activity they are doing. Furthermore, their period of exposure to the view is limited due to the speed of travel. However, due to the rural nature of their view and in some locations with views towards the Lake District National Park the visual amenity of transport receptors has the potential to be significantly affected by the construction activities. The assessment of effect on transport receptors is therefore **scoped in.**

13.8.2 Operation

13.8.2.1 Effects during operation will be long term. The direction of effects is likely to range between adverse and beneficial.

Effects on landscape character

13.8.2.2 Effects on landscape features within the draft Order Limits will arise if any vegetation requires removal to accommodate access tracks or other development, as well as potential beneficial effects as a result of new planting associated with landscape enhancements within and around the draft Order Limits.

13.8.2.3 Effects on landscape character during the operational phase could result from the presence of solar panels and associated structures.

13.8.2.4 The West Cumbria Coastal Plain NCA (NCA 7) would receive changes to its character across a small proportion of the overall character area as the Proposed Development would change the land cover from rural pastures and some arable fields to solar panels. The character of the land would become more industrialised. The Proposed Development is considered to be reversible in the longer-term. As the West Cumbria Coastal Plain NCA (NCA 7) has the potential to be significantly affected, the assessment of effect on this NCA is therefore **scoped in.**

13.8.2.5 The Ridge and Valley LCT (5a) would receive changes to its character across large parts of the area. However, it is expected that distinctive landscape features such as prominent trees, historic hedge lines and woodland blocks can be retained as part of the Proposed Development. Also, the Proposed Development is considered to be reversible in the longer-term. As the Ridge and Valley LCT has the potential to be significantly affected, the assessment of effect on this LCT is therefore **scoped in.**

13.8.2.6 The Rolling Lowland LCT (5c) and Lowland (D) and the Urban Fringe LCT (5d) would receive direct changes to only a very small proportion of the total extent of the area. However, the Proposed Development has the potential to indirectly affect the setting of surrounding landscapes. It is expected that distinctive landscape features such as prominent trees, historic hedge lines and woodland blocks can be retained as part of the Proposed Development. The Proposed Development is considered to be reversible in the longer-term. Although only a very small part of the respective LCTs would be directly affected by the Proposed Development, the indirect effects on its setting have the potential to be significant. Therefore, the assessment of effect on the Rolling Lowland LCT (5c) and the Urban Fringe LCT (5d) are **scoped in.**

13.8.2.7 Within the study area the setting of the Broad Valleys LCT (8b) and Upland Valley (H), Open Moorland LCT (9a), Ridges LCT (9d) and the Rolling Fringe LCT (12b) and Upland Limestone Farmland (I) could potentially be indirectly affected the Proposed Development. The Proposed Development is considered to be reversible in the longer-term. Therefore, the assessment the assessment of all LCTs within the 3km study area are **scoped in.**

Effects on views and visual amenity

13.8.2.8 Effects on views and visual amenity during the operational phase could result from the presence of solar panels and associated structures.

13.8.2.9 Residential and recreational receptors within the study area could experience extensive changes to the character and composition of the view as their view of rural countryside would become more industrialised. Some residential and recreational receptors would view the proposed solar panels close up, whilst other residential and recreational receptors would experience the panels in the distance. For both the Proposed Development could change large parts of the landscape within the view with the panels becoming a dominant feature. Therefore, the visual amenity of residential and recreational receptors has the potential to be significantly affected. The assessment of effect on residential and recreational receptors are therefore **scoped in.**

13.8.2.10 Transport receptors are generally less sensitive to changes in their view as their interest or appreciation of the view is secondary to the activity they are doing. Furthermore, their period of exposure to the view is limited due to the speed of travel. However, due to the rural nature of their view and in some locations views towards the Lake District National Park the visual amenity of transport receptors has the potential to be significantly affected. The assessment of effect on transport receptors is therefore **scoped in.**

13.8.3 Decommissioning

13.8.3.1 Effects during decommissioning will be similar and not greater than those during construction, and are not repeated here.

13.9 Proposed assessment methodology

13.9.1 Overview

13.9.1.1 The methodology for the LVIA involves the following stages:

- Review published landscape character assessments, studies, relevant supporting evidence base documents, aerial photography and mapping, and undertake fieldwork to define the baseline and to define the extent of the study area within which there is potential for landscape and visual effects.
- Define the landscape and visual receptors and describe the landscape and visual baseline.
- Review the design to embed mitigation measures into the Proposed Development to avoid or minimise adverse landscape and visual effects and maximise opportunities for landscape integration and enhancement.
- Determine the sensitivity (nature of the receptor) of landscape and visual receptors, by considering the value attached to the landscape or views and susceptibility to change of the receptor.
- Assess the magnitude of impact (nature of effect) of the Proposed Development in relation to size or scale, geographical extent, duration and reversibility.

- Assess the significance of effect by considering the relationship between the sensitivity of the receptor and the magnitude of impact and determine which effects are significant in EIA terms.

13.9.2 Assessment scenarios

13.9.2.1 The assessment of the likely landscape and visual effects of the Proposed Development is undertaken for the following scenarios:

- Current baseline (winter and summer) – reflective of the conditions which exist at the time of gathering baseline environmental data and undertaking the LVIA.
- Future baseline (winter and summer) – reflective of the conditions that will be experienced in the future, immediately prior to construction of the Proposed Development.
- The peak of construction activity, in winter.
- Year 1 of operation, in winter, to reflect a worst-case assessment scenario.
- Year 15 of operation, in summer, to reflect the entirety of the Proposed Development in operation, when proposed vegetation has matured or achieved its design intention.
- The peak of decommissioning activity, in winter.

13.9.3 Assessment of landscape effects

13.9.3.1 The assessment of landscape effects will address the effects of the Proposed Development on the landscape as a resource in its own right. Judging landscape effects requires consideration of the nature of the receptor (sensitivity) and the nature of the change (magnitude of impact).

13.9.4 Sensitivity of landscape receptors

13.9.4.1 Paragraph 5.39 of GLVIA3 states that *"landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape".*

13.9.4.2 Judging landscape sensitivity will thus be a two-part process of:

- Value attached to the landscape – relates to the existing landscape and this will be determined at the baseline stage in line with paragraph 5.19 of GLVIA3, which states that "as part of the baseline description the value of the potentially affected landscape should be established"; and
- Susceptibility to change – which is considered in relation to the Proposed Development.

13.9.5 Value attached to the landscape

13.9.5.1 Landscape Institute Technical Guidance Note (TGN) 02/21: Assessing landscape value outside national designations (Landscape Institute, 2021) defines landscape

value as "*the relative value or importance attached to different landscapes by society on account of their landscape qualities*" [225].

13.9.5.2 For assessing landscape value outside national designations, TGN 02/21 is now the primary source of guidance. The approach to assessing the value attached to the landscape will follow a three-stage process :

- Stage 1: identify if the landscape is covered by any landscape designations;
- Stage 2: consider each of the factors listed in Table 13-10, which have been developed with reference to Table 1 of TGN 02/21 and are pertinent and most important to understanding its value; and
- Stage 3: make an assessment the value attached to the landscape and assign value based on a five-point scale, clearly articulating the reasons for these judgements.

13.9.5.3 An overall conclusion will be drawn on the value attached to the landscape for each landscape receptor considering the overall weight of evidence.

Table 13-10 Establishing the value attached to the landscape

Stage 1 – Landscape designations	**Stage 2 - Define landscape value factors with reference to TGN 02/21**	**Criteria**	**Typical Description**
Landscape with statutory status or national policy protection: National Park, National Landscape, or World Heritage Site.	Natural heritage - Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape. Cultural heritage - Landscape with clear evidence of archaeological, historical or cultural interest which contribute positively to the landscape. Landscape condition - Landscape which is in a good physical state both with regard to individual elements and overall landscape structure. Associations - Landscape which is connected with notable	Very high	A designated landscape with statutory status (National Park or AONB) (referred to as a national landscape). Valued landscape in the context of NPPF paragraph 180 (a)
Local landscape designation, such as Special Landscape Area or Area of Great Landscape Value, supported by policy and a detailed evidence base.		High	A locally designated landscape supported by a detailed evidence base or with other strong indicators of value, which may include other relevant designations such as ancient woodland or conservation areas, with identified quality in the development plan or evidence base. May be considered valued landscape in the context of NPPF paragraph 180(a) with strong supporting evidence.
No relevant designations.		Medium	Unlikely to be a designated for landscape quality but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level.

Stage 1 – Landscape designations	Stage 2 - Define landscape value factors with reference to TGN 02/21	Criteria	Typical Description
	people, events and the arts. Distinctiveness - Landscape that has a strong sense of identity. Recreational - Landscape offering recreational opportunities where experience of landscape is important. Perceptual (Scenic) - Landscape that appeals to the senses, primarily the visual sense. Perceptual (wildness and tranquillity) - Landscape with a strong perceptual value notably wildness, tranquillity and/or dark skies Functional - Landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape.	Low	Not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base.
		Very low	A landscape dominated by industry or infrastructure or which is damaged or degraded landscape, not designated for landscape quality and not likely to exhibit indicators of value which are identified in the development plan or evidence base.

13.9.6 Valued landscape

13.9.6.1 The principle of "valued landscape" in England is supported by the NPPF 2023 (Chapter 15). Paragraph 180 requires that planning policies and decisions should contribute to and enhance the natural and local environment by, inter alia, (a) *"protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)"*.

13.9.6.2 According to paragraph A4.2.11 of TGN 02/21, a 'valued landscape' is an area identified as having sufficient landscape qualities to elevate it above other more everyday landscapes. There is therefore a high bar for an area to be considered valued landscape in the context of the NPPF.

13.9.6.3 Paragraph A4.2.5 of TGN 02/21 states that, *"where a landscape has a statutory status, such as a National Park or AONB, it is self-evident that it is a valued landscape".* Therefore, where such landscapes are present within the study area, these will be attributed very high value and are recognised as valued landscapes in the context of the NPPF.

13.9.6.4 A different approach will be taken to determine whether landscapes outside of nationally designated landscapes can be considered valued landscape in the context of the NPPF. Paragraph A4.2.6 of TGN 02/21 states that the interpretation of 'identified quality in the development plan' is not clear and that there are two fundamentally different interpretations that have been adopted by inspectors, which are considered below in more detail:

1. It means non-statutory, locally designated landscapes;
2. It means any landscape where there is evidence to justify the identification of a 'valued landscape'. Local designation alone may not be sufficient evidence.

13.9.6.5 For a landscape without statutory status to be considered valued landscape in the context of the NPPF it must be supported by strong evidence. The assessment will therefore consider each of the criteria set out in Table 13-10, references in Local Plan policy and evidence base, including whether there are existing local landscape designations in forming an overall judgement on value. Landscapes with high value may also be considered valued landscapes in the context of the NPPF.

13.9.7 Susceptibility of landscape receptors to change

13.9.7.1 GLVIA3 paragraph 5.40 defines the susceptibility to change of landscape receptors as: *"the ability of the landscape receptor (whether it be overall character or condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the Proposed Development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies"* (paragraph 5.40).

13.9.7.2 The features and characteristics which are more or less susceptible to the type of changes proposed will be set out for each LCA. The narrative will provide a clear explanation based upon analysis of the landscape receptor and the extent to which it is able to accommodate the type of change arising from the specific proposal.

13.9.7.3 Table 13-11 sets out examples of characteristics and features of landscapes which may indicate higher and lower susceptibility in respect of solar farm development.

Table 13-11 Considerations for landscape susceptibility

Landscape features or characteristics	Indicators of higher landscape susceptibility	Indicators of lower landscape susceptibility
Field pattern, scale and enclosure	Small scale fields. Complex or irregular field pattern. Ancient field patterns. Field boundaries formed by low fences or walls or hedges with few hedgerow trees.	Large scale fields. Simple, regular or rectilinear field pattern. Uniform field pattern. High field boundaries.
Landform	Steep topography. Exposed hillsides. Irregular or complex landform. Narrow valleys and ridges. Distinctive landform features.	Flat landscapes. Expansive lowland landscapes. Uniform landform. Landscapes with no or minimal distinctive landform features.

Landscape features or characteristics	Indicators of higher landscape susceptibility	Indicators of lower landscape susceptibility
Land cover	Pastures, particularly where grazing forms key characteristic of the landscape. Significant woodland cover. Parkland or designed landscapes. Natural or semi-natural land cover, particularly where conservation or restoration is a priority.	Large-scale arable land, particularly monoculture or with evidence of intensive farming practices.
Tranquillity/ human influences	Absence of human influences / natural landscapes. Infrequent built form. Overarching rural character. Remote, tranquil, spiritual or peaceful landscape. Sense of wilderness.	Major infrastructure (transport, utilities, industry). Large concentrations of residential, commercial, industrial development. Character affected by urban development. Noisy, settled landscapes. Modern and developed landscapes with signs of human activity.
Condition / intactness	Intact landscapes with natural or historic features in good condition.	Degraded landscapes (likely to have evidence of human influences / modern intensive farming practices). Degraded / intermittent boundary treatments.
Historic features and cultural heritage	Ancient / historic field patterns. Important, distinctive or remnant features of the landscape. Cultural associations with a particular landscape.	Modern / developed landscape with limited historic features.
Scenic quality and character	High scenic quality. Strong sense of place.	Low scenic quality. Weak sense of place.
Intervisibility	Open landscapes with exposed or far-reaching views. Sparse woodland and vegetative cover. Field systems defined by fences or managed low boundaries. Strong intervisibility with sensitive landscapes.	Confined or enclosed landscape with few inward or outward views. Limited invisibility with sensitive landscapes, key views, or landmarks. Intact, overgrown or tall vegetated boundaries with high proportion of hedgerow trees. High proportion of woodland blocks, copses, connected woodlands and belts.

13.9.7.4 The susceptibility to change for each landscape receptor will be categorised with reference to the criteria in Table 13-12below.

Table 13-12 Landscape susceptibility criteria

Landscape susceptibility	Typical description
Very high	The type of change arising from the specific proposal are very likely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
High	The type of change arising from the specific proposal are likely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Medium	The type of change arising from the specific proposal may lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Low	The type of change arising from the specific proposal are unlikely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Very low	The type of change arising from the specific proposal are very unlikely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.

13.9.8 Combining judgements to define landscape sensitivity

13.9.8.1 The sensitivity of each LCA has been defined by combining professional judgements on the value attached to the landscape and its susceptibility to change and is supported by clear reasoning. Reference has been made to the criteria set out in Table 13-13 below.

Table 13-13 Sensitivity of landscape receptors criteria

Sensitivity	Typical description
Very high	Landscapes with statutory status or national policy protection with very limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
High	Landscapes which may be locally designated or otherwise supported by a detailed evidence base or landscape with other strong indicators of value with limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Medium	Landscapes which are unlikely to be a designated for landscape quality but may exhibit some indicators of value and which may have some ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Low	Not designated for landscape quality and likely to exhibit few indicators of value and likely to accommodate the type of change no or limited undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
Very low	Landscapes of very low value able to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.

13.9.9 Magnitude of landscape impacts

13.9.9.1 Paragraph 3.28 of GLVIA3 notes that the magnitude is informed by combining considerations relating to the "*scale, extent and duration*" of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

13.9.9.2 In summarising the magnitude of landscape impacts, reference will be made to the following:

- size or scale - the degree to which key characteristics or features identified in the baseline would change Judgements on size or scale of change depend on the extent of existing landscape elements that would be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape. It is also influenced by the degree to which aesthetic or perceptual aspects of the landscape are altered through removal or addition of components such as solar panels, buildings, roads, paths and vegetation; and whether the effect changes the key characteristics of the landscape which are critical to its distinctive character;
- geographical extent – the area over which the change would occur. Foror example, whether the effects of the Proposed Development are perceived over a large or very localised area.;
- duration – the time over which the change would occur , set out on the following scale: (short term (0-5 years), medium term (5-15 years), or long term (over 15 years); and
- Reversibility is related to whether the change can be reversed and is reported as reversible, partially reversible or permanent, e.g. effects arising from presence of construction traffic will cease at the end of construction and therefore is considered to be reversible, whereas effects arising from presence of new built development could be partially reversible or permanent.

13.9.9.3 The criteria set out in Table 13-14 will be referred to in determining the magnitude of landscape impacts.

Table 13-14 Magnitude of landscape impacts criteria

Magnitude of impact	Typical description
Very high	Substantial changes to key characteristics across most of the area or to unique and distinctive features at a local level. May be longer term impacts, and are more likely to be permanent than reversible
High	Changes to the character of the landscape across large parts of the area or to distinctive features at a local level. May be longer term impacts, permanent or reversible
Medium	Changes to the character of the landscape across parts of the area or to some existing features at a local level. May be medium term impacts, permanent or reversible.

Magnitude of impact	Typical description
Low	Slight change to landscape character or landscape features across a small area. May be short to medium term impacts, and are more likely to be reversible than [permanent.
Very low	Barely perceptible change to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible.

13.9.9.4 There may be cases where there will be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

13.9.10 Assessment of visual effects

13.9.10.1 The assessment of visual effects considers the effects of the Proposed Development on the views available to people and their visual amenity. Judging visual effects requires consideration of the nature of the receptor (sensitivity) and the nature of the impact (magnitude). The criteria against which judgements are made are provided below.

13.9.11 Sensitivity of visual receptors

13.9.11.1 Paragraph 6.31 of GLVIA3 states that "*each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, should be assessed in terms of both their susceptibility to change in views and visual amenity and also the value attached to particular views.*" The sensitivity of visual receptors results from a combination of parameters, such as:

- The activity/occupation/ pastime of the receptors at particular locations;
- The extent to which their attention or interest may be focused on the views; and
- The visual amenity they experience.

13.9.11.2 Consideration will also be given to the:

- Location, focus and orientation;
- Features or characteristics of value within the view;
- Principal or secondary interests;
- Static or kinetic nature of views;
- Duration of the view.

13.9.12 Value attached to views

13.9.12.1 A three-stage process will be used to determine the value attached to views. This relates to the features and characteristics of the baseline landscape within the view and other indicators of value, for example reference in policy, guide books, literature or art.

- **Stage 1**: identify if the view or the landscape within the view is covered by any relevant policy or designations and note features and characteristics of value with reference to the landscape baseline;
- **Stage 2**: identify if the view is identified on maps, is likely to be from a popular visitor location or has historical or cultural importance or associations; and
- **Stage 3:** Determine the value attached to the view with reference to the criteria provided in Table 13-15 using the evidence from stages 1 and 2.

Table 13-15 Value attached to views criteria

Value	Typical description
Very high	Views within or across a nationally or internationally designated landscapes and/or specific views designated in national or regional policy. Views are likely to have few or no detracting features and which may also have strong cultural associations supported by evidence, which could include links to historical events or people, representation in art or literature, for example.
High	Views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base. Views are likely to have few or no detracting features and may also have some cultural associations supported by strong evidence.
Medium	Views across landscapes which are unlikely to be designated but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level. Views may have some detracting features and cultural associations supported by evidence.
Low	Views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base. Views are likely to have some detracting features and lack cultural associations supported by evidence.
Very low	View across landscapes which are neither designated, nor identified in the development plan or evidence base, and without cultural associations. The landscape in the view is in poor condition or notably detracts from the experience of the view.

13.9.13 Susceptibility of visual receptors to change

13.9.13.1 The sensitivity of visual receptors is also dependent upon their susceptibility to changes in views and the visual amenity they experience.

13.9.13.2 Paragraph 6.32 of GLVIA3 explains that "*the susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:*

- *The occupation or activity of people experiencing the view at particular locations; and*
- *The extent to which their attention or interest may therefore be focussed on the views and the visual amenity they experience at particular locations."*

13.9.13.3 GLVIA3 notes that visual receptors "*most susceptible to change*", include residents and visitors engaged in outdoor recreation "*whose attention or interest is likely to be focused on the landscape and on particular views*" (para 6.33).

13.9.13.4 Table 13-16 sets out the criteria referred to in determining the susceptibility of visual receptors to the Proposed Development.

Table 13-16 Susceptibility of visual receptors criteria

Susceptibility	Typical description
Very high	Visitors to nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are fundamental to the experience. People engaged in specific activities for enjoyment of dark skies.
High	Residents at home. Visitors to tourist hotspots, heritage assets or other attractions outside of nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are important to the experience. People engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views, for example those using promoted walking and cycling routes. People travelling along promoted scenic routes.
Medium	People engaged in outdoor recreation or travelling along public rights of way or local roads, which are not promoted routes but where an appreciation of the surrounding landscape are relevant to the experience. People working outdoors.
Low	People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape People travelling on major road, rail or other transport routes which are not recognised as scenic routes.
Very low	People working indoors.

13.9.14 Summarising the sensitivity of visual receptors

13.9.14.1 The sensitivity of visual receptors is based on professional judgement and will be informed by the criteria in Table 13-17, considering the value attached to views and susceptibility of visual receptors to the changes proposed.

Table 13-17 Sensitivity of visual receptors criteria

Criteria	Description
Very high	Activity where views are fundamental to the experience and are related to landscapes with national or international designation and with few or no detracting features and which may also have strong cultural associations supported by evidence.
High	Activity resulting in a particular interest or appreciation of the view and/or views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base with few or no detracting features and may also have some cultural associations supported by strong evidence.
Medium	Activity resulting in a general interest or appreciation of the and/or a view, likely to exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level.
Low	Activity where interest or appreciation of the view is secondary to the activity or the period of exposure to the view is limited, and/or views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value and likely to have some detracting features and lack cultural associations supported by evidence.

Very low	Activity where interest or appreciation of the view is inconsequential to their activity, and/or across landscapes which are neither designated, nor recognised in policy, and without cultural associations or is in poor condition or notably detracts from the experience of the view.

13.9.15 Magnitude of visual impacts

13.9.15.1 The magnitude of visual impacts relates to the extent to which the baseline view would change as a result of the Proposed Development. This assessment has been made with reference to fieldwork observations, photographs and photomontages where relevant from the representative viewpoints identified.

13.9.15.2 Paragraph 3.28 of GLVIA3 notes that magnitude is informed by combining considerations relating to the "*scale, extent and duration*" of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

13.9.15.3 Reference will be made to the following in summarising the magnitude of visual impacts:

- Size and scale – loss of existing features or addition and integration of new features and the time over which it will be experienced and whether views will be full, partial or glimpsed.
- Geographical extent – the angle of view in relation to the main activity of the receptor, the distance of the viewpoint from the proposed development and the extent of the area over which the changes would be visible.
- Duration and reversibility – the time over which the change would occur, set out on the following scale: short term (0-5 years), medium term (5-15 years), or long term (over 15 years).

13.9.16 Combining judgements to define magnitude of visual impact

13.9.16.1 The magnitude of visual impact will be defined by combining judgements on size or scale, geographical extent, duration and reversibility, with reference to Table 13-18**,** based on guidance from GLVIA3.

Table 13-18 Magnitude of visual impacts criteria

Magnitude of impact	Typical description
Very high	The Proposed Development will result in extensive changes to the character and composition and will become the dominant feature of the landscape within the view. There may be longer term impacts, permanent or reversible.
High	The Proposed Development will change the character and composition of large parts of the landscape within the view. There may be longer term impacts, permanent or reversible.
Medium	The Proposed Development will change the character and composition of discrete parts of the landscape within the view. There may be medium term impacts, permanent or reversible.

Low	The Proposed Development will cause small changes to the character and composition of the landscape within the view. There may be short to medium term impacts, permanent or reversible.
Very low	The Proposed Development will cause barely perceptible changes in the character and composition of the landscape within view. May be short term impacts, permanent or reversible.

13.9.16.2 There may be cases where there will be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

13.9.17 Significance of landscape and visual effects

13.9.17.1 The approach to determining the significance of landscape effects and visual effects and whether these effects are considered significant in EIA terms will be the same.

13.9.17.2 Judgements on the sensitivity of each receptor and the magnitude of impact will be combined to establish the significance of effect and whether effects are considered significant in EIA terms. There are important distinctions between these two terms:

- Significance of effect relates to the level recorded for any effect, with reference to the matrix set out in Table 13-19 below.
- Significant effects are those which are considered most important in the decision-making process. An effect in this LVIA is considered significant in EIA terms if it is of major or moderate significance. All other effects will be categorised as not significant in EIA terms.

13.9.17.3 Table 13-19 will be used to guide judgements on the relationship between the sensitivity of a visual receptor, the magnitude of impact and the resulting significance of effect. Where conclusions differ from this guide, a reasoned explanation will be provided in the assessment text.

Table 13-19 Significance of landscape and visual effects

		Magnitude of impact				
		Very high	**High**	**Medium**	**Low**	**Very high**
Sensitivity	**Very high**	Major	Major	Major or Moderate	Moderate	Moderate or Minor
	High	Major	Major or Moderate	Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Moderate	Moderate or Minor	Minor	Minor or Negligible
	Low	Moderate	Moderate or Minor	Minor	Minor or Negligible	Negligible
	Very low	Moderate or Minor	Minor	Minor or Negligible	Negligible	Negligible

13.9.17.4 The identification of the likely significant effects on landscape and visual receptors will rely on detailed analysis and the professional judgement of competent experts, and consultation with stakeholders. Table 13-20 defines what the significance of effect terms mean.

Table 13-20 Descriptions of landscape and visual effects

Significance of effect	Landscape effects	Visual effects
Major beneficial	Effects that result in a considerable improvement of the existing landscape resource. Valued characteristic features would be restored or reintroduced as part of the development.	Effects that result in a substantial improvement in the existing view.
Moderate beneficial	Effects that result in a partial improvement of the existing landscape resource. Valued characteristic features would be largely restored or reintroduced.	Effects that result in a noticeable improvement in the existing view.
Minor beneficial	Effects that result in a slight improvement of the existing landscape resource. Characteristic features would be partially restored.	Effects that result in a limited improvement in the existing view.
Negligible beneficial	Effects that result in a very slight improvement to the existing landscape resource, not uncharacteristic within the receiving landscape.	Effects that result in a barely perceptible improvement in the existing view.
Neutral	Effects which are a balance between adverse and beneficial effects and are neutral in their consequences for the landscape.	Effects that are a balance between adverse and beneficial effects and are neutral in their consequences for the view of visual receptors.
Negligible adverse	Effects that result in a very slight deterioration to the existing landscape resource, not uncharacteristic within the receiving landscape.	Effects that result in a barely perceptible deterioration in the existing view.
Minor adverse	Effects that result in a slight deterioration of the existing landscape resource. Characteristic features would be partially lost.	Effects that result in a limited deterioration in the existing view.
Moderate adverse	Effects that result in a partial deterioration of the existing landscape resource. Valued characteristic features would be largely lost.	Effects that result in a noticeable deterioration in the existing view.
Major adverse	Effects that result in a considerable deterioration of the existing landscape resource. Valued characteristic features would be wholly lost.	Effects that result in a substantial deterioration in the existing view.

13.9.17.5 Whether effects are adverse, beneficial or neutral will be determined by considering the way in which the changes are likely to affect the baseline.

13.9.17.6 Adverse effects are likely to occur where the Proposed Development introduces new elements or changes which are discordant or intrusive resulting in a

deterioration to existing character or valued features of the landscape or of views and visual amenity.

13.9.17.7 Beneficial effects are likely to occur where the Proposed Development enhances the character of the landscape or existing views.

13.9.17.8 Paragraphs 5.37 and 6.29 of GLVIA3 state that is possible for effects to be neutral in their consequences for landscape and for visual receptors. Where a judgement of neutral effects has been reached, reference will be made to the contribution of the Proposed Development to the baseline and acknowledging the positive and negative aspects which have been considered.

13.9.17.9 Where the assessment has concluded that there will be no impacts on a receptor, this will be reported as no effect. This may, for example, be a consequence of changes to the design which has avoided impacts on receptors identified at the scoping stage.

13.9.17.10 Residual effects are those which remain even with embedded or primary mitigation at construction and year 15 of existence and operation and which cannot be further mitigated by design or other measures in this time period.

13.10 Assumptions, limitations and uncertainties

13.10.1.1 This section sets out the assumptions which have been made and the limitations which inform the scope of the LVIA.

- All fieldwork will be undertaken from publicly accessible locations. Professional judgement will be used to assess residents' views, aided by aerial photography and fieldwork observations.
- Agreement will be sought on viewpoints through consultation with Cumberland Council, and verified views and photomontages will be prepared from a select number of the agreed viewpoints.
- For the construction phase assessment, the assumptions are that construction activity will be undertaken across the draft Order Limits at the same time and during winter. This assumes that existing deciduous vegetation is not in leaf, thereby representing a worst case assessment scenario.
- For the year 15 operation, the assumption is that all new planting would have successfully established, having increased in height by 4.5 metres since the year 1 assessment (i.e. 30cm of growth per year).
- For decommissioning, the assumptions are the Proposed Development is no longer operational, and the solar panels and associated structures and equipment are being removed in a manner similar to the construction phase, requiring machinery and localised excavation. The proposed green infrastructure would remain. Therefore, as effects on landscape and visual receptors will be

the similar as, and not greater than, the construction phase, it is proposed that a separate decommissioning assessment is not included within the LVIA.

- Uncertainties at this stage are the layout, siting and heights of the solar panels, sub-stations and associated structures as well as possible replacement pylons. The LVIA study area, landscape and visual receptors will be reviewed accordingly in relation to the heights of these features, informed by ZTVs. Where any uncertainties remain with regards to panel orientation and the height, scale and design of proposed structures, the assessment will be based on the relevant worst-case parameters and will be set out in the LVIA.
- Structures such as the communication mast and the possible replacement pylons would be experienced as minor changes to existing structures and minor new elements in the context of existing electrical infrastructure in the local landscape, They are therefore not likely to give rise to significant effects. For that reason, it has not been included for the initial modelling of the ZTV used for scoping.
- It is assumed that existing vegetation, such as woodland blocks and hedgerows are largely retained with only minor areas of vegetation lost for create new or wider field entrances for construction and maintenance access .
- A lighting assessment is scoped out of the assessment, as any lighting during the construction and decommissioning phase would be temporary and designed by angling away from visual receptors and operated using timer and motion control to minimise light spill. During the operational phase there will be no continuous lighting. All lighting during operation will be for access and safety using shielded, low intensity down lighting and motion sensors or infrared security lighting around key electrical infrastructure, using motion sensors.

13.11 Summary

Table 13-21 Landscape and visual scoping summary

Aspect	Construction and decommissioning	Operation	Any required surveys?
Landscape character receptors (NCA and LCAs), refer to Table 13-7	Scoped in	Scoped in	Yes (summer and winter fieldwork)
Visual receptors (residential, recreational and transport), refer to Table 13-8	Scoped in	Scoped in	Yes (summer and winter photography)
Night-time lighting	Scoped out	Scoped out	No

13.11.1.1 The assessment of effects on the landscape and visual resource during decommissioning are scoped in. However, as the decommissioning effects will be similar and not greater than those during construction, the conclusions of the construction assessment will stand for the decommissioning effects as a reasonable worst-case scenario. Therefore, there will be no separate decommissioning assessment.

14 Major accidents and disasters

14.1 Introduction

14.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of major accidents and disasters.

14.1.1.2 It sets out receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

14.1.1.3 The following aspects have been considered as part of the scope and methodology for major accidents and disasters:

- Potential for adverse environmental effects related to the vulnerability of the Proposed Development to risks of major accidents and / or disasters.

14.2 Relevant legislation, policy, standards and guidance

14.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for major accidents and disasters and have informed the scope of the assessment.

14.2.2 Legislation

Table 14-1 Major accidents and disasters - Legislation

Legislation	Relevance to assessment
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [226]	Schedule 4, 8 A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council(3) or Council Directive 2009/71/Euratom(4) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

14.2.3 Policy

Table 14-2 Major accidents and disasters - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [227]	4.12 Safety The Health and Safety Executive (HSE) is responsible for enforcing a range of occupational health and safety legislation some of which is relevant to the construction, operation and decommissioning of energy infrastructure. Applicants should consult with the HSE on matters relating to safety.
Cumberland Consolidated Planning Policy Framework [228]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

14.2.4 Standards and guidance

Table 14-3 Major accidents and disasters - Standards and guidance

Standards and guidance	Relevance to assessment
Major Accidents and Disasters in EIA: A Primer, 2020. Institute of Environmental Management and Assessment [229]	Offers an assessment methodology based on known current practice within the UK to date and identifies key terminology that can be used.
The National Risk Register of Civil Emergencies, 2023. The Cabinet Office [230]	The National Risk Register outlines the most serious risks facing the United Kingdom.
Cumbria Community Risk Register, 2022. Cumbria Resilience Forum [231]	Provides information on the biggest emergencies that could happen in Cumbria, together with an assessment of how likely they are to happen and the impacts if they do. This includes the impacts to people, their houses, the environment and local businesses.

14.3 Consultation

14.3.1.1 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES where relevant to major accidents and disasters.

14.3.1.2 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-

statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

14.4 Study area

14.4.1.1 There is no specific regulatory guidance or standardised methodology for defining a study area in relation to the assessment of major accidents and disasters. For scoping, the study area has been taken to cover the draft Order Limits and any immediately adjoining aspects that could be considered to give rise to, or be impacted by, a potential major accident and/or disaster.

14.5 Baseline conditions

14.5.1 Desktop sources used

14.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- The National Risk Register of Civil Emergencies [230]
- Cumbria Community Risk Register [231]
- COMAH 2015 Public Information Search [232]
- Publicly available base mapping, such as Bing maps.

14.5.2 Surveys undertaken and proposed

14.5.2.1 No surveys are required in respect of major accidents and disasters.

14.5.3 Existing baseline

14.5.3.1 It is considered that the baseline relevant to the major accidents and disaster topic comprises:

- Current existing (without the Proposed Development) major accident and disaster risks to the study area.
- Features external to the Proposed Development in question, within the study area, that contribute a potential source of hazard to the Proposed Development under consideration and may make it vulnerable to a major accident and/or disaster.
- Sensitive environmental receptors at increased risk of a significant effect if an external major accident and/or disaster occurred once the Proposed Development was present.

Existing major accident and disaster risks

14.5.3.2 The National Risk Register [230] is based on information from the National Security Risk Assessment, which is the government's assessment of the most serious risks facing the UK. The risks that meet the threshold for inclusion in the

National Risk Register would have a substantial impact on the UK's safety, security and/or critical systems at a national level. The risk register classifies risks into categories including terrorism; cyber; state threats; geographic and diplomatic; accidents and systems failures; natural and environmental hazards; human, animal and plant health; societal; and conflict and instability.

14.5.3.3 The National Risk Register states that for risks that are most relevant to a local area, a review of the relevant Community Risk Register should be undertaken. The Cumbria Community Risk Register [231] covers local risks relevant to Cumbria and is considered relevant to the Proposed Development. Within the Cumbria Community Risk Register the following 'very high' level risks have been identified. These are those that Cumbria Resilience Forum have identified as the most likely to have an impact on the local community.

- Very high
  - Localised Fluvial Flooding
  - Fluvial Flooding
  - Influenza-type Pandemic
  - Failure of the National Electricity Transmission Systems

14.5.3.4 Major accident and disaster risks relevant to the baseline in the absence of the Proposed Development are, therefore, considered to include all of the above.

Potential sources of hazard

14.5.3.5 Features external to the Proposed Development that contribute a potential source of hazard are considered to be nearby Control of Major Accident Hazards (COMAH) sites. COMAH sites are establishments storing or otherwise handling large quantities of hazardous industrial chemicals. A review of sites listed by the COMAH 2015 Public Information Search [232] has been undertaken to identify any COMAH sites within the HSE land use planning distance of 3 miles of the relevant study area. One site has been identified 2.9 miles west of the draft Order Limits (Aurorium UK Limited, CA14 1JJ), an upper tier COMAH site.

14.5.3.6 It is also considered that there are features external to the Proposed Development that could present a potential source of hazard. These include, but are not limited to:

- oil, gas and electricity transmission networks across the study area
- potential presence of unexploded ordnance, although noted low risk [233]
- below-ground hazards such as several former coal mining, the draft Order Limits are noted as a Development High Risk Area [234], and potential presence of coal-bed methane and shale gas [235]
- directly adjacent highways, including the A595 and the road running from A595 at Lillyhall Industrial Estate to Branthwaite, Winscales
- Flood Zone 2/3 associated with Lostrigg Beck [236]

Sensitive environmental receptors

14.5.3.7 Sensitive environmental receptors are identified in each individual topic chapter in the EIA Scoping Report.

14.5.4 Future baseline

14.5.4.1 Future baseline changes relevant to major accidents and disasters may include a changing climate, change in COMAH status of nearby sites and changes to external features that present a hazard to the Proposed Development.

14.6 Potential impacts

14.6.1.1 The Proposed Development is not considered to have high vulnerability to major accidents or disasters. Whilst the legislation is not explicit, the language of the EIA Regulations is aimed towards hazardous industries or operations (those with a 'high vulnerability' to major accidents).

14.6.1.2 Following a high-level screening exercise for the purposes of scoping, as suggested in the IEMA guidance [229], it has been determined that at present the Proposed Development has the following potential impacts:

- Is the development a source of hazard itself that could result in a major accident and/or disaster occurring?
    - The Proposed Development is a solar scheme using proven technology, with widespread use across the UK and beyond. The market is tightly regulated by design standards and operating procedures. There is the potential for on-site fires associated with technology such as batteries as a form of energy storage, and inverters. However as standard the technology will have built in safety features including fire resistant construction, fire detection, suppression systems, emergency stop functions and isolation monitoring. Although rare, fires and associated explosions do have the potential to cause safety concerns to human health, including anyone working within the draft Order Limits, or within the area of fire spread/associated contamination fall out. Fires also have the potential to have an impact on the natural environment including the habitats and species in close proximity.
- Does the development interact with any sources of external hazards that may make it vulnerable to a major accident and/or disaster. If an external man-made or natural hazard occurred, would the existence of the Proposed Development increase the risk of a significant effect to an environmental receptor occurring?
    - There are no COMAH sites within the study area, with the nearest 2.9 miles west, considered too far away from the Proposed Development to give rise to a risk to the draft Order Limits.

- The construction of the Proposed Development has the potential to interact with utilities during construction and decommissioning, with the potential to cause utility strike. Depending on the nature of the accident this could cause supply disruption to users, and/or present a risk of danger to people and the natural environment within the draft Order Limits and in the surrounding area via contamination or potential fire or explosion. As the Proposed Development design progresses discussions will be held with utility providers to ascertain the locations of all assets, and the provider's required offset distances will be implemented in the Proposed Development design to minimise this risk. Contractor best practice and working guidelines will also be implemented via a CEMP (guided by the principles set in the oCEMP) to minimise the risk of such accidents occurring, and to minimise the severity of an impact in the event an asset is struck.
- It is possible that unexploded ordnance could be disturbed during construction, although the draft Order Limits are considered to have a low risk to unexploded ordnance. The low risk for presence of UXO is highlighted as part of the Preliminary Risk Assessment undertaken, refer to Appendix 11.1, and highlighted that should new evidence indicate that UXO may be an issue, it specialist advice would be sought.
- There is potential for unstable ground conditions within the draft Order Limits associated with below ground hazards such as the historic mining use of the area. A Preliminary Risk Assessment and Coal Mining Report are being undertaken. Risks will be fully understood and mitigation will be embedded into the design of the Proposed Development where required and additional mitigation measures utilised where identified as required. This will minimise the risk to people working within the draft Order Limits, in terms of land collapse, throughout all phases of the Proposed Development. An appropriate Coal Mining Report would be commissioned, and as part of this risks fully understood and appropriate mitigation outlined and implemented.
- Road accidents could occur during the construction or decommissioning phases involving vehicles associated with the Proposed Development, leading to potential fatality / injury to members of the public. However, the change in traffic flows is expected to be within daily variation, meaning there should be no significant increase in the potential road accidents. In addition, an oCTMP will carefully manage access and routing to ensure any potential risks are managed appropriately. The potential for road accidents to members of the public during operation caused by glint or glare from installed solar panels will be assessed as part of a standalone Glint and Glare assessment, which will be appended to the ES to support the DCO application. Any identified mitigation proposals will be embedded into the design of the Proposed Development or applied in relation to the Proposed Development.

- The potential to be impacted by flooding or cause an increase in flood risk could occur during all phases of the Proposed Development. The water resources and flood risk chapter of the EIA Scoping Report covers risks associated with flooding. In addition, a Drainage Strategy and Flood Risk Assessment will be undertaken to accompany the DCO application for the Proposed Development. Final plans of the oCEMP, oLEMP and oDEMP will be secured through the DCO and be in place to manage risk.
- The potential for extreme weather events to be worsened due to the presence of the Proposed Development (e.g. impacts to flood risk) can be considered as adequately addressed as part of design, through compliance with required design standards to ensure climate resilience. In addition, a Flood Risk Assessment (FRA) is to be completed to support the DCO application to ensure that the Proposed Development and drainage strategy do not increase the risk of flooding on- or off-site.
- Accidental spillage of contaminants, such as hydrocarbons, and their subsequent release into the drainage system are considered to be low consequence events that do not meet the definition of a major accident or disaster, and are expected to be able to be managed and mitigated via the suite of management plans that will be in place, outlined further below.
- The risk of an influenza-type pandemic and failure of the National Electricity Transmission Systems is not considered relevant to the vulnerability of major accidents and disasters associated with the Proposed Development.

14.7 Design, mitigation and enhancement measures

14.7.1 Embedded measures

14.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

14.7.1.2 There are no embedded measures relevant to major accidents and disasters. However, it is noted that in general the design, construction and operation of the Proposed Development must comply with relevant health and safety legislation, regulations and industry guidance helping to control any risks that could arise from the Proposed Development at acceptable levels. A suite of management plans will be in place, as outlined further below, to incorporate standard industry best practice and identify specific controls to limit adverse impacts to the environment.

14.7.2 Further mitigation

14.7.2.1 There is no further mitigation identified for the topic of major accidents and disasters.

14.7.3 Management plans

14.7.3.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to major accidents and disasters including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Construction Traffic Management Plan
- outline Battery Fire Safety Management Plan (BFSMP). This management plan will specifically detail measures to ensure that all safety concerns around battery energy storage system, including fire risk, are addressed as far as reasonably practicable. The relevant local fire and rescue service will be consulted in the preparation of the management plan.

14.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

14.7.3.1 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

14.8 Likely significant effects

14.8.1.1 The effects arising during all phases of the Proposed Development are unlikely to result in significant effects relating to major accidents and disasters. The probability, likelihood and frequency of a major accident or disaster is very low in the instance of the Proposed Development and would be managed under established legislative requirements or the design process. As such, further assessment of the vulnerability to major accidents and disasters is **scoped out** of the assessment.

14.8.1.2 Nevertheless, it is proposed that the ES and/or further supplementary assessments will include a detailed assessment of the risks associated with ground conditions (i.e. land stability from previous coal mining use of the draft Order Limits) and flood risk.

14.9 Proposed assessment methodology

14.9.1.1 The major accident and disaster topic is **scoped out** from further assessment.

14.10 Assumptions, limitations and uncertainties

14.10.1.1 Scoping has been undertaken based on the information available on the Proposed Development available at the time of writing. The proposal is expected to be a type of development that has been successfully deployed globally previously, and as such would have a proven technology with a good safety record, with a low risk of giving rise to a major accident and/or disaster.

14.10.1.2 In accordance with good safety management principles, it is assumed that all risks that have the potential to be major accidents and/or disasters, and as such could impact a local environmental receptor, will be managed through best practice in construction techniques, compliance with relevant legislation and through adherence to the oCEMP, oLEMP and oDEMP. A oBFSMP will be in place to specifically manage risks related to battery fire safety.

14.11 Summary

Table 14-4 Major accidents and disasters scoping summary

Aspect	**Construction**	**Operation**	**Decommissioning**	**Any required surveys?**
Major accidents and disasters	Scoped out	Scoped out	Scoped out	None

15 Noise and Vibration

15.1 Introduction

15.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of noise and vibration.

15.1.1.2 It sets out noise and vibration receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

15.1.1.3 The following aspects have been considered as part of the scope and methodology for noise and vibration:

- Noise and vibration from construction and decommissioning traffic
- Noise and vibration from construction and decommissioning activities
- Noise and vibration from operational traffic
- Noise and vibration from operational activities

15.1.1.4 This chapter is supported by the following figures:

- Figure 15.1 Sensitive receptor location plan

15.2 Relevant legislation, policy, standards and guidance

15.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for noise and vibration and have informed the scope of the assessment.

15.2.2 Legislation

Table 15-1 Noise and Vibration - Legislation

Legislation	Relevance to assessment
The Environmental Protection Act 1990 [237] (as amended by the Noise and Statutory Nuisance Act 1993 [238]) (EPA)	The EPA sets out: the definition of statutory nuisance due to noise; the duty on local authorities to investigate and abate nuisance; and the defence against abatement because "best practicable means" has been employed to minimise noise (including vibration) for business premises. The EPA sets out the means for a person affected by noise nuisance to seek abatement through the courts. The Noise and Statutory Nuisance Act sets out an extension of powers to abate noise nuisance to a wider range of sources than the Environmental Protection Act 1990.
The Control of Pollution Act 1974 (CoPA) [239]	Sets out the Section 60 notice which a local authority can serve so as to impose requirements upon relevant construction activities with regard to the control of noise. Under Section 61 of the CoPA, the party that intends to carry out works to which Section 60 applies may apply to the local authority for consent and "an application under this section shall contain particulars of – The works, and method by which they are to be carried out; and The steps proposed to be taken to minimise noise resulting from the works."
Infrastructure Planning (Environmental Impact Assessment) Regulations [240]	4 (1) A description of the development, including in particular – (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases. 5 (5) A description of the likely significant effects of the development on the environment resulting from, inter alia— (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste.

15.2.3 Policy

Table 15-2 Noise and Vibration - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for Energy (EN-1) [241]	EN-1 refers to the relevant British Standards for the assessment of operational noise and construction noise (where 'noise' is used as an umbrella term for noise and vibration) and refers to further information provided in the technology specific National Policy Statements e.g., EN-3 & EN-5. Paragraph 5.12.5 lists the factors that will determine the likely noise impact of a proposed development and where noise impacts are likely to arise, paragraph 5.12.6 details what should be included in the noise assessment.

Policy	Relevance to assessment
	Paragraph 5.12.15 requires applicants to demonstrate good design through measures such as selection of the quietest cost-effective plant; containment of noise within buildings; optimisation of plant layout to minimise noise emissions; and the use of landscaping, bunds or noise barriers to reduce noise transmission. Paragraph 5.12.17 states that the Secretary of State (SoS) should not grant development consent unless it is satisfied that the proposals will meet the three aims of the Noise Policy Statement for England7 (NPSE) Paragraph 5.12.14 sets out potential mitigation measures.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [242]	Section 2.5.2 states "Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage" Section 2.7.40 states "Applicants should include in the ES a noise assessment of the impacts on amenity in case of excessive noise from the project in line with guidance set out in Section 5.12 in EN-1."
National Policy Statement for Electricity Networks Infrastructure (EN-5) [243]	Section 2.10.9 states that "Applicants must consider the following measures: The positioning of lines to help mitigate noise; Ensuring that the appropriately sized conductor arranges is sued to minimise potential noise; Quality assurance though manufacturing and transportation to avoid damage to overhead line conductors which can increase potential noise effects; Ensuring that conductors are kept clean and free of surface contaminants during stringing/installation; and The selection of quieter cost-effective plants." Section 2.11.7 states "the Secretary of State should ensure that appropriate assessment methodologies have been used in the evidence presented to it, and that the appropriate mitigation options have been considered and adopted. Where the applicant can demonstrate that appropriate mitigation measures will be put in place, the residual noise impacts are unlikely to be significant"
Noise Policy Statement for England, 2010 [244] (NPSE)	Paragraph 1.6 sets out the long-term vision of Government noise policy, i.e. to "promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development." Paragraph 1.7 states that the NPSE vision is supported by aims to effectively manage and control environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development by avoiding significant adverse impacts, mitigating and minimising adverse impacts and contributing to the improvement of health and quality of life. Paragraph 2.20 states that to identify "significant adverse" and "adverse" impact in line with the three aims of NPSE, there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organization:

Policy	Relevance to assessment
	No Observed Effect Level (NOEL): This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. Lowest Observed Adverse Effect Level (LOAEL): This is the level above which adverse effects on health and quality of life can be detected. Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health and quality of life occur. Paragraph 2.24 states that where an impact lies somewhere between LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur. Paragraph 2.22 notes that the NPSE states "it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."
National Planning Policy Framework [245] (NPPF)	Paragraph 180 states that the planning system should contribute to and enhance the natural and local environment by (amongst other considerations) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution. Paragraph 191 states that planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution. This involves, in particular, mitigating and reducing to a minimum, potential adverse impacts resulting from noise; avoiding noise that gives rise to significant adverse impacts on health and the quality of life In addition, tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value should be identified and protected. Paragraph 193 states that planning policies and decisions should ensure that new development can be integrated effectively with existing business and community facilities, with existing businesses not having unreasonable restrictions placed on them as a result of new development permitted after the business was established. Where the operation of an existing business or community facility could have a significant adverse effect on a new development, the application should provide suitable mitigation before the development is complete. This should be taken into account when considering whether proposed development is an acceptable use of land.

Policy	Relevance to assessment
Cumberland Consolidated Planning Policy Framework [246]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.
Allerdale Local Plan (Part 1) [247]	This policy aims to ensure that new developments do not harm the safety or amenity of existing and residents or the natural environment which include minimising noise that would be harmful.

15.2.4 Standards and guidance

Table 15-3 Noise and Vibration - Standards and guidance

Standards and guidance	Relevance to assessment
Planning Practice Guidance – Noise, 2019 [248] (NPPG)	The PPG-N provides guidance in the form of a noise exposure hierarchy, which details the levels of perception to noise exposure and the expected outcomes and required actions.
Institute of Environmental Management and Assessment (IEMA) (2014) Guidelines for Environmental Noise Impact Assessment [249]	Presents guidelines on how the assessment of noise effects should be presented within the Environmental Impact Assessment (EIA) process. The IEMA guidelines cover aspects such as: scoping, baseline, prediction and example definitions of significance criteria.
British Standard 4142:2014+A1:2019 Methods for rating and assessing Industrial and Commercial Sound [250] (BS 4142)	Used to rate and assess sound of an industrial nature including, but not limited to, assessing sound from proposed, new, modified, or additional sources of industrial sound, and sound at proposed new dwellings. It contains guidance on the monitoring and assessment of industrial and commercial sound sources (including fixed installations comprising mechanical and electrical plant and equipment) affecting sensitive receptors.
British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings [251] (BS 8233)	Presents methodology for noise ingress calculations.
British Standard 5228-1:2009+A1:2014 “Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise” [252] (BS 5228-1)	Provides guidance on the assessment and control of noise from construction sites, along with suggestions for the derivation of guideline levels for impact assessment.
British Standard 5228-2:2009+A1:2014 “Code of Practice for Noise and Vibration Control on Construction and Open	Provides guidance on the assessment and control of vibration from construction sites, along with suggestions for the derivation of guideline levels for impact assessment.

Standards and guidance	Relevance to assessment
Sites – Part 2: Vibration" [253] (BS5228-2)	
Department for Transport (1988) Calculation of Road Traffic Noise [254](CRTN)	Describes procedures for calculating noise from road traffic.
Highways England (2018) Design Manual for Roads and Bridges: LA111- Noise and Vibration [255]	Guidance document provides methodology for the assessment of noise from road traffic. Also provides modifications to CRTN and a methodology for the assessment of noise and vibration from construction traffic. Whilst specific to the assessment of roads, this guidance is considered best practice in the industry and relevant across a number of project sectors.
World Health Organisation (1999) Guidelines for community noise [256]	Guidance for the protection of people from the effects of noise in non-industrialised environments.
International Organisation for Standardisation (2024) Acoustics — Attenuation of sound during propagation outdoors [257]	This document specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

15.3 Consultation

15.3.1.1 The following stakeholders will be consulted with regards to noise and vibration as part of the assessment process:

- The Environmental Health Officer (EHO) at Cumberland Council – to inform assessment methodologies and design principles that need to be adhered to for compliance with relevant national and local planning policies, legal requirements, and best practice guidelines in relation to noise and vibration.

15.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion Comments received will be considered and addressed through the PEIR and ES, where relevant to noise and vibration.

15.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

15.4 Study area

15.4.1 Construction noise study area

15.4.1.1 The study area for construction noise effects includes existing sensitive receptors (ESRs) within 300 m of the draft Order Limits. This is based on guidance in BS 5228-1 and DMRB LA 111.

15.4.2 Construction vibration study area

15.4.2.1 The study area for construction vibration effects, based on guidance from BS 5228-2 and DMRB LA 111, comprises 100 m from the closest construction activity with the potential to generate vibration effects at ESRs. For the purposes of Scoping, the draft Order Limits set the closest point an activity may take place.

15.4.3 Construction traffic noise study area

15.4.3.1 The study area for construction traffic includes each applicable road understood to be affected, based on guidance in CRTN and DMRB LA 111.

15.4.4 Operational noise study area

15.4.4.1 Based on previous solar experience and professional judgement, the study area for operational noise would comprise ESRs within 500 m of the draft Order Limits, with a particular focus on the nearest ESR.

15.5 Baseline conditions

15.5.1 Desktop sources used

15.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Google Earth aerial imagery

15.5.2 Surveys undertaken and proposed

15.5.2.1 No surveys have been completed at the time of writing:

15.5.2.2 The following surveys are planned to be undertaken, and will inform the PEIR / ES:

- Baseline noise survey to establish the existing noise climate at the ESRs.

15.5.3 Existing baseline

15.5.3.1 The draft Order Limits are located within the open countryside between the town of Workington, which lies approximately 2km to the west, and the Lake District National Park, approximately 4.3km to the east. Locally, it is contained by Winscales Road (A595) to the west, a local road between Lillyhall Business Park

and the village of Branthwaite to the south and the valley of the River Marron between Branthwaite and Little Clifton. The land use within the draft Order Limits is predominantly rough grazing including on areas of moorland with some arable farming in places.

15.5.3.2 ESRs within 500m of the Proposed Development are listed below and can be identified in Figure 15.1.

Table 15-4 Identified Existing Sensitive Receptors within 500m

Receptor	Location	Type of Receptor	Distance from the draft Order Limits (m)
ESR1	Whyclose	Residential	4
ESR2	Wythermoor House	Residential	170
ESR3	Gale House	Residential	210
ESR4	Cumberland Lodge	Residential	170
ESR5	Grasmoor View	Residential	210
ESR6	Fair View	Residential	200
ESR7	Stargill Farm	Residential	10
ESR8	Brackenbarrow	Residential	60
ESR9	Close End	Residential	100
ESR10	Fell View Farm	Residential	280
ESR11	Punderland Farm	Residential	190
ESR12	Brooklands	Residential	320
ESR13	Furnace House	Residential	7
ESR14	Residential Property	Residential	50
ESR15	Oldfield	Residential	450
ESR16	Lucy Close Farm	Residential	290
ESR17	Outgang Farm	Residential	110

15.5.3.3 There are no statutory designated sites within the draft Order Limits, however, the River Marron which forms part of the River Derwent and Tributaries SSSI and River Derwent and Bassenthwaite Lake SAC lies to the east of the draft Order Limits.

15.5.4 Future baseline

15.5.4.1 The future baseline for noise and vibration is expected to remain as the current existing baseline, bar future proposed development (considered under a cumulative assessment initially to determine if any form part of a future baseline), in the absence of the Proposed Development proceeding due to its largely rural and agricultural nature.

15.6 Potential impacts

15.6.1 Construction

15.6.1.1 The construction works are of a temporary nature and as such impacts are temporary and reversible.

15.6.1.2 The potential impacts of the Proposed Development in relation to noise and vibration during construction are likely to include:

- Construction traffic, including HGV trips to and from the Proposed Development; and
- Construction activities, including preparatory works, and installation of solar PV modules and supporting equipment.

15.6.2 Operation

15.6.2.1 The potential impacts of the Proposed Development in relation to noise and vibration during operation are likely to result from:

- Operational road traffic to and from the Proposed Development; and
- Operational noise from supporting infrastructure including inverters and transformers, BESS and the on-site substation.

15.6.3 Decommissioning

15.6.3.1 The works involved for the decommissioning phase would be similar or of a lower magnitude/duration than for the construction phase. Therefore, it is considered decommissioning would have similar impacts to that of construction.

15.7 Design, mitigation and enhancement measures

15.7.1 Design principles

15.7.1.1 The Proposed Development is being designed with regard to a set of design principles. Relevant to noise and vibration these include:

- A reasonable buffer between residential dwellings and the nearest panels will be maintained.

15.7.2 Embedded measures

15.7.2.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

15.7.2.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to noise and vibration already committed to include:

- An appropriate buffer will be maintained between properties and construction areas

- Any sources of operational noise (i.e. inverters) will be located as far as reasonably possible from existing sensitive receptors, and at a minimum distance of 300m from existing sensitive receptors.
- Routing for construction and operation vehicles will avoid routing through local villages.

15.7.3 Further mitigation

15.7.3.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for noise and vibration will be defined, if required, through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to noise and vibration may include:

- Plant selection, siting, screening and enclosures as appropriate.

15.7.4 Management plans

15.7.4.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to noise and vibration including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Decommissioning Environmental Management Plan (oDEMP)
- outline Construction Traffic Management Plan

15.7.4.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

15.7.4.3 Specifically, any residual noise and vibration impacts during construction would be managed through the oCEMP. Measures to control noise as defined in Annex B of BS 5228:2009+A1:2014 Part 1 and Section 8 of BS 5228:2009+A1:2014 Part 2 [253] will be adopted where reasonably practicable. These measures represent 'Best Practicable Means' (BPM) (as defined by Section 72 of the Control of Pollution Act 1974) to manage noise and vibration emissions from construction activities. As part of the oCEMP an Environmental Clerk of Works will also be required to be appointed to advise and supervise the mitigation measures outlined in the CEMP. Measures specific to travel planning and HGV movement would be incorporated into the oCTMP.

15.7.4.4 An oDEMP will also be produced, and as per the oCEMP will include measures, commitments, and actions (which will include appropriate best practice measures) to reduce noise during decommissioning.

15.7.4.5 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

15.8 Likely significant effects

15.8.1 Construction

Noise effects from construction traffic

15.8.1.1 Adverse noise effects due to construction traffic, such as HGV trips to deliver materials and equipment to and from the Proposed Development, are not expected to be significant. Vehicle trips would be temporary, over a maximum 24 month period, and the nature of the Proposed Development would not require large scale material removal or delivery. There is no requirement to remove large amounts of demolition material, spoil, earth etc. from the draft Order Limits, nor is there a need for large amounts of construction materials such as concrete to be delivered. Construction routing would avoid passing through local villages.

15.8.1.2 Estimated construction traffic vehicle numbers have been provided by the Traffic and Transport team, it is anticipated that up to 18 HGV trips per day will be undertaken during the construction period, which is determined to be less than 10% change in current traffic.

15.8.1.3 Therefore, while there may be short term temporary noise impacts due to construction traffic, it is very unlikely that these would be sufficient to constitute a significant effect due to the temporary nature, relatively low volume and intensity of movements. An oCTMP will detail measures specific to travel planning and HGV movement to ensure impacts are controlled.

15.8.1.4 Noise from construction traffic is proposed to be **scoped out** of the assessment.

Noise effects from construction activities

15.8.1.5 Potentially significant noise effects during the construction would include noise from preparatory works, and the installation of solar PV modules and supporting equipment. Although significant effects are anticipated to be unlikely, due to the proximity of the nearest sensitive receptors, noise from construction activities is proposed to be **scoped in** to the assessment.

Vibration effects from construction traffic

15.8.1.6 Vibration from traffic on the public highway is caused by irregularities in the road surface. Where the road surface is free from irregularities, such as potholes, significant vibration effects would not be expected, even at relatively short distances (i.e. within a few metres). This is based on guidance in DMRB LA 111.

15.8.1.7 Perceptible vibration due to construction traffic is also unlikely, except for situations where construction traffic passes very close (i.e. within a few metres) of residential properties. However, this would only occur for short periods. As such, significant vibration effects due to vibration caused by construction traffic is unlikely due to the low intensity of vehicle movements.

15.8.1.8 Vibration from construction traffic is proposed to be **scoped out** of the assessment.

Vibration effects from construction activities

15.8.1.9 Sources of construction vibration include piling and vibratory compaction. Construction vibration would not be expected to cause damage to buildings or structures unless very high levels of vibration are generated. Such levels would only be expected to occur where vibration generating activities occur very close to structures, within approximately 10m. Such distances between vibration generating activities and buildings or structures are not expected during the Proposed Development as construction works are expected to be beyond 10m to buildings and structures.

15.8.1.10 There is potential for effects on human receptors due to construction vibration at ESRs within the study area. The level of significance would depend on the nature and the duration of activities, the distance between the source of vibration and the ESR, the sensitivity of the ESR, and the standard measures employed to reduce vibration. However, the duration of such activities would be expected to be relatively short at any one location, and, together with the implementation of standard measures, significant effects from such works are not anticipated.

15.8.1.11 Construction vibration effects are proposed to be **scoped out** of the assessment.

15.8.2 Operation

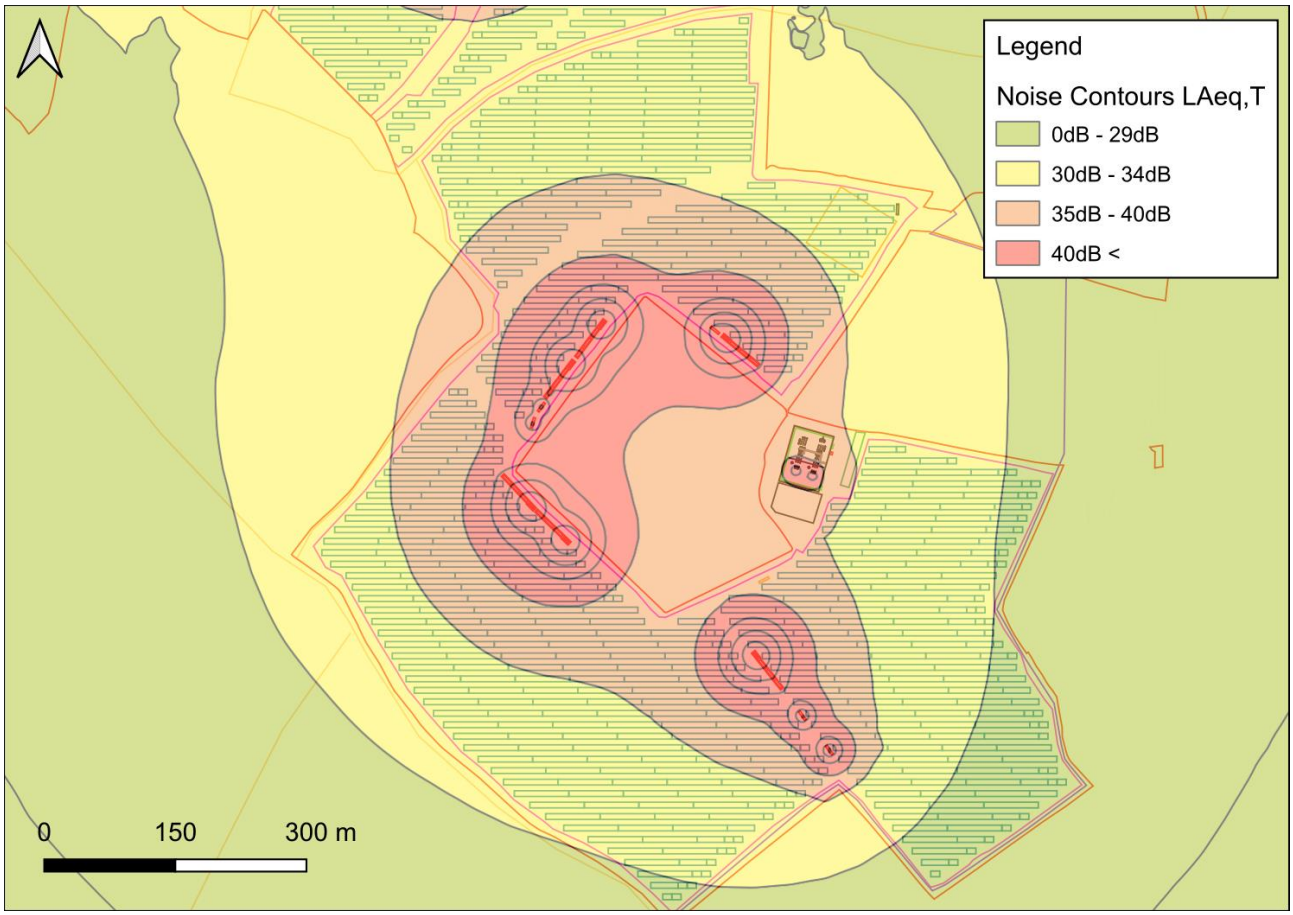
Noise effects from operational activities

15.8.2.1 During the operational phase, it is possible that noise could be generated by supporting infrastructure that would be installed as part of the Proposed Development.

15.8.2.2 The solar PV modules and connecting cables do not emit noise. However, there is the potential for the BESS and the solar farm supporting infrastructure, such as inverters, transformers, and the on-site substation, to generate some noise during operation.

15.8.2.3 Plate 15.1 below shows a typical noise contour plot for similar electrical infrastructure at another solar farm. The figure shows that at distances approximately equal to 300m, predicted noise levels from the equipment are generally at or below 30 dB. Typical background noise levels in rural areas can easily fall below 25 dB during the night-time period, which is considered very low in accordance with BS 4142:2014 [250]. Therefore, for an existing residential property located at 300m from the proposed electrical equipment with a typical existing background noise level of 25 dB, would represent the onset of an adverse effect (5 dB above the existing background noise level) in terms of operational noise in accordance with BS 4142:2014 [250].

Plate 15-1 Typical solar farm noise contour plot (i.e. taken from a solar scheme similar to the Proposed Development)



15.8.2.4 Any sources of operational noise (i.e. inverters) will be located as far as reasonably possible from existing sensitive receptors, and at a minimum distance of 300m from existing sensitive receptors.

15.8.2.5 Full details of any noise generating supporting infrastructure would also be included as part of the Proposed Development description within the ES, along with further details as to how the design of the Proposed Development has been developed to minimise any adverse impacts on the residential amenity of surrounding occupiers. It is not anticipated that any noise impacts arising from plant and supporting infrastructure would be to levels deemed to be significant, particularly in consideration of the passive nature of solar farm development.

15.8.2.6 However, as the candidate electrical infrastructure is not known at this stage and precise locations of the items of plant are also unknown, it is not possible to assess the significance of effect at this stage, therefore, operational noise is **scoped in** to the assessment.

Noise from operational traffic

15.8.2.7 During the operational phase, it is possible that noise could be generated by road traffic to and from the Proposed Development.

15.8.2.8 It is anticipated that traffic trips to and from the Proposed Development during operation would be minimal (one trip per month) and for maintenance purposes only. It is considered that given the volumes, traffic trips generated by the Proposed Development are unlikely to result in significant noise effects.

15.8.2.9 Noise from operational traffic is proposed to be **scoped out** of the assessment.

Vibration effects from operational activities

15.8.2.10 There are no sources of operational vibration proposed as part of the Proposed Development as plant with moving parts, including cooling equipment and transformers, would be mounted on suitable anti-vibration mounts. Vibration would therefore not be expected to be perceptible even in very close proximity to plant.

15.8.2.11 Vibration from operational activities is proposed to be **scoped out** of the assessment.

Vibration effects from operational traffic

15.8.2.12 As operational traffic would be minimal (one trip per month) and for maintenance purposes only, it is considered that vibration from operational traffic is unlikely to result in significant effects.

15.8.2.13 Vibration from operational traffic is proposed to be **scoped out** of the assessment.

15.8.3 Decommissioning

15.8.3.1 The works involved for the decommissioning phase would be similar or of a lower magnitude/duration than for the construction phase.

15.8.3.2 On this basis noise and vibration from demolition activities and traffic to and from the Proposed Development is proposed to be **scoped out** of the assessment. Noise from decommissioning activities is **scoped in**, however as the effects are anticipated to be similar to or less than construction no separate decommissioning assessment will be undertaken, and results will be as reported under construction.

15.9 Proposed assessment methodology

15.9.1.1 This section sets out the proposed assessment methodology for the assessment of noise effects from construction and operation activities.

15.9.1.2 Baseline noise monitoring will be undertaken to establish the noise environment around the Site and representative of surrounding ESRs. Monitoring will be undertaken at selected locations representative of ESRs around the draft Order Limits in agreement with the EHO.

15.9.1.3 The monitoring procedures will follow guidance from BS 7445-1:2003 'Description and environment of environmental noise – Part 1: Guide to quantities and procedures' and BS 4142:2014+A1:2019 [250] 'Methods for rating and assessing

industrial and commercial sound'. A weather station will also be installed for the duration of the noise surveys so any periods of adverse weather conditions could be identified and omitted from noise data.

15.9.1.4 The NPSE [244] introduced three concepts to the assessment of noise, as follows:

- NOEL – No Observed Effect Level
  - This is the level below which no effect can be detected and below which there is no detectable effect on the health and quality of life due to noise.
- LOAEL – Lowest Observed Adverse Effect Level
  - This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level
  - This is the level above which significant adverse effects on health and quality of life occur.

15.9.2 Construction noise

15.9.2.1 Construction noise levels would be calculated at the facades of ESRs within the study area in accordance with the methodology described in Annex F of BS 5228-1. The predicted construction noise levels at ESRs would be compared against the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method). The Category A construction noise thresholds represent the lowest assessment criteria, typically used to assess impacts in rural areas.

Magnitude of impact

15.9.2.2 The magnitude of impact has been considered as the change experienced from the current baseline conditions at a receptor, and has been considered on a scale of high, moderate, low or negligible.

15.9.2.3 The methodology used to determine the magnitude of change for construction noise is shown below in Table 15-5 and Table 15-6.

Table 15-5 Magnitude of construction noise impact

Magnitude of Change	Criteria
High	Noise levels is ≥10dB above the adopted Category A, B or C thresholds.
Moderate	Noise levels is 5-9dB above the adopted Category A, B or C thresholds.
Low	Noise levels is 1-4dB above the adopted Category A, B or C thresholds.
Negligible	Noise levels is ≤0dB above the adopted Category A, B or C thresholds.

Table 15-6 Thresholds of significant impact from construction noise at residential receptors in accordance with the ABC method of BS5228-1

Assessment Category Threshold Value Period (L_{Aeq})	Threshold Value in Decibels (dB)		
	Category A *1	Category B *2	Category C *3
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
***1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.**			
***2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.**			
***3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.**			

15.9.3 Operational Noise

15.9.3.1 The assessment of operational noise effects will be undertaken according to the methodology set out in BS 4142:2014 [250].

15.9.3.2 The baseline noise measurements will be used to determine representative daytime and night-time background noise levels at the assessed receptors.

15.9.3.3 Noise from operational plant such as substations, inverters, transformers and battery storage units will be predicted using noise modelling software and plant emissions data provided by the applicant.

15.9.3.4 The assessment will consider the level by which the Proposed Development's BS 4142 Rating level exceeds the prevailing background noise levels, as well as the context in which the sound will occur. BS 4142 states that a difference of +5 dB is likely to be an indication of adverse impact.

15.9.3.5 Where background and rating levels are low, BS 4142:2014 [250] states that the absolute level might be as, or more relevant than the margin by which the Rating level exceeds the background noise level. As such, it is proposed that noise limits will be a combination of a margin of 5 dB above the representative background level, subject to a fixed lower threshold of 35 dB, which would apply in low background noise situations.

15.9.3.6 Table 15-7 presents the operational noise magnitude of impact.

Table 15-7 Method for Assessing the Magnitude of Impact

Magnitude of Change	Level	Noise Level Criteria	Justification for Level-Action Required
Negligible	No Observed Adverse Effect Level (NOAEL)	Difference between Rating Level ($L_{Ar,Tr}$) dB and existing background level $L_{A90,T}$ dB is less than or equal to 0dB depending on context	Justification for Level: Below low impact threshold in BS4142:2014 Action Required: None
		Noise levels are below: Living Rooms: 35 $dBL_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: 40 $dBL_{Aeq,16hours}$ Bedrooms Rooms: 35 $dBL_{Aeq,16hours}$ 30dB $L_{Aeq,8hr}$ $L_{AFmax,2min}$ noise levels do not exceed: 45dB L_{AFmax} based on 10th highest $L_{AFmax,2min}$ sample)	Justification for Level: Less than threshold values in Table 4 in BS8233:2014 and Table 1 in World Health Organisation (1999) Guidelines on Community Noise Action Required: None
		Increase in ambient $L_{Aeq,T}$ due to contribution from proposed development of ≤1dB.	Justification for Level: Within negligible short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: None
Low	Lowest Observed Adverse Effect Level (LOAEL)	Difference between Rating Level ($L_{Ar,Tr}$) dB and existing background sound level $L_{A90,T}$ dB is between 1-4dB, depending on context.	Justification for Level: Within less likely for adverse or significant adverse impact to occur low impact threshold in BS4142:2014 Action Required: Mitigate and reduce to a minimum the exceedance over 0dB above background threshold
		Noise levels are between: Living Rooms: 35-40 $dBL_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: 40-45 $dBL_{Aeq,16hours}$ Bedrooms Rooms: 35-40 $dBL_{Aeq,16hours}$ 30-35dB $L_{Aeq,8hr}$ LAFmax,2min noise levels do not exceed 45dB L_{AFmax}	Justification for Level: Exceed threshold guidelines in Table 4 of BS8233:2014 and World Health Organisation (1999) Guidelines on Community Noise by no greater than 5dB to achieve reasonable internal conditions as

Magnitude of Change	Level	Noise Level Criteria	Justification for Level-Action Required
		based on 10th highest $L_{AFmax,2min}$ sample)	defined by Note 7 to Table 1 in BS8233:2014 Action Required: Mitigate and reduce to a minimum the exceedance over the threshold
		Increase in ambient LAeq,T due to contribution from proposed development of 1.0-2.9dB.	Justification for Level: Within minor short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Moderate	Significant Observed Adverse Effect Level (SOAEL)	Difference between Rating Level ($L_{Ar,Tr}$) dB and existing background sound level $L_{A90,T}$ dB is between 5-9dB, depending on context.	Justification for Level: Within adverse impact threshold in BS4142:2014. Action Required Additional mitigation required to achieve effect of LOAEL or less.
		Noise levels are between: Living Rooms: 40-45 $dBL_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: 45-50 $dBL_{Aeq,16hours}$ Bedrooms Rooms: 40-45 $dBL_{Aeq,16hours}$ 35-40dB $L_{Aeq,8hr}$ 45-55dB $L_{AFmax,2min}$ based on 10th highest $L_{AFmax,2min}$ sample)	Justification for Level: Exceeds BS8233:2014 $L_{Aeq,T}$ reasonable criteria by 5dB or exceeds $L_{AFmax,2min}$ (10th highest sample) Action Required: Additional mitigation required to achieve effect of LOAEL or less.
		Increase in ambient $L_{Aeq,T}$ due to contribution from proposed development of 3.0-4.9dB.	Justification for Level: Within moderate short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: Additional mitigation required to achieve effect of LOAEL or less.

Magnitude of Change	Level	Noise Level Criteria	Justification for Level-Action Required
High	Unacceptable Observed Adverse Effect Level (UOAEL)	Difference between Rating Level ($L_{Ar,Tr}$) dB and existing background sound level $L_{A90,T}$ dB is equal to or greater than 10dB, depending on context.	Justification for Level: Within significant adverse impact threshold in BS4142:2014 Action Required: Additional mitigation required to achieve effect of LOAEL or less.
		Noise levels exceed: Living Rooms: 45 $dBL_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: 50 $dBL_{Aeq,16hours}$ Bedrooms Rooms: 45 $dBL_{Aeq,16hours}$ 40dB $L_{Aeq,8hr}$ $L_{AFmax,2min}$ noise levels exceeds 55dB L_{AFmax} based on 10th highest $L_{AFmax,2min}$ sample)	Justification for Level: Exceeds BS8233:2014 $L_{Aeq,T}$ reasonable criteria by 10dB or exceeds $L_{AFmax,2min}$ (10th highest sample) by 10dB or more. Action Required: Additional mitigation required to achieve effect of LOAEL or less.

15.9.4 Sensitivity of receptors

15.9.4.1 The sensitivity of the receptors has been considered on a scale of high, moderate, low or negligible. The methodology used to determine the sensitivity is shown below in Table 15-8.

Table 15-8 Sensitivity of receptor

Sensitivity	Receptor Type
High	Receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance. For example, hospitals, residential care homes, and internationally and nationally designated nature conservation sites which are also known to contain noise sensitive species (i.e., noise may change breeding habits or threaten species in some other way).
Moderate	Receptors/resource has moderate capacity to absorb change without significantly altering its present character. For example, residential dwellings, offices, schools, and play areas. Locally designated nature conservation sites which are also known to contain noise sensitive species (i.e., noise may change breeding habits or threaten species in some other way).
Low	Receptor/resource is tolerant of change without detriment to its character or is of low or local importance. For example, industrial estates.
Negligible	Receptor/ resource is not sensitive to noise.

15.9.5 Significance of effect

15.9.5.1 The significance of effect will be informed by the magnitude of change due to the Proposed Development and the evaluation of the sensitivity of the affected receptor. The significance of effect will be determined using professional judgement and Table 15-9Table 15-8 will be a tool to assist this process.

15.9.5.2 Whilst Table 15-9 provides ranges, the level of effect is confirmed as a single level and not a range, informed by professional judgement. For each effect, it will be concluded whether the effect is 'beneficial' or 'adverse'.

Table 15-9 Effect significance matrix

Magnitude of Change	**Sensitivity**			
	High	Moderate	Low	Negligible
High	Major	Moderate-Major	Moderate	Minor
Moderate	Moderate-Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

15.9.5.3 Where significance of effects of Major and Moderate-Major are recorded these effects will be categorised as significant in EIA terms.

15.9.5.4 Where significance of effects of Moderate are recorded these effects will be categorised as significant unless contextual factors can be taken into consideration to determine the effect as not significant in EIA terms.

15.9.5.5 Where significance of effects of Minor and Negligible are recorded these effects will be categorised as not significant in EIA terms.

15.10 Assumptions, limitations and uncertainties

15.10.1.1 The noise specifications for each piece of equipment installed on the Proposed Development will be taken from BS 5228-1.

15.11 Summary

Table 15-10 Noise and vibration scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Noise from traffic	Scoped Out	Scoped Out	Scoped Out	-
Vibration from traffic	Scoped Out	Scoped Out	Scoped Out	-
Noise from activities	Scoped In	Scoped In	Scoped In, however no separate assessment undertaken and instead covered by the construction assessment	Baseline noise survey, locations to be agreed with Cumberland Council
Vibration from activities	Scoped Out	Scoped Out	Scoped Out	-

16 Socio-economics

16.1 Introduction

16.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of socio-economic receptors.

16.1.1.2 It sets out socio-economic receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

16.1.1.3 The following aspects have been considered as part of the scope and methodology for socio-economics:

- Employment opportunities during construction, operation and decommissioning.
- Recreational and community facilities.
- Public Rights of Way and recreational routes.
- Development Land.

16.1.1.4 Potential effects on agricultural land and soil resources are considered within Chapter 5 of this Scoping Report and this should be read alongside this chapter.

16.1.1.5 This chapter is supported by the following figures:

- Figure 16.1: Socio-economic study area
- Figure 16.2: Public rights of Way

16.2 Relevant legislation, policy, standards and guidance

16.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for socio-economics and have informed the scope of the assessment.

16.2.2 Legislation

Table 16-1 Socio-economics - Legislation

Legislation	Relevance to assessment
There is no legislation specific to the methodology of the assessment of socio-economic effects arising as part of the Proposed Development. Where relevant, legislation specific to elements of the assessment such as the Countryside and Rights of Way Act (2000) [258] will be referenced.	

16.2.3 Policy

Table 16-2 Socio-economics - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [259]	With reference to paragraphs 4.1.5 – 4.1.7 which discusses adverse impacts and benefits. Section 5.11 which considers potential impacts on land use and Section 5.13 specific to socio-economic impacts. This identifies the potential relevant socio-economic impacts which a project should consider, as well as potential mitigation measures and how these should be considered in the decision-making process.
National Policy Statement for renewable energy infrastructure (EN-3) [260]	The policies set out in NPS EN-3 are additional to the impacts discussed in NPS EN-1. Section 2.10 discusses the benefits, impacts, and technical considerations that a solar photovoltaic generation project should consider and potential mitigation measures. Paragraphs 2.10.9 – 2.10.17 outlines the role of solar in meeting the UK Government's net zero emissions target by 2050 and identifies solar as a key part of the government's strategy for low-cost decarbonisation of the energy sector.
National Planning Policy Framework [261]	The National Planning Policy Framework (NPPF) sets out various policies in relation to the socio-economic objectives of the planning system. **Paragraph 8** outlines the economic objectives of the planning system *"to help build a strong, responsive, and competitive economy by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity".* **Paragraph 8** also outlines the social objective of the planning system *"to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being".* **Paragraph 97** states that *"to provide the social, recreational and cultural facilities and services the community needs, decisions should: take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community."* **Paragraph 104** states *"decisions should protect and enhance public rights of way".*
Allerdale Local Plan 2011-2029 Part 1 [262]	Part 1 of Allerdale's Local Plan was adopted in July 2014 and sets out the priorities and spatial strategies for Allerdale. The Local Plan includes the following strategic policies relevant to the socio-economic and land use assessment: • Policy S3 Spatial Strategy and Growth • Policy S11 Gypsy, Traveller and Travelling Showpeople Sites • Policy S12 Land and Premises

Policy	Relevance to assessment
	• Policy S19 Renewable Energy and Low Carbon Technologies • Policy S20 Nationally Significant Infrastructure Projects • Policy S24 Green Infrastructure • Policy S32 Safeguarding Amenity The assessment will take into account the policies of the Local Plan when assessing the socio-economic and land use impacts of the Proposed Development. This will be considered during the construction, operation, and decommissioning phases. Any future application for development consent will be supported by a Planning Statement, which will detail how the Pro-posed Development complies with all relevant national and local policy requirements.
Allerdale Local Plan 2011-2029 Part 2 [263]	Part 2 of the Allerdale Local Plan was adopted in 2020 and sets out the Site Allocations and includes the following policies relevant to the socio-economic and land use assessment: • Policy SA1 Identified Sites • Policy SA30 Gypsy, Travellers and Travelling Showpeople Sites • Policy SA32 Tourism, Coastal and Countryside Recreation • Policy SA34 Employment Sites • Policy SA51 Amenity Greenspace • Policy SA52 Green Infrastructure Networks The assessment will take into account the policies of the Local Plan when assessing the socio-economic and land use impacts of the Proposed Development. This will be considered during the construction, operation, and decommissioning phases. Any future application for development consent will be supported by a Planning Statement, which will detail how the Pro-posed Development complies with all relevant national and local policy requirements.
Cumberland Consolidated Planning Policy Framework [264]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

16.2.4 Standards and guidance

Table 16-3 Socio-economics - Standards and guidance

Standards and guidance	Relevance to assessment
Planning Practice Guidance [265]	Planning Practice Guidance (PPG) provides guidance on planning and the economy and to consider the existing and potential future needs of the population in terms of economic development, jobs and employment opportunities, and on open space, sports and recreation facilities, public rights of way and local green space. There is no specific guidance with the NPPG of direct relevance to the assessment of socio-economic, recreation and tourism effects.
Homes and Communities Agency Additionality Guide [266]	The assessment of employment effects will follow the approach set out in the Homes and Communities Agency (HCA) Additionality Guide (4th Edition), that provides guidance on assessing the additional impact of local economic interventions, taking into account the potential for leakage, displacement, and supply chain effects.
Cumbria Clean Energy Strategy [267]	The Cumbria Clean Energy Strategy was issued by the Cumbria LEP in 2022 and sets out the strategic priorities for Cumbria's contribution to the UK renewable energy generation and capacity. The assessment will take the strategic economic context into account in the as-assessment of potential socio-economic and land use impacts during the during the construction, operation, and decommissioning phases.
Cumbria Local Skills Report [268]	The Cumbria Local Skills Report outlines that Cumbria faces an overall labour supply shortage and a skills gap across several sectors of the regional economy. A priority in the strategy is to develop and enhance skills aligned to the development of clean energy and associated application of technology. The assessment will take into account the priorities outlined in the Cumbria Local Skills Report in the assessment of potential employment and training benefits within the local and regional labour market.

16.3 Consultation

16.3.1.1 The following stakeholders will be consulted with regards to potential socio-economic effects as part of the assessment process:

- Cumberland Council in relation to Public Rights of Way (PRoW) and recreational routes
- Access or recreation groups, where these exist locally
- Local business groups, where relevant to the Proposed Development and/or mitigation measures.

16.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be

considered and addressed through the PEIR and ES where relevant to socio-economics.

16.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

16.4 Study area

16.4.1.1 The study area for the assessment of socio-economic will include:

- Potential employment effects may be felt over a wide area given the somewhat specialist nature of some of the construction and operational tasks. The study area for consideration of economic effects would therefore be the immediate authority area of Cumberland Council, as well as the wider North West region.
- Potential effects on PRoW and recreational routes would focus on the draft Order Limits but extend beyond the site where indirect effects are identified.
- Potential effects on other land uses, including community facilities and development land would focus on the areas immediately adjacent to the Proposed Development, within 500m of the draft Order Limits as shown on Figure 16.1 Socio-economic Study Area.

16.4.1.2 Should key receptors beyond these initial geographical areas be identified through assessment work or through consultation with key stakeholders, these study areas would be reviewed.

16.5 Baseline conditions

16.5.1 Desktop sources used

16.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- review of aerial imagery and mapping of the draft Order Limits and surrounding areas;
- Census data sourced from Nomis [269] and ONS [270];
- OS Open Greenspace [271]; and
- PRoW data from published sources [272].

16.5.1.2 Local Government in Cumbria changed on 1st April 2023 and the former borough of Allerdale where the Proposed Development is located was replaced by a new authority area, Cumberland Council.

16.5.1.3 Cumberland Council includes the area previously covered by Allerdale Borough Council, Carlise City Council and Copeland Borough Council. Given the timescales

of the above reorganisation, some baseline data (e.g. 2021 Census information) is presented at the previous council levels.

16.5.1.4 Other baseline data, for example, PRoW information is presented with reference to the draft Order Limits.

16.5.2 Surveys undertaken and proposed

16.5.2.1 No surveys are considered to be required in respect of potential socio-economic effects.

16.5.3 Existing baseline

Socio-economics

16.5.3.1 From a socio-economic perspective, it is proposed that the baseline focusses on the local economy, with potential socio-economic effects anticipated to relate to employment and supply chain opportunities, particularly during construction of the Proposed Development.

16.5.3.2 This section provides the baseline conditions for the following geographical areas:

- The former local authority of Allerdale;
- the county of Cumbria;
- the North West region; and
- England.

Population

16.5.3.3 The population of Allerdale, Cumbria, the North West, and England recorded at the 2021 Census are shown in Table 16-4. The percentage change of the population relative to the 2011 Census are also presented for these administrative areas.

16.5.3.4 As of the 2021 Census, the population of Allerdale is approximately 96,200. This represents a decrease of 0.3% compared to the population recorded at the 2011 Census. Between 2011 and 2021, the population of Cumbria stagnated, the North West increased by 5.2%, and the population of England as a whole increased by 6.6%.

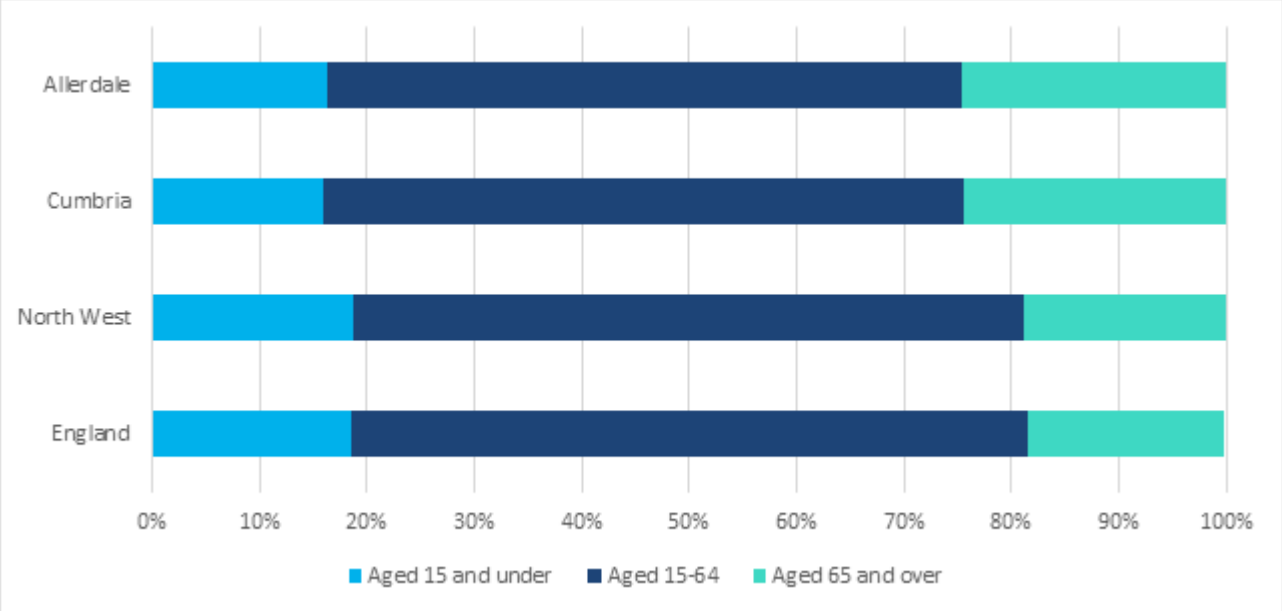
Table 16-4 Administrative areas by population and population growth [270]

Administrative area	Population (2021 Census)	Population change (2011-2021, %)
Allerdale	96,200	-0.3%
Cumbria	499,900	0.0%
North West	7,417,400	5.2%
England	56,490,000	6.6%

Age profile

16.5.3.5 Plate 8-1 presents the administrative aeras by age profile. The proportion of the population in Allerdale aged 15 and under (16.3%) is lower than the regional and national averages. In contrast, the proportion of the population that are aged 65 and over is significantly higher in Allerdale (24.7%) compared to the North West region (18.7%) and England (18.3%). The proportion of the population that are of working age in Allerdale and Cumbria is lower than the North West and England as a whole.

Plate 16-1 Administrative areas by age profile [270]

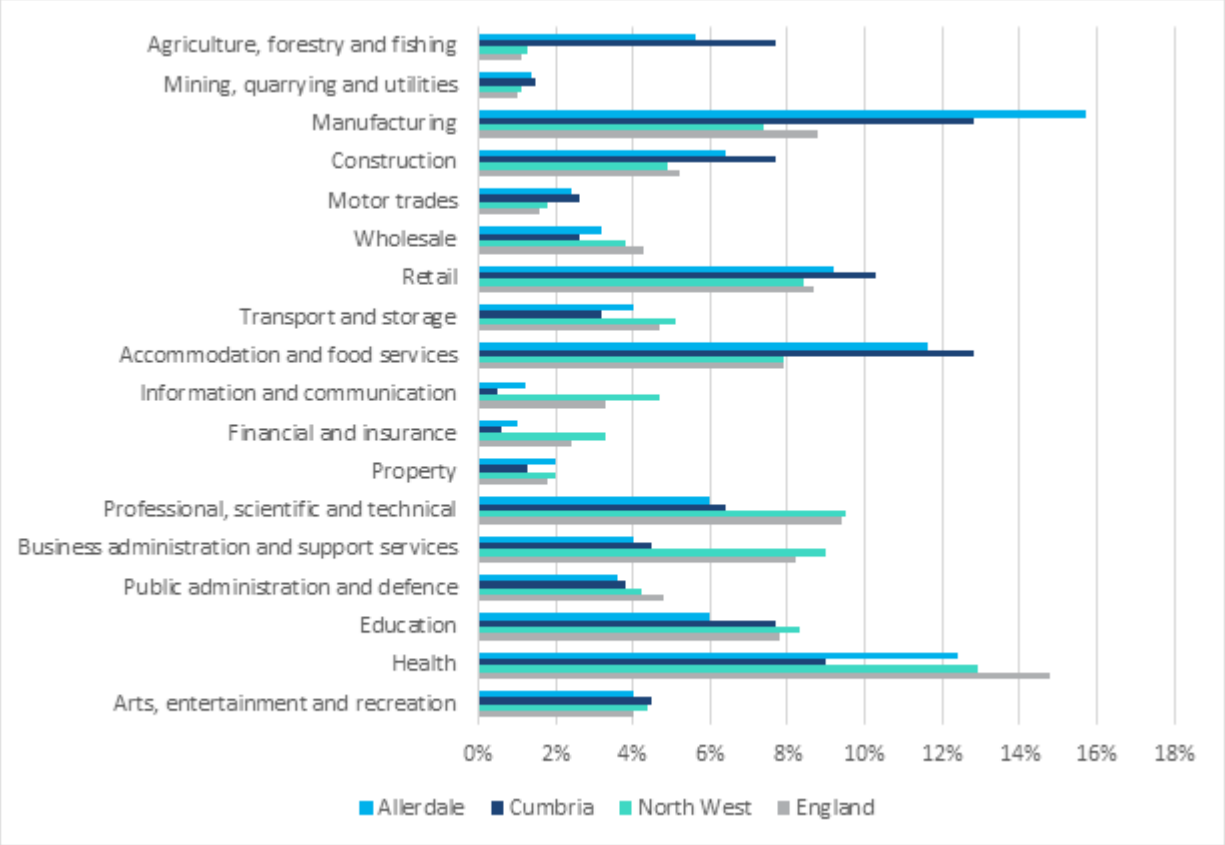


Key employment sectors

16.5.3.6 Plate 16-2 shows the administrative areas within the route by employment by broad industrial group. The largest sectors by employment in Allerdale are manufacturing (15.7%), health (12.4%), and accommodation and food services (11.6%). Allerdale and the wider Cumbria area have a notably higher level of employment in the manufacturing and tourism sectors compared to the regional and national averages.

16.5.3.7 In comparison, the top three sectors by employment in the North West region are health (12.9%), professional, scientific, and technical services (9.5%), and business administration services (9.0%). The top three sectors by employment in England as a whole are the health sector, professional, scientific, and technical services, and retail.

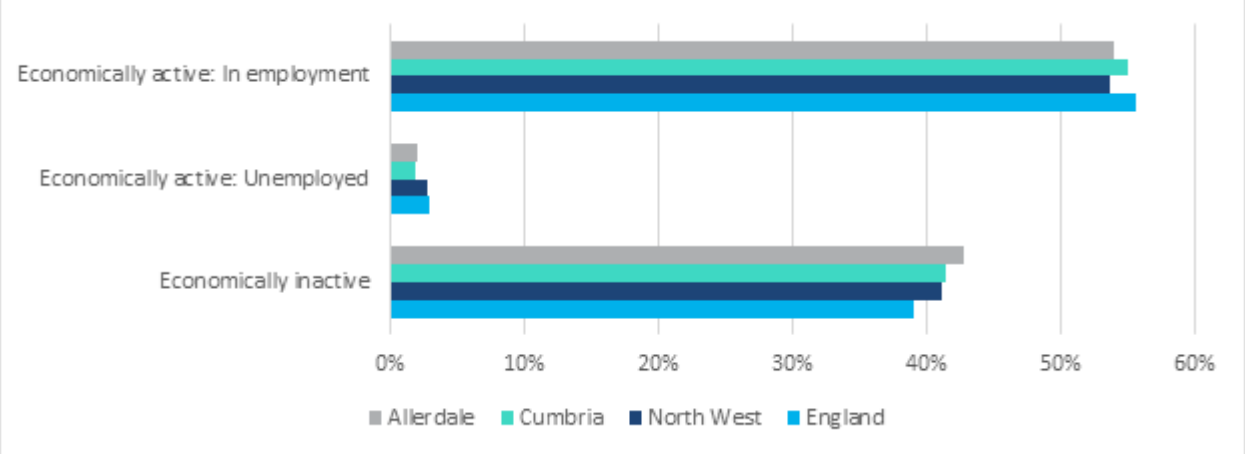
Plate 16-2 Employment by broad industrial group (BRES, 2022)



Economic activity and unemployment

16.5.3.8 According to 2021 Census data [270], 54% of the population aged 16 and over in Allerdale are economically active, which is broadly in line with the economic activity rate in Cumbria (55.1%), the North West (53.7%), and England (55.7%). Economic inactivity is slightly higher in Allerdale compared to the regional and national averages, reflecting the higher proportion of the population aged 65 years and over. Unemployment in Allerdale (2%) and Cumbria (1.9%) is slightly lower than the North West (2.8%) and England (2.9%).

Plate 16-3 Economic activity and unemployment by administrative area [271]



Land Use – Commercial Receptors

16.5.3.9 The following commercial receptors have been identified within 500m of the draft Order Limits:

- The Melbreak Hotel and Restaurant, Great Clifton
- The Barn Bed and Breakfast, Great Clifton
- Grassmoor View Holiday Park
- Cumberland Lodge
- Hunday Manor Country House
- Oilys Restaurant
- Lillyhall Industrial Estate
- The Wild Duck Inn, Branthwaite

Land Use – Community Facilities

Recreational and community facilities

16.5.3.10 The following recreational and community facilities have been identified within 500m of the draft Order Limits:

- St Luke's Church, Clifton
- Allotment on Fell View Road, Little Clifton
- Bridgefoot Village Hall

16.5.3.11 No amenity greenspace has been identified within the study area.

Public Rights of Way

16.5.3.12 Given the draft Order Limits' historic use, there are no PRoW that cross the draft Order Limits in its entirety. There are however PRoW located within the surrounding areas and some which enter the draft Order Limits as shown on Figure 16.2 Public Rights of Way. Local roads are also promoted for recreational access.

16.5.3.13 Table 16-5 identifies the PRoW that may interact with the draft Order Limits. These have been identified using the PRoW map available on the Cumberland Council website [272].

16.5.3.14 No promoted national cycle routes, long-distance paths or national trails have been identified in the study area.

Table 16-5 Existing PRoW that interact with the draft Order Limits

PRoW reference	Description
Footpath No. 241007	Short section of footpath running east-west and accessed off the local road network between Furnace House to Little Clifton
Footpath No. 241005	Footpath running east-west between Furnace House unclassified road U2188 102.
Footpath No. 230010	Footpath running east-west off Winscales Road (A595) and into the draft Oder Limits
Footpath No. 260003	Footpath running east-west from Winscales Road (A595) before bearing south through Lucy Close Farm to join the local road into Branthwaite
Footpath No. 260001	Short section of footpath that runs between Winscales Road (A595) and the local road network between the A595 Lillyhall roundabout and Branthwaite

Land use – development land

16.5.3.15 The following strategic land allocations for future development are included in the Allerdale Local Plan and are within 500m of the draft Order Limits:

- Strategic Policy S3 in the Allerdale Local Plan (Part 1) [262] identified a housing need of at least 5,471 net additional dwellings to be delivered over the plan period of 2011-2029. The villages of Little Clifton and Bridgefoot to the north of the draft Order Limits are identified as Limited Growth Villages in the Local Plan, with housing stock growth of 6% envisaged over the Plan period (in combination with other Limited Growth Villages).
- The draft Order Limits is located within an area identified as suitable for wind energy development under Policy SA50 in Part 2 of the Local Plan [263]. This area spans the entirety of the former borough of Allerdale excluding areas within and in proximity to the Lake District National Park, Hadrian's Wall World Heritage Site, and the Solway Coast Area of Outstanding Natural Beauty.
- There is one allocated housing site within 1km of the draft Order Limits at Scots Croft, which is adjacent to Bridgefoot Village Hall.

16.5.3.16 In addition to the Local Plan allocations, a small area of river, sand and gravel resource has been identified in the centre of the draft Order Limits.

16.5.3.17 The cumulative effects assessment, the approach to which is set out in Chapter 19, will address any land that is associated with other existing development and/or approved development. It is noted that the Dean Moor Solar Farm NSIP is directly adjacent to the draft Order Limits to the south.

16.5.4 Future baseline

16.5.4.1 The future baseline for residential properties, businesses, community facilities, open and development land over the medium-term is uncertain. Due to this uncertainty, it is assumed that the future baseline for the study area would be unchanged from the current baseline, except where new development is expected

to be delivered in line with allocated and planned development sites as set out above.

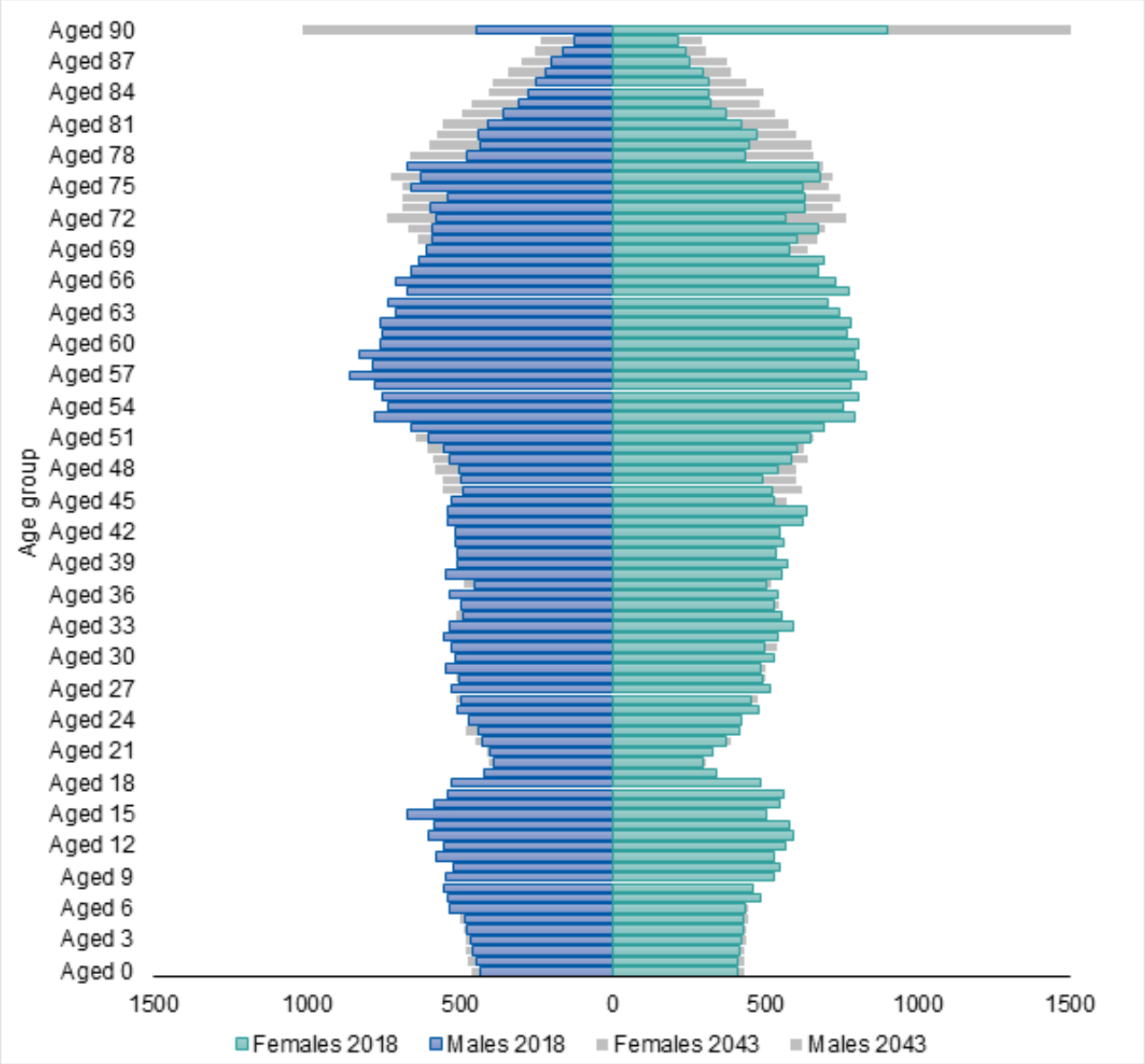
16.5.4.2 According to ONS 2018 population projections, the population of Allerdale is forecast to increase by 0.6% from 2018 to 2043, compared to 5.8% in the North West and 6.8% in England. As outlined in Table 16-6, the population growth by age group in Allerdale is forecast to vary significantly, with the population aged 15 years and under expected to decline by 5%, whereas the population aged over 65 is expected to increase by 19.4% from 2024 to 2043.

Table 16-6 Administrative areas by projected population from 2024 to 2043 – total and by age group (ONS, 2018)

Administrative area	% Change, total	% Change, 0-15	% Change, 16-64	% Change, 65+
Allerdale	0.6%	-5.0%	-6.3%	19.4%
North West	5.8%	-0.6%	1.6%	25.0%
England	6.8%	-1.8%	1.8%	31.0%

16.5.4.3 Plate 16-4 shows a population pyramid of the total population in Allerdale as of 2024, with the grey bars representing an increase in population between 2024 and 2043. The widening of the top of the pyramid reflects an ageing population, with an increasing proportion of the population in the area aged 65 and over.

Plate 16-4 Population pyramid of Allerdale from 2024 to 2043 (ONS, 2018)



16.6 Potential impacts

16.6.1.1 The Proposed Development has the potential to generate a range of socio-economic impacts, many of which would be temporary and focused on the construction phase.

16.6.2 Construction

16.6.2.1 The following impacts may arise during construction:

- Temporary construction employment.
- Potential supply chain opportunities during construction.
- Potential impacts on the local population or those living / working in the areas surrounding the Proposed Development.

- Effects on recreational resources, including PRoW.
- Effects on wider land uses.

16.6.3 Operation

16.6.3.1 Many of the impacts generated by the Proposed Development would be experienced during the construction phase and where possible, mitigation measures developed for construction effects (e.g., impacts on PRoW) would be designed in such a way that they provide the permanent design solution. These measures would also seek to bring about enhancements to receptors and some of these enhancements (e.g., new sections of PRoW) may be implemented post construction and therefore available into the operational phase of the Proposed Development. Operation phase impacts may therefore include enhancement to users of recreational resources.

16.6.3.2 Maintenance visits to the Proposed Development during operation would be minimal (circa 1 per month) and would involve staff accessing the Proposed Development in a car / non-HGV vehicle. Impacts stemming from this to the local population are therefore likely to be limited.

16.6.3.3 Operation may provide some employment opportunity to the local and wider regional market.

16.6.3.4 Impacts on land use would be first felt during construction, and therefore are accounted for as such.

16.6.4 Decommissioning

16.6.4.1 It is anticipated that the potential impacts of the decommissioning of the Proposed Development would be similar to those identified for construction in relation to job creation and supply chain opportunities. This phase of the Proposed Development could alter/revert any changes made to PRoW where this brings beneficial impacts.

16.7 Design, mitigation and enhancement measures

16.7.1 Design principles

16.7.1.1 The Proposed Development is being designed with regard to a set of design principles. Relevant to socio-economic receptors and these include:

- A reasonable buffer between residential dwellings and the nearest panels will be maintained.
- Impacts on public rights of way will be minimised through the use of buffer zones and planting

16.7.2 Embedded measures

16.7.2.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

16.7.2.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to socio-economic receptors already committed to include:

- Routing for construction and operational vehicles will avoid routing through local villages wherever possible.

16.7.2.3 Further embedded measures are likely to include:

- Access to any community facilities and assets to be maintained subject to any limitations from third parties.
- Diversion and/or creation/upgrade of sections of PRoW.

16.7.3 Further mitigation

16.7.3.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for socio-economic receptors will be defined through the PEIR/ES once the level of significance of effects is known.

16.7.4 Management plans

16.7.4.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to socio-economics including:

- Outline Construction Environmental Management Plan (oCEMP)
- Outline Construction Traffic Management Plan (oCTMP)
- Outline Public Rights of Way Management Plan (oPRoWMP)
- Outline Decommissioning Environmental Management Plan (oDEMP)

16.7.4.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

16.7.4.1 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

16.8 Likely significant effects

16.8.1.1 The assessment will consider the construction, operation, and decommissioning of the Proposed Development. The likely significant effects identified below take into account the design, mitigation and enhancement measures described above. A summary of likely significant effects of the Proposed Development over the project phases is provided below.

16.8.2 Construction

16.8.2.1 Given the baseline situation, design principles and embedded measures, it is considered that the following receptors may be impacted during the construction of the Proposed Development.

- Employment & Skills - construction related employment, training and apprenticeship opportunities,
- Supply Chain – indirect employment and supply chain opportunities.
- Potential temporary closure or diversions of PRoW and recreational routes.
- Potential temporary impacts on wider land uses including commercial and community receptors.
- Potential impacts on development land and land identified as a key resource (e.g. minerals).
- Potential temporary and/or permanent adverse amenity impacts.

16.8.2.2 In relation to employment and skills and supply chain receptors, construction of the Proposed Development has the potential to generate significant beneficial effects. It is therefore proposed that potential effects in relation to employment and supply chain are **scoped in** as part of the assessment.

16.8.2.3 Although given the historical uses on the draft Order Limits, the network of PRoW in the study area is not extensive, the Proposed Development has the potential to significantly effect PRoWs both negatively (e.g. disruption during construction) and positively (e.g. proposed new or extended routes). It is therefore proposed that direct and indirect effects on the PRoW network are **scoped in** as part of the assessment and opportunities will be explored to consider increased access and / or reinstatement of historical routes where appropriate.

16.8.2.4 The initial baseline identifies a limited number of wider land uses, including commercial and community receptors, within the study area. Any effects on these receptors would be indirect only, with proposed works not directly affecting the resource. Given the limited number of receptors and the indirect nature of any potential effects it is considered that this can be managed and mitigated through the committed management plans (e.g. oCEMP, oCTMP and oDEMP). It is therefore proposed that the assessment of indirect effects on commercial and community receptors is **scoped out** of the assessment.

16.8.2.5 As outlined in the baseline, there are no development land allocations within the draft Order Limits with the exception of the 'suitable for wind energy

development' allocation under Policy SA50. It should be noted that this area spans the entirety of the former borough of Allerdale excluding areas within and in proximity to the Lake District National Park, Hadrian's Wall World Heritage Site, and the Solway Coast Area of Outstanding Natural Beauty. The Proposed Development seeks the delivery of renewable energy generation and therefore does not conflict with this broad allocation. It would also not impact on other allocations within the locality and therefore it is proposed that effects on development land is **scoped out** of the assessment.

16.8.2.6 British Geological Survey Mapping [273] identifies a small area of river sand and gravel resource in the centre of the draft Order Limits. Areas of solar panels would avoid this area and the asset would therefore be unaffected by the Proposed Development and could, in theory continue to be accessed, subject to the necessary consents and licenses. It is therefore proposed to **scope out** impacts on mineral resources as part of the land use assessment.

16.8.2.7 Any wider effects on the local population (amenity effects) would be indirect with a commitment to avoid residential areas. These indirect amenity effects would be sufficiently dealt with by other assessment chapters (e.g. noise and visual effects) and mitigated through management plans. It is therefore not considered necessary to undertake a specific amenity assessment as part of the socio-economic chapter and it is therefore proposed these are **scoped out** of the assessment.

16.8.3 Operation

16.8.3.1 Many of the potential impacts on socio-economic receptors would be first experienced during the construction phase and would be scoped out of further assessment as part of the operation phase assessment.

16.8.3.2 The operation phase has the potential to generate a limited amount of additional employment opportunities, as well as some local supply chain requirements and as such, effects upon employment and skills and supply chain receptors is **scoped in** for further assessment.

16.8.3.3 It is considered that potential effects on PRoW and recreational resources would occur during the construction phase with mitigation measures developed during construction designed in such a way that they provide the ongoing design solution (e.g. PRoW diversions implemented on their ongoing/operational alignment. Such effects and proposed mitigation would therefore be reported during construction and would not be considered further as part of the operational assessment. The proposed development does however offer opportunities for enhancement of the PRoW network and the potential effects of such measures would be considered. It is therefore proposed that potential effects on the PRoW network are **scoped in** as part of the assessment during operation.

16.8.3.4 There would be no direct or indirect effects during operation on wider land use receptors, including community and commercial receptors and development land allocations. It is therefore proposed that these receptors are **scoped out** of the operational stage assessment.

16.8.3.5 In a similar way to the construction stage, any wider effects on the local population (amenity effects) during operation would be indirect and it is considered that such effects are sufficiently dealt with in other assessment chapters, as well as being managed through commitments to be set out within the committed management plans. It is therefore proposed that wider indirect amenity effects are **scoped out** of the operational stage assessment.

16.8.4 Decommissioning

16.8.4.1 It is anticipated that the potential effects of the decommissioning phase of the Proposed Development would be similar to those identified for construction in relation to employment and supply chain opportunities, as well as access to commercial and community receptors. The phase could also alter any changes made to PRoW. As with the construction phase, it is proposed that the scope of the decommissioning stage assessment would include:

- Employment, skills and supply chain effects – **scoped in**
- Effects on PRoW and recreational resources – **scoped in**
- Potential temporary effects on wider land uses including commercial and community receptors – **scoped out**
- Potential effects on development land and land identified as a key resource (e.g. minerals) – **scoped out**
- Potential effects on the wider population (e.g. amenity effects) – **scoped out**

16.9 Proposed assessment methodology

16.9.1.1 An assessment of potential effects would be undertaken to consider the potential impact of the Proposed Development against the established baseline environment.

16.9.1.2 The significance of an effect is a function of the value or 'sensitivity' of the receptor and the 'magnitude' or 'scale' of the change or impact.

16.9.1.3 Given the lack of published guidance or significance criteria for the assessment of socio-economic effects, the assessment would use bespoke methodology and significance criteria which has been used and tested on a number of other projects and subject to examination. Our proposed approach would include and assessment of the likely scale, permanence and significance of effects associated with socio-economic receptors.

16.9.1.4 Appropriate quantitative and qualitative significance criteria are defined below, based on professional judgement and accepted industry best practice and these criteria would be used to undertake the assessment of socio-economic effects.

Socio-economics

16.9.1.5 It is proposed that the assessment of employment effects during construction, operation and decommissioning is informed by data provided by the Applicant and

based on staffing requirements of similar UK base projects. Assumptions would be made in relation to the proportion of the workforce who may be sourced from the immediate region and the Homes and Communities Agency (HCA). Additionality Guide [266] would be used to calculate leakage and displacement effects, providing a net direct employment estimate for the Proposed Development.

16.9.1.6 Indirect and induced effects would also be considered using ready reckoner figures from the HCA Additionality Guide.

Land use receptors

16.9.1.7 It is proposed that the assessment of potential effects on wider land use receptors, including recreational and community facilities, development land and PRoW considered the potential direct and indirect effects during construction, operation and decommissioning.

16.9.1.8 Receptors would be identified using both published datasets, as well as through consultation activities. The sensitivity of each receptor would be defined based on the criteria presented below and consideration given to any direct or indirect effects.

16.9.1.9 Professional judgement would be used to consider the potential effects and mitigation requirements considered where necessary.

Assessment criteria

16.9.1.10 It is proposed that the following criteria are used in the assessment of socio-economic effects to determine sensitivity, magnitude of impact and overall significance of effect. Moderate and major effects are to be considered as significant in EIA terms.

Table 16-7 Sensitivity or value of receptors

Sensitivity	Definition of sensitivity
High	• Businesses, individuals, groups of individuals, or other receptors possessing very significant economic, social and/or community value. • These receptors are considered very likely to incur a significant loss or gain as a result of potential changes in the environment, with little to no potential for substitution. For example: residential properties, a regional or national trail, directly affected business premises or community facilities.
Medium	• Businesses, individuals, groups of individuals, or other receptors possessing some significant economic, social and/or community value. • These receptors are considered likely to incur some loss or gain as a result of potential changes in the environment, with limited potential for substitution. For example: a footpath or bridleway or land associated with a residential or business receptor
Low	• Businesses, individuals, groups of individuals, or other receptors possessing some economic, social and/or community value. • These receptors are not considered likely to incur a loss or gain as a result of potential changes in the environment, with potential for substitution. For example: a permissive trail.

Sensitivity	Definition of sensitivity
Negligible	• No change to business, individuals, groups of individuals or other receptors.

Table 16-8 Magnitude of impact

Sensitivity	Definition of sensitivity
High	• An adverse or beneficial effect that would be likely to result in total loss of an individual receptor or permanent changes to baseline situation for a large number of businesses, individuals or groups of individuals.
Medium	• An adverse or beneficial effect that would be very likely to result in partial changes to baseline situation for a moderate number of businesses, individuals or groups of individuals.
Low	• An adverse or beneficial effect that would be likely to result in minor changes to baseline situation for a small number of businesses, individuals or groups of individuals.
Negligible	• An adverse or beneficial effect that would be likely to result in little or no change to baseline situation for businesses, individuals or groups of individuals.

Table 16-9 Significance of effects

		Sensitivity of receptor			
		High	Medium	Low	Negligible
Magnitude of impact	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

16.10 Assumptions, limitations and uncertainties

16.10.1.1 The socio-economic assessment would rely largely on secondary data which is published by various third party providers. The assessment is therefore based on data and a baseline situation at a point in time.

16.10.1.2 Decommissioning of the Proposed Development is likely to generate future effects on socio-economic and land use receptors, however, the scale of these impacts is not possible to quantitatively assess at this stage given uncertainties in relation to the exact nature of the activity given the timescales and potential evolution of decommissioning processes over the lifetime of the Proposed Development. Effects during the decommissioning phase are therefore assumed to be similar to those likely to be experienced during construction of the Proposed Development as a worst-case.

16.11 Summary

Table 16-10 Socio-economic scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Employment and supply chain effects	Scoped In	Scoped In	Scoped In	No surveys required
All other socio-economic effects related to the local population (amenity effects)	Scoped Out	Scoped Out	Scoped Out	No surveys required
Land Use – PRoW and recreational resources	Scoped In	Scoped In	Scoped In	No surveys required
Land Use – potential indirect effects on commercial receptors, community facilities and development land.	Scoped Out	Scoped Out	Scoped Out	No surveys required
Land Use – Development land and allocations (including mineral resource)	Scoped Out	Scoped Out	Scoped Out	No surveys required
Socio-economic – wider population effects / amenity effects	Scoped Out	Scoped Out	Scoped Out	No surveys required

17 Traffic and transport

17.1 Introduction

17.1.1.1 This chapter outlines the baseline conditions for the Proposed Development relating to traffic and transport. It further sets out the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of traffic and transport.

17.1.1.2 It sets out traffic and transport receptors of relevance, and the approach to the assessment of the Proposed Development's impacts during construction, operation and decommissioning.

17.1.1.3 The following aspects have been considered as part of the scope and methodology for traffic and transport:

- Severance
- Driver and pedestrian delay
- Pedestrian and cyclist amenity
- Accidents and safety

17.1.1.4 This chapter is supported by the following figures:

- Figure 17.1 Baseline traffic and transport conditions

17.2 Relevant legislation, policy, standards and guidance

17.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines for transport which underpin the assessment methodology for traffic and transport.

17.2.2 Legislation

Table 17-1 Traffic and transport - Legislation

Legislation	Relevance to assessment
There is no legislation specifically relevant to the assessment of traffic and transport in relation to the Proposed Development	

17.2.3 Policy

Table 17-2 Traffic and transport - Policy

Policy	Relevance to assessment
Overarching NPS for Energy (EN-1) [274]	Section 5.14 (traffic and transport) is relevant to this chapter of the scoping report and provides detail of what should be included as part of this assessment.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [275]	Section 2.10 details solar photovoltaic guidance. EN-3 should be read in conjunction with EN-1. Section 2.7.8 to 2.7.12 and details the transport infrastructure required to support renewable energy infrastructure which may influence site selection and designs. It is stated that government policy encourages multi-modal transport and it is expected that applications will transport materials by water or rail routes where possible, with road transport expected where this is not feasible or for shorted journeys. Section 2.10.120 to 2.10.127 is relevant to this chapter as details of construction traffic and transportation noise are discussed.
National Planning Policy Framework (NPPF) [276]	Section 14 gives detail of the ambition to decrease the impact of climate change. Solar farm developments, such as Lostrigg, will help achieve this. Section 9 is relevant to this chapter of the scoping report as details on promoting sustainable transport are outlined. Section 9 outlines that transport issues should be considered from the earliest stages of plan-making and development proposals to ensure that potential impacts of development on the transport network, opportunities 279orm existing or proposed transport infrastructure can be realised, opportunities to promote sustainable modes of travel can be encouraged and that the environmental impacts of traffic and transport can be identified. This section also identifies that applications for development should: follow the transport hierarchy, address the needs of people with disabilities, create safe secure and attractive places, allow for the efficient delivery of goods and access by service and emergency vehicles and be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.
Cumbria Transport Infrastructure Plan 2022-2037 (Cumberland Council) (2021) [277]	The Infrastructure Plan sets out the policy framework for transport and connectivity in supporting sustainable and inclusive growth in Cumbria for the period 2022-2037. It has been developed by Cumbria County Council and Cumbria Local Enterprise Partnership and is Cumbria's Local Transport Plan. For the A595, which provides the main route between Carlisle, West Cumbria and Barrow-in-Furness, funding has been committed for a new link between the A595 and the M6 Junction 42 and for improvements at Grizebeck with a new link to improve current single-lane bottlenecks. Furthermore, Key Proposal 2b, refers to making the case for the delivery of improvements to the

Policy	Relevance to assessment
	A595 corridor and to promote a new eastern link around Whitehaven in the form of Whitehaven Relief Road.
Allerdale Local Plan (Part 1) [278]	The Local Plan sets out site allocations and associated policies. Theme 4 of the Local Plan outlines the strategic transport vision and framework for future sustainable development within Allerdale. SO4a states that the majority of development should be located in areas that was accessible by a variety of modes of transport, particularly public transport, walking and cycling and to reduce the need to travel. Other objectives relate to the need to improve sustainable transport access, support road and rail infrastructure improvements, develop and maintain safe and efficient integrated transport networks with good internal links and connections to key routes, as well as enable the delivery of transport hubs across the area.
Cumberland Consolidated Planning Policy Framework [279]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

17.2.4 Standards and guidance

Table 17-3 Traffic and transport - Standards and guidance

Standards and guidance	Relevance to assessment
IEMA Guidelines for the Environmental Assessment of Road Traffic (2023) [280]	The IEMA Guidelines provide thresholds and standards for measuring the traffic and transport impacts of a development.
The Design Manual for Roads and Bridges, National Highways [281]	Provides requirements and advice documents relating to works on motorway and all-purpose trunk roads in the UK.
DLUHC Guidance: Transport Evidence Bases in Plan Making and Decision Taking (2015) [282]	Guidance to help local planning authorities assess and reflect strategic transport needs in Local Plan making. It advises that the existing transport situation and likely generation of trips should be assessed, alongside the impact on the locality in social, economic and environmental terms. Facilities that support sustainable modes of travel in proximity to the site and opportunities to reduce the need for travel should be promoted where appropriate. Considerations should also be made regarding the cumulative impacts of existing and proposed developments on the transport network and the quality and capacity of transport infrastructure.
DLUHC Guidance: Travel Plans, Transport Assessments and Statements (2014) [283]	Provides advice on when Transport Assessments and Transport Statements are required, and what they should contain. Information regarding the proposed transport access and information on the existing functional classification of the nearby road network for the proposed development should be included in assessments and statements. Data about existing public transport provision, current traffic flows, proposed trip calculations for the proposed development and injury accident records on the nearby public highways should also be included in these documents. Measures and ways to improve the accessibility of the location and encourage environmental sustainability by reducing the need to travel are also important features in assessments and statements. Travel Plans should identify the specific required targets, measures and outcomes as well as set out clear future monitoring and management arrangements. Benchmark travel data, relevant information on existing travel habits in the area and proposals to reduce the need for travel are three key aspects of Travel Plans. Travel Plans should set out explicit outcomes rather than solely identifying processes to be followed. All journeys results from a proposed development should be included in these plans.

17.3 Consultation

17.3.1.1 The following stakeholders have been be consulted with regards to traffic and transport as part of the scoping process:

- National Highways
  - A meeting was held with National Highways on the 5th June 2024, introducing them to the project. Currently, the A595 is within the draft Order Limits to facilitate a cable corridor option, should this route remain National Highways has stated that they would require legal advice to help inform them on the subsequent processes that would have to occur as a result of this. There will therefore be ongoing consultation with National Highways regarding the potential on-road cable option and the processes that the applicant will need to follow to permit development on the Strategic Road Network.
  - Based on the potential operational impact of the Proposed Development, National Highways suggested that traffic and transport could be scoped out of the EIA based on the initial information presented at the meeting. This would be subject to a review of the evidence provided at scoping stage and confirmation of management plans to be provided (such as a Construction Traffic Management Plan).
  - Dean Moor Solar, a nearby Solar Farm development, was also highlighted by National Highways regarding the potential for cumulative transport effects.
- Cumberland Council
  - A meeting was held with Cumberland Council on the 22nd May 2024. Based on the information presented at the meeting, Cumberland Council suggested that they would be supportive of an assessment on traffic and transport to being scoped out of the EIA so long as a Transport Statement, Construction Traffic Management Plan and where relevant, a Construction Workforce Travel Plan, being provided. The need to review cumulative impacts with Dean Moor Solar was also raised by the Council.

17.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to traffic and transport.

17.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

17.4 Study area

17.4.1.1 The area surrounding the Proposed Development is in a rural area, to the east of the A595. The area south of the Proposed Development, in Lillyhall, is primarily made up of industrial uses with the surrounding roads generally being distributor roads.

17.4.1.2 Due to the nature of the Proposed Development and proposed access strategy, consideration will be given to a number of locations within the surrounding highway network which could potentially be impacted. Strategic roads include:

- A595
- A66
- A596

17.4.1.3 Local roads within the vicinity of the draft Order Limits include:

- Blackwood Road
- Moor Road
- Private access to Stargill Farm providing access to the Proposed Development.
- Unnamed road connecting the A595 and A596
- Unnamed road east of Lillyhall Roundabout
- Unnamed road west of the A595
- Winscales Lane to the west and Clifton Green to the east, providing access to all parcels.

17.5 Baseline conditions

17.5.1 Desktop sources used

17.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- Google Maps [284]
- Crashmap [285]
- WebTRIS [286]
- National Rail [287]

17.5.2 Surveys undertaken and proposed

17.5.2.1 No surveys have been undertaken at the time of writing.

17.5.3 Existing baseline

Existing local highway network

17.5.3.1 There are three strategic roads, as visible on Figure 2.1 located in the close proximity of the draft Order Limits:

- A595: Running directly adjacent to the draft Order Limits, a two lane single carriageway subject to the national speed limit. A footpath is located on one side of the carriageway. The A595 provides a link north to the A66 and south to the A590 in Dalton-in-Furness.
- A66: A two lane carriageway, subject to the National Speed Limit, which reduces when passing through settlements. The A66 provides a connection to Teesside in the east as well as northerly connections to Scotland via the M6.
- A596: A two lane single carriageway subject to a 50mph speed limit. The A596 provides connections from the A595 into Workington.

17.5.3.2 A number of local roads also run within close proximity to the draft Order Limits:

- Blackwood Road
- Moor Road
- Private access to Stargill Farm providing access to the Proposed Development.
- Unnamed road connecting the A595 and A596
- Unnamed road east of Lillyhall Roundabout
- Unnamed road west of the A595
- Winscales Lane to the west and Clifton Green to the east, providing access to all parcels.

Accidents and Safety

17.5.3.3 Accident data, taken from Crashmap [285] has been reviewed for the years 2018-2022. No serious clusters of accidents are present.

17.5.3.4 There are two fatal accidents present on the A66 north of the draft Order of Limits, one occurring in 2018 and one in 2019.

Existing active travel facilities

17.5.3.5 Public Rights of Way (PRoW) running through the draft Order Limits include:

- Footpath 241007
- Footpath 241005
- Footpath 230010
- Footpath 241007
- Footpath 260001

17.5.3.6 National Cycle Network Route 72 is located approximately 3 miles (4.5km) from the Proposed Development.

17.5.3.7 These features are illustrated on Figure 17.1.

Existing public transport facilities

Bus

17.5.3.8 The closest bus stops to the draft Order Limits are located at Chapel Brow Manor. Bus stops at this location are serviced by the number X5 bus, providing hourly services to Workington and Keswick. This is illustrated on Figure 17.1.

Rail

17.5.3.9 Workington railway station is located approximately 5km from the draft Order Limits. Northern services from Workington provide links to Carlisle, Whitehaven, Barrow-in-Furness and Lancaster.

17.5.3.10 Harrington Railway station is also located approximately 5km from the draft Order Limits. Northern services from Harrington provide links to Carlisle, Whitehaven, Barrow-in-Furness and Lancaster.

17.5.3.11 Rail stations are illustrated on Figure 17.1.

17.5.4 Future baseline

17.5.4.1 The future baseline of the draft Order Limits is expected to remain largely as outlined. Future developments could alter traffic flows and usage of the Road Network but no significant changes are forecast.

17.6 Potential impacts

17.6.1 Construction

17.6.1.1 The construction works are of a temporary nature (24 months), however, during this temporary period the traffic generated by the Proposed Development could have the following effects:

- severance (change in traffic flows);
- driver delay;
- pedestrian and cyclist amenity (change in traffic flows on routes used by pedestrians and cyclists); and
- accidents and safety.

17.6.1.2 It is expected that the draft Order Limits will be accessed via the A595.

17.6.1.3 Vehicular access points could include:

- Winscale Road
- Clifton Green
- Private access to Stargill Farm
- Unnamed road from the Lilyhall Roundabout to Branthwaite

17.6.1.4 To understand the scale of potential impacts, an estimate of the amount of construction traffic the Proposed Development could generate has been calculated based on the construction of other solar farm developments throughout the UK, and professional judgement.

17.6.1.5 Data from three other similar RWE UK based solar farm planning applications sites has been obtained, which showed that for the duration of the construction period, they generated an average of 104 construction deliveries per 13 hectares of panel area., and each 32 acres of construction took approximately 3 and a half weeks to complete. Applying these factors to the anticipated area of solar PV (228ha) expected, results in an estimate that the draft Order Limits could generate 18 HGV trips (36 two-way movements) per day during the construction phase.

17.6.1.6 It is also forecast that there could be up to 50 members of staff travelling to/from the site at any given time during the construction phase of the Proposed Development. Based on similar sites constructed elsewhere, employees are expected to travel to the draft Order Limits in groups of up to 7 people. This is forecast to result in approximately 8 car/LGV trips (16 two-way movements) per day spread across the draft Order Limits.

17.6.1.7 Therefore, a total of 18 HGV trips (36 two-way movements) and 8 car/LGV trips (16 two-way movements) could see a total of 26 (52 two-way movements) being added onto the network per day during the construction phase of the Proposed Development.

17.6.1.8 This initial trip forecast has been reviewed against the nearby Dean Moor Solar Farm development to ensure the forecasts made for the Proposed Development remain realistic. The EIA Scoping report for Dean Moor states that an initial appraisal of the likely impacts of that development has shown an anticipated level of traffic of 20 HGV trips (40 two-way movements) and 8 LGV trips (16 two-way movements) per day, during the construction period. This aligns with the forecast predicted for the Proposed Development.

17.6.2 Operation

17.6.2.1 Based on evidence from solar farm developments elsewhere, it is forecast that when the Proposed Development is operational, a small number of maintenance trips are expected with an average of one trip expected per month. Operational traffic is expected to be minimal, with occasional visits taking place by a handful of operatives. The majority of these trips will be by cars or vans, rather than HGVs. Thus, it is expected that any operational impacts on traffic and transport will be minimal and similar to the baseline environment.

17.6.3 Decommissioning

17.6.3.1 Decommissioning of the Proposed Development could give rise to a similar level of impact as the construction phase.

17.6.3.2 A robust interpretation of the construction phase represents a worst-case scenario for decommissioning, and therefore can be used as a proxy for the decommissioning stage. Similar activities are expected to be undertaken and vehicle movements are not expected to exceed those required during construction.

17.6.3.3 It is anticipated that the future baseline will be similar, with the exception of future developments, which may increase flows on the network. However, based on the information gathered for the construction phase, the flows during the decommissioning stage of the Proposed Development are unlikely to trigger a notable impact to severance, driver delay, pedestrian and cyclist amenity and accidents and safety, unlikely to trigger a notable impact to severance, driver delay, pedestrian and cyclist amenity and accidents and safety.

17.7 Design, mitigation and enhancement measures

17.7.1 Embedded measures

17.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

17.7.1.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to traffic and transport already committed to include:

- Routing for construction and operation vehicles will avoid routing through local villages.

17.7.2 Further mitigation

17.7.2.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for traffic and transport will be secured through the CTMP and Transport Statement.

17.7.3 Management plans

17.7.3.1 A suite of management plans will additionally be in place for the Proposed Development, relevant to traffic and transport including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Construction Traffic Management Plan (oCTMP)

- outline Decomissioning Environmental Management Plan (oDEMP)

17.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

17.7.3.3 These documents will specifically aim to reduce the impact of construction and decommissioning traffic on communities and the environment. Core objectives of these documents will include the routing of HGV vehicles, highways maintenance associated with the potential impact of HGV vehicles and the management of abnormal loads associated with the Proposed Development.

17.7.3.4 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council and National Highways in advance of the relevant phase of development.

17.8 Likely significant effects

17.8.1 Construction

Severance

17.8.1.1 To consider whether the potential change in traffic flows would have a severance effect, judgement has to be made on the magnitude of change in accordance with IEMA guidance and the sensitivity of receptors.

17.8.1.2 The IEMA guidance states that pedestrians are less sensitive to changes in traffic if there are adequate footways and crossing facilities. However, links where there will be high concentrations of sensitive locations (such as hospitals, schools and tourist attractions) are likely to be highly sensitive to changes in traffic flow unless there is separation from traffic.

17.8.1.3 For the Proposed Development, the receptors are users of the roads (pedestrians, cyclists, bus passengers, car drivers and freight drivers) within the Study Area. The receptor sensitivity within the Study Area is generally deemed to be Low, as stated in IEMA guidance, as there are residential areas and public land uses, but the roads have few direct frontage accesses and have capacity to accommodate change. Given the importance of the SRN, receptor sensitivity to changes on the A595, A66 and A596 is defined as High.

17.8.1.4 The assessment thresholds, set out in Table 17-4, are based on changes in traffic flows set out in IEMA.

Table 17-4 Severance assessment thresholds

Magnitude of Impact	Definition
High	More than 90% change in traffic flow

Magnitude of Impact	Definition
Medium	60% to 90%
Low	30 to 60%
Negligible	0% to 30%
No Change	No change in traffic flows

17.8.1.5 It is expected that the additional trips, associated with the Proposed Development, will not exceed the daily variation (+/-10%) of traffic flows.

17.8.1.6 The A595, A66 and A596 are all part of the SRN and, within the vicinity of the draft Order Limits, are all single carriageway routes with high daily average flows. The A595 is subject to Average Daily Flows (ADF) of over 12,000 vehicles between the intersections with the A66 and A596. Additional traffic, as a result of the Proposed Development, would account for a change of 0.2%.

17.8.1.7 There is no existing survey data available for the A66 and A596 within the vicinity of the draft Order Limits, but it is considered that the proposed change in traffic flow (approximately 26 trips (or 52 two way movements), in each direction) is still likely to be less than a 10% change in traffic flows on rural routes. A change in traffic of less than 10% is considered to have no discernible environmental effect, given that daily variations in background traffic flow may fluctuate by this amount.

17.8.1.8 Mitigation measures, including travel planning and HGV management during the construction stage, will be incorporated into a Construction Traffic Management Plan (CTMP). Therefore, given the forecast change in traffic flow (<10%) and through the application of traffic management messages to be agreed in the CTMP, no significant severance impact is anticipated and it is proposed that the effect on severance be **scoped out** of the assessment.

Driver delay

17.8.1.9 The IEMA Guidelines note that driver delays are only likely to be 'significant' when the traffic in the network surrounding the development is already at, or close to, the capacity of the system.

17.8.1.10 The IEMA Guidance does not define the magnitude of impact for driver delay. Therefore, for the purpose of this report, professional judgement has been used to determine the impact of driver delay, alongside consultation with the Council and National Highways and flow data.

17.8.1.11 Publicly available traffic data for the Strategic Network is available online via Webtris.

17.8.1.12 During the construction phase it is expected that there will be a total of 26 trips (52 two-way movements) when combining HGV trips with staff car/LGV trips. A

review of the Webris data was conducted looking at the last five years of average annual daily flow (AADF) on the A595. Results show a worst case scenario two way flow increase of 0.5% using flows from 2022 In other schemes of a similar nature, this volume has not been significant and is not expected to have a significant impact on driver delay.

17.8.1.13 Furthermore, through consultation with the Council and National Highways it was confirmed that the scale of traffic generated by the Proposed Development, and the anticipated scale of impact, is unlikely to effect driver delay on the local and strategic road network.

17.8.1.14 Therefore, it is proposed that impacts upon driver delay from construction of the Proposed Development are **scoped out** of further assessment.

Pedestrian and cyclist amenity

17.8.1.15 IEMA guidelines recommend pedestrian and cyclist amenity should be assessed where there is a significant increase in HGV flows on roads used by pedestrians and cyclists. As described within the baseline, limited footway provision is available alongside the carriageways in the vicinity of the Proposed Development which are likely to be used for construction vehicles. Combined with the fact that the change in traffic flows is likely to be low (below 10%), it is not anticipated that pedestrian and cyclist amenity on local roads would be affected by the Proposed Development.

17.8.1.16 Additionally, routing would be established in the CTMP to avoid the rural routes and villages with associated trips to the Proposed Development being assigned to the SRN.

17.8.1.17 It is acknowledged that pedestrian amenity on the PRoW network in the area may be affected, however, this would be considered further in the socio-economics assessment of the EIA. Mitigation proposals will be developed where necessary, and appropriate diversions and/or new routes will be established through a PRoW Management Plan to be submitted alongside the ES.

17.8.1.18 Therefore, it is recommended that the assessment of pedestrian and cyclist amenity is **scoped out** of further assessment as part of traffic and transport, however consideration of impacts upon PRoW will be included within the socio-economics assessment (see Chapter 16 Socio-economics).

Accidents and safety

17.8.1.19 The receptors are users of the roads (pedestrians, cyclists, bus passengers, car drivers and freight drivers) within the Study Area. The receptor sensitivity within the Study Area is generally deemed to be Low as there are residential areas and public land uses, but the roads have few direct frontage accesses and have capacity to accommodate change. Given the importance of the SRN, receptor sensitivity to changes on the A595, A66 and A596 is defined as High.

17.8.1.20 The IEMA Guidance references the use of professional judgement to assess the accident and safety impacts. The Proposed Development will generate additional traffic in the Study Area during the construction period.

17.8.1.21 The review of baseline conditions did not identify any clusters of collisions, and the change in traffic is expected to be within the daily variation of traffic flow (+/- 10%). Vehicular access into the Proposed Development will use established points of access off the public road network. It is therefore considered that there is no reason to consider the effects of the Proposed Development on accidents and safety any further, and it is **scoped out** of further assessment.

17.8.2 Operation

17.8.2.1 Based on evidence from solar farm developments elsewhere, it is forecast that when the Proposed Development is operational, a small number of maintenance trips are expected (one trip per month). Operational traffic is expected to be minimal, with occasional visits taking place by a handful of operatives. The majority of these trips will be by cars or vans, rather than HGVs. Thus, it is expected that any operational impacts on traffic and transport will be minimal, and the topic is **scoped out** of the operational assessment.

17.8.3 Decommissioning

17.8.3.1 Decommissioning of the Proposed Development could give rise to the same level of forecast trip generation as the construction phase of the Proposed Development and as such the construction assessment provides a worst-case scenario for potential effects.

17.8.3.2 Management and mitigation measures will be incorporated into an oDEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development.

17.8.3.3 The oDEMP will set out how vehicle access to and from the Proposed Development will be managed, and it is expected that the principles agreed to minimise disruption during construction will be reviewed and applied during decommissioning.

17.8.3.4 Effects during decommissioning are **scoped out** of further assessment.

17.9 Proposed assessment methodology

17.9.1.1 Based on a review of baseline conditions, and the initial consideration of likely effects, it is proposed that further assessment with regards to traffic and transport is **scoped out.**

17.9.1.2 After consultation with Cumberland Council and National Highways (NH), both stakeholders agreed that it is expected to be acceptable to scope traffic and transport out of the ES, albeit if the A595 remains as a potential on-road cable corridor, National Highways has stated that they would require legal advice to help

inform then on the subsequent processes that would have to occur as a result of this and discussions with National Highways would need to continue

17.9.1.3 A Transport Statement will be produced, to support the application, detailing baseline conditions, a qualitative and quantitative description of the travel characteristics of the Proposed Development, including movements across all modes of transport that would result from the Proposed Development, and measures to manage trips to the Proposed Development.

17.9.1.4 An Outline Construction Traffic Management Plan will also be developed.

17.10 Assumptions, limitations and uncertainties

17.10.1.1 The traffic forecast generated has been informed by construction trip rates from other RWE solar farm sites of a similar nature, with construction expected to take 24 months.

17.10.1.2 Similarly, based on the construction of other solar farm developments, it is expected that construction workers will travel in groups of 7 and car sharing will be encouraged through the CTMP.

17.10.1.3 It is expected that the majority of construction traffic accessing the site will fall into the 'normal' sized category (i.e. transit vans and HGVs). However, it is likely that there could be some abnormal load deliveries. If abnormal loads are required to access the site, the necessary permit will be sought from the Highway Authority.

17.10.1.4 The impact of the Proposed Development on the PRoW network will be addressed in the socio-economics assessment (see Chapter 16 Socio-economics).

17.11 Summary

17.11.1.1 As significant effects are not anticipated from traffic and transport as a result of the Proposed Development, it is proposed to scope out this topic from the ES. However, a Transport Statement will be produced which will review transport impacts from the Proposed Development and an Outline CTMP would be submitted in support of the DCO application.

Table 17-5 Traffic and transport scoping summary

Aspect	Construction	Operation	Decommissioning	Any required surveys?
Severance	Scoped out	Scoped out	Scoped out	None
Driver and pedestrian delay	Scoped out	Scoped out	Scoped out	None
Pedestrian and cyclist amenity	Scoped out	Scoped out	Scoped out	None
Accidents and safety	Scoped out	Scoped out	Scoped out	None

18 Water Resources and Flood Risk

18.1 Introduction

18.1.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, as described in Chapter 2, in respect of Water Resources and Flood Risk.

18.1.1.2 It sets out Water Resources and Flood Risk receptors of relevance, and the approach to the assessment of the Proposed Developments impacts during construction, operation and decommissioning.

18.1.1.3 The following aspects have been considered as part of the scope and methodology for Water Resources and Flood Risk:

- Surface water
- Groundwater
- Compliance with the Water Environment Regulations (WER)/Water Framework Directive (WFD)
- Water resources
- Flood risk

18.1.1.4 This chapter should be read in conjunction with:

- Chapter 7 - Biodiversity
- Chapter 11 – Ground Conditions

18.1.1.5 This chapter is supported by the following figures:

- Figure 18.1: Surface water features
- Figure 18.2: Bedrock geology
- Figure 18.3: Superficial geology
- Figure 18.4: WER WFD surface and transitional water catchments
- Figure 18.5: WER WFD groundwater bodies
- Figure 18.6: Groundwater designations
- Figure 18.7: Licenced abstractions
- Figure 18.8: Risk of flooding from surface water
- Figure 18.9: Flooding from rivers and sea
- Figure 18.10: Flooding from groundwater

18.2 Relevant legislation, policy, standards and guidance

18.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for Water Resources and Flood Risk and have informed the scope of the assessment.

18.2.2 Legislation

Table 18-1 Water Resources and Flood Risk - Legislation

Legislation	Relevance to assessment
Environment Act 2021 [288]	The Environment Act 2021 includes binding targets on water quality.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [289]	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transpose into English and Welsh law the Water Framework Directive 2000/60/EC and contain provisions to protect rivers, lakes, estuaries, coastal waters and groundwater. The regulations remain in force following the UK's withdrawal from the European Union. These regulations provide for protection of all types of water bodies and include environmental objectives, compliance parameters to be assessed and bring in the protection of areas with specific requirements such as shellfish waters for example. These requirements underpin the impact assessment for the water environment.
Conservation of Habitats and Species Regulations 2017 as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) [290]	The regulations provide for the designation and protection of important habitats and species as part of the National Site Network (NSN). The protection of water dependent NSN sites also forms part of the requirements established under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The regulations remain in force following the UK's withdrawal from the European Union. The 'Dutch Nitrogen Case' ruled that where an internationally important site (i.e. Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar Sites) is failing to achieve the required condition due to nutrient pollution, the potential for a new development to add to the nutrient load is 'necessarily limited'. This has informed the way in which the regulations apply to pollution related pressures and incidents, and informs the assessment regarding sensitivity of water environment receptors.
Environmental Permitting (England and Wales) Regulations 2016 [291]	These regulations are intended to manage and reduce pollution from certain industrial activities through permitting. These regulations are relevant as they set out the requirements in relation to environmental permits, including for discharges into the water environment.
Flood and Water Management Act 2010 [292]	This Act relates to the management of risks related to flooding and coastal erosion. The aim is to reduce the risk of flooding due to

Legislation	Relevance to assessment
	extreme weather events, which are likely to increase as a result of climate change. These regulations are relevant because they require design to consider changes to flood risk.
The Flood Risk Regulations 2009 [293]	Outlines requirements for the assessment of existing flood risk and the need to design new developments to ensure that they are safe from flooding and do not increase flood risk for surrounding receptors and transposes the Floods Directive 2007/EC/60 (Ref. 20.6) into law in England and Wales.
Water Resources Act 1991 [294]	Makes it an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. It also establishes regulatory controls for water abstraction, water impoundment and protection of water resources.
Land Drainage Act 1991 [295]	The Land Drainage Act 1991 identifies the responsible parties for the management and maintenance of land drainage including maintaining flows in watercourses. It provides relevant authorities with the powers to ensure landowners carry out works to maintain flows within watercourses and obtain the relevant consent(s) as required. This is relevant to design that could affect flows in Ordinary Watercourses.
The Infrastructure Planning (Environmental Impact Assessment) Regulations [296]	5 (2) The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors - (c) land, soil, water, air and climate;

18.2.3 Policy

Table 18-2 Water Resources and Flood Risk - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1) [297]	Section 4.10 of EN-1 sets out generic considerations that applicants and the Secretary of State should take into account to help ensure that renewable energy infrastructure is safe and resilient to climate change, and that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime. 2.4.3 Section 4.10 of EN-1 advises that the resilience of the project to climate change should be assessed in the Environmental Statement (ES) accompanying an application. For example, the impact of increased risk of drought as a result of higher temperatures should be covered in the water quality and resources section of the ES. 2.4.4 Section 5.6 Coastal Change and Section 5.8 Flood Risk of EN-1 set out generic considerations that applicants and the Secretary of State should take into account in order to manage coastal

Policy	Relevance to assessment
	change and flood risks. Generic environmental, biodiversity, ecology, geological and water management impacts are covered, including generic impacts and their mitigation. Section 5.8 refers to Flood Risk and Section 5.16 to Water Quality and Resources.
National Policy Statement for Renewable Energy Infrastructure (EN-3) [298]	NPS EN-3 flags the need for applicants for Solar photovoltaic sites to consider how plant will be resilient to increased risk of flooding. Applicants will consider several factors when considering the design and layout of sites, including ability to mitigate environmental impacts and flood risk. Sets out requirements for solar farms: • Where a Flood Risk Assessment has been carried out this must be submitted alongside the applicant's ES. This will need to consider the impact of drainage. • Where access tracks need to be provided, permeable tracks should be used, and localised Sustainable Drainage Systems (SuDS), such as swales and infiltration trenches, should be used to control any run-off where recommended. • Sites should be configured or selected to avoid the need to impact on existing drainage systems and watercourses. • Culverting existing watercourses/drainage ditches should be avoided. Where culverting for access is unavoidable, applicants should demonstrate that no reasonable alternatives exist and where necessary it will only be in place temporarily for the construction period.
National Policy Statement for Electricity Networks Infrastructure (EN-5) [299]	NPS EN-5 states that applicants should protect as far as reasonably practicable areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas.
National Planning Policy Framework (NPPF) [300]	The NPPF sets out the UK Government planning policies for England and seeks to ensure that flood risk is considered at all stages of the planning and development process. The NPPF states that new and existing development should not pose an unacceptable risk of water pollution, and that it should help to improve local environmental conditions, including water quality and actions set out in the River Basin Management Plans (RBMP).
North West River Basin Management Plan [301]	The North West RBMP was updated in 2022. It provides a baseline classification of the water environment in the North West River Basin District and highlights statutory objectives for protected areas such as waters used for drinking water, bathing, and designated sites. It lays out the actions needed to improve the water environment and achieve the objectives of the WER.
Allerdale Local Plan (Part 1) [302]	Relevant Evidence base documents include: • EB20 Allerdale Strategic Flood Risk Assessment 2007 • EB20b Strategic Flood Risk Assessment 2011 Vol 1 of 2 • EB20c Strategic Flood Risk Assessment 2011 Vol 2 of 2 Relevant supporting documents include:

Policy	Relevance to assessment
	• SD26 River Derwent Catchment Flood Management Plan • SD27 Cumbria Surface Water Management Plan Phase 3 Report • SD28 North West River Basin Management Plan • SD28a(1) North West River Basin Management Plan Annexes A - D • SD28a(2) North West River Basin Management Plan Annexes E – N Allerdale Borough Council Position Statements: PS10 Matter 10 Water Supply and the effect of development upon water quality
Cumberland Consolidated Planning Policy Framework [303]	Cumberland Council is the unitary authority which replaced the former local county and district councils including Allerdale Borough Council. The consolidated planning policy framework confirms that the Local Plan for each district is retained as the main policy document until such time as a new unitary-wide plan is produced and adopted.

18.2.4 Standards and guidance

Table 18-3 Water Resources and Flood Risk - Standards and guidance

Standards and guidance	Relevance to assessment
CIRIA (2023) Environmental good practice on site (5th edition) (C741) [304]	Provides practical advice about managing construction on site to minimise environmental impacts.
CIRIA (2015) The SuDS Manual (C753) [305]	Outlines the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.
Environment Agency (2022) Flood risk assessments: climate change allowances [306]	When and how local planning authorities, developers and their agents should use climate change allowances in flood risk assessments.
Environment Agency (EA) Pollution Prevention Guidance (PPG) notes (PPG1, PPG5, PPG8 and PPG21). [307]	Although EA PPG notes were withdrawn in England on 17 December 2015, they still provide a good information source for pollution prevention measures, and to inform the CEMP and embedded mitigation.
Environment Agency (2017) Protect groundwater and prevent groundwater pollution [308]	Understand when activities affect groundwater, what permissions may be needed and how to prevent pollution
Environment Agency (2017) Groundwater protection technical guidance [309]	If carrying out an activity that could lead to the input of substances to ground which could affect the quality or quantity of groundwater, need to understand: • what type of input you can make • how to assess the discernibility of hazardous substances

Standards and guidance	Relevance to assessment
	when geological formations can be determined as permanently unsuitable for other purposes
Flood Risk and Coastal Change: National Planning Practice Guidance (NPPG) [310]	Advises how to take account of and address the risks associated with flooding and coastal change in the planning process.
Highways England (2020) Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment [311]	Sets out the requirements for the assessment and management potential impacts on the water environment for highway projects.
Cumbria County Council Flood Risk Management Strategy (2022) [312]	Under the Flood and Water Management Act 2010 (the Act or FWMA), county and unitary authorities are the Lead Local Flood Authorities (LLFAs) with an overview role for local flooding in their area. Cumbria County Council (CCC) is the LLFA in Cumbria. A Local Flood Risk Management Strategy (LFRMS) is a requirement for all LLFAs to set out how local flood risks will be managed in the county, who will deliver them and how they will be funded.
UK Government (2022) Flood risk and coastal change [313]	Advises how to take account of and address the risks associated with flooding and coastal change in the planning process.

18.3 Consultation

18.3.1.1 The following stakeholders will be consulted with regards to Water Resources and Flood Risk as part of the assessment process:

- Environment Agency, regarding impact on the water environment receptors, WER/WFD and flood risk.
- Cumberland Council, regarding location of private water supplies within 5km of the draft Order Limits and comments on Flood Risk as LLFA.

18.3.1.2 Statutory consultees will be formally requested by PINs to comment upon this scoping report, to inform the Scoping Opinion. Comments received will be considered and addressed through the PEIR and ES, where relevant to Water Resources and Flood Risk.

18.3.1.3 A non-statutory consultation is planned later in 2024, this will publicly introduce the Proposed Development and invite feedback from both statutory and non-statutory stakeholders on the proposals. Feedback will be considered through the ongoing development of the design, and via the EIA process.

18.4 Study area

18.4.1.1 The Water Resources and Flood Risk scoping study area is defined by the draft Order Limits plus a 1km buffer, as shown on Figure 18.1.

18.5 Baseline conditions

18.5.1 Desktop sources used

18.5.1.1 The following desktop sources have been used to inform the existing baseline conditions of the study area:

- British Geological Survey (BGS) geological mapping available via the online GeoIndex viewer [314]
- BGS Lexicon of Named Rock Units [315]
- Cumbria County Council Flood Risk Management Strategy [316]
- Department for Environment, Food and Rural Affairs (Defra) Magic Map available online [317]
- Defra Hydrology Data Explorer [318]
- Flood Risk Maps [319] [320]
- WER/WFD Status classification data for surface water and groundwater water bodies [321]

18.5.1.2 The following additional information has been requested, though not all been received at time of writing and will inform the PEIR / ES:

- Hydrometric monitoring data including groundwater level, groundwater quality, surface water stage and flow, surface water quality and climate records (Environment Agency, EA – received).
- Abstraction licences from groundwater and surface water within 5km of the draft Order Limits (Environment Agency, EA - received).
- List of private water supplies within 5km of the draft Order Limits (Cumberland Council – received).
- Additional information held locally by the EA Area team, regarding the WER/WFD classification of water bodies, including, but not limited to:
  - Extended Waterbody Summary Reports
  - Programme of Measures
  - Waterbody Level Measure Actions
  - Any further information available regarding RBMP Cycle 2 and/or Cycle 3.
- A list of any hydraulic models in this area (received), but mainly for the Lostrigg Beck and River Marron and their associated tributaries, along with the cover sheets or model reports (EA).
- Susceptibility to groundwater flooding mapping (BGS - received).

18.5.2 Surveys undertaken and proposed

18.5.2.1 No surveys are required at scoping stage in respect of Water Resources and Flood Risk.

18.5.2.2 The following surveys are planned to be undertaken, and will inform the PEIR / ES:

- Site walkover to identify nature and sensitivity of water receptors.

18.5.3 Existing baseline

Site topography and land use

18.5.3.1 The draft Order Limits are 480ha in area and currently consist of arable and pasture farmland. The draft Order Limits are bounded by the A595 and Winscales Road to the west, Clifton Green and Oldfield Road to the east, agricultural land and woodland belts to the north, and an unnamed road from the Lillyhall Roundabout to Branthwaite village to the south.

18.5.3.2 The topography of the draft Order Limits is undulating, varying by approximately 50m across the draft Order Limits, topographic highs of 100-110mOD and lows along Lostrigg Beck, which runs through the centre of the draft Order Limits of 60mOD. Topography is also undulating across the wider study area, between 50mOD and 200mOD.

Surface water

18.5.3.3 Watercourses within the study area are shown in Figure 18.1. Lostrigg Beck and its named tributary Cavel Gill run through centre of the draft Order Limits, flowing from south to north. There are also several unnamed tributaries and field drains within the draft Order Limits which flow into Lostrigg Beck.

18.5.3.4 The River Marron is located to the east of the draft Order Limit, 110m from the draft Order Limits at its closest point in the north. The confluence of Lostrigg Beck and the River Marron is in Bridgefoot, 1km to the north of the draft Order Limits.

18.5.3.5 The River Marron in turn flows in to the River Derwent, 2.1km to the north of the draft Order Limits. The River Derwent flows from east to west in the study area, discharging into the Solway Firth at Workington. The upper catchment of the River Derwent includes the North-Western Lake District, including Bassenthwaite Lake and Derwent Water.

18.5.3.6 Eller Beck is located 860m to the north-west of the draft Order Limits. This flows to the south-west to join the River Wyre, entering the Solway Firth at Harrington.

18.5.3.7 Distington Beck is located 860m to the south of the draft Order Limits. This flows to the south-west, joining Lowca Beck before entering the Solway Firth at Lowca.

18.5.3.8 There are no river flow or level gauging stations within the draft Order Limits or study area. The nearest stations are noted below.

18.5.3.9 There is one river flow gauging station at Seaton Mill 2.8km to the north-west of the draft Order Limits on the River Derwent. The River Cocker, another tributary to the River Derwent has a flow gauge at Stanger, 7.8km to the east of the draft Order Limits.

18.5.3.10 There is one river level monitoring station on the River Wyre at Harrington Eadie Street, 3.1km to the south-west of the draft Order Limits. The river level of the River Derwent is measured upstream at Kingfisher, in Cockermouth, 6.5km to the north-east of the draft Order Limits.

18.5.3.11 OS Mapping shows numerous small water bodies within the 1km study area. The closest of which are ponds at former open cast coal sites (170m to the south of the Order Limits) to the south of the unnamed road from the Lillyhall Roundabout to Branthwaite village, and at Winscales Moor Wind Farm (310m to west of the draft Order Limits).

Groundwater

18.5.3.12 The 1:50,000 scale bedrock geology mapping [314], presented in Figure 18.2, indicates that the draft Order Limits are underlain by Carboniferous age bedrock of the Pennine Middle Coal Measures (PMCM) and Pennine Lower Coal Measures (PLCM). Both are described by the BGS as interbedded grey mudstone, siltstone and pale grey sandstone. The PMCM is described as commonly having coal seams and a bed of mudstone containing marine fossils at the base and several such marine fossil-bearing mudstones in the upper half of the unit. The PLCM is described as having mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part [315].

18.5.3.13 The bedrock in the vicinity of the draft Order Limits is reasonably heavily faulted, with a series of north-west to south-east trending faults present. This results in both the PMCM and PLCM being present at rockhead within the draft Order Limits. Coal seams, marine bands and sandstone bands are mapped throughout the draft Order Limits.

18.5.3.14 Within the wider area, the Pennine Coal Measures (PCM) dominate and are present to the north, south and west of the draft Order Limits, with the underlying Yoredale Group (YG) present at rockhead in areas to the south-east and north-west of Workington due to faulting. Notably, the Stainmore Formation (SMGP-MDSS on Figure 18.2) of the YG is present in the south-west of the 1km study area. The YG comprises cycles marine limestone, marine shale and thin sandstone commonly topped with seatearth or ganister and an overlying coal [315]. Beyond the 1km study area, to the east, the YG is more extensive, with the Great Scar Limestone Group beyond. The Lake District Fells are formed by earlier Ordovician strata.

18.5.3.15 The Whitehaven Sandstone Formation (WS-SDST) of the Warwickshire Group (WG), which overlies the PCM, outcrops to the south-east of Winscales, approximately 1.2km to the south of the draft Order Limits.

18.5.3.16 The 1:50,000 scale superficial geology mapping [314], presented in Figure 18.3, shows that the PCM are overlain by Till (clay with sand, gravel and boulders) throughout much of the Order Limits, with Alluvium (clay, silt, sand and gravel), Lacustrine Alluvium (clay and silt) and Alluvial Fan deposits (sand and gravel) present along Lostrigg Beck, Cavel Gill and some of the other tributaries. Superficial deposits are absent in the southern areas of the draft Order Limits, and in isolated portions of the north of the draft Order Limits, notably at Quarry Hill.

18.5.3.17 In the 1km study area, the superficial deposits are dominated by Till, with alluvial deposits and River Terrace Deposits (clay, sand and gravel) along watercourses, including the River Marron. Glaciofluvial Deposits (sand and gravel) are also present in discrete patches in proximity to the River Marron.

18.5.3.18 Hydrometric monitoring data available on Hydrology Data Explorer was consulted [318], and a data request was also submitted to the EA for a 5km search radius. This confirmed that within the study area, or immediate vicinity, there are no EA groundwater level monitoring stations and no groundwater quality monitoring stations.

18.5.3.19 The EA aquifer designations [317] within the study area are listed in Table 18-4.

Table 18-4 Aquifer designations

Geology	Formation/ Member	Aquifer Classification
Bedrock	Whitehaven Sandstone Formation	Secondary A
	Pennine Middle Coal Measures	Secondary A
	Pennine Lower Coal Measures	Secondary A
	Yoredale Group	Secondary A
Superficial	Till	Secondary (undifferentiated)
	Alluvium	Secondary A
	Lacustrine Alluvium	Secondary A
	Alluvial Fan Deposits	Secondary A
	Glaciofluvial Deposits	Secondary A
	River Terrace Deposits	Secondary A

Aquifer classification definitions:

- Principal aquifers: provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.
- Secondary A aquifers: comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.
- Secondary B aquifers: mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.
- Secondary (undifferentiated): aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.
- Unproductive strata: largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

18.5.3.20 There is one mapped spring within the draft Order Limits, in the south adjacent to the unnamed road from the Lillyhall Roundabout to Branthwaite village. In addition, there are further springs and marshy areas mapped to the east of the draft Order Limits between the draft Order Limits and the River Marron.

Water Environment Regulations (WER)/ Water Framework Directive (WFD)

18.5.3.21 The EU WFD was introduced in 2000 and was transposed into UK law by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The EA is the competent authority responsible for delivering the Directive in England. The WFD aims to protect and enhance the quality of the water environment. It takes a holistic approach to the sustainable management of water by considering the interactions between surface water, groundwater and water-dependent ecosystems. Under the WER/WFD, 'water bodies' are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger River Basin District (RBD), for which River Basin Management Plans (RBMPs) are developed and environmental objectives are set. These RBMPs are produced every six years, in accordance with the river basin management planning cycle. The WER/WFD requires the status classification of the condition of all surface water and groundwater bodies and the setting of objectives for maintaining or improving conditions so that water bodies reach and/or maintain 'good' status or higher (unless exceptions are identified).

18.5.3.22 The draft Order Limits and study area fall within the North West RBD as defined under the WER/WFD. The status classifications, objectives and programme of measures derived by the EA for water bodies located within the study area are outlined within the Cycle 3 North West RBMP [321].

18.5.3.23 The surface water catchments are presented in Figure 18.4. This shows that the majority of the draft Order Limits falls within the 'Derwent Operational Catchment' of the 'Derwent North West Management Catchment'. The draft Order Limits is predominantly located within the 'Lostrigg Beck' river water body catchment (ID GB112075070550) and the eastern edge of the 'Marron' river water body catchment (ID GB112075070540). The draft Order Limits are also within the 'Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers' groundwater body catchment (ID GB41202G103700), as shown on Figure 18.5.

18.5.3.24 The south-west corner of the draft Order Limits, comprising Lillyhall Roundabout, a short section of the A595 and a short section of the unnamed road from the Lillyhall Roundabout to Branthwaite village, fall within the 'Ehen-Calder Operational Catchment' of the 'South West Lakes Management Catchment'.

18.5.3.25 The surface water, transitional water and artificial water bodies within or adjacent to the study area and their status are shown in Table 18-5 and their extents are shown in Figure 18.6. The groundwater body within the study area and its status are shown in Table 18-6 and the extent is shown in Figure 18.5.

18.5.3.26 Additional information including the data behind these classifications has been requested from the EA and is pending. The status classifications and objective, Reasons for Not Achieving Good (RNAG), and programme of measures for these water bodies will be reviewed during the PEIR/ES phase.

Table 18-5 WER/WFD surface water, transitional water and coastal water bodies

Water Body	Water Body Type	Ecological status (2019)	Chemical Status (2019)	Ecological Status (2022)
Lostrigg Beck (ID: GB112075070550)	River	Moderate	Fail	Data not available[5] Moderate (2019)
Marron (ID: GB112075070540)	River	Good	Fail	Good
Derwent - conf Cocker to tidal (ID: GB112075070520)	River	Good	Fail	Moderate
Lowca Beck (ID: GB112074070040)	River	Moderate	Fail	Data not available

Table 18-6 WER/WFD groundwater bodies

Water Body	Overall Status (2019)	Quantitative Status (2019)	Chemical Status (2019)
Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers (ID: GB41202G103700)	Poor	Good	Poor

Environmental Designations

18.5.3.27 Within the 1km study area there are two environmentally designated sites, with some dependence on water, including a Sites of Special Scientific Interests (SSSI) and a Special Areas of Conservation (SAC), these are shown in Table 18-7 and Figure 2.6. There are no Ramsar sites, Special Protection Areas (SPA), Local Nature Reserves (LNR),or National Nature Reserves (NNR) within the 1km study area.

18.5.3.28 The closest environmentally designated site is River Derwent and Bassenthwaite Lake SAC and River Derwent and Tributaries SSSI, both of which include the River Marron, located 110m to the east of the draft Order Limits at its nearest point. The SAC/SSSI contains populations of salmon, otter, three types of lamprey, floating water-plantain and marsh fritillary butterfly [322]. It is also designated for the diverse habitats it provides including the clear still waters of Bassenthwaite and the transition from mountain streams to a large meandering river.

18.5.3.29 River Derwent and Tributaries SSSI is also listed as Groundwater Dependent Terrestrial Ecosystems (GWDTEs) [323].

[5] Data not available in Catchment Data Explorer. Query has been issued to the Environment Agency, the response to which stated '*The 2022 classification was only a partial re-classification and did not cover all elements or all waterbodies. Lostrigg Beck GB 112075070550 was not included. Therefore the 2019 classification and associated data continues to apply. The next full re-classification will be undertaken in 2025*.'.

Table 18-7 Environmental designations (with water dependent features) within the study area

Name	Designation	Distance from the draft Order Limits
River Derwent and Bassenthwaite Lake	SAC	110m to east (closest point)
River Derwent and Tributaries	SSSI	110m to east (closest point)

Water Resources

18.5.3.30 Drinking Water Safeguard Zones (DWSgZs) are established around public water supplies where additional pollution control measures are needed, these are designated by the EA. There are no DWSgZs within the study area.

18.5.3.31 Source Protection Zones (SPZs) are defined by the EA around large and public potable groundwater abstraction sites. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction. The following subdivisions are defined within SPZs:

- Zone 1: This zone is defined by a travel time of 50-days or less from any point within the zone at, or below, the water table. Additionally, the zone has as a minimum a 50m radius.
- Zone 2: This zone is defined by the 400-day travel time from a point below the water table. Additionally, this zone has a minimum radius of 250 or 500m, depending on the size of the abstraction.
- Zone 3: This zone is defined as the total area needed to support the abstraction or discharge from the protected groundwater source.

18.5.3.32 There are no SPZs within the study area.

18.5.3.33 Nitrate Vulnerable Zones (NVZs) are areas designated by Defra as being at risk from agricultural nitrate pollution. There are no NVZs within the study area.

18.5.3.34 Data on licensed water abstractions from surface water and groundwater within 5km of the draft Order Limits has been obtained from the EA. These abstraction points are presented in Figure 18.7, and indicate that there are no licensed abstractions within the draft Order Limits. There are two groundwater abstractions from the coal measures within the 1km study area, both of which area located in the southwest of the study area.

18.5.3.35 In addition, the EA data shows that there are two surface water abstractions on the River Marron, just outside the boundary of the 1km study area, four on the River Derwent and one further groundwater abstraction.

18.5.3.36 Cumberland Council have confirmed that there are no unlicensed private water supplies within 5km of the draft Order Limits.

18.5.3.37 The study area falls within the Derwent and West Cumbrian abstraction licensing strategy area [324]. In terms of surface water resources, the River Derwent is flagged as Over Licenced at Assessment Point (AP) 10, which is close to Workington. The River Marron (AP9) is flagged as having water available for licensing. The groundwater resource in the area is not assessed as it is not a Principal Aquifer. The groundwater management unit of West Cumbria has a licence restriction category of 'water available'.

Flood Risk

18.5.3.38 Flood risk from all sources in the study area is considered during the scoping stage. The flood risk maps are provided in Figure 18.8 and Figure 18.9. This includes sources where there may be potential to impact flood risk to the Proposed Development (as a receptor itself), as well as the potential for the Proposed Development to impact flood risk to surrounding receptors such as property, infrastructure and land.

18.5.3.39 Within the study area, sources of fluvial flood risk to the draft Order Limits are primarily from the Lostrigg Beck (designated Main River) and the River Marron (Main River). Most of the tributary watercourses are not explicitly represented in the fluvial flood mapping, but are implicitly represented in the surface water flood risk mapping. The EA has been asked what hydraulic models are available for these river systems that could be made available to inform the flood risk assessment, with the response pending.

18.5.3.40 Aside from the surface water flooding associated with the positions of smaller watercourses not included in the fluvial flood maps, surface water flooding is also associated with overland flow pathways and ponding in depressions within the study area.

18.5.3.41 The BGS susceptibility to groundwater flooding data set has been obtained and is presented in Figure 18.10. Which indicates that the flood risk varies across the draft Order Limits from 'Limited potential for groundwater flooding to occur' to 'Potential for groundwater flooding to occur at surface'. This data will be used at PEIR/ES stage to feed into the Flood Risk Assessment (FRA).

18.5.3.42 At the time of writing, there is no evidence to suggest that there is a risk of flooding from reservoirs or other artificial water bodies within the study area.

18.5.3.43 All flood receptors within the study area in hydrological connectivity with the Proposed Development will need to be identified in order to assess whether the proposals may increase flood risk to them, and to inform appropriate mitigation.

18.5.4 Future baseline

18.5.4.1 The future climate baseline is based on the UK climate change projections for a regional 25km grid surrounding the draft Order Limits. An initial review of UKCP18 data covering 43 years, and specifically focused on the north west England region, within which the Proposed Development is located, suggests that the region will experience an increase in mean temperature of 1.96°C during winter and 2.83°C in

summer compared to a 1981-2000 baseline. In the same period, precipitation is estimated to increase by 17.9% in winter and decrease by 22.2% in summer. .

18.5.4.2 To this end, the UK Groundwater Forum concluded the following, as the potential impacts of climate change on groundwater [325]:

- A long-term decline in groundwater storage.
- Increased frequency and severity of groundwater droughts.
- Increased frequency and severity of groundwater-related floods.

18.5.4.3 This will lead to greater variability in groundwater levels, with prolonged periods of high and low groundwater levels relating to the variability of rainfall and recharge.

18.5.4.4 The UK Centre for Ecology and Hydrology (UKCEH) have run predictive models to simulate these impacts, across England, Scotland and Wales, using predictions from UKCP09 [326]. This report has 26 individual surface water stations across the north-west of England, however none are within the study area. The closest stations are:

- Ellen at Bullgill (ID:75017), 11km to the north-east.
- Ehen at Braystones (ID: 74005), 20km to the south.

18.5.4.5 At these locations, by 2050s mean flow is predicted to increase by up to 40% in the winter, and decrease – much more variably – by up to 60% in the summer (however projections vary between -60% and +40% change) [327].

18.5.4.6 This report also predicts the impact on groundwater stations, for which there are 2 stations within the vicinity of the study area:

- Skirwith, near Penrith, approximately 50km east, on on Permo-Triassic Sandstone.
- Furness Abbey, at Barrow in Furness and approximately 60km south, on Permo-Triassic Sandstone.

18.5.4.7 Although neither are on the PCM, and therefore provide limited usefulness to inform projections for change in the study area, groundwater level at Skirwith is predicted to change between -0.7 and +0.25m in elevation, with little discernible seasonal variation.

18.5.4.8 For flood risk, future climate change will increase the likelihood of extreme storm events. Planning Policy Guidance for flood risk and climate change outlines the required climate allowances to be applied to either peak river flows or to peak rainfall intensity (depending on the nature of the analysis) [328]. The allowances that will need to be applied are determined by the location (Derwent North West Management Catchment), the flood zone the development is in, and the vulnerability classification of the Proposed Development. These will be defined at PEIR/ES stage.

18.6 Potential impacts

18.6.1 Construction

18.6.1.1 Specific construction activities with the potential to harm the water environment are:

- Earthworks
- Construction of laydown areas and construction compound
- Construction of concrete pad foundation for inverters, transformers and BESS
- Installation of mounting structures for solar PV modules
- Underground cable installation (cable plough or trenching)
- Horizontal directional drilling (HDD), or other trenchless techniques, under or in close proximity to watercourses, where utilised
- Construction vehicles travelling to and from the Proposed Development

18.6.1.2 During the construction phase, the following potential risks to the water environment have been identified:

- Physical loss of land drains present within the draft Order Limits and associated impacts to hydromorphological condition and aquatic habitat quality, as a result of construction activities.
- Changes to surface runoff patterns and land drainage as a result of construction activities, resulting in altered surface water flows and water levels within the draft Order Limits and downstream, including flood risk.
- Reductions in water quality and aquatic habitat quality of surface water bodies present within the draft Order Limits, or downstream waterbodies, as a result of ground disturbance and associated sediment releases during construction activities.
- Reductions in water quality and aquatic habitat quality of surface water bodies as a result of sediment release and disturbance from the construction.
- Subsoil compaction and reduced infiltration, resulting in increases in localised overland flooding and reduced recharge to groundwater.
- Impacts on local hydrogeology and groundwater resources including any private water supplies and abstractions. Changes to groundwater levels, flows and quality arising from construction activities.
- Reductions in water quality and increased turbidity of groundwater, resulting from the groundwork and associated sediment releases during construction activities.
- Reductions in water quality of surface water bodies or groundwater bodies present within the draft Order Limit, as a result of accidental release of contaminants (fuel oils and lubricants from construction plant, vehicles and traffic movements – accidental spillage during refuelling and/or leakage from

storage; spillage of cement, concrete material and alkaline wash waters, wheel washing, waste storage).

- Increased risk of flooding within the draft Order Limits and to neighbouring sites due to potential changes in nature and extent of the floodplain, including displacement or changes in floodplain storage.
- Potential increased exposure to flood risk during the construction phase by introducing new receptors in areas potentially at risk of flooding, namely construction infrastructure and personnel.

18.6.1.3 There is no requirement for water abstraction from surface water or groundwater to provide water during construction.

18.6.2 Operation

18.6.2.1 During the operation phase, the following potential risks to the water environment have been identified:

- Changes to surface runoff patterns and land drainage, resulting in altered surface water body flows and water levels within the draft Order Limits and downstream.
- Physical degradation or loss of surface water bodies present within the draft Order Limits and associated impacts to hydromorphological condition and aquatic habitat quality due to changes to drainage network.
- Presence of impermeable structures and surfaces and reduced infiltration, resulting in increases in localised overland flooding and reduced recharge to groundwater.
- Deterioration of water quality of surface water bodies and groundwater bodies present within the draft Order Limits as a result of accidental release of contaminants during proposed operation, and traffic accidents/ spillages on new access roads and transmission corridors.
- Alteration of groundwater levels and flow paths and consequently to flood risk due to reduced recharge resulting from rainfall captured by solar panels and hardstanding drainage.
- Increased risk of flooding within the draft Order Limits and to property elsewhere due to changes in nature and extent of the floodplain.

18.6.3 Decommissioning

18.6.3.1 During the decommissioning phase, the following potential risks to the water environment have been identified:

- Changes to surface runoff patterns and land drainage as a result of decommissioning activities, resulting in altered surface water flows and water levels within the draft Order Limits and downstream, including flood risk. Assume return to similar to baseline conditions.

- Reductions in water quality and aquatic habitat quality of surface water bodies present within the draft Order Limits, or downstream waterbodies, as a result of ground disturbance and associated sediment releases during decommissioning activities.
- Subsoil compaction and reduced infiltration, resulting in increases in localised overland flooding and reduced recharge to groundwater.
- Impacts on local hydrogeology and groundwater resources including any private water supplies and abstractions. Changes to groundwater levels, flows and quality arising from decommissioning activities.
- Reductions in water quality and increased turbidity of groundwater, resulting from the groundwork and associated sediment releases during decommissioning activities.
- Reductions in water quality of surface water bodies or groundwater bodies present within the draft Order Limits, as a result of accidental release of contaminants (fuel oils and lubricants from construction plant and vehicles – accidental spillage during refuelling and/or leakage from storage; waste removal and storage, wheel washing).
- Other flooding related impacts may potentially arise from the decommissioning of any flood risk infrastructure introduced in the design or mitigation, such as culverts for access routes or compensation floodplain storage.

18.7 Design, mitigation and enhancement measures

18.7.1 Embedded measures

18.7.1.1 Embedded measures are modifications to the design of a scheme, made during the pre-application phase, that are an inherent part of the design and do not require additional action to be taken.

18.7.1.2 The Proposed Development is currently evolving through an iterative design process. Embedded measures for the Proposed Development relevant to Water Resources and Flood Risk already committed to include:

- Minimum 10m offset from all infrastructure (including fencing) from bank top of all riparian boundaries and watercourses.
- Sustainable drainage solutions (SuDS) will be provided at source, ensuring that surface water run-off is managed consistently with existing site conditions.
- Access tracks will be permeable to allow water to filtrate through and maintain greenfield runoff rates.

18.7.1.3 Further embedded measures are likely to include:

- Application of a sequential approach to site selection, layout and design, to avoid or reduce the potential for flood risk to the Proposed Development, or to

other receptors as a result of the Proposed Development. Thereafter embedded design measures will seek to mitigate the flood risk, by, for example, designing any bridges or culverts to pass flood flows up to and including the 1 in 100 annual probability flood with an allowance for climate change, provision of compensation floodplain storage, locating construction phase equipment and temporary works outside flood risk areas where reasonably practicable.

- Suitable stand offs from springs, spring catchments or boreholes.
- For watercourse crossings where required, use of HDD or other trenchless technique underneath watercourses.
- Minimising area of hardstanding required for laydown and construction compound.
- Utilising 'Durabase Mat System' for construction compound rather than hardstanding.
- Scheduling of temporary/ construction works excavations and storage to not increase flood risk.

18.7.2 Further mitigation

18.7.2.1 Further mitigation are actions that require further site and project specific activity in order to achieve a reduction in effect, and/or anticipated outcome. Further mitigation for Water Resources and Flood Risk will be defined through the PEIR/ES once the level of significance of effects is known. Options for further mitigation for the Proposed Development relevant to Water Resources and Flood Risk may include:

- Locating key infrastructure away from sensitive receptors, identified at PEIR/ES stage.
- Modifications to construction methods and plans to protect sensitive receptors, identified at PEIR/ES stage.
- Site specific mitigation may be required to comply with the WER/WFD objectives and mitigate any potential impacts on WER/WFD status.

18.7.3 Management plans

18.7.3.1 A suite a management plans will additionally be in place for the Proposed Development, relevant to Water Resources and Flood Risk including:

- outline Construction Environmental Management Plan (oCEMP)
- outline Landscape and Ecological Management Plan (oLEMP), including general operational measures alongside those specific to landscape and ecology
- outline Decommissioning Environmental Management Plan (oDEMP)

18.7.3.2 These management plans will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.

18.7.3.3 Outline versions of these management plans will be submitted with the DCO application to secure the commitments contained within. It will be a requirement of the DCO for final iterations of these management plans to be produced and signed off by Cumberland Council in advance of the relevant phase of development.

18.8 Likely significant effects

18.8.1 Construction

18.8.1.1 Table 18-8 summarises the likely aspects of the water environment that have the potential to be significantly affected during the construction phase, and whether they are scoped in or out of further assessment.

Table 18-8 Construction phase likely significant effects

Aspect	Scoped in/ Scoped out	Justification
Surface water quality	**Scoped in**	Potential for the introduction of contamination and sediment into surface water during construction, and potential impacts to hydraulically connected habitats.
Surface water quantity	**Scoped in**	Potential changes to surface water flow and levels, as a result of installation of solar panel, and hardstanding areas, within the draft Order Limits and downstream, to hydraulically connected habitats or abstractions.
Groundwater quality	**Scoped in**	Potential for the introduction of contamination and sediment into groundwater during construction, and potential impacts to hydraulically connected habitats.
Groundwater quantity	**Scoped in**	Potential changes to shallow groundwater flow and levels at the e and downstream and to hydraulically connected habitats (e.g. from trenching and pile installation).
Water Dependent Terrestrial Ecosystems (WDTEs)	**Scoped in**	Potential impacts to WDTEs from changes to hydraulically connected surface water and groundwater as a result of construction activities.
Flood Risk and Drainage	**Scoped in**	Potential increased flood risk impacts due to possible changes in nature and extent of the floodplain and activities in areas of flood risk during construction.

18.8.2 Operation

18.8.2.1 Table 18-9 summarises the likely aspect of the water environment have the potential to be significantly affected during the operation phase, and whether they are scoped in or out of further assessment.

Table 18-9 Operation phase likely significant effects

Aspect	Scoped in/ Scoped out	Justification
Surface water quality	**Scoped in**	Potential for the introduction of contamination and sediment into surface water during operational use and potential impacts to hydraulically connected habitats (e.g. from road drainage or spillages).
Surface water quantity	**Scoped in**	Potential changes to surface water flow and levels at the draft Order Limits and downstream and to hydraulically connected habitats (e.g. due to interception of runoff by installed solar panels and areas of hardstanding).
Groundwater quality	**Scoped in**	Potential for the introduction of contamination and sediment into groundwater during operational use, and potential impacts to hydraulically connected habitats (e.g. from road drainage or spillages).
Groundwater quantity	**Scoped in**	Potential changes to shallow groundwater flow and levels within the draft Order Limits and downstream and to hydraulically connected habitats as a result of permanent below ground structures (e.g. piling) and surface structures intercepting recharge (e.g. hardstanding and solar panels).
WDTEs	**Scoped in**	Potential impacts to WDTEs from changes to hydraulically connected surface water and groundwater during operational use.
Flood Risk and Drainage	**Scoped in**	Potential increased flood risk impacts due to possible changes in nature and extent of the flood plain, alterations to the watercourse during operation.

18.8.3 Decommissioning

18.8.3.1 Table 18-10 summarises the likely aspect of the water environment have the potential to be significantly affected during the decommissioning phase, and whether they are scoped in or out of further assessment.

Table 18-10 Decommissioning phase likely significant effects

Aspect	Scoped in/ Scoped out	Justification
Surface water quality	**Scoped in**	Potential for the introduction of contamination and sediment into surface water during decommissioning, and potential impacts to hydraulically connected habitats.
Surface water quantity	**Scoped in**	Potential changes to surface water flow and levels, as a result of removal of structures and infrastructure altering flow paths, within the draft Order Limits and downstream and to hydraulically connected habitats.
Groundwater quality	**Scoped in**	Potential for the introduction of contamination and sediment into groundwater during decommissioning, and potential impacts to hydraulically connected habitats.
Groundwater quantity	**Scoped in**	Potential changes to shallow groundwater flow and levels within the draft Order Limits and downstream and to hydraulically connected habitats (e.g. from ground disturbance to remove solar panels, hardstanding and supporting infrastructures).
WDTEs	**Scoped in**	Potential impacts to WDTEs from changes to hydraulically connected surface water and groundwater as a result of decommissioning activities.
Flood Risk and Drainage	**Scoped in**	Potential increased flood risk due to decommissioning and removal or reversal of any changes introduced to the floodplain or watercourses for the design or mitigation of the scheme.

18.9 Proposed assessment methodology

18.9.1.1 The study area is defined by the draft Order Limits plus a 1km buffer, as shown on Figure 18.1, and is based on the 'source-pathway-receptor' pollutant linkage principle. The 1km study area was selected based on professional judgement of the potential impacts and pathways related to the project and alignment on approach with other solar schemes. This would be utilised during the PEIR / ES.

18.9.1.2 A comprehensive desk-based study will be completed using publicly available data and data received from stakeholders through consultation. Building on the analysis undertaken at scoping stage, the desk study will identify and confirm potential water receptors and sensitive areas within the study area, which may include groundwater and surface water dependent features, and private water supplies.

18.9.1.3 A site visit will be carried out in order to ground-truth and expand on the data received during the desk study and to gain a complete understanding of the existing topography, hydrological and hydrogeological conditions of the study area, and, where possible, address data deficiencies. The site visit will include a photographic survey of each of the key hydrological features / receptors identified during the desk study.

18.9.1.4 Following the site visit, the baseline condition and conceptual understanding of the geology, hydrogeology and hydrology within the draft Order Limits will be refined before completing the risk assessment.

18.9.1.5 The risk assessment methodology will involve:

- Identification of all key receptors and their sensitivity.
- Identification of the potential impacts of the Proposed Development (during both construction, operational and decommissioning phases).
- Assessment of the significance of the identified impacts (based on receptor sensitivity and magnitude of effect).
- Identification of proposed mitigation (design and construction).
- Identification of residual impacts.
- Identification of cumulative impacts.

18.9.1.6 Flood risk will be assessed using existing data and information wherever possible, requested from the EA. Initially, a scoping Flood Risk Assessment will be undertaken to qualitatively identify flood risks from all sources, both to the Proposed Development, and from the Proposed Development to other receptors. Where the scoping Flood Risk Assessment identifies the potential for flood risk impacts, a more detailed Flood Risk Assessment will be undertaken using hydraulic calculations or models to be agreed with the EA, to calculate the precise impacts on receptors in order to determine the mitigation design. A drainage strategy will also be developed.

Receptors

18.9.1.7 Receptors relevant to the assessment are summarised below:

- Surface water bodies including watercourses within the study area, shown in Figure 18.1
- Bedrock aquifers within the study area, shown in Figure 18.2
- Superficial aquifers within the study area, shown in Figure 18.3
- WER/WFD surface water, transitional water and artificial water bodies within the study area, shown in Figure 18.4
- WER/WFD groundwater bodies within the study area, shown in Figure 18.5
- Environmentally designated sites within the study area, shown in Figure 18.6
- Abstractions (Figure 18.7) and discharges within the study area (awaiting data)
- WDTEs within the study area, GWDTEs shown in Figure 18.8
- Other water features identified from OS mapping, including springs, lakes and ponds.

Sensitivity of receptors

18.9.1.8 The sensitivity value of each receptor within the study area will be determined according to the Design Manual for Roads and Bridges (DMRB) [329] criteria set out in Table 18-11.

18.9.1.9 Flood receptors include those such as property, land or infrastructure, as identified in the National Receptors Database and associated Ordnance Survey MasterMap products. This will be reviewed to identify the flood receptor vulnerability classification against the National Planning Policy Framework, for those receptors at risk or potential risk of flooding that may be impacted by the Proposed Development. This will also include the Proposed Development itself.

Table 18-11 Receptors

Environmental sensitivity value of a receptor	Receptors
Very High (e.g. International)	**Surface water:** Watercourse having a WFD classification and Q95 ≥1.0 m^3/s. Site protected/designated under European Commission (EC) (Ramsar site, salmonid water)/Species protected by EC legislation Ecology and Nature Conservation. **Groundwater:** Principal aquifer providing a regionally important resource and/or supporting a site protected under EC legislation. Ecology and Nature Conservation. Groundwater locally supports GWDTE. **Flood risk:** Essential Civil infrastructure.
High (e.g. National)	**Surface water:** Watercourse having a WFD classification and Q95 <1.0 m^3/s. Species protected under UK legislation (SSSI). Ecology and Nature Conservation. **Groundwater:** Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE. **Flood risk:** Highly vulnerable development.
Medium (e.g. Regional / County)	**Surface water:** Watercourses not having a WFD classification and Q95 >0.001m^3/s. **Groundwater:** Aquifer providing water for agricultural or industrial use with limited connection to surface water. **Flood risk:** Less vulnerable development.
Low (e.g. Local)	**Surface water:** Watercourses not having an WFD classification and Q95 ≤0.001m^3/s. **Groundwater:** Unproductive strata. **Flood risk:** Water compatible development.

Magnitude of impact

18.9.1.10 The magnitude of impact will be determined according to the Design Manual for Roads and Bridges (DMRB) [329] criteria set out in Table 18-12.

Table 18-12 Magnitude of impact

Magnitude of Impact	Environmental Impact	Examples
Major	**Negative:** Loss of an attribute and / or quality and integrity of an attribute **Positive:** Creation of new attribute or major improvement in quality of an attribute	**Negative:** Increase in peak flood level* (> 100mm); deterioration in surface water ecological or chemical WFD element status or groundwater qualitative or quantitative WFD element status. **Positive:** Creation of additional flood storage and decrease in peak flood level* (> 100mm); increase in productivity or size of fishery; improvement in surface water ecological or chemical WFD element status; improvement in groundwater qualitative or quantitative WFD element status.
Moderate	**Negative:** Loss of part of an attribute or decrease in integrity of an attribute **Positive:** Moderate improvement in quality of an attribute	**Negative:** Increase in peak flood level* (> 50mm); measurable decrease in surface water ecological or chemical quality or flow with potential for deterioration in WFD element status. Reversible change in the yield or quality of an aquifer, such that existing users are affected, with potential for deterioration in WFD element status. **Positive:** Creation of flood storage and decrease in peak flood level* (> 50mm); measurable increase in surface water ecological or chemical quality or flow with potential for WFD element status to be improved. Measurable increase in the yield or quality of an aquifer, benefiting existing users, with potential for WFD element status to be improved.
Minor	**Negative:** Measurable change to the integrity of an attribute **Positive:** Measurable increase, or reduced risk of negative effect to an attribute	**Negative:** Increase in peak flood level* (> 10mm); measurable decrease in surface water ecological or chemical quality or flow; decrease in yield or quality of aquifer, not affecting existing users or changing any WFD element status. **Positive:** Creation of flood storage and decrease in peak flood level* (> 10mm); measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD element status.
Negligible	Impacts which are beneath the level of perception, within normal bounds of	Negligible change to peak flood level* (< +/- 10mm); discharges to

Magnitude of Impact	Environmental Impact	Examples
	variation or within the margin of forecasting error.	watercourse or changes to an aquifer which lead to no change in the attribute's integrity.
Neutral	Neutral effects are predicted where the proposal is unlikely to alter the present or future baseline situation.	No change to peak flood level*, discharges to watercourse or changes to an aquifer which have no appreciable effect.
*Peak flood level for floods up to and including a 1% annual probability event, including climate change. Where access or egress routes are affected, the magnitude of the impact will be defined by the change in the Flood Hazard Rating as defined in Defra/EA report FD2320 [330]		

Significance of effect

18.9.1.11 By combining the magnitude of impact (or change) and the sensitivity (value) of each receptor, an assessment will be made of the significance of effect, considering the possibility and nature of mitigation. The resultant effects may be either negative (adverse), positive (beneficial) or neutral, depending on the nature of the impact. The significance of effect upon the receptor is assessed using Table 18-13, using DMRB LA104 guidance.

Table 18-13 Significance of effect

		Magnitude of impact			
		Negligible	**Minor**	**Moderate**	**Major**
Environmental value (sensitivity)	**Very high**	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral or Slight	Neutral or Slight	Slight

18.9.1.12 Effects of moderate magnitude and above represent a significant effect in EIA terms. Where these are also adverse effects, the Applicant will seek to mitigate these as far as possible.

18.10 Assumptions, limitations and uncertainties

18.10.1.1 The current baseline understanding of the draft Order Limits water environment has been summarised in the baseline section above. This understanding has been collated based on a range of publicly available data and information. It is assumed that the data collated is accurate. The accuracy of the baseline condition assessment is reliant upon the accuracy of the data available from the sources.

18.10.1.2 The data will be supplemented with additional data as part of the PEIR/ES process. This will include outstanding information from the EA/ Cumberland Council data requests, including location of water abstractions, and information gathered during a site visit to identify the nature and sensitivity of water receptors.

18.10.1.3 The environmental value and sensitivity of water environmental receptors, the magnitude of potential impacts and the significance level may change during later phases when more information and data becomes available.

18.10.1.4 Any third-party information, including the readily available data sources and input from external consultations is to be assumed to be accurate at the time of writing.

18.11 Summary

Table 18-14 Water Resource and Flood Risk scoping summary

Aspect	**Construction**	**Operation**	**Decommissioning**	**Any required surveys?**
Surface water quality	Scoped in	Scoped in	Scoped in	Site walkover to establish receptor sensitivity
Surface water quantity	Scoped in	Scoped in	Scoped in	Site walkover to establish receptor sensitivity
Groundwater quality	Scoped in	Scoped in	Scoped in	Site walkover to establish receptor sensitivity
Groundwater quantity	Scoped in	Scoped in	Scoped in	Site walkover to establish receptor sensitivity
WDTEs	Scoped in	Scoped in	Scoped in	Site walkover to establish receptor sensitivity
Flood Risk and Drainage	Scoped in	Scoped in	Scoped in	Where targeted hydraulic modelling or calculations are required, these will make best use of available information supplied by the Environment Agency, including existing models and surveys before identifying if further surveys are required.

18.11.1.1 The Water Resource and Flood Risk chapter of the ES will be additionally supported by the assessments outlined below. The scopes of these assessments will be agreed with the relevant stakeholders.

18.11.1.2 It is considered that a separate Hydrogeological Impact Assessment will not be required, beyond that usually undertaken in the PEIR/ES as there is currently no large underground structures or dewatering proposed.

WFD/WER Compliance Assessment

18.11.1.3 The WFD/WER Compliance Assessment will be undertaken to assess the potential impacts of the Proposed Development on the immediate water bodies present within the draft Order Limits and any linked water bodies.

18.11.1.4 The WFD/WER Compliance Assessment comprises an iterative process involving the following key stages: screening (baseline) assessment, scoping (preliminary) assessment; detailed impact assessment (where required); and the application of regulation 19 derogation assessments (where/if deemed applicable).

18.11.1.5 A WFD/WER screening and scoping assessment will be undertaken initially to:

- collate the latest WFD/WER baseline status and status objectives information available for the relevant WFD/WER water bodies that may be affected by the Proposed Development;
- identify the relevant construction activities and permanent components of the Proposed Development that have the potential to affect the WFD/WER water bodies at the sites and any latest associated embedded design and construction phase mitigation measures;
- undertake a high-level preliminary scoping assessment to identify the likely effects of the Proposed Development on the current status and status objectives of the relevant water bodies and any associated risks of non-compliance with WFD/WER objectives;
- identify any additional construction and design measures deemed necessary to mitigate the risk of non-compliance, as well as any additional mitigation and potential enhancement opportunities; and
- provide recommendations for any further detailed baseline and impact assessments that are deemed required in parallel with the forward detailed design stage of the Proposed Development.

18.11.1.6 Should the assessment identify the potential for the Proposed Development (taking into consideration all mitigation) to cause a deterioration in the status of one or more quality elements of the relevant water bodies, and/or prevent the future attainment of status objectives, the Proposed Development would be considered non-compliant and requiring design amendments and/or the development of additional mitigation measures. Where it is deemed not possible to mitigate the Proposed Development causing a deterioration of the status of (a) water body/bodies, the Proposed Development would need to be assessed in the context of an exemption under Regulation 19 of the WER (formerly known as Article 4.7) of the WER/WFD to proceed.

Flood Risk Assessment (FRA) and Drainage Strategy

18.11.1.7 Given the extent of the Proposed Development and potential interaction with areas of flood risk, a flood risk mitigation process will be proposed to identify the design and mitigation measures that should be considered to avoid, reduce or mitigate any flood risk where reasonably practicable.

18.11.1.8 The production of an FRA for planning will be undertaken in accordance with the NPS EN-1 which stipulates its requirements, alongside guidance within the National Planning Policy Framework (NPPF) and associated Flood Risk and Coastal Change guidance [331]. This is both to ensure the Proposed Development itself is designed to be safe and resilient to flood risk, as well as ensuring that the Proposed Development does not increase flood risk to neighbouring receptors.

18.11.1.9 The FRA will also need to demonstrate the application of the Sequential Test, which steers development into areas of lowest flood risk. It is assumed at this stage that the Proposed Development would be classed as 'Essential Infrastructure' under the vulnerability classification, and therefore will require an Exception Test if the proposed scheme will be located in Flood zone 3. Currently, the study area includes areas of Flood zone 3, which may or may not be possible to design around.

18.11.1.10 If an Exception Test will be required, the Proposed Development will need to demonstrate that the sustainability benefits to the community will outweigh the flood risk, that the development will be safe for its lifetime taking into account the vulnerability of users and that it won't increase flood risk elsewhere.

18.11.1.11 The FRA scope will be agreed with key stakeholders (such as the EA and the Lead Local Flood Authority (LLFA)) as the flood risk from surface water, fluvial and groundwater sources, together with the infrastructure design of the Proposed Development components, is further developed and better understood.

18.11.1.12 A drainage strategy will be required that demonstrates the appropriate management of runoff from the Proposed Development.

Highways England Water Risk Assessment Tool (HEWRAT)

18.11.1.13 The proposed methodology for the Detailed Assessment will follow the methodology and guidance provided in DMRB [329] for assessing the impacts of Road Schemes on Road Drainage and the Water Environment. The potential ecological impacts of routine runoff on surface waters will be assessed using the Highways England Water Risk Assessment Tool (HEWRAT).

19 Cumulative and in-combination effects

19.1 Introduction

19.1.1.1 This chapter outlines the proposed methodology for the assessment of cumulative and in-combination effects arising from the construction and operation of the Proposed Development.

19.1.1.2 Cumulative effects are the result of multiple actions on environmental receptors or resources over time and are generally additive or interactive (synergistic) in nature. Two categories of cumulative effects are typically considered within the cumulative effects chapter of an ES:

- In-combination effects from the interrelationship between different environmental effects of the Proposed Development (intra-project)
- Cumulative effects from the interrelationship between different projects along with the Proposed Development (inter-project)

19.1.1.3 In-combination effects, or intra-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by noise and dust effects resulting from the construction phase activities of a single development. In-combination effects will be assessed within technical topic chapters, aligned with guidance in PINS Advice Note Seventeen.

19.1.1.4 Cumulative effects, or inter-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development (using the same geographical area at the same time) may result in significant cumulative effects on the surrounding highway network. The assessment of cumulative effects will sit in a standalone chapter of the PEIR and ES.

19.2 Relevant legislation, policy, standards and guidance

19.2.1.1 The following section identifies the relevant legislation, planning policy, standards and guidelines which underpin the assessment methodology for cumulative and in-combination effects and have informed the scope of the assessment.

19.2.2 Legislation

Table 19-1 Cumulative and in-combination effects - Legislation

Legislation	Relevance to assessment
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) [332]	Sets out the information required for an ES, in relation to the assessment of cumulative effects, Schedule 4 paragraph 5 requires: *"A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".*

19.2.3 Policy

Table 19-2 Cumulative and in-combination effects - Policy

Policy	Relevance to assessment
Overarching National Policy Statement for energy (EN-1), 2023 [333]	4.1.5 *"In considering any proposed development, in particular when weighing its adverse impacts against its benefits, the Secretary of State should take into account:* • *its potential adverse impacts, including on the environment, and including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce, mitigate or compensate for any adverse impacts, following the mitigation hierarchy"* 4.2.12 *The cumulative impacts of multiple developments with residual impacts should also be considered.*
National Policy Statement for renewable energy infrastructure (EN-3) [334]	In relation to network connection, in 2.10.25 – 26 *"To maximise existing grid infrastructure, minimise disruption to existing local community infrastructure or biodiversity and reduce overall costs, applicants may choose a site based on nearby available grid export capacity. Where this is the case, applicants should consider the cumulative impacts of situating a solar farm in proximity to other energy generating stations and infrastructure."*

19.2.4 Standards and guidance

Table 19-3 Cumulative and in-combination effects - Standards and guidance

Standards and guidance	Relevance to assessment
Nationally Significant Infrastructure Projects - Advice Note Seventeen: cumulative effects assessment relevant to nationally significant infrastructure projects, 2015 [335]	Sets out a staged approach to cumulative effects assessment for Nationally Significant Infrastructure Projects and provides template formats for documenting the cumulative effects assessment within the ES.

19.3 Proposed Methodology

19.3.1.1 This section is split into two parts, as outlined in Section 19.1:

- In-combination effects assessment: comprising an assessment of the combined effects resulting from a number of different effects from the Proposed Development upon a single resource/receptor; and
- Cumulative effects assessment: comprising an assessment of cumulative effects of a number of different projects within the vicinity, in combination with the environmental impact of the Proposed Development on a range of different resources/receptors.

19.3.2 In-combination effects assessment

19.3.2.1 PINS Advice Note Seventeen notes that the assessment of interrelationships between environmental topics of a proposed NSIP, such as between ecology and hydrology, are typically assessed as part of the specialist environmental chapters of an ES. In accordance with this guidance, in-combination effects will be considered within each environmental topic's chapter of the ES and will not form part of the scope within the cumulative effects assessment (CEA) chapter.

19.3.3 Cumulative effects assessment

19.3.3.1 PINS Advice Note Seventeen [335] provides a systematic approach to CEA which can be split into four distinct phases, refer to Table 19-4, which will be applied to the Proposed Development.

19.3.3.2 Paragraph 2.5 of PINS Advice Note Seventeen states that the recommended process focuses cumulative effects with 'other existing development and/or approved development'. This assessment will be iterative and may need to be repeated a number of times during the preparation of a DCO application.

Table 19-4 Stages of cumulative assessment

CEA stage	Key activities
Stage 1: Establish the Zone of Influence (ZoI) and establish the long list of 'other existing development and/or approved development'	• identify the ZoI (study area) for each environmental aspect considered within the ES • identify a long list of other developments in the vicinity of the Proposed Development which may have cumulative effects in consultation with the relevant local authority • undertake desktop review of available environmental information for identified cumulative developments
Stage 2: Establish the short list of 'other existing development and/or approved development'	• identify which of the identified other developments from Stage 1 has the potential to give rise to significant cumulative effects by virtue of overlaps in temporal scope, due to the scale and nature of the other development/receiving environment; or any other relevant factors.
Stage 3: Information gathering	• information relating to each of the other developments is gathered and reviewed.
Stage 4: Assessment	• an assessment of the cumulative effects is undertaken. Each individual other development is reviewed in turn to identify whether here is potential for significant cumulative effects; and • additional mitigation measures are identified.

19.3.4 Stage 1 - Establishing the long list of 'other existing and/or approved development'

19.3.4.1 PINS Advice Note Seventeen [335] highlights the 'other existing development and/or approved development' types that should be established for the CEA as:

- Tier 1
  - under construction[6];
  - permitted application(s), whether under the Act or other regimes, but not yet implemented;
  - submitted application(s) whether under the Act or other regimes but not yet determined.
- Tier 2
  - projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted.
- Tier 3
  - projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted.

[6] Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. The ES should clearly distinguish between projects forming part of the dynamic baseline and those in the CEA [4]

- identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals;
- identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

19.3.4.2 The level of detail that is likely to be available to support the CEA will decrease along with the tiers, i.e. tier 1 developments likely having the most detail available and tier 3 developments having likely having the least detail available.

19.3.4.3 For the Proposed Development relevant other existing developments and/or approved developments will be identified through a desk-based review of the following sources:

- Nationally Significant Infrastructure Projects from National Infrastructure Planning [336]
- Transport and Works Act Orders (TWAO) from Department for Transport [337]
- Applications for planning permission under the town and Country Planning Act 1990 [338], allocations and Mineral and Waste EIA applications from Cumberland Council [339], including both those from the former Allerdale and Copeland districts.

19.3.4.4 Searches will be conducted online, using the criteria set out in Table 19-5 to establish the long list of 'other existing and/or approved development'.

Table 19-5 Long list search criteria

Development		Housing unit (no)	Housing land (ha)	Non-residential (ha)	Distance from Order Limits
Nationally Significant Infrastructure Projects		All	All	All	10km
Transport and Works Act Orders (TWAO)		All	All	All	10km
Mineral and Waste EIA applications		All	All	All	10km
Applications or allocations	Large scale	200+	4+	2+	10km
	Medium scale	10-199	0.5-4	1-2	2km
	Small scale	1-9	Less than 0.5	Less than 1	200m

19.3.4.5 A search was undertaken during May 2024 (Table 19-6) for 'other existing and/or approved development' to inform the initial long list and seek feedback on this via

this scoping exercise. This search will be further updated to inform the PEIR and ES using stakeholder feedback and a refresh of the search at an appropriate time.

Table 19-6 Long list search May 2024

Type	Application reference
Nationally Significant Infrastructure Projects	Dean Moor Solar Farm
Transport and Works Act Orders (TWAO)	None identified
Mineral and Waste EIA applications	SCR-2/21/25
Applications or allocations	**Large scale -** FUL/2023/0191 RMA/2023/0007 REJ/2022/0004 FUL/2022/0069 FUL/2021/0308 FUL/2021/0192
	Medium scale – FUL/2024/0077 FUL/2024/0039 OUT/2023/0017 (noted withdrawn) FUL/2023/0253 (noted refused) FUL/2023/0261 FUL/2023/0212 FUL/2022/0232 FUL/2021/0021 FUL/2020/0191 FUL/2023/0207 (noted refused)
	Small scale – FUL/2023/0074 AGR/2021/0029 FUL/2021/0013 FUL/2020/0189 (noted withdrawn) 2/2018/0276 (noted refused) 2/2017/0291 2/2016/0677 (noted refused)

19.3.5 Stage 2 - Short list of 'other existing development and/or approved development

19.3.5.1 The long list will be filtered to develop a short list of 'other existing and/or approved development' to be included in the CEA. This will ensure that the assessment is proportionate in that it includes only 'other existing and/or approved development' likely to result in significant cumulative effects. The criteria to be used for short-listing will be:

- Temporal scope: considering the potential for the programme for the construction, operation and decommissioning of the 'other existing and/or approved development' to overlap and interact with the Proposed Development.
- Scale and nature of development: considering if the 'other existing and/or approved development' is likely to be defined as an EIA project due to its potential to lead to significant environmental effects.
- Other factors: These will include consideration of potential impact pathways to identified sensitive receptors.

19.3.5.2 Professional judgement will be applied where necessary to ensure that only 'other existing and/or approved development' likely to lead to significant cumulative effects are included.

19.3.5.3 Cumberland Council and any other relevant consultation bodies will be consulted on the shortlisted 'other existing developments and/or approved developments' proposed to be included in the CEA to agree the final list for assessment.

Stage 3 - Information gathering

19.3.5.4 Information will be gathered for each of the short-listed 'other existing developments and/or approved developments', relevant to their environmental effects. This information will include:

- proposed design and location information
- proposed programme of construction, operation and decommissioning, and
- environmental assessment reports.

19.3.5.5 The information will be obtained primarily from the websites of Cumberland Council [339], Department for Transport [337] and the Planning Inspectorate [336]. This may be supplemented with information from liaison with other stakeholders and developers.

Stage 4 - Assessment

19.3.5.6 Environmental topic specialists will review the information gathered and will carry out a proportionate assessment of significant cumulative effects. They will consider how the reported effects of the 'other existing developments and/or approved developments' would be likely to interact with the reported effects of the Proposed Development, to reach conclusions on the nature and significance of cumulative effects.

19.3.5.7 The significance of the cumulative effects will be determined using the same criteria as are used in the relevant individual topic assessments for the Proposed Development. Where there are limitations on the assessment due to the availability of information relating to the effects of the 'other existing developments and/or approved developments', those limitations will be noted.

19.3.5.8 In cases where significant cumulative effects are identified, it may be necessary to propose additional mitigation measures specifically for cumulative effects. These

additional measures will be set out in the CEA. These measures may be delivered solely by the Applicant or may, in some cases, be subject to agreement with another developer, which would be sought.

19.3.5.9 Appendix 2 (Matrix 1 - Assessment matrix) from the Planning Inspectorate's Advice Note 17 [335] on cumulative effects will be used to guide the development of and reporting of the assessment.

20 Structure and content of the PEIR

20.1.1.1 An outline structure of the PEIR is provided within this chapter, in accordance with the guidance for the content of scoping requests contained within PINS Advice Note Seven [340].

20.1.1.2 A PEIR is defined in (Regulation 12(2)(b) of the EIA Regulations [332] as:

'information referred to in regulation 14(2) which –

1) *has been compiled by the applicant; and*
2) *is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)'*

20.1.1.3 There is no prescribed format for PEIR. However, applicants are encouraged to prepare this as an early draft of the ES [341].

20.1.1.4 The information presented in the PEIR is 'preliminary' with a purpose to actively seek consultee comments, with an opportunity for both the design of the Proposed Development and the EIA to take into consideration any comments received through this consultation.

20.1.1.5 It is intended for the purposes of the Proposed Development that the PEIR will be arranged as set out below and topic chapters included will be those scoped in for further assessment in this EIA Scoping Report.

20.1.1.6 The PEIR will be structured as follows:

- Non-technical summary (NTS)
  - The NTS will summarise the findings of the PEIR, written in non-technical language.
- Main report
  - This document will comprise the main body of the PEIR and it will detail the preliminary findings of the environmental assessment and any identified additional mitigation measures to avoid, reduce or minimise any potentially significant adverse environmental effects.
- Figures
  - These will comprise a set of figures which support the preliminary assessments undertaken.
- Technical appendices
  - These will comprise the preliminary supporting technical appendices to the topic chapters including background data, technical reports and survey data.

20.1.1.7 It is also intended that a draft of the outline management plans that will support the DCO application will be prepared and made available where possible to do so enabling consultee feedback on management measures to be proposed.

20.1.1.8 The PEIR will be submitted in the form of an early draft of the ES and will, therefore, follow a similar structure of the ES. The PEIR will outline the intended structure and content of the ES.

21 Conclusion

21.1 Summary of the proposed EIA approach

21.1.1.1 In accordance with Regulation 8(1)(b) of the EIA Regulations [332], this EIA Scoping Report provides notification to the SoS that the Applicant will produce an ES which will accompany the DCO application for the Proposed Development. This EIA Scoping Report has been produced to support an application for a Scoping Opinion with regards to the scope and level of detail of information to be provided in the ES, in accordance with Regulation 10 of the EIA Regulations [332].

21.1.1.2 This EIA Scoping Report has identified the likely significant effects of the Proposed Development with respect to each environmental topic and set out the proposed approach and methodology for further assessment in the EIA. Table 21.1 provides a summary of the proposed scope of the topics to be included in the ES.

Table 21-1 Summary of proposed scope of the EIA

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
Agricultural land and soils	Agricultural land (C, D) Soil resource (Damage to soil) (C, D) Soil resource (Loss of soil) (C, D) Soil Organic Matter and Soil Carbon (C, O, D)	Agricultural holdings / farm businesses Operational impacts upon agricultural land, soil resource (damage to soil), and soil resource (loss of soil).	The landowners involved in the Proposed Development have signed up by voluntary agreement and have therefore considered the potential effects on the overall viability of the farm holdings. This includes the potential impacts on agricultural tenants who utilise the land at present and agreement is in place that these tenancies would end should the application for development consent be successful. It is therefore proposed that potential effects on the wider farm holdings / farm businesses is scoped out of the assessment. It is considered that providing that best practice soil management measures are implemented through the preparation of the oSRMP and Outline oLEMP, during the operational phase there would be no significant negative impacts on the soil resource onsite. Further, impacts upon agricultural land, soil resource (damage to soil), and soil resource (loss of soil) would be first felt during construction phase, and as such the impacts are assessed at this point.
Air quality	No assessment proposed	Dust and particulate matter Vehicle emissions	A standalone construction dust assessment will be undertaken to identify relevant mitigation measures. It is anticipated

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
			that with the implementation of suitable site-specific mitigation measures, aligned with IAQM guidance and secured through the oCEMP and oDEMP, the residual effects of dust and particulates on existing sensitive receptors will not be significant. Anticipated traffic generation will be below the applicable IAQM thresholds for detailed assessment.
Biodiversity	Statutory Designated Sites (C, O, D) Non-statutory Designated Sites (C, O, D) Priority Habitats (C, D) Bats (C, O, D) Breeding birds (C, O, D) Wintering birds (C, O, D) Badger (C, D) Otter and water vole (C, D) Amphibians (C, D) Reptiles (C, D) Fish (C, D) Invertebrates (C, D) Protected and notable plants (C, D)	Operational impacts upon priority habitats, badger, otter and water vole, amphibians, reptiles, fish, invertebrates, and protected and notable plants.	The operational phase of the Proposed Development will involve no additional habitat loss. Security fencing will be designed to incorporate appropriate gates to allow mammal access. The final landscape design will provide habitat enhancements and connectivity across the Proposed Development. As a result, no direct impacts are anticipated. Any indirect impacts will be adequately mitigated through embedded design measures and the oLEMP.
Climate change	Greenhouse gas emissions (C, O , D) Climate resilience (C, O, D)	In-combination climate impacts	The combined effect of the impacts of the Proposed Development and potential climate change impacts on the receiving environment during construction, operation and decommissioning are unlikely to give rise to significant effects.

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
Cultural heritage	Direct impacts to buried archaeological remains (C) Indirect impacts to the setting of designated and non-designated heritage assets (O)	Operational and decommissioning impacts to buried archaeological remains. Construction and decommissioning impacts to the setting of designated and non-designated heritage assets.	Any potential impacts to buried archaeological remains will occur during construction. The Proposed Development will not result in any physical impacts on heritage assets during construction and decommissioning however has the potential to impact on the setting of assets through the finished built form during operation. Impacts during construction and decommissioning are unlikely to give rise to significant effects.
Electric, magnetic and electromagnetic fields	No assessment proposed	Electric, magnetic and electromagnetic fields	The Proposed Development is not anticipated to exceed the ICNIRP exposure guidelines, and the design of the Proposed Development will consider any infrastructure constraints. In light of this there are not expected to be any potential impacts related to electromagnetic fields to human receptors both within and immediately adjacent to the Proposed Development. Mitigation measures will be included in the oCEMP, oLEMP and oDEMP to ensure the protection of infrastructure.
Ground conditions	No assessment proposed	Human health Historic mining legacy Controlled waters Ecological Receptors / grazing livestock	A land quality focused preliminary risk assessment (Desktop Study) has been prepared, and the results and recommended mitigation measures will be incorporated into the design to mitigate any identified potential effects. These mitigation measures will be subsequently recorded in the oCEMP, oLEMP and oDEMP where

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
			required. A standalone Coal Mining Risk assessment will be undertaken has been committed to be undertaken to understand and mitigate risks associated with mining legacy further. The coal mining risk assessment will be completed and agreed with the Coal Authority prior to consent for the development being granted. Therefore, a separate chapter on ground conditions within the ES is not considered to be required.
Human health	No assessment proposed	Human health	The construction, operation and decommissioning of the Proposed Development has the potential for limited impacts on human health. Assessment of potential impacts however, and inclusion of appropriate mitigation measures will be covered elsewhere in the PEIR/ES and within supporting documentation, including: •Noise, landscape and visual, and socio-economics chapters of the PEIR/ES. •Construction dust assessment •Suite of management plans, including the oCEMP, oDEMP, CTMP and oBFSMP. In addition, the design of the Proposed Development, and its supporting infrastructure, would be maintained to operate safely so as not to present a risk to human health.
Landscape and visual	Landscape character receptors (C, O, D) Visual receptors (C, O, D)	Night-time lighting	A lighting assessment is scoped out of the assessment, as any lighting during the

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
			construction and decommissioning phase would be temporary and designed by angling away from visual receptors and operated using timer and motion control to minimise light spill. During the operational phase there will be no continuous lighting. All lighting during operation will be for access and safety using shielded, low intensity down lighting and motion sensors or infrared security lighting around key electrical infrastructure, using motion sensors.
Major accidents and disasters	No assessment proposed	Major accidents and disasters	The effects arising during all phases of the Proposed Development are unlikely to result in significant effects relating to major accidents and disasters. The probability, likelihood and frequency of a major accident or disaster is very low in the instance of the Proposed Development and would be managed under established legislative requirements or the design process. As such, further assessment of the vulnerability to major accidents and disasters is scoped out of the assessment.
Noise and vibration	Noise from activities (C, O, D)	Noise from traffic Vibration from traffic Vibration from activities	The number of vehicle trips during construction, operation and decommissioning would be at a level unlikely to trigger a significant effect. An oCTMP will detail measures specific to travel planning and

Topic	Proposed scope of assessment (C – Construction, O = Operation, D = Decommissioning)	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
			HGV movement during construction to ensure impacts are controlled. During decommissioning a similar document would be produced. Operational maintenance movements are anticipated to be 1 / month. Perceptible vibration due to traffic is unlikely - limited movements, the temporary nature of these movements, and the fact that vibration will usually dissipate within a few meters would mean effects are unlikely to be significant. Distances of less than 10m between vibration generating activities and buildings or structures are not expected during construction or decommissioning of the Proposed Development and, therefore effects are unlikely to be significant. There would be no vibration generating activities during operation.
Socio-economics	Employment and supply chain effects (C, O, D) Land use – PRoW and recreational resources (C, O, D)	All other socio-economic effects related to the local population (amenity effects) Land Use – potential indirect effects on commercial receptors, community facilities and development land. Land Use – development land and allocations (including mineral resource)	Potential effects on the local population would focus on employment opportunities. Indirect effects such as visual amenity and other amenity impacts would be dealt with by other assessment. There are a limited number of wider land uses, including commercial and community receptors, within the study area. Any

Topic	Proposed scope of assessment (C – Construction, O = Operation, D = Decommissioning)	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
		Socio-economic – wider population effects / amenity effects	effects on these receptors would be indirect only, with proposed works not directly affecting the resource. Given the limited number of receptors and the indirect nature of any potential effects it is considered that this can be managed and mitigated through the committed management plans. There are no development land allocations within the draft Order Limits with the exception of the suitable for wind energy development allocation. The Proposed Development is not anticipated to impact on other allocation within the locality. The mineral resource identified would not be permanently sterilised by the Proposed Development due to its non-intrusive nature. Panel Areas would avoid the area of river sand and gravel resource and therefore the Proposed Development would not have an impact on the asset. Any wider effects on the local population (amenity effects) would be indirect with a commitment to avoid residential areas. These indirect amenity effects would be sufficiently dealt with by other assessment chapters (e.g. noise and visual effects) and mitigated through management plans.

Topic	**Proposed scope of assessment** (C – Construction, O = Operation, D = Decommissioning)	**Aspects proposed to be scoped out**	**Rationale for aspects proposed to be scoped out**
Traffic and transport	No assessment proposed	Severance Driver and pedestrian delay Pedestrian and cyclist amenity Accidents and safety	It is not anticipated that the construction, operation or demolition of the Proposed Development would result in significant effects on traffic and transport. The forecasted construction traffic flows are a less than 10% change from the current baseline, and as such are considered to have no discernible environmental effect, given that daily variations in background traffic flow may fluctuate by this amount. Mitigation measures, including travel planning, HGV management and pedestrian and cyclist management will be incorporated into an oCTMP, oCEMP and oDEMP. A Transport Statement would also be undertaken and support the DCO application. National Highways and Cumberland Council have indicated agreement on proposed approach.
Water resources and flood risk	Surface water quality (C, O, D) Surface water quantity (C, O, D) Groundwater quality (C, O, D) Groundwater quantity (C, O, D) Water Dependent Terrestrial Ecosystems (C, O, D) Flood Risk and Drainage (C, O, D)	No aspects scoped out	Not applicable
Cumulative effects	In-combination effects will be considered within each environmental topic's	No aspects scoped out	Not applicable

Topic	Proposed scope of assessment (C – Construction, O = Operation, D = Decommissioning)	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
	chapter of the PEIR/ES and will not form part of the scope within the Cumulative Effects Assessment chapter. A Cumulative Effects Assessment will be undertaken comprising an assessment of cumulative effects of a number of other existing developments and/or approved developments within the vicinity, in combination with the environmental impact of the Proposed Development on a range of different resources/receptors		

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