Rampion Extension Development Limited

Rampion 2 Offshore Wind Farm

Environmental Impact Assessment
Scoping Report

Wood Environment & Infrastructure Solutions UK Limited – July 2020

Report for

Rampion Extension Development Ltd

Main contributors

[redacted]

Issued by

[redacted]

Approved by

[redacted]

Wood

1 Shinfield Business Park
Shinfield
Reading
RG2 9FW

Doc Ref. 42285

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Contents

Acronyms

Term	Abbreviation
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AC	Alternating Current
ADR	Air Defence Radar
AE	Actual Evapotranspiration
AEZ	Archaeological Exclusion Zone
AfL	Agreement for Lease
AIL	Abnormal indivisible loads
AIS	Automatic Identification System
ALC	Agricultural Land Classification
amsl	Above mean sea level
ANA	Archaeological Notification Area
ANMP	Aids to Navigation Management Plan
ANS	Air Navigation Services
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ATC	Air Traffic Control
BAP	Biodiversity Action Plan
BAT	Best Available Technology
BEIS	Department for Business Energy and Industrial Strategy
BFI	Base Flow Index
BGS	British Geological Survey

Term	Abbreviation
BMV	Best and Most Versatile Land
BoCC	Birds of Conservation Concern
BMAPA	British Marine Aggregate Producers Association
BP	Before Present
BPM	Best Practicable Means
BS	British Standards
BSI	British Standards Institution
BTO	British Trust for Ornithology
CA	Cruising Association
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CEH	Centre for Hydrology and Ecology
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CLVIA	Cumulative Landscape and Visual Impact Assessment
CO	Conservation Objective
CO_2	Carbon Dioxide
COCP	Code of Construction Practice
CPA	Coastal Protection Area
CRM	Collision Risk Model
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan

Term	Abbreviation
CWS	County Wildlife Site
dB(A)	Decibel (A-weighted)
DCO	Development Consent Order
DDV	Drop Down Video
DECC	Former Department for Energy and Climate Change (now BEIS)
Defra	Department for the Environment and Rural Affairs
DfT	Department for Transport
dML	Deemed Marine Licence
DMRB	Design Manual for Roads and Bridges
DTI	Department for Trade and Industry
EA	Environment Agency
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission
EcIA	Ecological Impact Assessment
ECR	Export Cable Route
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
EMF	Electromagnetic Field
EPA	Environmental Protection Act
EPP	Evidence Plan Process
EPS	European Protected Species
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
ERCOP	Emergency Response and Cooperation Plan
ES	Environmental Statement

Term	Abbreviation
ESCC	East Sussex County Council
EU	European Union
EU DCF	EU Data Collection Framework
EUMOFA	EU Market Observatory for Fisheries and Aquaculture
FEPA	Food and Environment Protection Act
FLO	Fisheries Liaison Officer
FLOWW	Fisheries Liaison with Offshore Wind and Wet Renewables group
FRA	Flood Risk Assessment
FSA	Formal Safety Assessment
ft	Feet
FTE	Full-Time Equivalent
GBP	British pound sterling
GEART	Guidelines for the Environmental Assessment of Traffic
GIS	Geographical Information System
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GPG	Institute of Acoustics Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise
GPS	Global Positioning System
GWDTE	Groundwater Dependent Terrestrial Ecosystem
GWMU	Groundwater Management Unit
GVA	Gross Value Added
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drill
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HES	Historic Environment Services
HGV	Heavy Goods Vehicle

Term	Abbreviation
HLC	Historic Landscape Characterisation
HMWBs	Heavily Modified Water Bodies
HRA	Habitats Regulation Assessment
HSC	Historic Seascape Character
HSE	Health and Safety Executive
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IAQM	Institute of Air Quality Management
ICES	International Council for the Exploration of the Sea
IDB	Internal Drainage Board
IEMA	Institute of Environmental Management and Assessment
IFCA	Inshore Fisheries and Conservation Authority
IMO	International Maritime Organisation
IOA	Institute of Acoustics
IOF	Important Ornithological Feature
IPC	Infrastructure Planning Commission
ITZ	Inshore Traffic Zone
JNCC	Joint Nature Conservation Committee
km	Kilometre
LAT	Lowest Astronomical Tide
LCA	Landscape Character Area
LCT	Landscape Character Types
LDV	Light Duty Vehicle
LIDAR	Light Imaging Detection and Ranging
LLCA	Local Landscape Character Area
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve

Term	Abbreviation
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LQ	Location Quotient
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
m	Metre
MAFF	Ministry of Agriculture, Fisheries and Food (now part of Defra)
mAOD	Metres Above Ordnance Datum
MAIB	Marine Accident Investigation Branch
MAGIC	Multi-Agency Geographic information for the Countryside
MarESA	Marine Evidence Based Sensitivity Assessment
MARPOL	International Convention for the Prevention of Pollution from Ships
mbgl	Metres Below Ground Level
MCA	Marine Character Area
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MENE	Monitor of Engagement with the Natural Environment
Met Office	Meteorological Office
MGN	Marine Guidance Note
MHWS	Mean High-Water Springs
Mil AIP	Military Aeronautical Information Publication
MLWS	Mean Low-Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Protected Area

Term	Abbreviation
MPS	Marine Policy Statement
MPCP	Marine Pollution Contingency Plan
MU	Management Unit
MW	Megawatts
NATS	National Air Traffic Services
NCA	National Character Area
NCN	National Cycle Network
NFFO	National Federation of Fishermen's Organisation
NGR	National Grid Reference
NHLE	National Heritage List for England
NMFS	National Marine Fisheries Services
nm	Nautical Mile
NNR	National Nature Reserve
NO	Nitrogen oxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NRA	Navigational Risk Assessment
NRHE	National Record of the Historic Environment
NSIP	Nationally Significant Infrastructure Project
NtM	Notice to Mariners
NTEM	National Trip End Model
NWG	Working Group for Noise from Wind Farms
NVZ	Nitrate Vulnerable Zone

Term	Abbreviation
O&M	Operations and Maintenance
OPERA	Operational Programme for the Exchange of weather Radar information
OREIs	Offshore Renewable Energy Installations
OS	Ordnance Survey
OWF	Offshore Wind Farm
PAD	Protocol for Archaeological Discoveries
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Areas
PHE	Public Health England
PINS	The Planning Inspectorate
PM_{10}	Particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5µm or less
PPG	Guidance for Pollution Prevention
PPV	Peak Particle Velocity
PRoW	Public Rights of Way
pSAC	Proposed Special Area of Conservation
pSPA	Potential Special Protection Area
PTS	Permanent Threshold Shift.
PWS	Private Water Supply
RAMSAR	Ramsar Convention on Wetlands
RBMP	River Basin Management Plan
RED	Rampion Extension Development Limited
RFC	Ratio of flow to capacity
RNLI	Royal National Lifeboat Institution
RSPB	Royal Society for the Protection of Birds

Term	Abbreviation
RPG	Registered Parks and Gardens
RWER	RWE Renewables Limited
RYA	Royal Yachting Association
SAC	Special Area of Conservations
SAR	Search and rescue
SCA	Seascape Character Assessment
SCANS	Small cetaceans in European Atlantic Waters and the North Sea
SCOS	Special Committee on Seals
SDNP	South Downs National Park
SDNPA	South Downs National Park Authority
SEL	Sound Exposure Level
SLVIA	Seascape, Landscape and Visual Impact Assessment
SNCB	Statutory Nature Conservation Body
SNH	Scottish Natural Heritage
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPL	Sound Pressure Level
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
STECF	Scientific, Technical and Economic Committee for Fisheries
SuDS	Sustainable Drainage Systems
TCE	The Crown Estate
TEMPro	Trip End Model Presentation Programme

Term	Abbreviation
TOC	Total Organic Carbon
TSS	Traffic Separation Scheme
TTS	Temporary Threshold Shift.
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UKIAIP	UK Integrated Aeronautical Information Package
UKFEN	UK Fisheries Economics Network
UN	United Nations
UXO	Unexploded Ordnance
VMS	Vessel Monitoring System
WFD	Water Framework Directive
WHO	World Health Organisation
WRMU	Water Resource Management Unit
WSCC	West Sussex County Council
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
WWI	First World War
WWII	Second World War
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Glossary

Term	Description
Above Ordnance Datum	Ordnance Datum is the vertical datum used by the Ordnance Survey as the basis for deriving the height of ground level on maps. Topography may be described using the level in comparison to 'above' ordnance datum.
Access Land	Land with public access as designated by the Countryside & Rights of Way Act 2000.
Additional Environmental Measures	Equate to 'secondary environmental measures', as defined by Institute of Environmental Management and Assessment (2016). These are environmental measures not specifically incorporated in the design, but additional environmental measures identified through the Environmental Impact Assessment process to further reduce environmental effects.
Agricultural Land Classification	Agricultural Land Classification provides a means of assessing the quality of farmland. Its assessment is based on physical limitations of the land, such as climate, site characteristics (e.g. gradient) and soil. The assessment gives an indication of the versatility and expected yield of the land. The system classifies agricultural land in five grades. The 'best and most versatile' agricultural land is classified as 1, 2 and 3a. The Agricultural Land Classification was developed by the former Ministry of Agriculture, Fisheries and Food in 1988 and revised in 1996.
Archaeological Exclusion Zones (AEZs)	Buffers around known archaeological receptors that should be avoided during construction works.
Archaeological Notification Area	This is an area identified by the local authority as having a high potential for archaeological remains to be present.
Area of Outstanding Natural Beauty	Land protected for conservation and preservation under section 82 of the Countryside and Rights of Way Act 2000 for its natural beauty.
Areas of Temporary Land Use	Land required for construction but not permanent land requirement for the Proposed Development.
Aspect	Used to refer to the individual environmental topics.
Associated Development	Associated Development is defined by the Planning Act 2008 as having a direct relationship with the principal development, either supporting the construction or operation or helping to address its impact

Term	Description
	It is for the Secretary of State to decide on a case by case basis whether or not development should be treated as associated development.
Authorised Landfill	Authorised Landfill sites are facilities that local authorities and industry take waste to be disposed of in the ground, and that are currently authorised by the Environment Agency under Environmental Permitting Regulations.
Barrier effect	Barrier effect is experienced by bird species which intend forage beyond or migrate past the array but due to avoidance behaviour, have to navigate around the array. Barrier effect is often not discernible from displacement behaviour.
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Baseline conditions	The environment as it appears (or would appear) immediately prior to the implementation of the Proposed Development together with any known or foreseeable future changes that will take place before completion of the Proposed Development.
Beam Trawl	A trawl where the mouth or opening of the net is kept open by a beam, which is mounted at each end on guides which travel along the seabed.
Before Present (BP)	Time scale referring to the years before 1950.
Beneficial, Neutral or Adverse Types of Landscape Effect	The landscape effects may be beneficial, neutral, or adverse. In landscape terms – a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include low or negligible changes that may be considered as part of the 'normal' landscape processes such as maintenance or harvesting activities. An adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction leading to a reduction in the landscape quality and character of an area.
Beneficial, Neutral or Adverse Types of Visual Effect	The visual effects may be beneficial, neutral, or adverse. In visual terms – beneficial or adverse effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be beneficial, neutral, or adverse. However, it is not the assumption of this assessment that all change, including significant change is a negative experience. Rather this assessment has considered

Term	Description
	factors such as the visual composition of the landscape in the view together with the design and composition, which may or may not be reasonably, accommodated within the scale and character of the landscape as perceived from the receptor location.
Benthic ecology	Benthic ecology encompasses the study of the organisms living in and on the sea floor, the interactions between them and impacts on the surrounding environment
Best and Most Versatile Agricultural Land	Land in Grades 1, 2 and 3a of the Agricultural Land Classification system as defined by Annex 2 of National Planning Policy Framework guidance. It is the land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals.
Biodiversity Offsetting	Conservation activities that are designed to provide biodiversity benefits to compensate for losses in biodiversity following a development.
Biotope	A region of habitat associated with a particular ecological community
Bottom Trawl/Otter trawl	A large, usually cone shaped net, which is towed across the seabed.
Bronze Age	This period follows on from the Neolithic and is characterized by the increasing use of Bronzework. It is subdivided in the Early, Middle and Late Bronze Age. Archaeological period lasting from 2,600-700 BC
Centre for Environment Fisheries and Aquaculture Science	The Government's marine and freshwater science experts, advising the UK government and overseas partners.
Cetacean	Aquatic mostly marine mammals that includes the whales, dolphins, porpoises.
Climate Change	A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes, to external forcing or to persistent

Term	Description
	anthropogenic changes in the composition of the atmosphere, ocean or in land use.
Climate Change Act	Legislation enacted in 2008 by the UK Parliament to establish a framework for the reduction of greenhouse gas, which includes a target for the year 2050 emissions, a system of carbon budgeting, establishing the Committee on Climate Change, carbon trading schemes and other provisions.
Coastal processes	The processes that interact to control the physical characteristics of a natural environment, for example: winds; waves; currents; water levels; sediment transport; turbidity; coastline, beach and seabed morphology.
Coastal retreat	Natural recession of a coastline over time.
Code of Construction Practice	The code sets out the standards and procedures to which developers and contractors must adhere to when undertaking construction of major projects. This will assist with managing the environmental impacts and will identify the main responsibilities and requirements of developers and contractors in constructing their projects.
Compensation	Loss of value is remedied or offset by a corresponding compensatory action on the same site or elsewhere, determined through the process of Environmental Impact Assessment.
Competent Expert	The Environmental Consultants are competent experts within the meaning of the 2017 EIA Regulations in relation to relevant expertise, level of experience and qualifications in preparing environmental statements.
Compulsory Purchase Act	An Act to make provision relating to spatial development and town and country planning; and the compulsory acquisition of land.
Conceptual Model	A conceptual model represents the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors.
Construction Effects	Used to describe both temporary effects that arise during the construction phases as well as permanent existence effects that arise from the physical existence of development (for example new buildings).
Controlled Waters	Controlled waters as defined by Defra as follows: 1. Relevant territorial waters which extend seaward for three miles

Term	Description
	2. from the low-tide limit from which the territorial sea adjacent to 3. England and Wales is measured 4. Coastal waters from the low-tide limit to the high-tide limit or fresh- water limit of a river or watercourse 5. Inland freshwaters 6. Natural and artificial lakes, ponds, reservoirs, rivers or watercourses above the fresh-water limit 7. Natural and artificial underground rivers and watercourses 8. Surface water sewers, ditches and soakaways that discharge to surface or groundwater 9. It also includes those that may be currently dry 10. Groundwaters - any waters contained in underground strata Controlled waters do not include any public sewer or any drain that enters into a public sewer (foul sewer).
Crustacea	Arthropod of the large, mainly aquatic group Crustacea, such as a crab, lobster, shrimp, or barnacle
Cumulative effects	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 2012)
Cumulative Effects Assessment	Assessment of impacts as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Proposed Development.
Cumulative landscape effects	Effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (SNH, 2012)
Cumulative impact	Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development.
DCO Application	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Planning Inspectorate who will consider the application and make a recommendation to the Secretary of State, who will decide on whether development consent should be granted for the Proposed Development.
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Definitive Map and Statement	The legal record of known PRoWs held by the relevant/ respective local highway authority.

Term	Description
Demersal	Relating to the seabed and area close to it. Demersal spawning species are those which deposit eggs onto the seabed.
Department for Business, Energy & Industrial Strategy	The Government department responsible for business; industrial strategy; science; research and innovation; energy and clean growth; and climate change.
Department for Environment, Food and Rural Affairs	The lead UK Government Department for overall environmental policy.
Development Consent Order	This is the means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects, under the Planning Act 2008.
Drop Down Video (DDV)	A survey method in which imagery of habitat is collected, used predominantly to survey marine environment
Early Medieval	This dates from the breakdown of Roman rule in Britain to the Norman invasion in 1066 and is to be used for monuments of post Roman, Saxon and Viking date. Archaeological period lasting from 1066 to 410
Early Prehistoric	For monuments which are characteristic of the Palaeolithic to Mesolithic but cannot be specifically assigned. Archaeological period lasting from 50,000 to 4,000 BC
Ecological feature	Ecological feature is the term used to refer to biodiversity receptors. This term is taken directly from Ecological Impact Assessment guidance from the Chartered Institute of Ecology and Environmental Management.
EIA Regulations, 2017	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. The EIA regulations require that the effects of a project, where these are likely to have a significant effect on the environment, are taken into account in the decision-making process for the project.
Elasmobranchs	Cartilaginous fishes such as sharks, rays, and skates.
Electromagnetic field (EMF)	An electromagnetic field is an electric and magnetic force field that surrounds a moving electric charge.

Term	Description
Elements	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Embedded environmental measures	Equate to 'primary environmental measures' as defined by Institute of Environmental Management and Assessment (2016). They are measures to avoid or reduce environmental effects that are directly incorporated into the preferred masterplan for the Proposed Development.
English Heritage	A charity and company with responsibility for managing historic buildings, monuments and sites in England.
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.
Environment Agency	A non-departmental public body, with responsibilities relating to the protection and enhancement of the environment in England.
Environmental Impact Assessment	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Measures	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible, remedy identified effects. (GLVIA3, 2013 Para 3.37).
Environmental Protection Act	An Act of the Parliament of the UK that as of 2008 defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.
Environmental Quality Standards	The Environmental Quality Standards determines priority substances and certain other polluting chemicals as set out in the Water Framework Directive and Environmental Quality Standards Directive. A value is provided, generally defined by regulation, which specifies the maximum permissible concentration of a potentially hazardous chemical in an environmental sample, generally of air or water.
Environmental Statement	The written output presenting the full findings of the Environmental Impact Assessment.
EUNIS habitat classification	A pan-European system which facilitates the harmonised description and classification of all types of habitat, through the use of criteria for habitat identification
European Agricultural Fund	A grant scheme operated by the European Commission supporting rural development strategies and projects.

Term	Description
for Rural Development (EAFRD)	
European Protected Species	European Protected Species are species of plants and animals (other than birds) protected by law throughout the European Union.
European site	European sites are those that are designated through the Habitats Directive and Birds Directive (via national legislation as appropriate). Within England additional sites designated through international convention are given the same protection through policy – overall all of these are referred to as European sites. European sites in England are considered to be SPAs, SACs, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), possible SACs (pSACs), Ramsar sites (designated under international convention) and proposed Ramsar sites
European Union	The union of 27 European member states.
Evidence Plan Process	A voluntary consultation process with specialists' stakeholders to agree the approach, the information to support, the EIA and HRA for certain aspects.
Explorer Maps	Maps produced by the Ordnance Survey at a scale of 1:25,000. The maps have a particular focus on access resources and clearly show PRoWs, Access Land, etc.
Feature	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines OR a particular aspect of the Proposed Development.
Fish larvae	The developmental stage of fish which have hatched from the egg and receive nutrients from the yolk sac until the yolk is completely absorbed.
Full-time equivalent (FTE)	A unit for measuring employment which indicates the workload which indicates the workload associated with each post. One FTE is the equivalent of a full-time post, whilst an FTE of 0.5 suggests half-time.
Future Baseline	Refers to the situation in future years without the Proposed Development.
Geodiversity	Geodiversity is defined as 'the range of rocks, minerals, fossils, soils and landforms' and is the variety of rocks, fossils, minerals, landforms, soils and natural processes, such as weathering,

Term	Description
	erosion and sedimentation, that underlie and determine the character of our natural landscape and environment.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
Geophysical	Relating to the physics of the earth
GLVIA 3	Guidelines for Landscape and Visual Impact Assessment, Third Edition, published jointly by the Landscape Institute and Institute of Environmental Management and Assessment, 2013.
Good Practice Environmental Measures	Equate to Tertiary environmental measures, as defined by the Institute of Environmental Management and Assessment (2016). They include measures that would occur with or without input from EIA feeding into the design process (for example, measures that represent established industry practice or that would be undertaken to meet existing legal requirements).
Google Earth	An online, aerial photography resource.
Gross Value Added (GVA)	The contribution of individual businesses, industries and/ or sectors to the economy as a result of direct (as well as indirect/ supply chain) expenditure associated with the Proposed Development.
Habitats Regulations	EC Council Directive 92/43/EEC, known as the Habitats Directive, was transposed in the UK by the Habitats Regulations 1994 (as amended). The Habitats Regulations apply to UK land and territorial waters and act to ensure biodiversity of natural habitats and of wild flora and fauna through a range of measures including designation of SACs.
Habitats Regulation Assessment	The assessment of the impacts of implementing a plan or policy on a European Site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.
Heatmaps	Map-based, pictorial representation of the relative usage of routes from collated ‘tracks’ gathered from Strava users.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
Highways Authority	Government owned company charged with operating, maintaining and improving England’s motorways and major A roads.

Term	Description
Historic England	The public body that champions and protects England's historic places.
Historic Landscape Character	The identification and interpretation of the varying historic character within an area that looks beyond individual heritage assets providing understanding of the whole landscape and townscape area into HLC Types.
Historic Landscape Characterisation (HLC)	Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area.
Horizontal Directional Drill (HDD)	An engineering technique avoiding open trenches.
Hydrodynamic regime	The characteristic patterns and statistics of variation in water levels and currents for a given location or area. Potentially includes tidal, surge and other residual flow processes; (does not include waves).
Impact	The changes resulting from an action.
Impact pathway	A change descriptively assessed by one aspect, used by another aspect to inform a related assessment.
Indirect effects	Effects that result indirectly from the Proposed Development as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. Often used to describe effects on landscape character that are not directly impacted by the Proposed Development such as effects on perceptual characteristics and qualities of the landscape.
Indirect/ supply chain impacts	As suppliers to the Proposed Development increase output to meet the additional demand for their goods and services associated with the Proposed Development, there will also be a corresponding increase in demand on their own suppliers, and down their supply chains.
Inshore	The sea up to two miles from the coast.
Inshore Fisheries and Conservation Authority	There are 10 Inshore Fisheries and Conservation Authorities (IFCAs) in England. The 10 IFCA Districts cover English coastal waters out to 6 nautical miles from Territorial Baselines. The

Term	Description
	IFCAs have shared powers and duties which are found in the Marine and Coastal Access Act, 2009.
Institute of Environmental Management and Assessment	International membership organisation for environment and sustainability professionals.
Institute of Public Rights of Way and Access Management (IPROW)	The professional body representing access specialists.
Intertidal	The area of the shoreline which is covered at high tide and uncovered at low tide.
Iron Age	This period follows on from the Bronze Age and is characterized by the use of iron for making tools and monuments such as hillforts and oppida. The Iron Age is taken to end with the Roman invasion. Archaeological period lasting from 800 BC to 43 AD.
Iterative design	A process by which the design is repeated to make improvements, solve problems, respond to environmental measures and engage local communities and statutory stakeholders.
Joint Nature Conservation Committee	JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
Landscape Character Area (LCA)	These are single unique areas which are the discrete geographical areas of a particular landscape type.

Term	Description
Landscape Character Assessment	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive. The process results in the production of a Landscape Character Assessment.
Landscape Character Types (LCTs)	These are distinct types of landscapes that are usually homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes. (Topic Paper 6, Countryside Agency and SNH 2004).
Landscape capacity	The ability of a landscape to accommodate different amounts of change or development of a specific type. Capacity reflects the landscape's sensitivity to the type of change, and the value attached to the landscape, and is therefore dependent on judgements about the desirability of retaining landscape characteristics and the acceptability of their loss.
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape classification	A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.
Landscape constraints	Components of the landscape resource such as views or mature trees recognised as constraints to development. Often associated with landscape opportunities.
Landscape effects	Effects on the landscape as a resource in its own right. An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. (GLVIA3 2013, Para 5.1).
Landscape patterns	Spatial distributions of landscape elements combining to form patterns, which may be distinctive, recognisable and describable e.g. hedgerows and stream patterns.

Term	Description
Landscape quality (condition)	A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape qualities	A term used to describe the aesthetic or perceptual and intangible characteristics of the landscape such as scenic quality, tranquillity, sense of wildness or remoteness. Cultural and artistic references may also be described here.
Landscape receptors	Defined aspects of the landscape resource that have the potential to be affected by a proposal
Landscape resource	The combination of elements that contribute to landscape context, character, and value.
Landscape sensitivity	The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value.
Landscape strategy	The overall vision and objectives for what the landscape should be like in the future, and what is thought to be desirable for a particular landscape type or area as a whole, usually expressed in formally adopted plans and programmes or related documents.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Last Glacial Maximum	Most recent time during the last glacial period that the ice sheets were at their greatest extents, approximately 26,500-19,000 years ago.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Lidar	A surveying method that measures distance to a target by illuminating the target with laser light and measuring the reflected light with a sensor. Differences in laser return times and wavelengths can then be used to make digital 3-D representations of the target.
Likely Significant Effects	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of the Proposed Development on the environment which should relate to the level of an effect and the type of effect.

Term	Description
Listed Building	A building which is for the time being included in a list compiled or approved by the secretary of state, any object or structure fixed to the building; any object or structure within the curtilage of the building which, although not fixed to the building, forms part of the land and has done so since before 1 July 1948 shall be treated as part of the building.
Local Wildlife Site (LWS)	Local Wildlife Sites are non-statutory designations conferred by local planning authorities and given weight through local planning policy. These sites are selected through a selection of criteria (criteria are area dependent) aimed at identifying "substantive nature conservation value".
Locally Important Geological Site	These are equivalent to Sites of Borough or Local Importance for Nature Conservation and accorded equivalent protection.
Location Quotient (LQ)	An index through which the concentration of employment in a particular sector within a particular area is assessed. Put simply, this is a measure of relative specialisation and can be used to compare a region to a larger reference region. For example, a LQ equal to one would mean that representation locally is equal to the representation in the larger reference area as a while. The sectors with scores above one are over-represented within the study area's economy, and those below are under-represented.
Magnitude (of change)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'. Also known as the 'degree' or 'nature' of change.
Main River	Rivers where maintenance, improvement or construction work is carried out by the Environment Agency to manage flood risk
Management Unit (MU)	The cetacean MUs have been defined to provide an indication of the spatial scales at which impacts of plans and projects alone, cumulatively and in-combination, need to be assessed for the key cetacean species in UK waters, with consistency across the UK Seal Mus are geographic areas within which seal populations are considered.
Marine aggregate	Marine dredged sand and/or gravel.
Marine Conservation Zone	A Marine Conservation Zone (MCZ) is a type of marine nature reserve in UK waters. They were established under the Marine and Coastal Access Act (2009) and are areas designated with

Term	Description
	the aim to protect nationally important, rare or threatened habitats and species.
Marine Mammal Mitigation Protocol	To include measures to minimise the risk of injury (PTS) in marine mammals.
Marine Management Organisation	MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs. MMO license, regulate and plan marine activities in the seas around England so that they're carried out in a sustainable way.
Medieval	The Medieval period or Middle Ages begins with the Norman invasion and ends with the dissolution of the monasteries. Archaeological period lasting from 1066-1540 AD.
Mesolithic	The Middle Stone Age, falling between the Palaeolithic and the Neolithic; marks the beginning of a move from a hunter gatherer society towards food producing society. Archaeological period lasting from 10,000-4,000 BC.
Millennium Green	Small parcels of open space for public use that were established by the then Countryside Agency to celebrate the turn of the millennium.
Monitor of Engagement with the Natural Environment (MENE)	A regular survey of population use of the natural environment run by Natural England and Defra.
Morphological evolution	Change in the dimensions or orientation of a morphological feature as a result of net changes in the volume or location of the material it comprises, for example: the seabed; sediment bedforms; sandbanks; coastlines.
Multi-Agency Geographic information for the Countryside (MAGIC)	An online, map-based library of data sources maintained by Defra.
National Cycle Network (NCN)	National cycle network developed by Sustrans for sustainable travel.
National Heritage List for England	The only official, up to date, register of all nationally protected historic buildings and sites in England - listed buildings, scheduled monuments, protected wrecks, registered parks and gardens, and battlefields.

Term	Description
National Policy Planning Framework	The National Policy Planning Framework sets out the Governments planning policies for England and how these are expected to be applied. It provides a framework within which local plans can be developed which reflect the community's needs.
Nationally Significant Infrastructure Project	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales that bypass normal local planning requirements. These include proposals for renewable energy projects.
NATS	NATS is the main air navigation service provider in the UK including provision of en-route air traffic control services to all flights in the UK.
Natural England	The government advisor for the natural environment in England.
Neolithic	This period follows on from the Palaeolithic and the Mesolithic and is itself succeeded by the Bronze Age. This period is characterized by the practice of a farming economy and extensive monumental constructions. Archaeological period lasting from 4,000-2,600 BC
Net Gain	Net gain is an approach to development that aims to leave the natural environment in a measurably better state than beforehand.
Noise sensitive receptors	Locations or receptors that may potentially be adversely affected by the addition of a new source of noise. These can include residential properties, people and sensitive species.
Notable species	Species with a conservation designation (e.g. listed in a red data book, Birds of Conservation Concern etc.) but that receive no specific legal protection.
Nursery habitat	Habitats where high numbers of juveniles of a species occur, having a greater level of productivity per unit area than other juvenile habitats.
Offshore	The sea further than two miles from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbines in the same location (offshore) in the sea which are used to produce electricity.
Offshore scoping area	An area that encompasses all planned offshore infrastructure.

Term	Description
Onshore scoping area	An area that encompasses all planned onshore infrastructure.
Option or prospecting aggregate extraction areas	Aggregate areas that have been identified by prospective dredging companies, agreed with The Crown Estate during the tender process and have been awarded the right to apply for a marine licence.
Ordinary Watercourse	Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a main river. Responsibility for permitting development lies with the lead local flood authority.
Ordnance Survey	Ordnance Survey is the national mapping agency of the UK. Since 1 April 2015 part of Ordnance Survey has operated as Ordnance Survey Ltd, a government-owned company, 100% in public ownership.
ORVal	An online tool for estimating the recreational usage and value of a resource.
Palaeolithic	The period is defined by the practice of hunting and gathering and the use of chipped flint tools. This period is usually divided up into the Lower, Middle and Upper Palaeolithic. Archaeological period lasting from 50,000-10,000 BC
Particulate Matter	Microscopic portions of solid matter suspended in air. PM_{10} - microscopic particles with an aerodynamic diameter of 10 microns or less. $PM_{2.5}$ - microscopic particles with an aerodynamic diameter of 2.5 microns or less.
Pelagic	Any part of the water column (for example the sea from surface to bottom sediments) that is not close to the seabed. Pelagic spawning species release their eggs into the upper layers of the sea.
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Perceptual Aspects	A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. (GLVIA3, 2013 Box 5.1)
Permanent Threshold Shift	A permanent reduction in an animals sensitivity to sound.

Term	Description
Photomontage	A visualisation which superimposes an image of the Proposed Development upon a photograph or series of photographs.
Planning Act 2008	The legislative framework for the process of approving major new infrastructure projects.
Planning Inspectorate	The Planning Inspectorate deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
Post-medieval	Begins with the dissolution of the monasteries and ends with the death of Queen Victoria. Use more specific period where known. Archaeological period lasting from 1540-1901 AD.
Preliminary Environmental Information Report	The written output of the Environmental Impact Assessment undertaken to date for the Proposed Development. It is developed to support public consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, draw preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.
Proposed Development	The development that is subject to the application for development consent, as described in Chapter 2.
Protocol for Archaeological Discoveries (PAD)	A document detailing how finds made during the lifetime of the Proposed Development should be reported.
Public Rights of Way	The laws in England and Wales provide you with the right to walk, ride, cycle and drive in public rights of way in the countryside. Public rights of way include footpaths, byways and bridleways.
Ramsar site	Areas designated by the UK Government under the International Ramsar Convention (the Convention on Wetlands of International Importance) 1971.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA3 2013, Box 5.1)
Receptor	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and

Term	Description
	landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Proposed Development.
Recreation Asset	A resource (such as PRoW or an area of open space) that may be used by the public for recreation purposes.
Recreation Value	Evidence that the landscape is valued for recreational activity where experience of the landscape is important. (GLVIA3 2013, Box 5.1)
Regionally Important Geological Site	The most important places for geology and geomorphology outside statutorily protected land such as Sites of Special Scientific Interest. The designation of a Regionally Important Geological Site is one way of recognising and protecting important Earth science and landscape features for future generations to enjoy. Sites are selected according to their value for: educational fieldwork scientific study, historical significance and aesthetic qualities. In London Regionally Important Geological Sites are sites that are considered worthy of protection for their geodiversity importance at the London-wide level.
Representativeness	Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.
Rochdale Approach	The Rochdale Approach is a parameter-based approach to environmental assessment which aims to take account of the need for flexibility in the evolution of detailed design.
Roman	Traditionally begins with the Roman invasion in 43AD and ends with the emperor Honorius directing Britain to see to its own defence in 410AD. Archaeological period lasting from 43-410 AD.
Scale Indicators	Landscape elements and features of a known or recognisable scale such as houses, trees, and vehicles that may be compared to other objects, where the scale of height is less familiar, to indicate their true scale.
Scenic quality	Depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or ‘genius loci’ and other more intangible qualities. (GLVIA3 2013, Box 5.1)
Scoping Opinion	A Scoping Opinion is adopted by the Secretary of State for a Proposed Development.

Term	Description
Scoping Report	A report that presents the findings of an initial stage in the Environmental Impact Assessment process.
Scour	A localised sediment erosion feature caused by local enhancement of flow speed and turbulence due to interaction with an obstacle.
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Secretary of State	The body who makes the decision to grant development consent.
Sediment deposition	Settlement of sediment in suspension back to the seabed, causing a localised accumulation.
Sediment transport	The movement of sediment by natural processes, as individual grains or as a collective volume.
Semi-pelagic (or benthopelagic)	Partially living their life on the seabed (benthic) and partially living their life in the water column above (pelagic).
Sense of Place (genius loci)	The essential character and spirit of an area: 'genius loci' literally means 'spirit of the place'.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Significant effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement.

Term	Description
	Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
Site of Special Scientific Interest	Sites designated at the national level under the Wildlife & Countryside Act 1981 (as amended). They are a series of sites that are designated to protect the best examples of significant natural habitats and populations of species.
Site of Importance for Nature Conservation	A designation used by local authorities for area of land of local conservation value.
Source	A substance that is in, on or under the land and has the potential to cause harm or to cause pollution of controlled waters.
Source-Pathway-Receptor Linkage	The linkage of a source of contamination on or under the land which has the potential to cause harm or pollution (such as a landfill) and a receptor (something that could be adversely affected by contamination such as groundwater or people) by means of a pathway (a route by which the receptor is exposed to, or affected by, the contamination such as direct contact). A land contamination risk only exists where a source, pathway and receptor are present. Without this complete linkage, there is no risk to people or the environment even if a source of contamination is present.
Spawning	The release or deposition of eggs and sperm, usually into water, by aquatic animals.
Special Area of Conservation (SAC)	International designation implemented under the Habitats Regulations for the protection of habitats and (non-bird) species. Sites designated to protect habitats and species on Annexes I and II of the Habitats Directive. Sufficient habitat to maintain favourable conservation status of the particular feature in each member state needs to be identified and designated.
Special Protection Area (SPA)	Sites designated under EU Directive (79/409/EEC) to protect habitats of migratory birds and certain threatened birds under the Birds Directive
Stakeholder	Person or organisation with a specific interest (commercial, professional or personal) in a particular issue.

Term	Description
Study area	Area where potential impacts from the Proposed Development could occur, as defined for each aspect.
Spatial Scope	Spatial scope is the area over which changes to the environment are predicted to occur as a consequence of a Proposed Development.
Subtidal	The region of shallow waters which are below the level of low tide.
Susceptibility	The ability of a defined landscape or visual receptor to accommodate the specific Proposed Development without undue negative consequences.
Suspended sediment concentration	The mass concentration (mass/ volume) of sediment in suspension.
Sustainability	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustrans	A charitable body dedicated to promoting sustainable transport, especially cycling and walking. Sustrans has developed an extensive, national network of signed and promoted routes.
Temporal Scope	The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 30 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Temporary Threshold Shift	A temporary reduction in an animals sensitivity to sound.
Tidal excursion buffer	The greatest distance and direction that water carrying an impact might be carried during one mean spring tide, from a given location or area.
Time depth	Historical layering – the idea of landscape as a ‘palimpsest’, a much written-over asset of landscape.

Term	Description
Total Organic Carbon (TOC)	The total amount of carbon found within an organic compound
Transboundary effects	Assessment of changes to the environment caused by the combined effect of past, present and future human activities and natural processes on other European Economic Area Member States.
The Applicant	Rampion Extension Development Limited (RED)
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, positive (beneficial), neutral or negative (adverse) or cumulative.
Unexploded Ordnance	Unexploded ordnance are explosive weapons (bombs, shells, grenades, land mines, naval mines, etc.) that did not explode when they were employed and still pose a risk of detonation, potentially many decades after they were used or discarded.
United Nations	The United Nations is an international organization founded in 1945 to maintain global peace and security.
Viewpoints	Selected for illustration of the visual effects fall broadly into three groups: Representative Viewpoints: selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example certain points may be chosen to represent the view of users of particular public footpaths and bridleways; Specific Viewpoints: chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, such as landscapes with statutory landscape designations or viewpoints with particular cultural landscape associations. Illustrative Viewpoints: chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations. (GLVIA3 2013, Para 6.19)
Visual amenity	The overall views and surroundings, which provide a visual setting or backdrop to the activities of people living, working, recreating, visiting or travelling through an area.
Visual effect	Effects on specific views and on the general visual amenity experienced by people.

Term	Description
Visual Receptors	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual sensitivity	The sensitivity of visual receptors such as residents, relative to their location and context, to visual change proposed by development.
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Walkover survey	A relatively quick survey process involving visiting sites on foot to gain a broad-brush understanding of the context of a particular asset, how it may be impacted, and what mitigation may be possible.
Water Framework Directive	A substantial piece of EU water legislation that came into force in 2000, with the overarching objective to get all water bodies in Europe to attain Good or High Ecological Status. River Basin Management Plans have been created which set out measures and potential mitigation to ensure that water bodies in England and Wales achieve 'Good Ecological Status'.
Wave regime	The characteristic patterns and statistics of variation in waves for a given location or area.
West Sussex Historic Environment Record	This record collection provides details of all known archaeological assets, sites and former archaeological events within West Sussex.
Wireline	A computer-generated line drawing of the DTM (digital terrain model) and the Proposed Development from a known location.
World Health Organization	World Health Organization was established in 1946. The primary role of World Health Organization is to direct and coordinate international health within the United Nations system.
Written Scheme of Investigation (WSI)	A live document forming the agreement between the client, the appointed archaeologists, contractors and the relevant stakeholders. The document sets out methods to mitigate the effects on all the known and potential archaeological receptors within the development area.
Zone of Influence	The area surrounding the Proposed Development which could result in likely significant effects.
Zone of Theoretical Visibility	A computer-generated tool to identify the likely (or theoretical) extent of visibility of a Proposed Development.

1. Introduction

1.1 Overview of the Proposed Development

1.1.1 This document supports a request by Rampion Extension Development Limited (hereafter referred to as 'RED') for a formal Environmental Impact Assessment (EIA) Scoping Opinion from the Planning Inspectorate for the proposed Rampion 2 Offshore Wind Farm Project (Rampion 2) located adjacent to the existing Rampion Offshore Wind Farm located in the English Channel in the south of England). For the purposes of clarification, in this document, the existing Rampion Offshore Wind Farm is referred to as 'Rampion 1' hereon in to enable clear differentiation with Rampion 2. This report has been prepared in accordance with Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

1.1.2 The existing Rampion 1 project was developed following award of Zone 6 in the United Kingdom Round 3 offshore wind development leasing round run by The Crown Estate (TCE) in 2009. Located between 13km and 25km from the Sussex coast, it occupies some 78km^2 with an installed capacity of 400 megawatts (MW). Rampion 1 connects into the onshore transmission network via a new substation located next to the existing 400 kilovolt (kV) substation at Bolney in Mid Sussex, approximately 27km inland from a landfall located at Worthing, West Sussex.

1.1.3 Rampion 2 (the 'Proposed Development') similarly comprises both onshore and offshore infrastructure associated with an offshore wind farm including:

- offshore wind turbine generators (WTGs) and associated foundations, inter-array cables with an installed capacity of up to 1200MW but not exceeding the number of WTGs installed at Rampion 1;
- up to three offshore substations;
- up to four offshore export cables will be installed, each in its own trench within the overall cable corridor*;*
- a single landfall site using Horizontal Directional drilling (HDD) installation techniques;
- buried onshore cables in a single corridor approximately 36km in length; and
- a new onshore substation that will connect to the existing substation at Bolney, Mid Sussex.

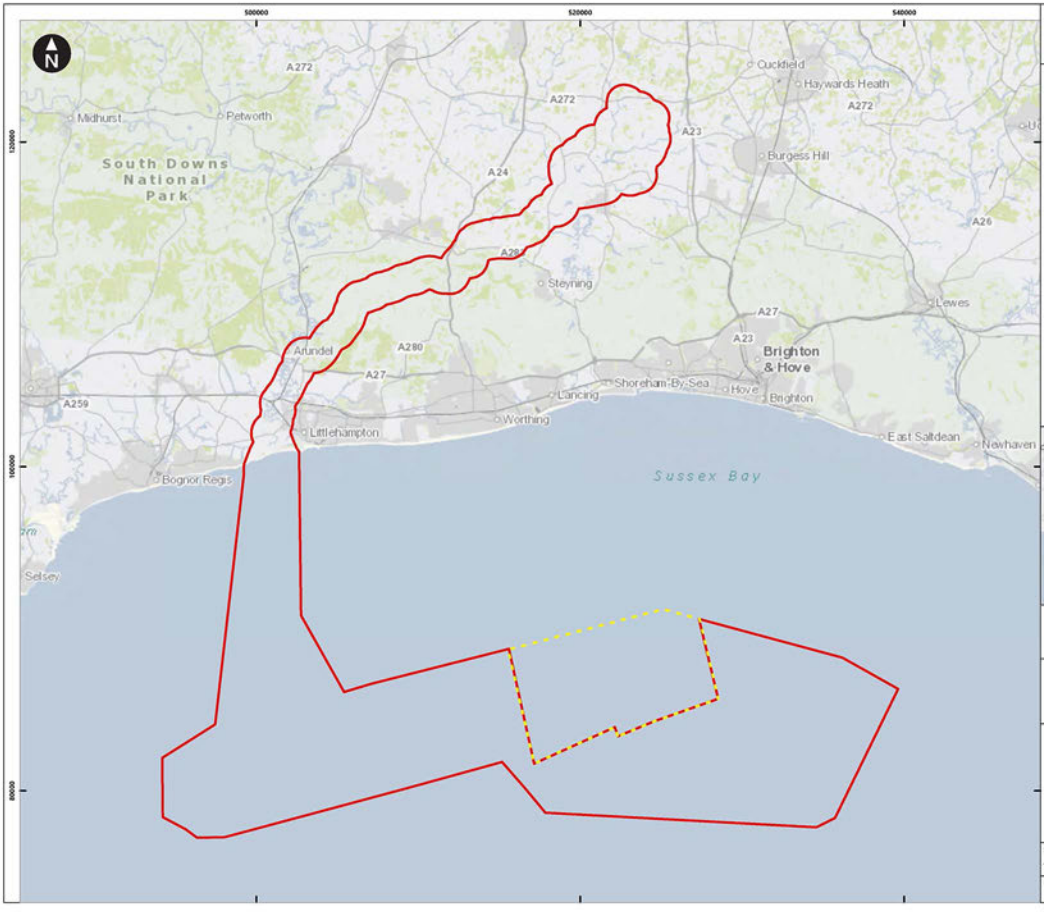
1.1.4 As the Proposed Development will have a capacity greater than 100MW it is defined as a Nationally Significant Infrastructure Project (NSIP) under Section 15(3) of the Planning Act 2008. An application for Development Consent for Rampion 2 will therefore be required. The Development Consent Order (DCO) will be accompanied by an Environmental Statement (ES) (in accordance with the EIA Regulations 2017). The Proposed Development is defined as a Schedule 2 project under the EIA Regulations 2017.

1.1.5 The offshore element of Rampion 2 will be located within an Area of Search adjacent to the existing Rampion 1 project comprising a seabed area awarded in 2019 under the TCE wind farm extension process (to the west of Rampion 1) and

development within the remainder of the original Round 3 Zone 6 area (to the south east of Rampion 1) together with a small link or 'bridge' area between the two areas for cabling. RED is finalising an Agreement for Lease (AfL) with TCE for the wind farm array with an additional lease required for the export cable corridor and adjoining cabling 'bridge'.

1.1.6 The onshore elements of Rampion 2 comprise a transmission cable approximately 36km from landfall at Climping, West Sussex to a 'satellite' substation located within a 5km radius of the existing Bolney Substation, Mid Sussex. RED have signed a grid connection agreement for the Proposed Development.

1.1.7 The location of Rampion 2 is illustrated in **Figure 1.1**. This presents the Scoping Boundary which combines the onshore and offshore search areas.



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Key

- Scoping Boundary
- Existing Rampion Offshore Wind Farm (Rampion 1)

Kilometres 0 1 2 4 6 8

1:200,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 1.1 Scoping Boundary

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-CC-FG-SA-0001				1.0
Company: WOOD	Drawn By: POLAI	Chk/Aprvd: WOOD	Drawn Date: 12/06/2020	Status: FINAL

Document uncontrolled when printed

ISO A3 Landscape

1.2 The Applicant and the EIA project team

The Applicant

1.2.1 RED is a joint venture between RWE Renewables, Enbridge and a Macquarie-led consortium. The shareholdings broadly mirror those in Rampion Offshore Wind Limited which owns Rampion 1, with RWE being the majority shareholder and Development Service Provider for the joint venture.

1.2.2 RWE is an international company with power generation, trading and supply. Key markets include the UK, Europe, North America, Asia and Oceania. RWE has recently purchased the renewable energy business 'E.ON Climate & Renewables' which it is combining with other renewable energy assets.

EIA project team

1.2.3 The preparation of the Environmental Impact Assessment (EIA) is being led by Wood Environment & Infrastructure Solutions UK Ltd (hereafter known as Wood) supported by GoBe Consultants Ltd (GoBe). A number of specialist consultancies are providing expert input into the EIA aspect chapters, as indicated in **Table 1.1**. Eversheds-Sutherland have been instructed as legal advisers supporting the delivery of the application for development consent for Rampion 2.

1.2.4 For the purposes of this Scoping Report, the term 'offshore' refers to the receptors on the seaward side of Mean High Water Springs (MHWS) and 'onshore' refers to the receptors on the landward side of MHWS.

Table 1.1 Rampion 2 EIA project team

	Aspect	Author
Onshore technical team	Agriculture and Soils	Land Research Associates
	Air Quality	Wood
	Historic Environment	Wood
	Ground Conditions	Wood
	Water Environment	Wood
	Landscape and Visual Impact Assessment	Wood
	Terrestrial Ecology	Wood

	Aspect	Author
	Transport	Wood
Offshore technical team	Underwater noise	Subacoustech/GoBe
	Marine mammals	SMRU
	Benthic ecology	GoBe
	Civil and military aviation	WPAC Ltd
	Coastal Processes	ABPmer
	Commercial Fisheries	Poseidon Consultants
	Fish and Shellfish	GoBe
	Intertidal Habitats	GoBe
	Landscape, Seascape and Visual	Optimised Environments (OpEn) Ltd
	Marine Archaeology	Maritime Archaeology Ltd
	Nature Conservation	GoBe
	Offshore Ornithology	GoBe/APEM
	Other Marine Users	GoBe
	Shipping and Navigation	Anatec
	Socioeconomics (onshore and offshore)	Hatch Regeneris Ltd

1.2.5 Pursuant to Regulation 14(4) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as amended, the Environmental Statement (ES) will be prepared by competent experts and the ES will outline the relevant expertise or qualifications of the experts. Wood and GoBe are registered with the Institute of Environmental Management and Assessment (IEMA)'s EIA Quality Mark scheme. The scheme allows organisations that lead the co-ordination of

EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

1.3 Structure of this Scoping Report

1.3.1 The remainder of this Scoping Report is structured as follows:

- **Chapter 2** provides a description of Rampion 2;
- **Chapter 3** provides an overview of the legislation and policies that are relevant to Rampion 2;
- **Chapter 4** explains the approach that has been taken to identify the scope of the EIA;
- **Chapters 5** and **6** set out the proposed scope and methodology for each environmental aspect where a significant environmental effect is likely to arise as a result of Rampion 2; and
- **Chapter 7** summarises those effects that are scoped in and out of the EIA and sets out the proposed content of the ES.

1.3.2 There are also a number of Figures and Appendices which are referenced throughout this Scoping Report.

2. The Proposed Development

2.1 Introduction

2.1.1 This chapter provides an overview of the Proposed Development, Rampion 2, and it sets out the main components of the offshore wind farm, associated substations and energy transmission infrastructure. It also describes the key activities that will be undertaken during construction, operation and maintenance, and decommissioning, including key parameters along with indicative timescales.

2.2 Design envelope

2.2.1 At this early stage, the description of the Proposed Development is indicative and a 'design envelope' approach has been adopted having regard to the Planning Inspectorate Advice Note Nine: Rochdale Envelope, July 2018. The provision of a design envelope is intended to identify key parameters to enable the environmental assessment to be carried out whilst retaining sufficient flexibility to accommodate further refinement during detailed design. Further details of this approach are provided in **Chapter 3: Policy and legislative context.**

2.2.2 Assessing using a parameter-based design envelope approach means that the assessment will consider a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. This approach to environmental assessment provides sufficient detail to enable meaningful and comprehensive assessment of the Proposed Development whilst maintaining flexibility for refinements to the design as Rampion 2 continues to evolve. The use of this approach has been adopted for this Scoping Report and will also enable the subsequent EIA to be based on a description of the location, design and size of the Proposed Development that is suitable to allow a comprehensive assessment of its likely significant environmental effects.

2.2.3 The description of the Proposed Development will be refined as Rampion 2 continues to evolve through the key subsequent stages of the design and EIA process including in the forthcoming provision of Preliminary Environmental Information, and culminating in the ES that will accompany the application for DCO.

2.3 Description of the Proposed Development

Scoping Boundary

2.3.1 The Scoping Boundary (illustrated in **Figure 1.1**) used to inform this Scoping Report combines the search areas for the offshore and onshore infrastructure associated with Rampion 2. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.

2.3.2 The offshore elements of the Proposed Development are situated within an Area of Search adjacent to the south east and west of the existing Rampion 1 project (as shown on **Figure 1.1**), approximately 13km to 25km offshore, occupying an irregular elongated area. The wind farm array Area of Search has an approximate area of 315km^2. In addition, a small area or 'bridge' to adjoin the two areas at the Rampion 1 south west corner has also been added to the Area of Search to enable cabling requirements across the full area. For clarity, no WTGs or substations will be located in the 'bridge' area. The scoping area for the offshore export cables to connect the offshore wind farm area to the shore is approximately 74km^2. The nearest coastal ports are Littlehampton, Worthing, Shoreham-by-Sea, Brighton and Newhaven.

2.3.3 The onshore cable corridor is approximately 36km in length. The onshore element of the Scoping Boundary includes the landfall area, cable route corridor and an area to identify a new substation within. The onshore element of the Scoping Boundary illustrated in **Figure 1.1** is approximately 2km wide along the cable corridor including a 1 km buffer either side of the indicative potential cable centreline. It is also approximately 5.7km wide in the area being considered for the substation at the north eastern extent of the cable route corridor as a preferred location is yet to be identified. The onshore element of the Scoping Boundary and length of cable route will be further refined as ongoing engineering and environmental information is gathered and incorporated into the design of the Proposed Development.

2.3.4 The key characteristics of the Rampion 2 Scoping Boundary are summarised in **Table 2.1**.

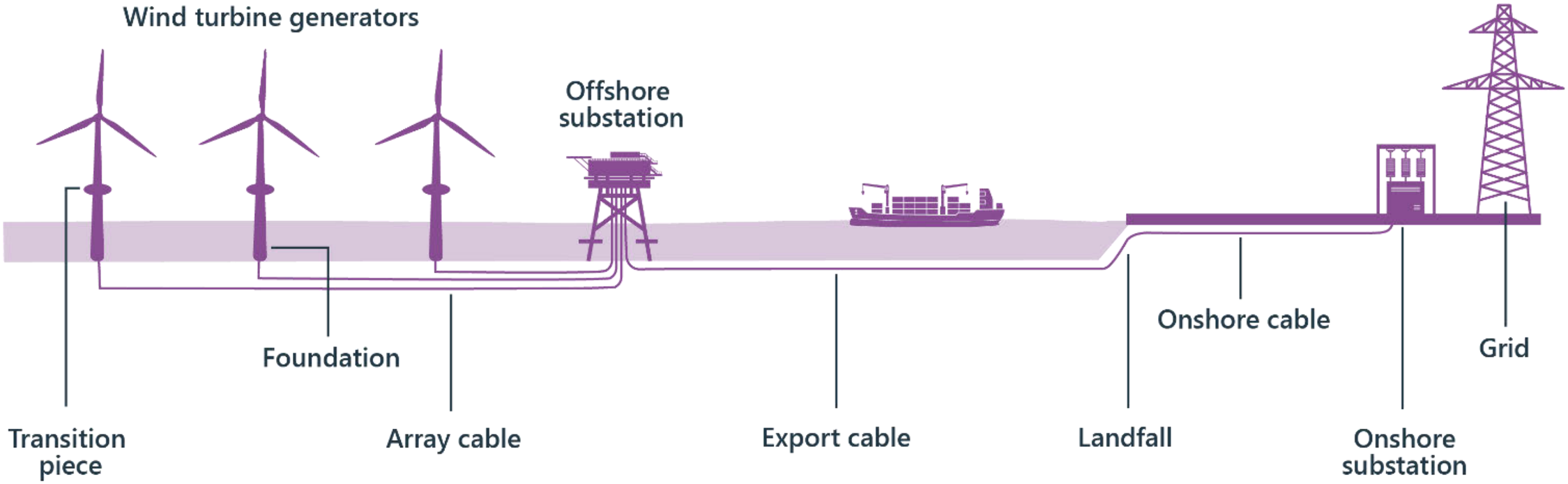
Table 2.1 Scoping Boundary characteristics

Parameters	Values
Wind farm array Area of Search for Rampion 2	315km^2
Export cable corridor Area of Search	76km^2
Closest distance to shore of wind farm Area of Search	13km
Water depth range in wind farm Area of Search	15-60m
Onshore cable length	Approximately 36km
Onshore Cable Area of Search width (not including end points)	2km

Proposed Development infrastructure overview

2.3.5 The key components of Rampion 2 are described below and illustrated in **Figure 2.1.**

Figure 2.1 Key components of the Proposed Development



2.3.6 For the purposes of the Scoping Report, the key components of Rampion 2 are separated into offshore and onshore elements with an overview of each provided below. These subsequent sections provide detail and parameters where possible at this early stage and will be described in accordance with the Design Envelope principle. The Preliminary Environmental Information Report (PEIR) and ES will provide further clarity on the Rampion 2 design, routes and locations as the Proposed Development progresses through the EIA process.

Offshore elements of the Proposed Development

Introduction

2.3.7 The offshore elements of Rampion 2 refer to works below MHWS and will comprise the following key components:

- wind turbine generators (WTGs);
- wind turbine foundations;
- substations and associated foundations;
- inter-array cables; and
- export cables to connect the wind farm area to the landfall.

2.3.8 All offshore project components are assumed to be fabricated off-site, stored at a suitable port facility and transported directly offshore as needed during construction.

2.3.9 The key offshore component parameters that can be confirmed at this point are provided in **Table 2.2** and are described below.

Table 2.2 Offshore component parameters

Offshore components	Indicative parameters
Wind Turbine Generators (WTGs)	
Rotor diameter	275m
Maximum number of WTGs	Up to 116 WTGs
Maximum tip height	Up to 325m
Air Gap above Highest Astronomical Tide (HAT)	Minimum air gap 22m

Offshore substation	
Number of substations	Up to 3
Foundation type	Monopile or jacket
Inter-array cable	
Array cable length	Dependent on distance between WTGs
Array cable depth	Target depth 1m dependant on cable burial risk assessment
Export cable	
Export cable rated capacity	Up to 275kV
Export cables/trenches	Up to 4
Fibre optic cables	Bundled into export cable
Number of cable crossings	No known third party cable crossings to be confirmed through consultation and further data gathering
Export cable corridor Area of Search	76km^2
Export cable trench depth	Target depth 1m dependant on cable burial risk assessment
Landfall	
Number of HDD drills	Up to 4
Number of transition bays	Up to 4

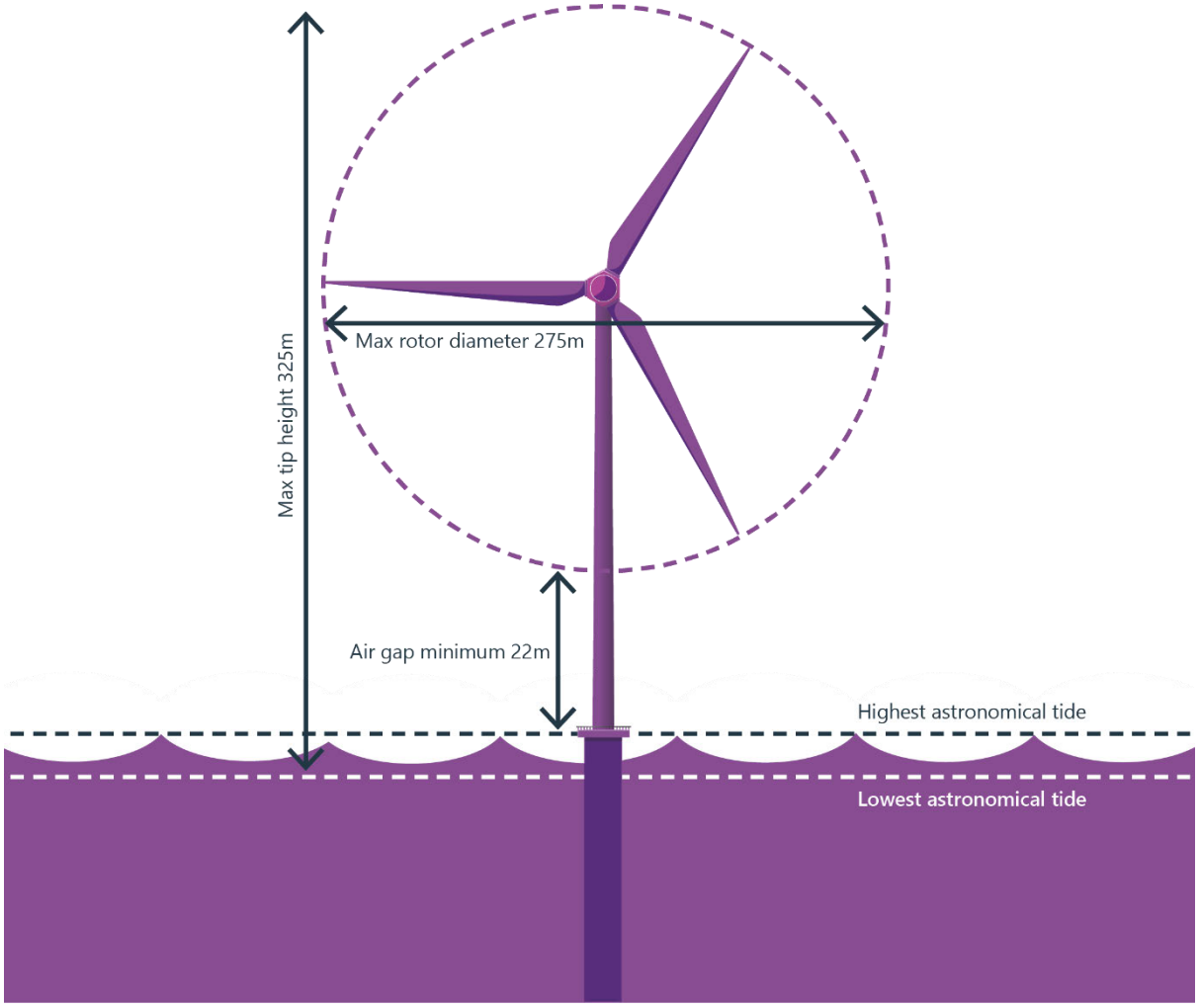
Wind turbine generators (WTGs)

2.3.10 The WTGs will comprise a tower (potentially assembled in sections), a nacelle (housing a gearbox, generator, and transformer), a rotor, and turbine blades. The

wind turbine transformer steps up generated electricity to a higher voltage in order to reduce losses during transmission over the longer distances to the substation.

2.3.11 As wind turbine technology is continually evolving, it is difficult to definitively predict the profile of WTGs that will be commercially available at the point of construction at least five years into the future. As such, the size and capacity of the WTGs for Rampion 2 will be determined during the final project design stage. The maximum design scenario for the WTGs is as follows and illustrated in **Figure 2.2**.

Figure 2.2 Illustration of a wind turbine including maximum dimensions



2.3.12 Rampion 2 will have a generating capacity of up to 1,200MW and it is anticipated that WTGS ranging from 10MW to 16MW will be the likely WTG options available. This provides a suggested maximum indicative range of up to 116 (10MW) or 75 (16MW) WTGs. RED can confirm that the number of turbines utilised for the Rampion 2 will not exceed those at Rampion 1.

Wind turbine foundations

Introduction

2.3.13 The type of wind turbine foundation will be determined from the results of geotechnical investigations, existing environmental sensitivities and final WTG selection. It is anticipated that more than one type of foundation may be used across Rampion 2. The results of preliminary engineering investigations indicate that several design options for the wind turbine foundations could be considered for Rampion 2 including:

- monopiles; and
- jackets.

2.3.14 The foundations will be fabricated offsite, stored at a suitable port facility and transported to site as needed. Specialist vessels will be needed to transport and install foundations.

2.3.15 Each foundation type may require some form of seabed preparation which may include seabed levelling, ground reinforcement and removing surface and subsurface debris. Consent for boulder clearance and unexploded ordnance (UXO) removal will be sought in a future Marine Licence application, when geophysical survey data of suitable spatial resolution is available to identify and quantify UXO.

2.3.16 Scour protection material may be required around the base of some or all wind turbine foundations to protect from current and wave action ensuring structural integrity. A Scour Management Plan will be developed including details of the need, type, quantity and installation methods for scour protection and agreed with the relevant stakeholders.

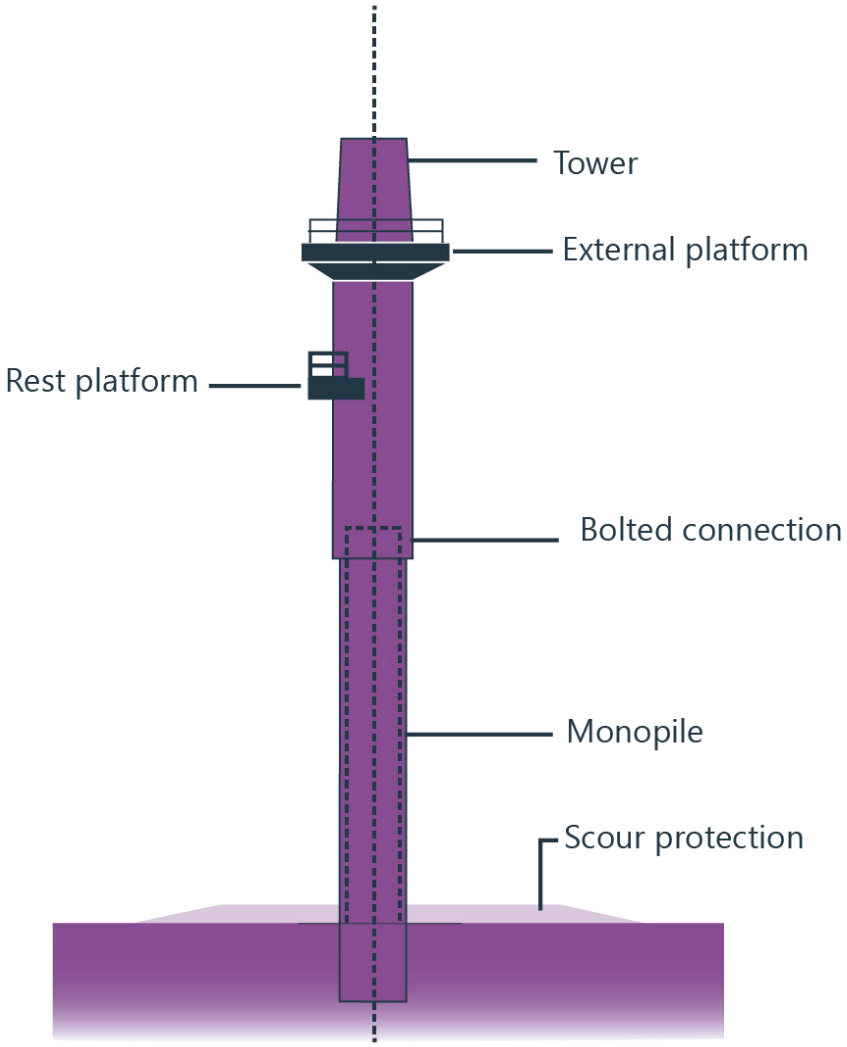
2.3.17 Wind turbine support structures will include access facilities and appropriate lighting and markers for aviation and navigation.

Monopile Foundations

2.3.18 Monopile foundations are welded tubular steel sections with a large diameter. Monopiles are installed vertically into the seabed by either driving (use of a pile-driving hammer), combining driving and drilling techniques where harder ground conditions are present or appropriate alternative methods as they become available and practicable. The dimensions of the monopiles that may be used will depend on the size of the WTGs, hydrodynamic forces, and ground conditions. A tubular transition piece is bolted or grouted to an installed monopile, and comprises a turbine tower flange, boat landings and other appurtenances.

2.3.19 A typical monopile foundation schematic is provided in **Figure 2.3**.

Figure 2.3 Monopile foundation schematic

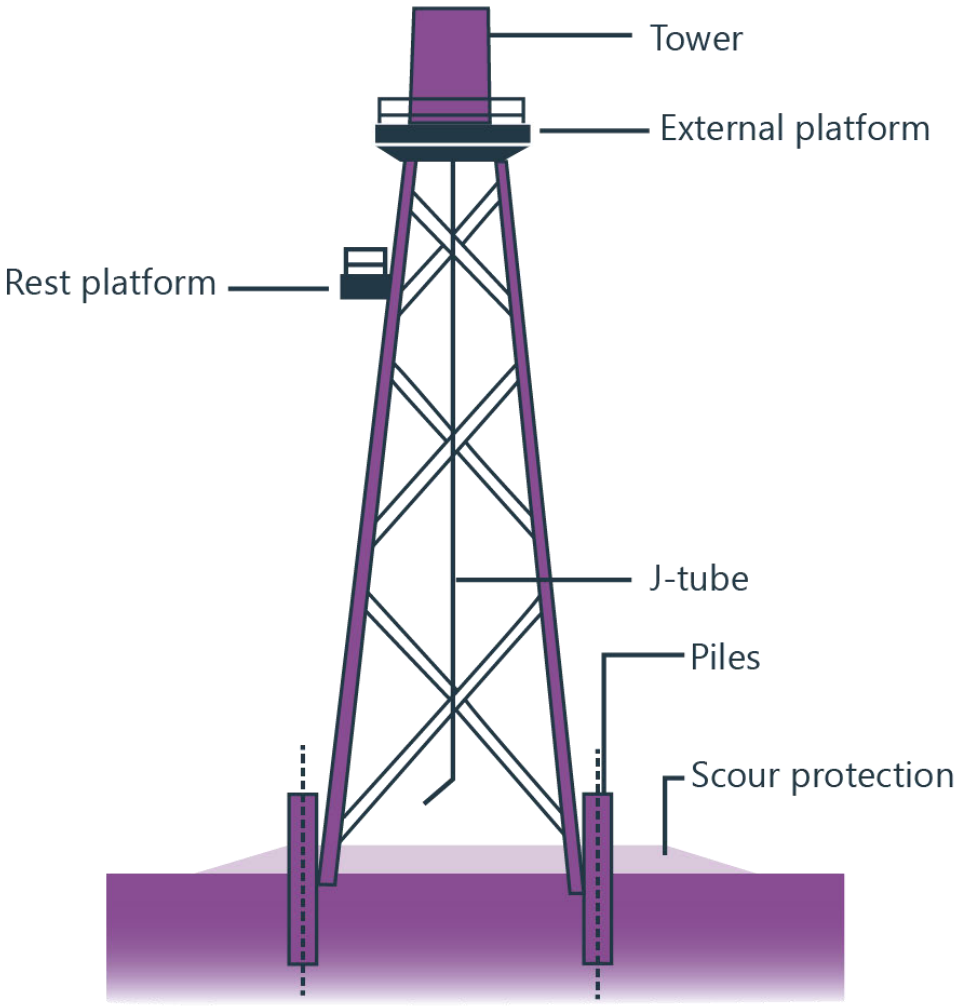


Jacket foundations

2.3.20 Jacket foundations typically consist of steel tubulars with a lattice structure to support the turbine tower. The jacket is supported by small diameter pin piles which are driven into the seabed through a pile sleeve at each leg. The pin piles are connected to the legs via a grouted or deformed connection.

2.3.21 A typical jacket foundation with piles schematic is provided in **Figure 2.4**.

Figure 2.4 Jacket foundations with piles schematic



2.3.22 Other solutions such as suction buckets may be used as an alternative to pin piles for securing the jacket to the seabed. Suction buckets comprise a large steel cylinder which is sealed at the top. The suction bucket is embedded into the seabed by creating a negative (suction) pressure inside the bucket. The difference in pressure across the top plate as a result further pushes the bucket into the seabed.

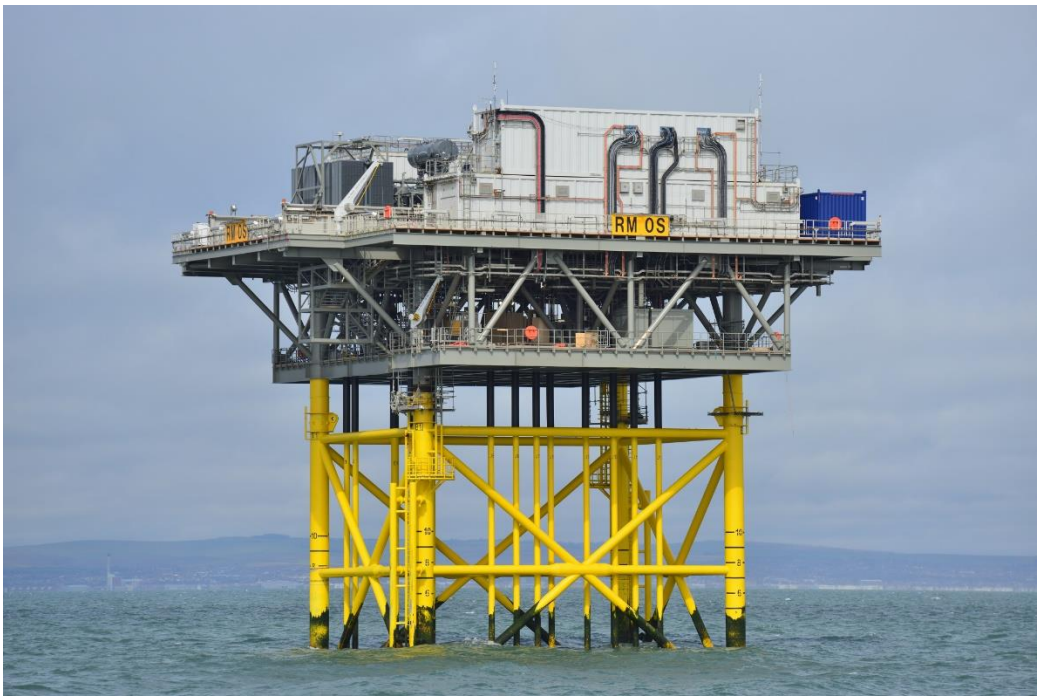
Offshore substation(s)

2.3.23 It is anticipated that there will be up to three offshore substations associated with Rampion 2. The substations will transform generated electricity to a higher voltage for transmission to shore via export cables. The location and extent of the offshore substations will be confirmed through the detailed design process but will be located within the Scoping Boundary.

2.3.24 It is anticipated that each substation will likely comprise a topside platform installed on a foundation, typically a monopile or jacket type foundation. The substation platform will likely include components including transformers, batteries,

generators, switchgear, fire systems, and modular facilities for operational and maintenance activities, similar to the offshore substation for Rampion.

Figure 2.5 Offshore substation example



Offshore cables

Array cables

2.3.25 Subsea array cables will be installed to connect the WTGs. These array cables will then subsequently connect the WTGs to the offshore substation(s). It is anticipated that the array cables will be installed via either ploughing, jetting, trenching, or post-lay burial techniques, depending on ground conditions along the specific cable route. The array cables will typically be buried at a target burial depth of 1m below the seabed surface depending on the outcome of the cable burial risk assessment. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (for example from anchor drag damage). Cable installation may require some form of seabed preparation which may include boulder and/or sandwave clearance.

2.3.26 The array cables will be 33kV or 66kV and the length of cable will be dependent on the distance between WTGs themselves, and the distance between the WTGs and offshore substations. For the purposes of the EIA, a maximum length for the array cables will be defined to inform assessments.

Export cables

2.3.27 Electricity from the offshore substation(s) will be transmitted via export cables to the transition joint bay located at the landfall on the shoreline. It is anticipated this will be via up to four circuits laid in separate trenches at different times and

installed via either ploughing, jetting, trenching, or post-lay burial techniques, depending on ground conditions along the specific cable route.

2.3.28 The export cables will have a rated capacity up to 275kV, and be typically buried at a target burial depth of 1m below the seabed surface depending on the outcome of the cable burial risk assessment. The exact routing of the export cables within the cable corridor will be determined during the detailed design of Rampion 2, with consideration of seabed conditions and any environmental sensitivities. There are no known third party cables within the Scoping Boundary for Rampion 2. In the eventuality that cable crossings are required for the Rampion 2 assets or any potentially unknown subsea cables/pipelines, then a methodology for this will be agreed in collaboration with the relevant infrastructure owners.

Landfall

2.3.29 The potential landfall location, where the export cables will come ashore, has been identified at Climping in West Sussex through a detailed constraints mapping exercise described in **Section 2.4**. The exact landfall location will be refined as the detailed design and EIA assessments progress to determine site suitability and minimise potential impacts.

2.3.30 Construction of the landfall is anticipated to be via a trenchless technique such as Horizontal Directional Drilling (HDD). Each export cable will require one HDD and this involves drilling a pilot hole between the entry (onshore) and exit (offshore) points which is then enlarged by a larger cutting tool passing through the hole. The cable duct is then placed through the channel created.

2.3.31 The HDD will be drilled from an onshore construction compound and will exit the seabed in an exit pit at a suitable location. The length of the HDD will depend on factors such as water depth, seabed topography, shallow geology / soil conditions and environmental constraints. Due to the nature of the landfall approach with shallow water, duct extensions may be required from the offshore end of the HDD.

2.3.32 The HDD offshore exit pits will be spaced some distance apart, typically 20 – 50m depending on local environmental and technical constraints. The export cables are generally protected in the HDD exit pits and in the offshore export cable trench. However, there may be a limited section between the HDD exit pit and the cable trench where the export cables require some protection. If this is the case, a Scour Management Plan will be developed including details of the need, type, quantity and installation methods for scour protection and agreed with the relevant stakeholders.

2.3.33 Transition joint bays will be constructed in the vicinity of the landfall location to enable the jointing of the offshore export cable and onshore cable. Each transition joint bay is typically a large underground concrete structure. The onshore construction compound associated with the landfall will be temporary in nature and reinstated after completion of the Proposed Development.

Onshore elements of the Proposed Development

Introduction

2.3.34 The onshore elements of Rampion 2 relate to the onshore electricity grid connection from the point of MHWS to connection with the National Grid transmission system. This will comprise the following key components:

- transmission cables defined in a cable corridor of approximately 36km in length; and
- a new substation that will connect to National Grid's substation at Bolney, Mid Sussex, for which there are currently a number of options under consideration.

2.3.35 Recognising existing constraints and sensitivities around the existing Bolney Substation, a number of candidate 'satellite' sites (within a radius of 5km and lying within the boundary set out in this Scoping Report) are being considered for where the new wind farm substation would be located. Regardless of final site selection, the electricity ultimately needs to be fed into the existing National Grid Bolney substation, which would require underground cables and minor upgrades at Bolney Substation.

2.3.36 The location of onshore scoping area is provided in **Figure 1.1** and the key components of the onshore elements of Rampion 2 are described below.

Onshore Cable Corridor

2.3.37 The onshore grid connection for Rampion 2 will be made via a buried cable along the entire length of the route wherever possible. The cable corridor will be refined during the detailed design and the EIA process in order to identify a cable route corridor which is optimal from an environmental, economic and engineering perspective.

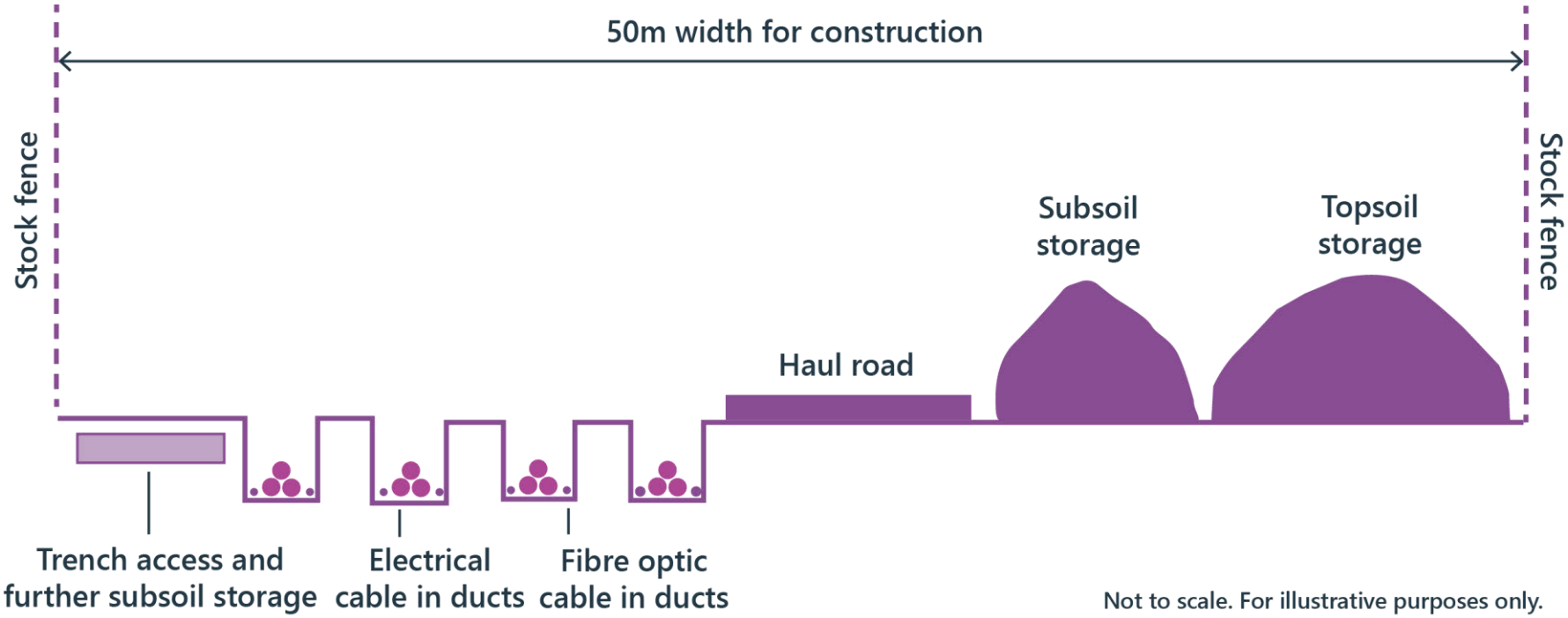
2.3.38 The onshore cable system will be installed in up to four trenches, with cables drawn through installed ducts. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential effects where constraints are identified, including to cross environmentally sensitive water courses, major roadways and railways. Fibre optic cables will be installed alongside the transmission cables for communication and monitoring purposes. The onshore cable will not be oil-filled and there are no fluids required to be introduced into the cable trenches. The trenches will then be backfilled, with approximately 1m of soil covering the cables and ducts.

2.3.39 The onshore cable route will be constructed in stages or sections along the route. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced. At regular intervals along the route joint bays will be installed to enable the cable installation and connection process. The joint bays are subsurface structures with an associated link box located at or above ground level. These link boxes enable electrical checks and testing to be carried out on the cable system during operation.

2.3.40 During construction, a temporary construction corridor will be defined which will incorporate temporary working areas to provide access and allow for safe

construction. In particular, the temporary construction corridor will provide access to construction traffic, and space for cable assembly, cable trench excavation, and storage space for excavated topsoil and subsoil in separate stockpiles. It is expected that the width of the cable construction corridor for surface trenching will be approximately 50m. A cross-section of a typical Rampion 2 temporary construction corridor is provided in **Figure 2.6** . At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects.

Figure 2.6 A typical temporary construction corridor cross-section of the Rampion 2 onshore cable corridor



2.3.41 The temporary construction corridor may also require widening beyond the standard width in predetermined locations to allow sufficient space for access at crossings, avoidance of obstacles, directional drilling, and the application of trenchless techniques.

2.3.42 The key onshore cable parameters that can be confirmed at this point are provided in **Table 2.3**.

Table 2.3 Onshore cable parameters

Onshore cable corridor	Indicative parameters
Cable corridor swathe width (construction only)	Up to 50m
Number of cables (including fibre optics)	Up to 20
Number of ducts (including fibre optics)	Up to 20
Number of trenches	Up to 4
Depth to top of buried infrastructure (ducts)	Target depth 1m dependant on cable burial risk assessment
Trenchless (HDD) crossings	To be identified

2.3.43 A number of temporary construction laydown areas will be required along the temporary construction corridor to accommodate construction equipment, materials, and site offices.

2.3.44 On completion of construction the cable construction corridor land will be reinstated to its former condition with the haul road, any soil storage and stock fences removed. Where underground cables are installed, a permanent easement will be agreed with landowners, or failing agreement acquired using compulsory acquisition powers, to enable access for inspections and maintenance during operation of Rampion 2.

2.3.45 Should construction of the offshore wind farm be undertaken in phases, it may not be possible to install all onshore cables in a single operation. For any remaining cables, ducts will be installed in the trenches in the initial phase to allow the cables to be drawn through the ducts as later phases of the Proposed Development are brought forward. This approach will remove the need to undertake repeat excavations along the route. The only exception to this are potential areas along the route that are identified for HDD to enable crossing sensitive locations. On completion of cable installation, the haul road, and any construction compounds will be removed, and the cable corridor will be fully reinstated.

Onshore substation

2.3.46 Rampion 2 will connect to the National Grid's Bolney substation in West Sussex and in order to connect the transmission cable to the electricity network, a new substation will be required. The onshore substation will be located on land in proximity (up to circa 5km) to the existing National Grid 400kV substation at Bolney. The overall site footprint for the proposed onshore substation is anticipated to be up to 4.5 hectares (ha), and the exact location of the substation will be confirmed as the detailed design, the EIA process and landowner discussions progress.

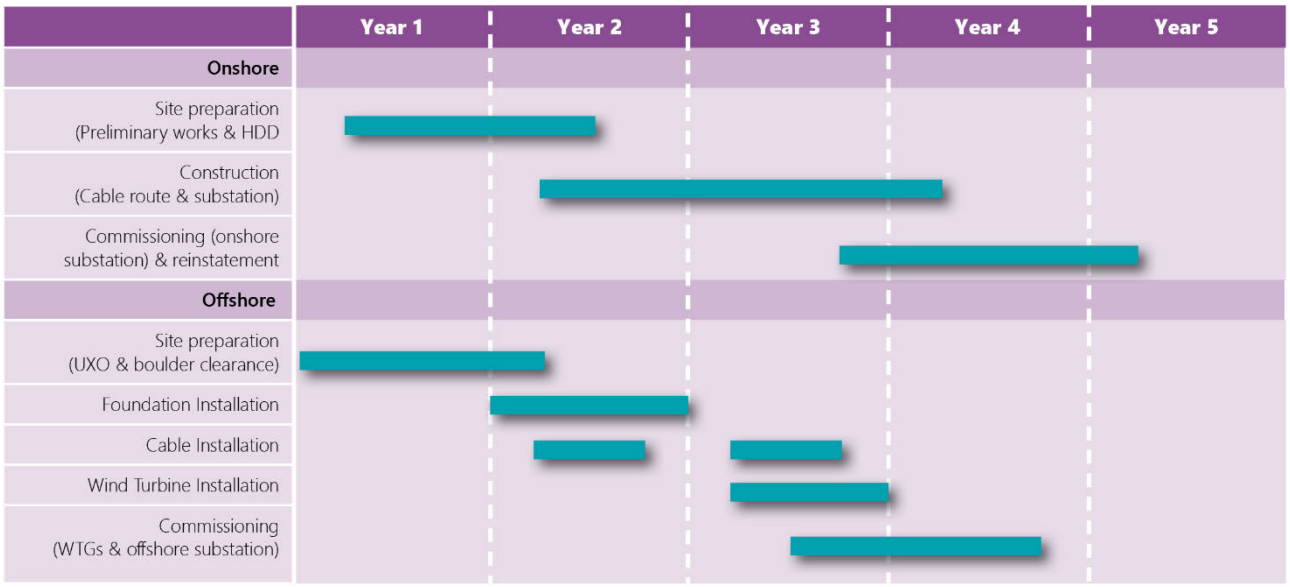
2.3.47 Construction works for the onshore substation will include creation of site access, site preparation works, installation of underground services and foundations, construction of the building, installation of electrical equipment, installation of perimeter fencing, and landscaping.

2.3.48 The onshore substation will contain necessary transmission equipment including transformers, reactors, capacitor banks, and open busbars. The substation will also house switchgear and controls, and welfare facilities.

Construction programme

2.3.49 An indicative construction programme for Rampion 2 is shown in **Figure 2.7**. The duration of construction is anticipated to be up to five years.

Figure 2.7 Indicative construction programme



HDD – Horizontal Directional Drilling
UXO – Unexploded ordnance
WTG – Wind turbine generators
OSP – Offshore Substation Platform

Operation, maintenance and decommissioning

2.3.50 For Rampion 2, RED will draw on experience gained in operating and maintaining Rampion 1. This includes identifying potential synergies when developing the operation and maintenance strategy for the Proposed Development.

2.3.51 The operation and maintenance strategy will be finalised once the technical specifications of Rampion 2 are confirmed, including WTG model, design of electrical transmission infrastructure and final Proposed Development layout.

2.3.52 Maintenance activities will be undertaken for both preventive and corrective maintenance requirements. Operation and maintenance services will be undertaken via supply and crew vessels.

2.3.53 During the operation of the onshore cable, periodic testing of the cable is likely to be required (every two-five years). This will require access to the link boxes along the cable route. This will involve attendance by up to three light vehicles, such as vans, in a day at any one location. The vehicles will gain access using existing field accesses and side accesses as agreed with landowners to reach the relevant sections of the cable.

2.3.54 The onshore substation will be designed to be unmanned during operation, however some maintenance visits may be required. This would typically involve a very small number of vehicles, typically light vans. Infrequently, equipment may be required to be replaced, then the use of an occasional HGV may be utilised, depending on the nature of the repair.

2.3.55 The operational lifetime of Rampion 2 is assumed to be a minimum of 30 years. A decommissioning plan and programme will be developed prior to construction and updated during operation of Rampion 2 to account for any changes to decommissioning best-practice and developments in technology.

2.3.56 The decommissioning of Rampion 2 is anticipated to involve the removal of all offshore infrastructure above the seabed, and the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ offshore and onshore to minimise environmental effects associated with removal. The decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment. Further detail will be provided in the decommissioning plan.

2.4 Consideration of alternatives

Introduction

2.4.1 The EIA will set out the options considered for Rampion 2 and the main reasons for selecting particular options, taking into consideration environmental effects, technical feasibility and the overall objectives of the Proposed Development. In addition, the EIA will also consider a ‘no development option’ which will outline the likely evolution of the baseline scenario without implementation of the Proposed Development.

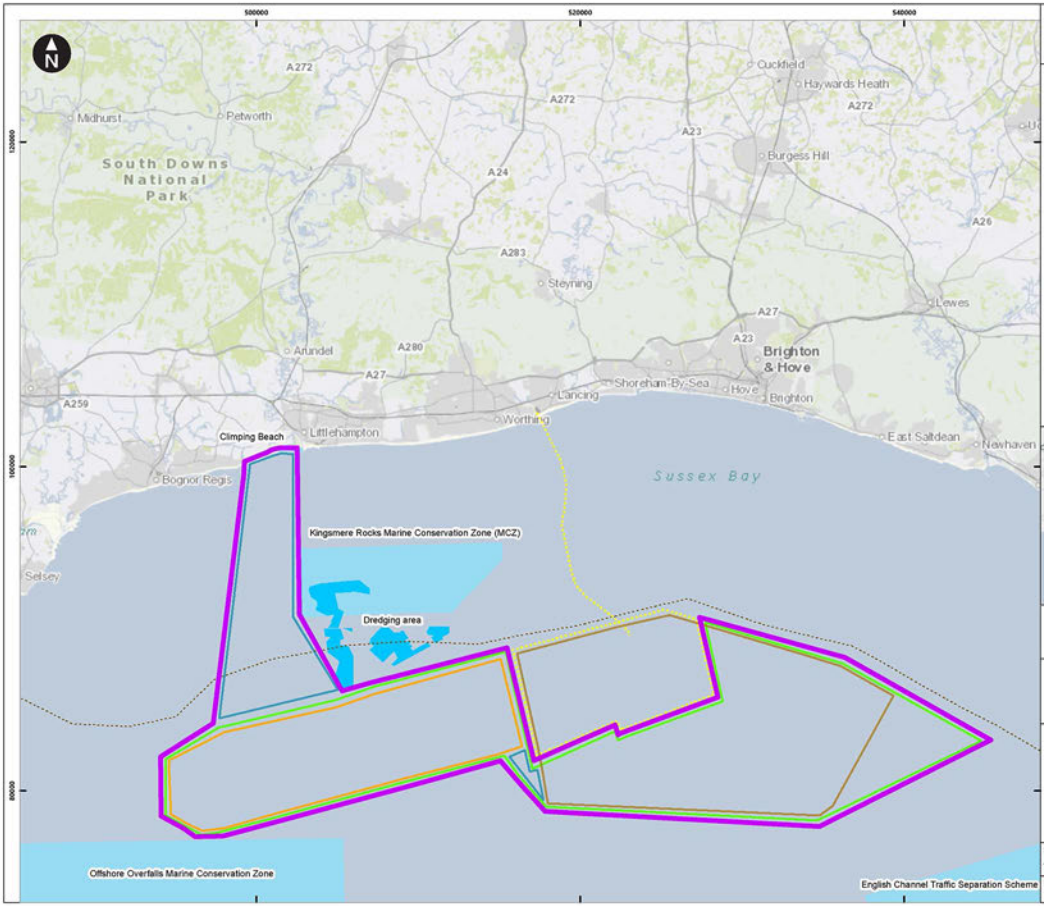
2.4.2 This section presents a summary of the process for route planning and site selection that is being followed for Rampion 2. The PEIR and ES will provide

further detail including how the design, routes and locations have evolved over time and any refinements that take place specifically as a result of the EIA process and in response to stakeholder feedback.

Offshore site identification

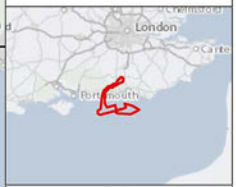
Offshore wind farm area

2.4.3 RED is proposing to develop a new offshore wind project, Rampion 2, adjacent to the existing Rampion 1 project. Rampion 1 was developed following TCE Round 3 offshore wind leasing programme launched in 2008. This process identified nine zones through a Strategic Environmental Assessment (SEA). Rampion 1 is located in the English Channel, off the south coast of England within the Round 3 Zone 6 area. The zone has an overall area of 271 km^2, and Rampion 1 was situated in the North Western part of the Zone, occupying some 78km^2. Rampion 1 was consented in July 2014 and fully operational in 2018. The existing Rampion 1 project is shown in **Figure 2.8** below.



Key

- Offshore element of scoping boundary
- Area of search- Export cable
- Round 3 zone 6 area
- Constraints
- Round 3 extension area
- Areas of search -Windfarm
- Existing Rampion 1 project windfarm site and associated export cable
- 13 km to shore line



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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 2.8 Rampion 2 offshore site selection considerations

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-OF-FG-SA-0001				1.0
Originator:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
	BARNB	WOOD	15/06/2020	FINAL

ISO A3 Landscape

2.4.4 In 2018, the Applicant applied to TCE for an extension to Rampion 1 through the wind farm extension leasing process and following the outcome of TCE's plan-led Habitats Regulations Assessment (HRA), was awarded development rights for the Rampion Extension Site in September 2019. This area extending due west of existing Rampion 1 project (as seen in **Figure 2.8**) was omitted from the original Round 3 leasing process due to it being an area of active aggregates extraction licences at that time. Identification of the extension area considered the following factors:

- the eastern boundary is defined by the western edge of the existing Rampion 1 project;
- the northern boundary maintains minimum 13km distance from shore, as per the existing Rampion 1 project and exhibits similar relatively shallow water depths (20-40m). In addition, this boundary also keeps the development to the south of various active aggregates extraction licences; and
- the southern and western boundaries were selected following analysis of shipping traffic patterns and avoiding the main vessel routes together with avoidance of the Offshore Overfalls Marine Conservation Zone (MCZ) to the south west.

2.4.5 To enable greater optionality and optimisation of a project, the Applicant confirmed its interest in developing in the remainder of the Round 3 Zone 6 area that it was originally awarded development rights to in 2008/9. RED has since been awarded development rights to a significant portion of this Zone 6 area. Identification of this area considered the following factors:

- this area is wholly within that originally considered by the SEA in [2008/09];
- the northern boundary maintains minimum 13km distance from shore, as per the existing Rampion 1 project;
- the eastern boundary is limited to the original boundary considered (but subsequently not constructed) in the Rampion 1 DCO in consideration of the sensitivity of views from the Heritage Coast;
- the southern boundary has been drawn to ensure appropriate separation from the English Channel Traffic Separation Scheme (TSS) as per is the original Zone 6 boundary; and
- the western boundary is largely defined by the existing Rampion 1 project.

2.4.6 Rampion 2 comprises both the seabed area awarded under the TCE extension process and development within the remainder of the original Round 3 Zone 6 area. In addition, a small area or 'bridge' to adjoin the two areas at the Rampion 1 south west corner has also been added to the Area of Search to enable cabling requirements across the full area. For clarity, no WTGs or substations will be located in the 'bridge' area.

2.4.7 RED is finalising an AfL with TCE for the wind farm array Area of Search with an additional lease required for the export cable corridor and adjoining cabling 'bridge'.

2.4.8 The aggregate of these seabed areas will be optimised (together with the onshore aspects of the project) to form a single development giving rise to a single application for Development Consent.

2.4.9 RED believes that a single DCO Application provides increased flexibility to respond to feedback from consultees and stakeholders to help inform and shape the final design, to ultimately bring forward the best optimised proposal as a DCO Application. At this early stage of development, RED does not wish to pre-judge whether such a final proposal will lie wholly within one area or the other, or to comprise development within both areas.

Offshore export cable corridor

2.4.10 The onshore site selection process detailed in **Section 2.4** confirms a landfall at Climping, West Sussex. As such, a broad offshore export corridor has been identified from this landfall to the western extent of Rampion 2. This corridor has been defined suitably wide to enable further refinement in due course as more detailed assessment, constraint mapping and consultation progresses. Identification of the offshore export cable corridor considered the following factors:

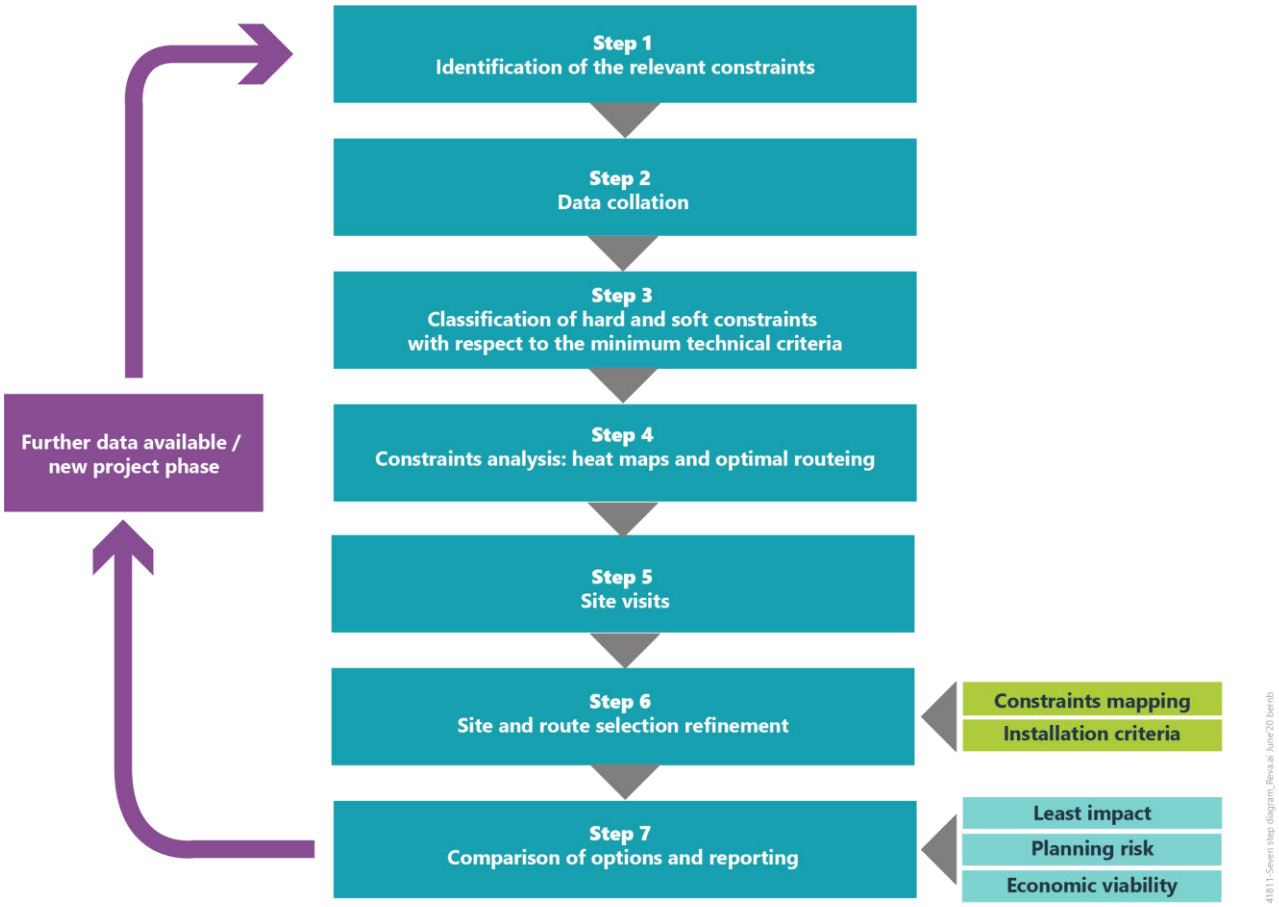
- avoidance of the Sites of Special Scientific Interest (SSSI) designation at eastern part of landfall, 'Climping Beach';
- avoidance of Kingmere Rocks MCZ to the east of the export corridor; and
- avoidance of active aggregates extraction licence areas to the east of the export corridor.

Onshore site selection

Appraisal methodology

2.4.11 A comprehensive onshore route planning and site selection exercise has been undertaken to identify economically, technically and environmentally acceptable landfall, cable routes and substation site options initially from seven potential grid connection points across two counties along the South Coast. This process is summarised in **Figure 2.9**.

Figure 2.9 Site selection methodology flowchart



2.4.12 A detailed constraints mapping exercise considered seven potential grid connection points across two counties along the South Coast.

2.4.13 To inform the identification of potential landfall locations, substation sites and indicative cable routes, a detailed constraints mapping exercise was undertaken whereby a number of key environmental, technical and commercial constraints were established as summarised in **Table 2.4**. This constraints data was gathered over a study area based on a 30km buffer around the seven potential grid connection points to allow for the area between these points and the coastline.

Table 2.4 Key constraints considered in the assessment

Topic	Constraint
Environmental	
Landscape and visual.	National Park. Area of Outstanding Natural Beauty (AONB). National Trail.

Topic	Constraint
	Sustrans National Cycle Trail.
	South Marine Plan Area (data contained within).
	South Downs National Park (SDNP): View Characterisation and Analysis (Land Use Consultants, 2015).
	SDNP Tranquillity Study (2017).
	South Downs Integrated Landscape Character Assessment (2017).
	South Downs National Park Viewshed Analysis.
Biodiversity (terrestrial, ornithological and intertidal).	Ramsar.
	Special Protection Area (SPA).
	Special Area of Conservation (SAC).
	Site of Special Scientific Interest (SSSI).
	Ancient Woodland.
	National Nature Reserve.
	Local Nature Reserve.
Historic Environment.	World Heritage Site.
	Scheduled Monument.
	Registered Parks and Garden.
	Historic Battlefield.
	National Trust Land.
	Conservation Area
	Listed Building.
Socio-economics.	Settlement boundaries.
	Notable planning land allocations.
	Tourism and recreation facilities (e.g. golf courses, caravan parks / campsites, fisheries, playing fields).
	Significant health and educational establishments outside settlements.
	Quarries.
	Agricultural Land Classifications – Grade 1.

Topic	Constraint
Other environmental factors.	Flood zone 3 (land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year). Flood zone 2 (land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year).
Technical / physical	
Potential obstacles.	Motorways. Railway lines. Main rivers. Utilities, e.g. overhead power lines. Incised valleys and gradients over 10%.
Commercial	
Landownership	Ministry of Defence (MoD) land.

2.4.14 Professional judgement was used to establish whether each constraints layer was considered a 'hard' or 'soft' constraint. These constraints were combined into a heatmap to enable potential options for the onshore infrastructure to be identified in areas demonstrating avoidance of hard constraints and lower levels of soft constraints identified.

- A **'hard'** constraint: These will directly influence the boundaries of sites/indicative cable routes, unless suitable mitigation is available; they generally constitute no-build areas. Hard constraints are often defined through reference to national policy and legislation
- A **'soft'** constraint: These will not generally prevent progress in isolation. Soft constraints are more likely to include local policy designations and can often be moderated through mitigation.

2.4.15 The potential landfall locations, substation sites in proximity to the identified grid connection points and indicative cable route options identified through this process were then appraised to determine the following:

- the potential environmental impact with regard to landscape and visual, biodiversity, historic environment, socioeconomic and planning;
- the ease of construction with reference to the technical criteria; and

- the relative cost in terms of potential cable length.

2.4.16 This appraisal comprised a 'traffic light' system applied for each constraint for each option to enable a relative ranking of these options.

Initial appraisal outcomes

2.4.17 A summary of the appraisal outcomes is provided below.

- Whilst seven grid connection points (four transmission and three distribution connected) were initially identified, once it was confirmed that any economically viable project would exceed the capacity that could be connected into the distribution system and this was reflected in a Grid Connection Agreement with National Grid for 1200MW, it was clear that the project must connect into the transmission system. This is due to a number of factors including electrical capacity, system stability and regulatory requirements. As such, the four identified transmission grid connection points at Fawley, Chilling, Lovedean and Bolney were investigated. There was suitable land available for a new substation at all of these potential grid connection points and as such all were taken forward for further consideration in combination with the outcome of the landfall and cable route option appraisals.
- Nine potential landfall locations were identified along the South Coast. Of these, three were excluded following appraisal. A potential landfall location at Lee-on-the-Solent was excluded due to the presence of Ministry of Defence land and Alver Country Park in close proximity. Similarly, a landfall location at West Wittering was excluded as a potential option due to recreational constraints and the presence of Chichester and Langstone Harbours Special Protection Area (SPA). A landfall location at Brooklands Park in Worthing was excluded due to physical constraints including existing transmission infrastructure associated with the Rampion Offshore Wind Farm, and an allocated area of Local Green Space. The remaining six landfalls were taken forward for further consideration in combination with the outcome of the substation and cable route option appraisals.
- Seven indicative cable routes were identified from the six remaining landfall locations to the four identified transmission connection points. In addition, a number of other potential options were sought but not further developed due to insurmountable constraints particularly the presence of existing built development. In general, it was found that, the further inland the potential grid connection point is located, the more constrained the indicative cable route became, both in terms of environmental and technical constraints. The seven indicative cable routes identified were taken forward for further consideration in combination with the outcome of the landfall and substation option appraisals.

2.4.18 One further potential grid connection point (Little Horsted) was appraised in addition to above. This was subsequently excluded, given that this is only a proposed new substation, for which planning permission has not yet been sought, and therefore timescales for its construction are uncertain.

2.4.19 An electrical feasibility study was conducted by National Grid at RED's request. This considered five National Grid connection points, including Bolney where the existing Rampion 1 project connects. It concluded that only Fawley, Bolney and

Little Horsted have the electrical capacity necessary to connect Rampion 2. National Grid are obligated to conduct a Connections Infrastructure Options Notice (CION) process, under which they are required by the Regulator, OFGEM, to connect generators into the transmission system in the most economic and efficient manner. This process concluded that Bolney is the optimum connection point for Rampion 2. The Applicant was subsequently granted an offer on this basis, and have signed a Grid Connection Agreement for 1200MW with National Grid.

2.4.20 In light of this outcome and that of the onshore site selection appraisal, a landfall at Climping was selected with an identified route connecting it to Bolney, noting that the new substation site may not be directly adjoining the existing Bolney substation site. This substation, landfall and connecting cable route combination was selected largely due to Climping being in closest proximity to the preferred connection point (relative to other options considered) but also for the following key reasons:

- the lack of statutory designations at the coast and immediately inland in association with the Climping landfall;
- the availability of large foreshore areas clear of development and large flat areas immediately inland at the Climping landfall;
- there are isolated Listed Buildings in the vicinity of Climping landfall, but these are easily avoided through the sensitive locating of construction works;
- the Ancient Woodland and Priority Habitat woodland in the vicinity of the Climping landfall and the potential substation site options are avoidable;
- the Climping landfall is well screened for local residential receptors;
- the landfall is located in close proximity (relative to the other landfall options identified) to the Rampion 2 offshore wind farm site minimising the offshore cable route required;
- the limited number of Listed Buildings within 500m of the substation and the potential satellite substation site options are generally well screened / within the bounds of properties;
- there are no statutory ecological designations along the indicative cable route; and
- the indicative cable route generally avoids development. Any impacts on isolated Listed Buildings that may be in the vicinity should be avoidable through design.

2.4.21 It is noted that this connection combination does have a number of outstanding constraints to consider including flood risk and its positioning within the South Downs National Park. Subsequent site selection and route narrowing work will, in consultation with the relevant stakeholders, work to minimise the impacts on these constraints where possible.

2.4.22 A more detailed investigation of the Climping to Bolney cable route and potential substation sites in proximity to the existing Bolney substation was subsequently undertaken to:

- investigate and appraise potential new substation site options in the vicinity of the existing Bolney connection using the same methodology described above and determine potential cable routes to these from the indicative cable route;
- understand land ownership along the cable route and at potential substation site options; and
- consider potential technical pinchpoints including ground truthing along the indicative cable route and understand options to minimise these.

2.4.23 This exercise has resulted in consideration of numerous local routeing options and the appraisal of eight additional new substation site options in proximity to the Bolney connection. The current Scoping Boundary comprises the landfall at Climping, the indicative cable route and an area that encompasses these potential substation options and local cable spurs to connect them to the indicative cable route and the Bolney connection.

Onshore route narrowing strategy

2.4.24 Ongoing work is required to narrow this down into a single cable connection option and this will include:

- more detailed site selection work on the substation options to confirm optimal options;
- technical review of the substation sites to confirm suitability;
- discussions with the substation site option landowners to understand feasible of procuring the site for a substation;
- environmental surveys of the cable route to confirm suitability; and
- discussions with relevant stakeholders such as Local Planning Authority (LPA), National Parks Authority (NPA) and Natural England (NE) to understand potential concerns and risks.

Next steps

2.4.25 The PEIR and ES will outline further how the Rampion 2 design, routes and locations have evolved as the Proposed Development progresses through the EIA process.

2.4.26 The PEIR will present the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, the likely significant effects and environmental measures proposed. The requirement to consult on Preliminary Environmental Information is set out in The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, Regulation 12 (1) (b) (herein the 'EIA Regulations') which requires the Applicant to set out in the statement of community consultation prepared under section 47 of the Planning Act 2008, how it 'intends to publicise and consult on preliminary environmental information' (where the proposed development is "EIA development"). In accordance with section 47(7) of the Planning Act 2008, the Applicant is required to carry out consultation in accordance with the statement.

3. Policy and legislative context

3.1 Introduction

3.1.1 This Chapter gives a short overview of the policy and legislative context for the Rampion 2 EIA. A full explanation of the relevant policy and legislation will be provided in the ES. Each individual environmental aspect will provide a summary of the key legislation relevant to the specific aspect assessment.

3.1.2 UK Legislation is determined by a range of international agreements (including European Union (EU) directives, regulations and agreements) which are outlined in this Chapter. The UK left the EU on 31 January 2020 under terms set out in the European Union (Withdrawal Agreement) Act 2020 ('the Withdrawal Act'). The Withdrawal Act established a transition period which will currently run until 31 December 2020 unless formally extended. This transition period will see the UK being treated for most purposes as if it were still an EU member state with most EU law (including as amended or supplemented) continuing to apply to the UK. The Withdrawal Act retains the body of existing EU-derived law (which includes the EIA Regulations and other relevant environmental legislation) within UK domestic law.

3.1.3 At the time of writing, the exact nature of amendments to UK legislation originating from EU law is uncertain, however any changes to relevant policy and legislation will be updated and considered as the EIA process proceeds towards submission of the DCO Application.

3.2 Climate change and renewable energy

3.2.1 The former Department of Trade Industry (DTI) published the '*Meeting the Energy Challenge A White Paper on Energy May 2007*' (DTI, 2007) which outlined the two main long-term energy challenges for the UK in:

- *"tackling climate change by reducing carbon dioxide emissions both within the UK and abroad: and*
- *ensuring secure, clean and affordable energy as we become increasingly dependent on imported fuel."* (Page 6, DTI, 2007)

3.2.2 Key international and national climate change and renewable energy drivers and policy relevant to Rampion 2 are outlined in **Table 3.1**.

Table 3.1 Summary of relevant climate change and renewable energy drivers

Drivers	Key commitments / requirements
United Nations Framework Convention on Climate Change (Kyoto Protocol) (1992)	The UK is a signatory of the Kyoto Protocol which commits the UK to reduce greenhouse gas emissions.

Drivers	Key commitments / requirements
Paris Agreement 2015	The 21st Conference of the Parties in Paris in 2015 sought agreement in "*holding the increase in global average temperature well below 2°c above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°c above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.*"
European Union Renewables Directive (Directive 2009/28/EC)	Requires a reduction of 20% in greenhouse gases by 2020 compared to 1990 levels; and Requires 20% of the EUs energy consumption (including electricity, heat and fuel) to come from renewable sources by 2020.
UK Renewable Energy Strategy (2009)	Outlines the UK's commitment to source 15% of energy from renewable sources by 2020.
The Energy Act 2013	Outlines commitment to low carbon energy industry and investment in low carbon electricity generation; and Introduces the Contracts for Difference (CfDs) to encourage investment in low carbon electricity generation.
The Climate Change Act 2008	The UK made the commitment to an 80% reduction (compared to 1990 levels) in greenhouse gas emissions by 2050.
Draft Climate Change Act 2008 (2050 Target Amendment) Order 2019	This amendment order results in a change in the reduction of greenhouse gas emissions outlined in the Climate Change Act 2008 from 80% to 100% compared to 1990 levels.
The Clean Growth Strategy: Leading the way to a low carbon future 2017 (as amended)	Aims to encourage renewable energy technologies including offshore wind by further Pot 2 CfD auctions. Working with industry to develop a Sector Deal for offshore wind.

3.3 The Planning Act 2008

3.3.1 The Planning Act 2008 (as amended) is the primary legislation that establishes the legal framework for applying for, examination and determination of applications for DCOs for Nationally Significant Infrastructure Projects (NSIPs) in line with the requirements of published National Policy Statements (NPSs).

3.3.2 Rampion 2 has an expected capacity of greater than 100MW and is therefore considered to be a NSIP under Section 15(3) of the Planning Act 2008. The Planning Act 2008 has been amended through the adoption of the Localism Act 2011 which transferred decision-maker responsibilities to the relevant Secretary of State (SoS) which for Rampion 2 is the SoS for Business, Energy and Industrial Strategy (BEIS). Under the Localism Act 2011, the Planning Inspectorate is responsible for the NSIP planning process and will examine the Rampion 2 DCO Application and make a recommendation to the SoS to grant or refuse consent.

3.4 National Policy Statements

3.4.1 NPSs are produced by the Government and they comprise the Government's objectives for the development of NSIPs. Part 2 of the Planning Act 2008 outlines the provisions in relation to NSIPs. There are currently 12 designated NPSs of which six relate to energy generation and the four NPSs of relevance to Rampion 2 are:

- Overarching National Policy Statement for Energy (EN-1) (DECC, 2011a);
- National Policy Statement for Renewable Energy (EN-3) (DECC, 2011b);
- National Policy Statement for Electricity Networks (EN-5) (DECC, 2011c); and
- National Policy Statement for Ports (DfT, 2012).

3.4.2 Where relevant to the EIA, further details pertaining to NPSs are provided in **Chapters 4** to **6** of this Scoping Report and will be included in the ES.

3.5 The EIA Regulations 2017 and guidance documents

3.5.1 The requirement for an EIA originates from the EU EIA Directive 2011/92/EU (as amended by Directive 2014/52/EU). The EIA Directive is directly transposed into English law for NSIPs (required as part of the Planning Act 2008) by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the 'EIA Regulations 2017').

3.5.2 The EIA Regulations 2017 set out a procedure for assessing, consulting and informing decision-making for projects which are likely to have significant environmental effects. The EIA Regulations 2017 require the provision of an Environmental Statement (ES) alongside the DCO Application which RED will be producing and submitting alongside the DCO Application for Rampion 2.

3.5.3 Paragraph 5 of Schedule 4 of the EIA Regulations 2017 specifically outlines that the EIA must identify, describe and assess, the direct and any indirect, secondary, cumulative, transboundary, short–term, medium-term and long-term, positive and

negative significant effects of the Proposed Development upon specific environmental factors. The requirement of Schedule 4 of the EIA Regulations 2017 will be met through the assessment of effects for each environmental aspect assessed as part of the EIA. Further details are outlined in the scope of environmental aspects outlined in **Chapters 5** and **6**.

3.5.4 The EIA will be undertaken in line with legislation and policy and specifically in accordance with the requirements of the EIA Regulations 2017. In addition, the EIA will take into consideration a range of up-to-date key guidance documents which include (but are not limited to):

- Advice Note Three: EIA consultation and notification (Version 7) (Planning Inspectorate, 2017a);
- Advice Note Six: Preparation and submission of application documents (Version 8) (Planning Inspectorate, 2019a);
- Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7) (Planning Inspectorate, 2020);
- Advice Note Nine: Rochdale Envelope (Version 3) (Planning Inspectorate, 2018a);
- Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (Version 8) (Planning Inspectorate, 2017c);
- Advice Note Eleven: Working with public bodies in the infrastructure planning process (Version 4) (Planning Inspectorate, 2017d);
- Advice Note Twelve: Transboundary Impacts and Process (Version 5) (Planning Inspectorate, 2018b);
- Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2) (Planning Inspectorate, 2019b);
- Advice Note Eighteen: The Water Framework Directive (Planning Inspectorate, 2017e);
- Cumulative Impact Assessment Guidelines – Guiding Principles For Cumulative Impact Assessment in Offshore Wind Farms (RenewableUK, 2013);
- Environmental Impact Assessment Guide to: Delivering Quality Development (IEMA, 2016);
- Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017);
- Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements (Version 2) (Centre for Environment, Fisheries and Aquaculture Science (CEFAS), 2004); and
- South inshore and offshore Marine Plan Areas (MMO, June 2014).

3.5.5 This list of key guidance documents is not exhaustive and provides a general overview of important guidance documents that will help to inform the EIA process

for Rampion 2. The list will be continually reviewed and updated throughout the EIA process up to submission of the DCO Application. Each individual environmental aspect also refer to relevant aspect-specific guidance in **Chapters 5** and **6** of the Scoping Report where appropriate.

3.5.6 A full list of relevant legislation and guidance considered as part of the EIA process will be provided in the PEIR and ES respectively.

Regulation 8(1)(b) notification that the application for DCO will be accompanied by an ES

3.5.7 Rampion 2 falls under Schedule 2 of EIA Regulations 2017. In line with Regulation 8(1)(b) of the EIA Regulations 2017, RED hereby provides notice that the application for DCO will be accompanied by an Environmental Statement (ES). Regulation 8(3A) of the EIA Regulations 2017 requires this notification to provide information listed in paragraph (3)(a) and (b) as follows:

- a plan sufficient to identify the land; and
- a description of the development, including in particular –
  - a description of the physical characteristics of the whole development and, where relevant, of demolition works; and
  - a description of the location of the development, with particular regard to the environmental sensitivity of geographical areas likely to be affected

3.5.8 **Figure 1.1** provides a plan sufficient to identify the land and **Chapters 2, 5** and **6** respectively provide a description of development in line with the requirements of Regulation 8(3A) of the EIA Regulations 2017. **Chapters 5** and **6** provide a description of the location of the Proposed Development with particular regard to the environmental sensitivity of geographical areas likely to be affected.

EIA Scoping and Regulation 10 request for Scoping Opinion under the EIA Regulations 2017

3.5.9 EIA scoping is not mandatory under the EIA Regulations 2017 however it is considered good practice to request a scoping opinion from the SoS and this is also encouraged under the Planning Inspectorate's Advice Note Seven (Planning Inspectorate, 2017b) which states "*Although requesting a scoping opinion of the Secretary of State is not a statutory requirement, the scoping opinion is an important document and the EIA Regulations require the ES to be based on the most recent one adopted.*" (Paragraph 4.7). Therefore, in accordance with the EIA Regulations 2017, RED is providing this Scoping Report to help refine the scope of the assessment and focus on the key issues. The resultant ES will be based upon the scoping opinion received in response to the formal request received in this Scoping Report.

3.5.10 The purpose of the Scoping Report is to request a formal Scoping Opinion from the SoS in accordance with Regulation 10 of the EIA Regulations 2017. RED hereby requests that the SoS *"…state in writing their opinion as to the scope, and level of detail of, information to be provided in the environmental statement*". (Regulation 10(1) EIA Regulations 2017).

3.5.11 This Scoping Report contains the following information as required under Regulation 10(3) of the EIA Regulations 2017:

- 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 Proposed Development on the environment; and
- such other information or representations as the person making the request may wish to provide or make.

3.5.12 A plan outlining the Scoping Boundary of the Proposed Development is provided in **Figure 1.1** and a description of the Proposed Development is outlined in **Chapter 2**. An explanation of the likely significant effects of the Proposed Development on the environment is provided in **Chapters 5** and **6**.

3.5.13 Under the EIA Regulations 2017, once a request for a Scoping Opinion has been issued to the SoS for consideration, it is required to consult with the consultation bodies (as defined under Regulation 10(6) of the EIA Regulations 2017) and to issue RED with a Scoping Opinion within 42 days (five weeks) of the date of receipt of the request for the Scoping Opinion or such longer period as is agreed. The scoping opinion of the SoS is being sought on the following:

- the environmental aspects that should be assessed within the ES;
- the likely significant effects of the construction and operation of Rampion 2;
- those effects that are not likely to be significant and do not need to be considered further;
- the approach to defining the study areas for each environmental aspect;
- the data that has been gathered (and will be gathered) to support the assessments;
- the assessment methods that will be used to determine likely significant effects;
- the approach to determining the environmental measures that could be incorporated into Rampion 2 to avoid, reduce or, as a last resort, compensate for significant effects; and
- the approach to assessment of cumulative effects.

3.5.14 Ongoing dialogue will be held between RED and the Planning Inspectorate (on behalf of the SoS) and stakeholders in regards to the scope of the assessment, with a view to reaching agreement over the scope, as required by the EIA Regulations 2017. Future changes in the design of Rampion 2 or new environmental information will also be subject to discussion over any consequent changes to the scope of the assessment.

3.5.15 The approach taken in preparation of this Scoping Report has been informed by the Planning Inspectorate's Advice Note Seven and it also reflects that the EIA Regulations 2017 require an ES to focus on aspects of the environment likely to

be subject to significant effects. Advice Note Seven (Planning Inspectorate, 2017b) identifies that the scoping process should allow for *"…an early identification of the likely significant effects applicable to the EIA Regulations (in particular Schedule 4) and also provides opportunity to agree where aspects and matters can be scoped out from further assessment.*" (Paragraph 4.7). In line with Advice Note Seven, where appropriate, this Scoping Report looks to scope out aspects/matters from further assessment with suitable justification provided. This aims to streamline the assessment to focus on key likely significant effects.

3.5.16 The Planning Inspectorate's Advice Note Seven (Planning Inspectorate, 2017b) also reiterates the requirement for ESs to be focused on likely significant effects highlighting the need to use scoping as a mechanism for ensuring the EIA process is proportionate:

3.5.17 "*Ensuring that ESs are appropriately focussed on aspects and matters where a likely significant effect may occur is essential. The Planning Inspectorate is keen to ensure that the scoping process is used effectively, ensuring that the EIA process is proportionate. The Planning Inspectorate will agree to 'scope out', from the need for further assessment, aspects and matters where it is appropriate to do so. In order to support the Planning Inspectorate with this aim, Applicants should ensure that their requests include sufficient justification for scoping aspects/matters out. The justification should be evidence based and have reference to the assessment process.*"

3.5.18 It is therefore the intention for the scoping process to be used to ensure the Rampion 2 EIA is proportionate and that, where appropriate and justification is provided, aspects/matters are scoped out accordingly.

3.5.19 **Table 3.2** outlines the guidance provided by Advice Note Seven and describes where in this Scoping Report the requirements or guidance have been addressed.

Table 3.2 Advice Note Seven requirements

Advice Note Seven Requirement	Location in this Scoping Report
The Proposed Development	
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the DCO Project for example design parameters	**Chapter 2: The Proposed Development**
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	**Figure 1.1** presents the Scoping Boundary, **Figure 2.1** illustrates the key components of Rampion 2
EIA approach and topic areas	

Advice Note Seven Requirement	Location in this Scoping Report
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	**Section 2.4: Consideration of alternatives**
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	**Chapter 7** presents a summary table of all matters identified to be scoped out from the offshore and onshore aspect chapters
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	**Chapters 5** and **6**, and any associated appendices
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	**Chapters 5** and **6**, and any associated appendices
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 eg criteria for determining sensitivity and magnitude	**Chapters 5** and **6**, and any associated appendices
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	**Chapters 5** and **6**, and any associated appendices
Information Sources	
References to any guidance and best practice to be relied upon	**Section 3.5: The EIA Regulations and guidance documents**, **Chapters 4, 5** and **6**.
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	**Chapters 5** and **6**, and any associated appendices
An outline of the structure of the proposed ES	**Section 4.5: Structure of the Environmental Statement (ES)**

Consideration of alternatives

3.5.20 The EIA Regulations 2017 require the consideration of alternatives, as follows:

- Paragraph 18(2)(d) of Part 5 states, with respect to what an ES should include, that it should contain "*a description of the reasonable alternatives studied by the developer, 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 significant effects of the development on the environment.*"
- Paragraph (2) of Schedule 4 states that an ES should include "*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.*"

3.5.21 **Section 2.4** provides a current overview of the consideration of alternatives to-date and this will be continually updated and reviewed throughout the EIA. The consideration of alternatives will be presented in the PEIR and ES in line with the requirements of the EIA Regulations 2017.

Cumulative effects assessment

3.5.22 A Cumulative Effects Assessment (CEA) will be carried out in accordance with the EIA Regulations 2017, the Planning Inspectorate's Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects and for the offshore elements especially, be consistent with the guidance provided by the RenewableUK and the Natural Environment Research Council (NERC) published guidelines (RenewableUK, 2013) on the undertaking of the CEA.

3.5.23 Paragraph 5(e) of Schedule 4 of the EIA Regulations 2017 refers to the need to consider "*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*". For each environmental aspect considered in the ES, an assessment will be undertaken of how the environmental effects resulting from the project could combine with similar aspect-related effects generated by other existing or approved developments that affect a common receptor. **Section 4.4** provides more detail on the approach to CEA.

3.6 Environmental legislation

3.6.1 In addition to the EIA Regulations 2017, a range of environmental legislation at International, European and National level will apply to the EIA for Rampion 2. This environmental legislation will be described in the ES and some key noteworthy legislation taken into consideration are:

- Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') 1992 (as amended);
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) 1994;
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (WFD);
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (MSFD);
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the 'Birds Directive');
- Marine and Coastal Access Act 2009;
- Wildlife and Countryside Act 1981;
- The Conservation of Habitats and Species Regulations 2017;
- The Conservation of Offshore Marine Habitats and Species Regulation 2017;
- Countryside and Rights of Way Act 2000;
- Protection of Badgers Act 1992;
- National Parks and Access to the Countryside Act 1949; and
- Natural Environment and Rural Communities Act 2006 (NERC).

3.6.2 This list of environmental legislation is not exhaustive and each individual environmental aspect ES chapter will describe the legislation, policy and guidance relevant to the assessment.

3.7 Habitat Regulations Assessment (HRA)

3.7.1 In accordance with the Habitats and Birds' Directives (Council Directive 92/43/EEC and Directive 2009/147/EC) a network of protected areas has been designated by European Union member states for the protection of Europe's most valuable and threatened habitats and species. These areas are known as European sites. These sites consist of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). As a matter of Government policy, listed Ramsar sites receive the same protection.

3.7.2 The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Habitats Regulations) transpose the Directives into UK law. The Habitats Regulations require that an Appropriate Assessment (AA) of the implications must be made by the relevant decision-making authority (or Competent Authority) if a project (or plan) that is not directly connected to, or necessary to the management

of a European site is likely to have a significant effect on a European site either alone, or in combination with other plans or projects. The process of determining potential impacts to European sites is known as Habitats Regulations Assessment (HRA).

3.7.3 In order to carry out the HRA, the competent authority, under Regulation 5(2)(g) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, requires a report to be submitted alongside the ES. As such, the HRA does not form part of the ES, although the baseline presented contains some of the same information.

3.7.4 The Planning Inspectorate's Advice Note Ten '*Habitat Regulations Assessment relevant to nationally significant infrastructure projects*' (Planning Inspectorate, 2017c), defines HRA as a progressive, four step process which determines likely significant effect (LSE) and (where appropriate) assesses adverse impact on the integrity of a European site, examines alternative solutions, and provides justification of Imperative Reasons of Overriding Public Interest (IROPI).

3.7.5 An HRA is required for Rampion 2. Accordingly, RED will provide the SoS with HRA reports, providing the necessary information to undertake all necessary stages of the HRA of the Proposed Development.

3.7.6 The first stage of an HRA is Screening (Stage 1). The purpose of the Screening stage is to consider all elements of the Proposed Development with the potential to result in LSE on European sites. If, on the best available information, likely significant effects (LSE) to European site(s) cannot be discounted, then an AA of the implications for site integrity is required at the next stage of the process (HRA Stage 2).

3.7.7 To support the Screening assessment, RED has developed a methodology to identify and evaluate potential LSEs, specifically for offshore wind farm developments. The method accounts for the unique challenges offshore windfarms present for the assessment of highly mobile receptors (most notably, seabirds and marine mammals) in the context of complex species behaviours over large spatial scales. The method has been progressively refined by input from Statutory Nature Conservation Bodies (SNCBs) and to accommodate industry-relevant developments, such as the increasingly precautionary seabird ranges being applied to assessments (for example Woodward, 2019). The method aligns with the process required for HRA Screening set out in the Planning Inspectorate's Advice Note Ten (Planning Inspectorate, 2017c) and provides for a transparent and auditable process to be documented in the HRA Screening report.

3.7.8 The HRA Screening report will provide an initial basis for the early, pre-application consultation directed by Advice Note Ten (Planning Inspectorate, 2017c) and will be issued for consultation to relevant (including transboundary) consultees prior to the PEIR. The discussion of HRA matters, including the Screening process, will also take place in parallel through the Evidence Plan Process from the earliest stages. This strategy will facilitate stakeholder input and effective feedback loop which ensures that the information being gathered to support the EIA process, provides for the HRA.

3.8 Design envelope

3.8.1 The NPS for Renewable Energy Infrastructure (NPS EN-3) (DECC, 2011b) published in 2011 considers that due to the "complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the applicant at the time of application, possibly including:

- *precise location and configuration of turbines and associated development;*
- *foundation type;*
- *exact turbine tip height;*
- *cable type and cable route; and*
- *exact locations of offshore and/or onshore substations."* (Paragraph 2.6.42)

3.8.2 NPS EN-3 also recognises in paragraph 2.6.43 that wind farm operators are "*unlikely to know precisely which turbines will be procured for the site until sometime after any consent has been granted. Where some details have not been included in the application to the Secretary of State, the applicant should explain which elements of the scheme have yet to be finalised, and the reasons. Therefore, some flexibility may be required in the consent. Where this is sought and the precise details are not known, then the applicant should assess the effects the project could have to ensure that the project as it may be constructed has been properly assessed (the Rochdale [Design] Envelope)*." (DECC, 2011b).

3.8.3 NPS EN-3 also goes on to make reference to the use of the 'Rochdale Envelope' approach as *"…a series of maximum extents of a project for which significant effects are established. The detailed design of a project can then vary within this 'envelope without rendering the ES inadequate"*.

3.8.4 The design envelope approach is widely used and accepted for major infrastructure projects in the UK, including for recent applications for offshore wind farms. The Planning Inspectorate has similarly provided guidance in Advice Note Nine: Rochdale Envelope (Planning Inspectorate, 2018a) which states that "*The 'Rochdale Envelope' is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been resolved at the time when the application is submitted*". Advice Note Nine also outlines an approach that can be taken, in accordance with the requirements of the EIA Regulations 2017, where some details of the Proposed Development have not yet been confirmed when the application for DCO is submitted, and where flexibility is sought to address uncertainty. Where details are still to be finalised at the application stage, the Applicant is advised to set out in the ES the relevant design parameters used for the assessment. The EIA for Rampion 2 will therefore adopt a parameter-based design envelope approach in accordance with advice provided in NPS EN-3 and Advice Note Nine which anticipates the scale and complexity of offshore wind farm development which will likely require adoption of the Rochdale Envelope principles. **Paragraphs 4.4.4** and **4.4.5** of this Scoping Report sets out how environmental factors will be incorporated into the design of the Proposed Development.

3.8.5 Assessment using a parameter-based design envelope approach means that the assessment will consider a maximum design scenario whilst allowing the flexibility

to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. This approach to environmental assessment provides sufficient detail to enable meaningful and comprehensive assessment of Rampion 2 whilst maintain flexibility for refinements to the design as the Proposed Development continues to evolve. The use of this approach has been adopted for this Scoping Report and will also enable the subsequent EIA and ES to be based on a description of the location, design and size of Rampion 2 that is suitable to allow a comprehensive assessment of its likely significant environmental effects.

4. The EIA process

4.1 Introduction

4.1.1 This chapter describes the principles of EIA and approach being taken to identify and evaluate potential effects associated with Rampion 2. The approach to scoping is outlined along with the broad principles relating to establishment of baseline conditions, embedded environmental measures, methodology and assessment of effects that will be adopted for the EIA. This chapter also sets out the proposed temporal, spatial and technical scope of the environmental assessments, along with an overview of the proposed methodologies for cumulative effects assessment.

4.2 Progressing Rampion 2 during COVID-19

4.2.1 The current restrictions imposed during the COVID-19 pandemic have potential implications for Rampion 2, in particular with regard to normal consultation activities and conducting EIA site surveys. The following measures are being taken by the Rampion 2 project team to achieve as much as possible during the EIA programme whilst working fully within the restrictions, and being mindful of and managing any potential implications.

- The use of remote sensing habitat classification to enable initial, rapid and robust information gathering on the habitats present within the Scoping Boundary onshore, without the need for full land access at this early stage. Further details regarding this approach and the results can be found in **Section 6.6: Terrestrial ecology and nature conservation**.
- EIA surveys that do require land access are planned to proceed within appropriate seasons this calendar year, whilst applying social distancing measures to keep surveyors and members of the public safe. A watching brief will be maintained on the progress of data collection throughout the EIA, and progress will be shared with appropriate stakeholders.
- Monthly aerial surveys collecting bird and marine mammal data have continued to be undertaken, following the implementation of additional health and safety measures, in line with industry and company guidelines, put in place due to COVID-19.
- EIA surveys that may not require land access but rely on the baseline environment to reflect the normal situation such as noise and onshore and offshore traffic surveys or that are significantly hindered this calendar year because of the restrictions imposed by the pandemic will be planned for a time when survey results will reflect a more normal pattern. Flexibility where needed will be sought from stakeholders regarding the timely completion of surveys and the provision of this information. Further details regarding planned surveys is provided in **Chapters 5** and **6**.
- In accordance with the PINS Advice Note Seven (Version 7, June 2020), RED are conducting early targeted consultation with some stakeholders. The

purpose of this engagement is to share and seek agreement on assessment approaches and to obtain as much relevant environmental information as possible in advance of key project milestones such as Scoping, PEIR and ES. In turn, the Planning Inspectorate expects consultation bodies to be pragmatic in finding suitable approaches to aid the robust preparation of applications and RED will continue to engage with stakeholders on this basis.

- The Rampion 2 project team is keeping abreast of the advice issued with regard to site surveys and consultation activities such as that issued by the National Infrastructure Planning Association, Natural England, CIEEM and the Planning Inspectorate during this time period. In addition, all activity will follow Government guidance on COVID-19 as updated from time to time.

4.3 Consultation and the Evidence Plan Process

Introduction

4.3.1 This Scoping Report supports the submission to the Planning Inspectorate for the purposes of requesting a Scoping Opinion under the Planning Act 2008 and associated EIA Regulations. In advance of formal submission of the DCO Application to the Planning Inspectorate, both statutory and non-statutory consultation will be carried out with key stakeholders in accordance with relevant legislation and guidance. This consultation will build on the feedback provided in the Scoping Opinion and further define the scope of studies, surveys and assessments, as required. This will be supported by an Evidence Plan Process for certain topics and issues.

4.3.2 Consultation for Rampion 2 commenced from the earliest stages of pre-application process to ensure that key concerns are taken into consideration in the EIA and the design evolution of Rampion 2.

Pre-application consultation

4.3.3 Section 42 of the Planning Act 2008 requires the Applicant to carry out pre-application consultation with a range of prescribed consultees. The key stakeholders to be consulted as part of the pre-application process are outlined in Section 42-47 of the Planning Act 2008 and include (but are not limited to):

- local authorities;
- prescribed statutory bodies including the Marine Management Organisation (MMO);
- local communities; and
- other key interest groups.

4.3.4 In addition to statutory consultation with prescribed consultees, as best practice, applicants are also encouraged to engage in non-statutory consultation with all potentially affected parties from the earliest stages of design. This allows stakeholders and local communities to gain a better understanding of the Proposed Development and any potential effects identified whilst also giving the opportunity to influence the design and help identify appropriate mitigation. Local

knowledge and understanding is important and RED will seek to engage with consultees through both formal and informal consultation prior to submission of the DCO Application. This Scoping Report will help inform that consultation exercise.

4.3.5 Statutory and non-statutory consultation will help to inform the preparation of key materials as part of the EIA in support of the pre-application DCO process. This includes this Scoping Report, the PEIR supporting formal consultation and the ES submitted alongside the application for DCO.

Statement of Community Consultation

4.3.6 In accordance with Section 47 of the Planning Act 2008, a Statement of Community Consultation (SoCC) will be prepared. The SoCC will set out details of the Proposed Development, and how RED will consult with the local community, the consultation methods to be used, the scope of the consultation and the consultation period.

4.3.7 Due to the size and nature of the Proposed Development, the Proposed Development has the potential to impact upon a diverse community reaching over a large geographical area, which covers several local authority areas.

4.3.8 The content of the SoCC will be discussed and agreed with all local authorities in whose area the Proposed Development is situated, as well as the coastal authorities adjacent to the offshore elements of Rampion 2. The Statements of community involvement for each of the local authorities' will be reviewed, to ensure that the SoCC aligns with the work already undertaken by local authorities in identifying communities and organisations.

4.3.9 Once agreed with the local authorities, the SoCC will be published in accordance with statutory requirements by advertising in newspapers in the vicinity of the Proposed Development, on the Rampion 2 website and local authorities' websites and any other locations agreed with local authorities.

The Evidence Plan Process

4.3.10 An Evidence Plan Process (EPP) is currently being arranged and draft Terms of Reference (ToR) prepared, which will be circulated to stakeholders for comment and agreement. The process will be initiated alongside this Scoping Report with the objective of seeking agreement on the evidence required to be submitted to the Planning Inspectorate as part of the Rampion 2 DCO Application. In common with several recent Offshore Wind Farm DCO Applications, the EPP for Rampion 2 will be broadened beyond solely Habitats Regulations Assessment (HRA) matters to include relevant components of the EIA process. Of specific relevance to this Scoping Report, the Rampion 2 EPP will also provide for discussion and clarification of the proportionate approach to EIA that has been adopted for the Proposed Development. As part of the process to agree the ToR, a schedule of proposed meetings and workshops will be scheduled to coincide with strategic Proposed Development milestones such as receipt of scoping responses, pre and post PEIR and pre-DCO Application submission. Producing the engagement programme will ensure that all parties have foresight of resource requirements to enable meaningful and productive discussions can be undertaken.

4.3.11 Noting that this is a voluntary and non-legally binding process, the EPP aims to provide a forum for discussion and a framework for recording areas of agreement / disagreement) between RED and the relevant statutory authorities, advisers and other relevant stakeholders with regard to:

- those matters to be addressed by the EIA and HRA process;
- the data that will be used to support the assessments;
- to review latest scientific evidence and guidance relevant to aspects;
- the methods to be applied in collection and analysing the data and assessing the potential impacts of a scheme together; and
- such other matters as the Parties to the EPP seek to cover during the process (this could, for example, extend to discussions around mitigation or management of impacts).

4.3.12 The EPP will comprise both an overarching Steering Group, whose main function will be to oversee the development of the Plan and ensure continual progress of the Evidence Plan process, and individual topic focused technical panels. These specialist technical panels will consider key aspects, for example offshore ecology, onshore ecology or ornithology to specifically provide for engagement between RED and relevant statutory stakeholders and Regulatory groups in a structured and efficient manner. In this way key stakeholders can achieve increased certainty on the amount and range of evidence to be presented within the application and RED can obtain early sight of any issues to address during the preapplication stage. The EPP, documented within an Evidence Plan report, will provide the evidence base of agreement for a range of documents that will be produced during the application process which will be consulted on formally as part of the DCO Application and will help form the basis of Statements of Common Ground (SoCG) that may be required by PINs during the Examination of the application.

4.4 Approach to the EIA

Overview

4.4.1 EIA is a process for identifying the likely significant environmental effects (positive and negative) of a Proposed Development to inform the decision-making process for development consent to be granted. The EIA process will culminate in the provision of an ES written in accordance with the EIA Regulations 2017 which will help inform the Planning Inspectorate's (on behalf of the SoS) granting of a DCO for Rampion 2. In particular, the ES will provide an overview of the likely significant effects associated with Rampion 2 during the construction, operation and maintenance, and decommissioning phases which will help to inform decision-making.

4.4.2 The overall approach to the EIA is shown in **Figure 4.1**. This approach provides the general framework for identifying impacts and assessing the significance of their effect(s). The level of significance of an effect is commonly derived from combining measures evaluating the magnitude of change and the value, importance and sensitivity of the resource(s) and/or receptor(s) affected. In practice the approaches and criteria applied across different environmental and

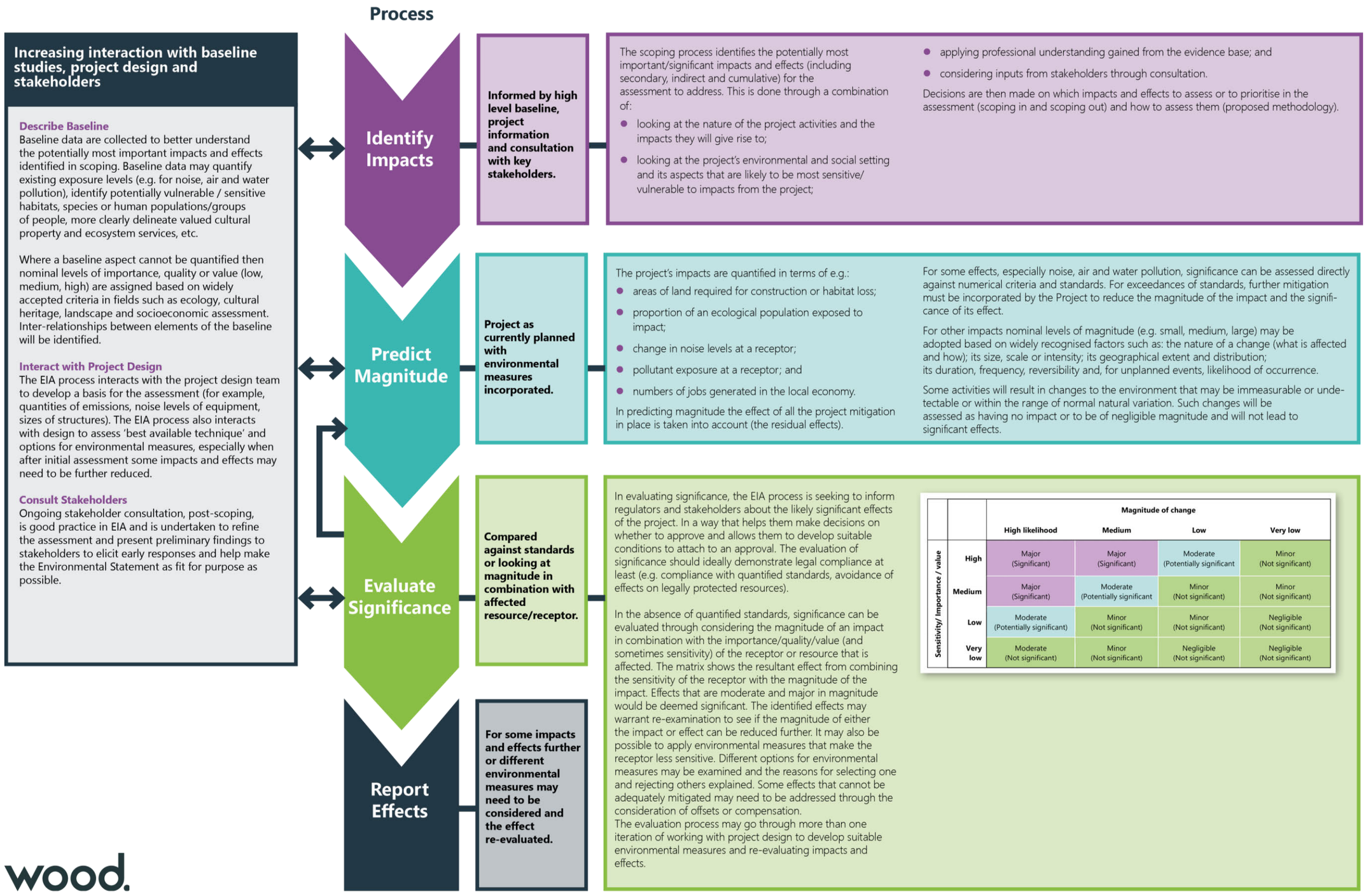
socioeconomic aspects vary. **Chapters 5** and **6** outline the proposed approaches to the technical topics that will be addressed in the EIA.

4.4.3 The EIA process aims to be systematic, analytical, impartial, consultative and iterative allowing opportunities for environmental concerns to be addressed in the design and evolution of the Proposed Development. Typically, throughout the evolution of the design, a number of design iterations take place in response to environmental constraints identified during the EIA process prior to the final design being submitted for approval. This iterative design process is a fundamental element of the EIA and for Rampion 2 this will be described further at later stages in the PEIR and ES as the design continues to develop.

4.4.4 RED will seek to achieve a sustainable and good design for Rampion 2 as referred to in the Planning Act 2008, which complies with relevant British and international Codes and Standards. A design will be selected that meets operational requirements at the same time as limiting and mitigating the environmental effects of the Proposed Development as far a practical.

4.4.5 From the outset the environment has been central to the design of Rampion 2, and at the scoping stage this is demonstrated through the development of the Commitments Register (see **paragraph 4.4.12**) which identifies early commitments that have been made and embedded into the Rampion 2 design. Design will be continually refined and developed throughout the EIA process, allowing opportunities throughout for the development of environmental measures which can be then embedded directly into the design, with consultation being fundamental to the iterative approach. Opportunities will be provided throughout for stakeholders to provide feedback facilitated through the statutory and non-statutory stakeholder engagement as a mechanism to communicate the design as it progresses. With this approach to design, RED will seek to apply the four principles outlined by the National Infrastructure Commission in ‘Design Principles for National Infrastructure’ NIC (2020).

Figure 4.1 Approach to EIA



Sensitivity/ Importance / value	Magnitude of change: High likelihood	Medium	Low	Very low
High	Major (Significant)	Major (Significant)	Moderate (Potentially significant	Minor (Not significant)
Medium	Major (Significant)	Moderate (Potentially significant	Minor (Not significant)	Minor (Not significant)
Low	Moderate (Potentially significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
Very low	Moderate (Not significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)

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Delivering proportionate EIA

Overview

4.4.7 To ensure that the EIA and resultant ES are robust and focused to help inform the decision-making process, the EIA will be carried out taking into consideration the Institute of Environmental Management and Assessment (IEMA)'s guidance document Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017) which aims to help ensure that 'proportionate' EIA is delivered in support of projects in the UK. IEMA guidance specifically highlights industry-wide concerns relating to "*…individual EIAs being too broadly scoped and their related Environmental Statement (ES) to be overly long and cumbersome*" (IEMA, 2017).

4.4.8 The following key tools/approaches have been adopted at the scoping stage for Rampion 2, to assist in the delivery of proportionate EIA:

- use of existing evidence base;
- commitments register (informed by the site selection exercise, the existing Rampion 1 project, good and standard practices); and
- approach to appropriate level of assessment.

4.4.9 A proactive, early stage scoping process is a way of ensuring that the EIA and ES are robust whilst suitably focused on aspects of the environment likely to be subject to significant effects. Where more certainty in relation to information exists, this Scoping Report aims to focus the scope of the proposed assessments on material issues to ensure the EIA is proportionate.

Existing evidence base

4.4.10 There is a considerable existing evidence base for Rampion 2 in the form of data and information relating to baseline conditions and previous environmental assessments. Much of this data and information has been collated as part of the ongoing site selection process (outlined in Section 2.4), ongoing environmental surveys and the previous EIA for carried out for Rampion 1. This existing evidence base has been collated, supplemented and drawn upon for the purposes of this Scoping Report to help inform the scope of the forthcoming environmental assessments and establish the robustness of survey data collected during the COVID-19 period. Further details provided in **Chapters 5** and **6** for each of the relevant individual environmental aspects. This data and information has been utilised to:

- inform the understanding of baseline environment;
- scope out matters from further consideration in the EIA wherever possible; and
- scope in matters for further assessment as part of the EIA.

4.4.11 The existing evidence base will continue to be expanded as the EIA progresses as further data collection and environmental survey and modelling work is carried out. The evidence base will be regularly discussed with relevant stakeholders to ensure that it is appropriate.

Commitments register

4.4.12 As part of the ongoing scoping process, to enable a refinement of the likely significant effects of Rampion 2 to be taken forward and assessed as part of the EIA, RED has established a Commitments Register which identifies at this early stage certain environmental measures that RED will implement as part of the Proposed Development and that will be embedded into design, also referred to as 'embedded environmental measures' and /or 'primary mitigation' (please also refer to **Paragraphs 4.4.19** and **4.4.20**).

4.4.13 This Commitments Register has been populated with a range of environmental measures including proposed avoidance measures which have been informed by the ongoing site selection exercise (see **Section 2.4**), best practice and design commitments which were adopted as part of the existing Rampion 1 project and/or are considered to be sectoral practices and procedures for NSIPs and in particular offshore wind farm development. An example is where practical onshore, sensitive sites will be avoided by the permanent onshore footprint at the substation location including SSSIs, ancient woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, RSPB reserves, Local Nature Reserves, Local Wildlife Sites, National Trust Land, Listed Buildings and Scheduled monuments.

4.4.14 These commitments have been used to inform the scope of the individual assessments in each environmental aspect section in **Chapters 5** and **6**. The Commitments Register is presented in full in **Appendix A: Commitments register** and will be regularly updated and maintained throughout the EIA, forming an intrinsic part of the design evolution narrative.

Appropriate level of assessment

4.4.15 The assessment of whether an effect has the potential to be of likely significance has been based upon review of existing evidence base, consideration of commitments made (embedded measures), professional judgement and where relevant, recommended aspect specific methodologies and established practice. In applying this judgement, use has been made of a simple test that to be significant an effect must be of sufficient importance that it should be taken into consideration when making a development control decision.

4.4.16 For those matters 'scoped in' for assessment, the approach to level of assessment is tiered. For each matter it is identified whether a 'simple' or 'detailed' assessment within each environmental aspect in the Scoping Report (**Chapters 5** and **6**) for the PEIR and ES is proposed:

- the 'simple assessment' approach for an environmental aspect / effect which may include secondary baseline data collection (for example desk-based information) and qualitative assessment methodologies; and
- the 'detailed assessment' approach for an environmental aspect/effect which may include primary baseline data collection (for example through site surveys) and quantitative assessment methodologies (for example modelling).

4.4.17 The judgement of whether to adopt a 'simple' or 'detailed' assessment takes into account the potential for both standalone and cumulative effects.

4.4.18 Effects that are considered to not be significant are scoped out of further assessment in the EIA in the relevant environmental aspect. Full justification for scoping out of effects is provided for each relevant environmental aspect in **Chapters 5** and **6**. To ensure the provision of a proportionate EIA and an ES that is focused on likely significant effects, this Scoping Report takes into account the considerable levels of existing environmental information available and extensive local geographical knowledge and understanding of the site and surroundings that RED has gained from ongoing site selection analysis, environmental surveys and the existing Rampion 1 project.

Environmental measures

4.4.19 For each environmental aspect, the EIA process will systematically identify impacts and effects and take into consideration environmental measures that Rampion 2 will adopt. These environmental measures include both avoidance, best practice and design commitments, which are classified into primary or tertiary measures in accordance with the IEMA 'Guide to Shaping Quality Development' (2015) definitions.

4.4.20 Some early commitments have been identified by the project team (see **Paragraph 4.4.12**) at the scoping stage which constitute embedded measures. Where these assist in focusing the scope of the EIA they are set out in **Chapters 5** and **6**.

- Primary (inherent): Referred to as 'embedded measures', are modifications to the location or design of the development made during the pre-application phase that are an inherent part of the Proposed Development, and do not require additional action to be taken.
- Secondary (foreseeable): Actions that will require further activity in order to achieve the anticipated outcome.
- Tertiary (inexorable): Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
  - These environmental measures will be secured by the DCO either through adherence to the Rochdale Envelope, or through requirements or deemed Marine Licence (dML) conditions.

Technical, spatial and temporal scope

Technical scope

4.4.21 The technical scope of assessment for each environmental aspect is detailed in **Chapters 5** and **6** and this covers the scoping in and out of impacts and effects to be assessed as part of the EIA. Justification is provided for the individual approach and scoping of matters to be considered in the assessment for each environmental aspect. The technical scope also details the approach to baseline data collection and assessment methodologies. **Chapter 7** provides a summary table of aspects and/or matters to be scoped out of the EIA.

4.4.22 Other EIA matters that have been given due consideration for the technical scope of the EIA are as follows:

- Major Accidents and Disasters: The EIA Regulations 2017 requires the environmental assessment to identify, describe and assess major accidents

and/or disasters. It is not anticipated that Rampion 2 will use hazardous material that could be released in the event of a natural disaster. A standalone major accidents and/or disasters ES chapter is therefore not proposed. Where appropriate, relevant environmental aspects, as part of the EIA, will assess the likely risks to the project in relation to potential areas of vulnerability. For example, any flood risk concerns are considered with the Water Environment aspect and will be addressed as part of the Flood Risk Assessment.

- Human health: Regulation 5(2) of the EIA Regulations 2017 outlines that 'human health' needs to be taken into consideration in the EIA. Rampion has a significant offshore element (construction and operation activities) with the onshore infrastructure and activities limited to construction (installation of buried cables and construction of substation) and operation of the substation. It is anticipated that the main interactions with human health will likely be through ground conditions, noise and vibration, air quality, visual, socio-economic and transport effects. Therefore, human health will be addressed through the individual assessments for ground conditions, noise and vibration, air quality, landscape and visual impact, socio-economics and traffic and transport in the corresponding environmental aspect chapters in the PEIR and the ES. Consequently, a stand-alone human health ES chapter is not proposed.
- Waste: RED will adopt good construction and management practices to ensure waste is minimised as far as possible and that the storage, transport and eventual disposal of waste have no significant environmental effects. The management and collection of waste arisings will be carried out under the requirements of the UK waste regulatory regime. It is therefore proposed that waste will not be the subject of a separate environmental aspect chapter in the EIA, as the effects of any waste related development will be addressed as part of the relevant environmental aspects and associated strategies. An example of this will be the transport effects from the management of waste arisings being considered in the transport aspect chapter of the ES where appropriate.
- Climate Change: The likely significant effects associated with climate change will be considered, where necessary, within the aspect specific assessments for example **Section 5.2**: **Coastal processes** considers changes to coastal morphology and **Section 6.10**: **Water environment** considers flood risk.

Spatial Scope

4.4.23 The geographical context within which Rampion 2 is located is shown in **Figure 1.1**. The spatial scope for each aspect assessment will depend on the nature of the potential effects and the location of receptors that could be affected. Relevant aspect study areas are described for each of the environmental aspects in **Chapters 5** and **6**. The spatial scope of the technical assessments will therefore take account of:

- physical area of the Proposed Development;
- nature of the baseline environment; and
- manner and extent to which environmental effects may occur.

4.4.24 The environmental aspect sections (**Chapters 5** and **6**) describe how study areas will be set for the assessment of likely significant environmental effects associated with that aspect. The methodology for setting the precise study area will then be applied to the final location of the components and supporting infrastructure. Study areas may need to be refined in consultation with relevant consultees to ensure they still adequately reflect the area of potential influence for likely significant environmental effects.

4.4.25 The term 'offshore' refers to the receptors on the seaward side of Mean High Water Springs (MHWS) and 'onshore' refers to the receptors on the landward side of MHWS. To ensure a joined-up consideration and assessment of the land and water interface, the offshore assessment (**Chapter 5: Environmental aspects offshore**) for Rampion 2 covers impacts from the offshore project elements up to MHWS and includes the intertidal zone. The onshore assessment (**Chapter 6: Environmental aspects onshore**) covers impacts from the onshore project elements on receptors and resources that are landward of MHWS. The socio-economic assessment for the Proposed Development is covered in a single section which includes both intertidal and offshore impacts as well as onshore impacts (**Section 5.15**).

Temporal Scope

4.4.26 The temporal scope refers to the time periods over which impacts and effects may be experienced by sensitive receptors and this will be defined further in for each aspect in discussion with relevant consultees. The EIA will assess effects during the construction (approximately 5 years), operation and maintenance and where appropriate, decommissioning phases of the project.

Environmental management

4.4.27 Rampion 2 will conform to general environmental management practices across all phases including construction, operations and maintenance and decommissioning. During the construction phase, adherence to a Code of Construction Practice (COCP) or equivalent is proposed and the COCP will contain a range of environmental and health & safety considerations.

Cumulative effects assessment

4.4.28 A cumulative effects assessment (CEA) will be carried out for Rampion 2 which will examine the result from the combined impacts of Rampion 2 with other developments on the same single receptor or resource.

4.4.29 The CEA will be carried out in accordance with the EIA Regulations 2017, the Planning Inspectorate's Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2019b) and for the offshore elements especially, be consistent with the guidance provided by the RenewableUK and the NERC published guidelines (RenewableUK, 2013) on the undertaking of the CEA.

4.4.30 For an 'other developments' to be considered in the CEA, the approach and principles set out in Advice Note Seventeen and RenewableUK guidance will be adhered to. This guidance suggests that other developments that are deemed

likely to go ahead, or are going ahead and for which sufficient information is available, should be taken forward for consideration. For the purposes of the CEA, the types of other developments include:

- projects that are under construction;
- projects that have planning permission or marine licences;
- projects for which planning or marine licence applications have been submitted to the relevant authority;
- projects which are on the Planning Inspectorate's Programme of Projects whether a scoping report has been submitted or not; and
- projects that are identified in development plans and in other plans and programmes as may be relevant.

4.4.31 The CEA will focus on other developments in proximity to Rampion 2 which may have effects on the same resources and receptors. Generally, only other developments where an EIA is required are considered appropriate for inclusion in the CEA. The CEA will include other developments that may begin construction or operation or be decommissioned within the same period as Rampion 2 construction or operation. Decommissioning of Rampion 2 is considered to be too far into the future for any meaningful consideration of cumulative effects with other developments, and will therefore not be addressed.

4.4.32 Initial engagement with the appropriate local planning authorities has indicated that there are a number of other developments located within the vicinity of the Proposed Development. To date these include:

- three major Highways England projects in the area, including the Arundel Bypass;
- a proposed waste to energy plant; and
- housing developments within each of the local authorities, particularly in the vicinity of Bolney.

4.4.33 The Planning Inspectorate website has been consulted to identify relevant NSIPs located within the south east region. To date this has identified the following key projects both currently at Examination stage which are other developments for consideration, however it is not anticipated at this stage that the construction of these will coincide with the construction of Rampion 2.

- Southampton to London Pipeline Project: This development aims to replace 90km of Esso Petroleum Company Limited's 105km aviation fuel pipeline that runs from Fawley Refinery near Southampton to Esso's West London Terminal Storage Facility in Hounslow. The proposed buried replacement pipeline is located approximately 40km to the west of Rampion 2 Scoping Boundary onshore. The proposed construction schedule indicates that construction will be complete by spring 2023.
- The Aquind Interconnector: This development comprises the proposed construction and operation of an electricity interconnector between Normandy in France and Hampshire in the UK, including both onshore and offshore elements. An onshore buried cable route is proposed between National Grid

substation at Lovedean, Hampshire and Eastney, Hampshire covering a distance of approximately 20km. The onshore elements of the development are located approximately 32km to the west of the onshore elements of Rampion 2 at the closest point . The offshore cable route is proposed between Eastney, Hampshire and the UK/France Exclusive Economic Zone (EEZ) boundary, covering a distance of approximately 109km. Part of the offshore elements of the development are located within the Scoping Boundary in the south west corner. The indicative programme suggests that construction onshore will be complete by 2023 and offshore by 2022.

4.4.34 Further information will be gathered where possible on the above-mentioned developments through further engagement to develop the long list of other developments. A review of the local authority Strategic Housing and Economic Land Availability Assessment (SHELAA) will also be conducted.

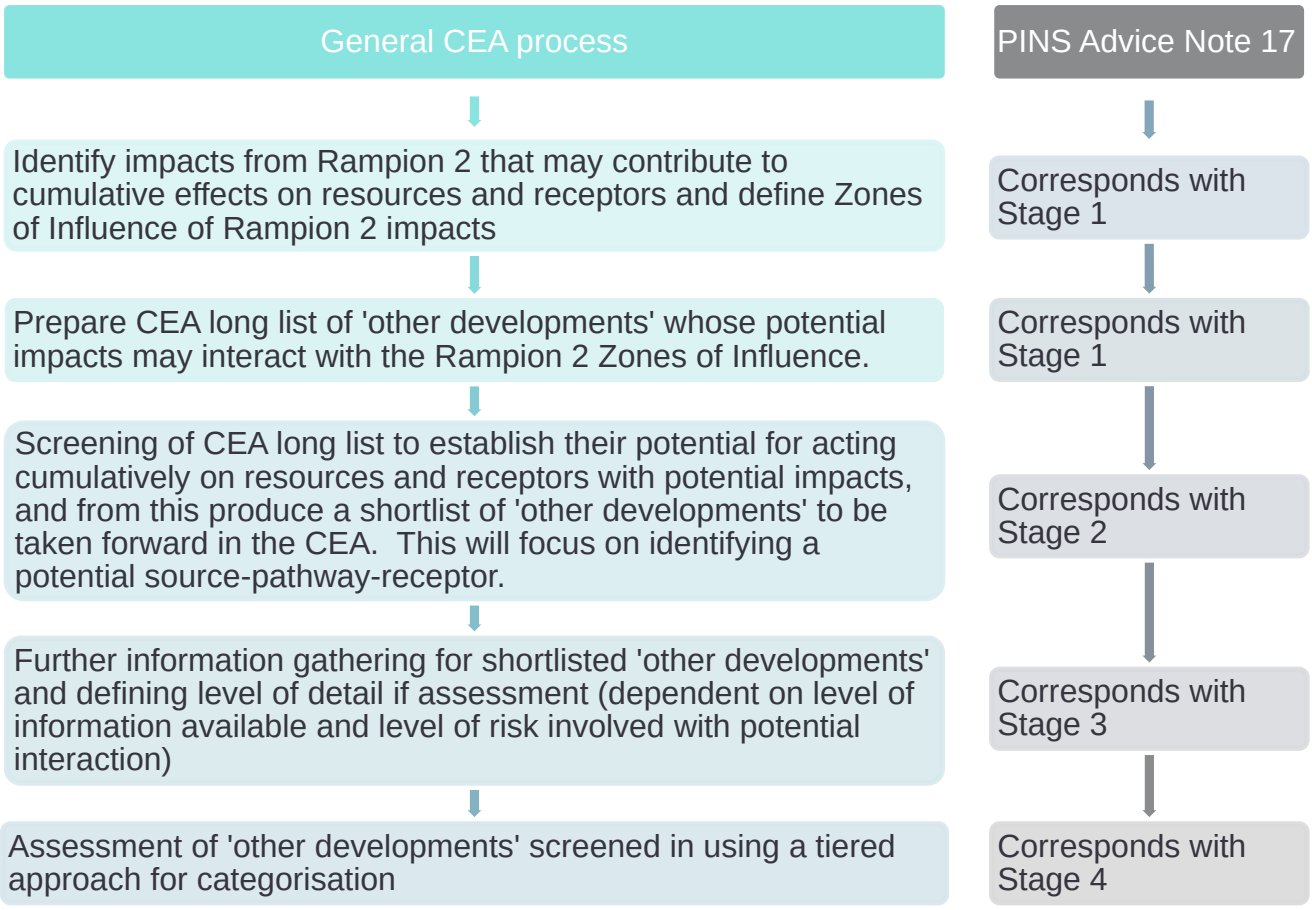
4.4.35 Each of the other developments identified in the long list will be considered as part of a CEA screening exercise to establish the likelihood of adverse cumulative effects with Rampion 2. The screening exercise will be undertaken in line with the guidance set out in the Planning Inspectorate's Advice Note Seventeen to compile a short list of other developments.

4.4.36 Where potential cumulative environmental effects have been identified, these will be considered further in the relevant environmental aspect assessments in the EIA, communicated at PEIR and reported on in the ES. A short list of other developments will be presented within the PEIR.

4.4.37 The CEA methodology will be generally divided into a screening stage and an assessment stage. The offshore and onshore assessment will have slightly different approaches. The offshore screening approach will follow the RenewableUK (RenewableUK, 2013) accepted guidance which is specific to the marine elements of an offshore wind farm, addressing the need to consider mobile wide-ranging species (foraging species, migratory routes etc). The onshore screening approach will follow the Planning Inspectorate's Advice Note Seventeen (Planning Inspectorate, 2019b) which is an accepted process for NSIPs and will follow the four-stage approach set out in the guidance.

4.4.38 Detailed methodologies will be developed in consultation with consultees and communicated at PEIR, the general staged process that will be followed, and how this corresponds to the Planning Inspectorate's Advice Note Seventeen (Planning Inspectorate, 2019b) is illustrated in **Figure 4.2**.

Figure 4.2 General CEA Process



4.4.39 At the scoping stage, for each aspect, potential impacts of Rampion 2 that may contribute to cumulative effects on resources and receptors are set out in **Chapters 5** and **6**.

Inter-relationships

4.4.40 Paragraph 5(2)(e) of the EIA Regulations 2017 requires that the EIA consider the interaction of environmental effects associated with the Proposed Development and this requirement will be met through the various aspect assessments. Environmental aspects that have common receptors will be identified, and consideration will be given to whether the aspect effects on any common receptors are likely to combine. The aspect assessments will:

- identify the common receptor(s) from the individual aspect assessments;
- identify impact source pathways that can affect the common receptor(s);
- identify potential effects on the identified common receptor(s); and
- produce an inter-related effects assessment for the construction, operation and maintenance and decommissioning phases where appropriate.

Transboundary effects

4.4.41 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) states affects the environment of another EEA state(s). The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context, which was adopted in 1991 as the 'Espoo Convention', was negotiated to enhance the cooperation between EEA states in assessing environmental effects in a transboundary context. The Espoo Convention has been implemented by the EIA Directive and transposed into UK law for NSIPs by way of the EIA Regulations 2017, specifically under Regulation 32 which sets out the process for consultation and notification.

4.4.42 Regulation 32 of the EIA Regulations 2017 requires that where the Secretary of State is of the view that a development that is the subject of an EIA is likely to have significant effects on the environment of another EEA State a notification is made by the Secretary of State to that other EEA State.

4.4.43 As set out in Advice Note Twelve: Transboundary Impacts and Process (Planning Inspectorate, 2018b), the role of the Planning Inspectorate, where an NSIP has been identified as an EIA development, includes the screening for likely significant effects on the environment of another EEA State. Screening may take place at any time when new relevant information becomes available. Where a likely significant effect on the environment of any other EEA State(s) is identified, the role of the Planning Inspectorate includes the identification of EEA State(s) to be notified, notification of these states, consultation with EEA States, and notification to the EEA State(s) of the outcome of the application for DCO. **Appendix B** presents a Transboundary Screening Matrix for Rampion 2.

4.5 Structure of the Environmental Statement (ES)

4.5.1 The ES will document the EIA process, describe the Proposed Development and the EIA process. At this stage it is anticipated that the ES will comprise the following structure set out in **Table 4.1**.

Table 4.1 Draft structure of the ES

Volume / Chapter	Heading
Volume 1	Non-Technical-Summary
Volume 2	Environmental Statement
Chapter 1	Introduction
Chapter 2	Policy and legislative context
Chapter 3	The Proposed Development

Volume / Chapter	Heading
Chapter 4	Alternatives
Chapter 5	Approach to the EIA
Chapter 6 - 18	Environmental aspects offshore including: coastal processes, other marine users, fish and shellfish ecology, benthic and intertidal ecology, commercial fisheries, marine mammals, offshore ornithology, shipping and navigation, nature conservations, civil and military aviation, landscape, seascape and visual, archaeology and cultural heritage, and socio-economics.
Chapters 19 – 27	Environmental aspects onshore including: landscape and visual impact, air quality, agriculture and soils, noise and vibration, terrestrial ecology and nature conservation, transport, ground conditions, historic environment, and water environment.
Chapter 28	Cumulative and transboundary effects
Chapter 29	Summary and conclusions
Volume 3	Appendices

5. Environmental aspects offshore

5.1 Introduction

Overview

5.1.1 The basis for the offshore scoping exercise is described in the following sections:

- **Section 5.2: Coastal processes;**
- **Section 5.3: Other marine users;**
- **Section 5.4: Fish and shellfish ecology;**
- **Section 5.5: Benthic and intertidal ecology;**
- **Section 5.6: Commercial fisheries;**
- **Section 5.7: Marine mammals;**
- **Section 5.8: Offshore ornithology;**
- **Section 5.9: Underwater noise;**
- **Section 5.10: Shipping and navigation;**
- **Section 5.11: Nature conservation;**
- **Section 5.12: Civil and military aviation;**
- **Section 5.13: Landscape, seascape and visual;**
- **Section 5.14: Archaeology and cultural heritage;** and
- **Section 5.15: Socio-economics.**

5.2 Coastal processes

Introduction

5.2.1 The coastal processes assessment will consider the pathways of effect and potential likely significant effects on offshore physical environment receptors, that may arise from the construction, operation and decommissioning of the Proposed Development. Coastal processes refer to key characteristics of the physical marine environment including: winds; waves; currents; water levels; seabed sediment type and transport patterns; suspended sediment concentration; and coastal morphology.

5.2.2 This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

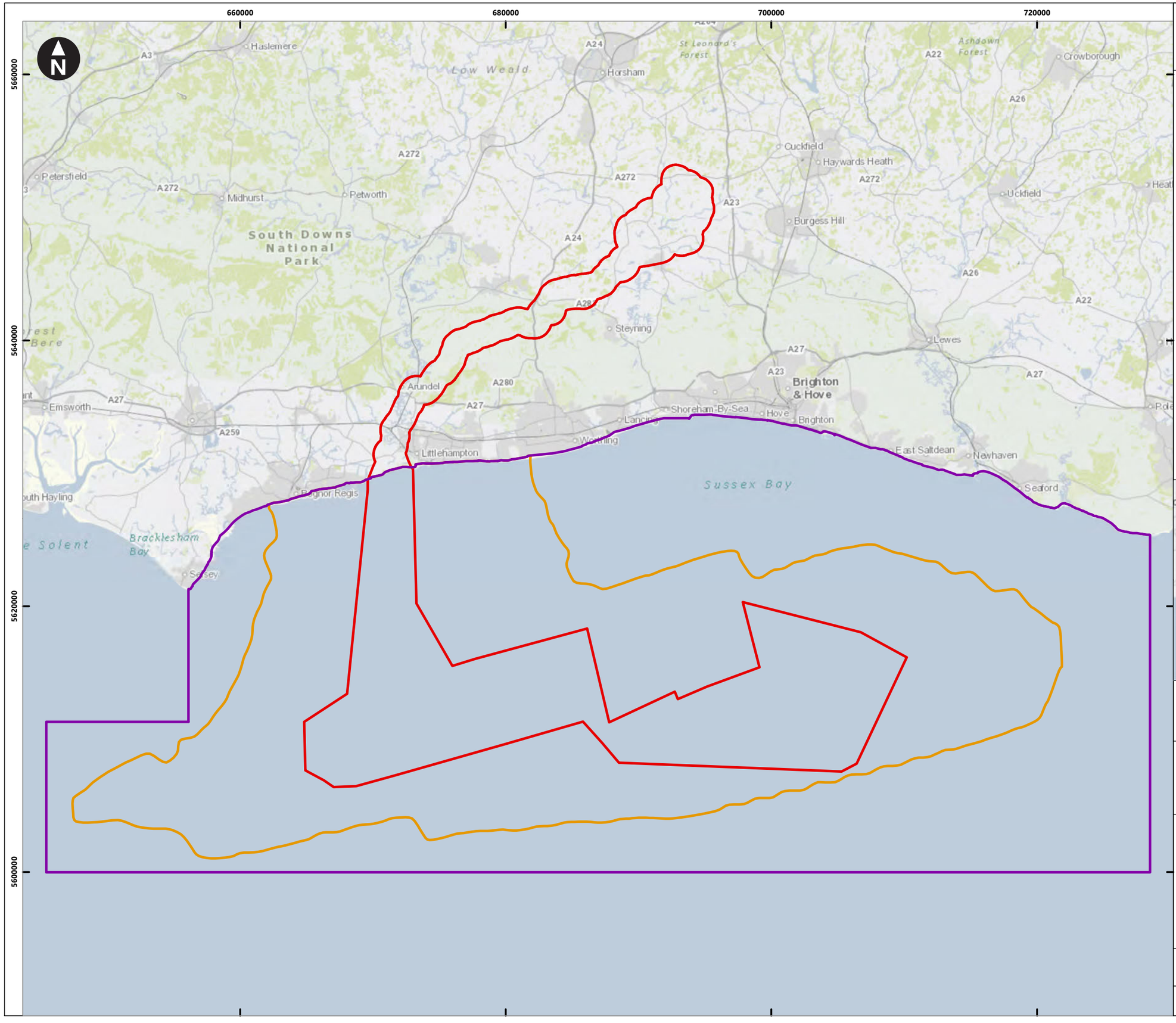
5.2.3 Coastal processes interfaces with various other aspects, , and as such, should be consider alongside these; namely:

- **Section 5.4: Fish and shellfish ecology** (describes pathways of effect from coastal processes physical parameters on potentially sensitive fish and shellfish ecology receptor species)**;**
- **Section 5.5: Benthic subtidal and intertidal ecology** (describes pathways of effect from coastal processes physical parameters on potentially sensitive benthic and intertidal ecology receptor species and habitats)**;**
- **Section 5.6: Commercial fisheries** (describes pathways of effect from coastal processes physical parameters on potentially sensitive commercial fisheries receptor species)**;**
- **Section 5.7: Marine mammals** (describes pathways of effect from coastal processes physical parameters on potentially sensitive marine mammal receptor species)**;**
- **Section 5.8: Offshore ornithology** (describes pathways of effect from coastal processes physical parameters on potentially sensitive ornithology receptor species)**;**
- **Section 5.10: Shipping and navigation** (describes pathways of effect from coastal processes physical parameters on potentially sensitive shipping and navigation receptor sectors)**;** and,
- **Section 5.11: Nature conservation** (describes pathways of effect from coastal processes physical parameters on potentially sensitive receptor species and habitats)**.**

Study area

5.2.4 The study area for the coastal processes assessment is defined as the Scoping Boundary together with the Zone of Influence (ZOI), shown in **Figure 5.2.1**. For this latter aspect, this has been determined based on the spatial extent of potential impact on waves at adjacent coastlines (between Beachy Head and Selsey Bill), and the likely extent of potential sediment plume impacts described by the tidal excursion buffer (describing the greatest distance and direction that water carrying an impact might be carried during one mean spring tide, from any part of the Scoping Boundary).

5.2.5 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore Rampion 2 components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.



Key

- Scoping Boundary
- Study Area
- Spring tidal excursion buffer

Kilometres

0 1.5 3 6 9 12

1:275,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.2.1 The Study Area for the coastal processes assessment

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O4-0001	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
ABPmer	OJR	WOOD	22/05/2020	FINAL

Assessment methodology

Introduction

5.2.6 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this coastal processes scoping assessment, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the coastal processes assessment.

Impact assessment

5.2.7 The coastal processes assessment will be undertaken in accordance with industry best practice. In addition to general EIA guidance (e.g. from IEMA and the Planning Inspectorate) and National Policy Statements relevant to Renewable Energy, the following topic specific guidance is particularly relevant:

- The South Marine Plans (MMO, 2018);
- General advice on assessing potential impacts of and mitigation for human activities on Marine Conservation Zone (MCZ) features, using existing regulation and legislation (JNCC and Natural England, 2011);
- Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects. (Centre for Environment, Fisheries and Aquaculture Science (Cfas), 2011);
- Coastal Process Modelling for Offshore Wind farm Environmental Impact Assessment: Best Practice Guide. ABPmer and HR Wallingford for COWRIE, 2009, [http://www.offshorewindfarms.co.uk];
- Review of Cabling Techniques and Environmental Effects applicable to the Offshore Wind farm Industry. Department for Business Enterprise and Regulatory Reform in association with Defra. (BERR, 2008); and
- Potential effects of offshore wind developments on coastal processes (ABPmer and METOC, 2002).

Assessment of potential changes to suspended sediment concentration and seabed deposition

5.2.8 Potential increases in suspended sediment concentration are associated with installation activities such as cable burial and dredging. For these relatively common marine activities, the potential extent, duration and concentration of suspended sediment plumes will be assessed using a combination of the available evidence base, and project specific spreadsheet based numerical models. The impact will be assessed in terms of the difference caused, relative the normal range of natural occurrence and variability.

5.2.9 Potential sediment deposition is associated with the settlement of sediment disturbed by installation activities. The potential extent and thickness of sediment deposition will be assessed using a combination of the available evidence base, and project specific spreadsheet based numerical models. The impact will be

assessed in terms of the difference caused, relative the normal range of natural occurrence and variability.

Assessment of potential changes to coastal morphology at the landfall

5.2.10 Potential changes to coastal morphology at the landfall are associated with the process used to transition the export cables from the offshore to the onshore environment. The proposed method for cable landfall is to bury the cables beneath the beach using Horizontal Directional Drilling (HDD) techniques. By avoiding any disturbance to the coastline fabric or morphology, and due to the absence of any infrastructure at or near the surface, this method means that, unless the cable becomes exposed, there is unlikely to be interaction with or therefore impact on coastal process. The impact will be assessed in terms of the difference caused, relative the normal range of natural variability.

5.2.11 The assessment will also consider the potential for the planned transition to remain stable and buried throughout its operational lifetime, for example, avoiding exposure due to natural coastal retreat. The potential impact of any associated activities will also be assessed if identified in the proposed design, for example, requirements for HDD exit pits in nearshore areas. The assessment will be undertaken as a desktop exercise by an experienced coastal geomorphologist utilising a range of historical and present-day data relating to the coastline at and around the landfall location.

Assessment of potential changes to the wave and hydrodynamic regimes

5.2.12 Potential changes to the wave and hydrodynamic (tidal) regime are associated with local interaction with the obstacles presented by the wind farm infrastructure. The potential impact of the proposed design of Rampion 2 will be assessed both alone and in conjunction with the built design of the existing Rampion project. Previous assessments for Rampion 1 utilised numerical modelling to consider a much more conservative design scenario than was built; the EIA considered 80 x 4MW gravity base structures and 95 monopile structures (175 structures in total), whereas the wind farm was actually built with 116 monopile foundations. The results of the previous modelling remain valid and can reliably support and inform an evidence-based assessment of the likely individual and combined impact of Rampion 2 and Rampion 1. The impact will be assessed in terms of the difference caused, relative the normal range of natural variability in the wave climate and tidal regime.

5.2.13 There are no coastal processes receptors identified that are directly sensitive to changes to the wave or hydrodynamic regimes alone. Resulting changes to patterns of sediment transport and morphological evolution may potentially affect a limited number of coastal processes receptors (including nearby coastlines, sandbanks and areas of designated seabed), which are separately considered below. Potential for changes to recreational surfing wave climate will be considered in conjunction with other relevant aspects.

5.2.14 The impact on other sensitive receptors, which are potentially affected by changes in coastal processes, for example in relation to benthic ecology, are considered within those specific sections, with the outputs of the coastal processes assessments providing data to inform those assessments.

Assessment of potential changes to the sedimentary transport regime

5.2.15 Potential changes to the rate and patterns of sediment transport into, through and from the study area will be assessed, including nearby coastlines, sandbanks and areas of designated seabed. The assessment will be informed by the assessment of potential changes to the hydrodynamic (tidal currents) and wave regimes, in conjunction with standard quantitative relationships for prediction of sediment transport. Potential differences in the sediment transport regime will be assessed in the context of the normal range of natural variability. The impact will be assessed in terms of the difference caused, relative the normal range of natural variability in sediment transport.

Assessment of potential seabed scour

5.2.16 Potential changes to the local seabed level in the form of scour are associated with the local interaction between currents and waves and the obstacle presented by wind farm infrastructure located above the seabed surface. This interaction causes locally enhanced transport of seabed sediments, leading to localised erosion. Once an equilibrium state is reached, scour pits are a localised depression that may have a different seabed texture to the surrounding seabed, however, they have no further net effect on sediment transport into, through or from the area. Standard relationships, supported by the available evidence base, will be used to estimate the likely dimensions of scour for unprotected infrastructure. Scour protection around foundations or cables will prevent the formation of scour around the protected item by design.

Baseline conditions

Data sources

5.2.17 The key data sources that have been used to collate the information for the Scoping Report are presented in **Table 5.2.1**.

Table 5.2.1 Key sources of coastal processes data

Source	Date	Summary	Coverage of study area
Navigation Charts (UKHO)		Description of bathymetry and general seabed type at a regional scale.	Full coverage of the study area.
UK Atlas of Marine Renewable Energy	Accessed May 2020	Mapped summary statistics for wind and wave climate and tidal regime (available online www.renewables-atlas.info/).	Full coverage of the study area.
ABPmer SEASTATES Wave	Accessed May 2020	Hindcast database of wave height, period and direction (~40 years, 1979 to near present) approximately 5km	Full coverage of the study area.

Source	Date	Summary	Coverage of study area
Hindcast Database		resolution (for more information see www.seastates.net/downloads/).	
ABPmer SEASTATES Tide and Surge Hindcast Database	Accessed May 2020	Hindcast database of water levels, current speed and direction (~40 years, 1979 to near present) approximately 2km resolution (for more information see www.seastates.net/downloads/).	Full coverage of the study area.
NOAA Climate Forecast System Reanalysis (CFSR)	Accessed May 2020	Hindcast database of wind speed and direction (~40 years, 1979 to near present) approximately 2km resolution (available online rda.ucar.edu/datasets/ds093.1/).	Full coverage of the study area.
Rustington Wave Buoy (Channel Coastal Observatory)	Accessed May 2020	Observations of wave height, period and direction (~10 years used, January 2010 to near present) (available online www.channelcoast.org/).	Point location 4nm SSE of Littlehampton Harbour, inside the study area.
Geophysical survey of Zone 6 (Osiris Projects Ltd)	2010 to 2011	High resolution geophysical survey of the Round 3 Zone 6 area, including the present extent of Rampion 1 and parts of the Rampion 2 Scoping Boundary.	Partial coverage of the study area.
Geotechnical survey of Zone 6 (Fugro Geoconsulting Ltd)	2011	Geotechnical survey of the Round 3 Zone 6 area, including the present extent of Rampion 1 and parts of the Rampion 2 Scoping Boundary.	Partial coverage of the study area.
Metocean survey (EMU Ltd)	2011	Measurements of water levels, currents and waves at three locations (2 @3 months and 1 @6 months) in the Round 3 Zone 6 area, including the present extent of Rampion 1 and parts of the Rampion 2 Scoping Boundary.	Partial coverage of the study area.
Benthic Survey (EMU Ltd)	2011	Benthic survey including sediment grab samples at 59 locations in the Round 3 Zone 6 area, including the present extent of Rampion 1 and parts of the Rampion 2 Scoping Boundary.	Partial coverage of the study area.

Baseline

5.2.18 A detailed description of baseline conditions within the Rampion 1 array and export cable corridor area is provided in the Environmental Statement Physical Environment chapter (ABPmer 2012a), the dedicated baseline description appendix (ABPmer 2012b), and the associated technical report (ABPmer 2012c). The following is a summary of relevant information to inform this scoping exercise for Rampion 2. A more detailed site-specific baseline description will be developed to inform the PEIR and ES, incorporating any new survey data.

5.2.19 Rampion 2 is located in the Eastern English Channel, between 13km and 25km offshore from the Sussex coast. Water depths within the Rampion 2 array area range from approximately 15m (in the north west) to 60m (in the south east) below Chart Datum (CD), with relatively gentle seabed slopes. Water depths within the offshore cable corridor range decrease gradually from approximately 15m to 20m below CD (at the offshore end), to the landfall.

5.2.20 The seabed of the region is predominantly sands and gravels, overlying normally consolidated sands and clays with some peat layers and basal gravels. The finer grained sediments are relatively mobile, allowing coarse-grained surface lag deposits to form in some areas. The tidal regime controls sediment mobility throughout most of the Scoping Boundary, resulting in the presence of active sediment bedforms. The available survey data show the presence of sand streaks, patches, megaripples and sand waves in the area (Osiris, 2010a, 2010b, 2011; James *et al*., 2007; Evans *et al*., 1998). Sand waves are the most common mobile seabed feature, with typical heights of approximately 2m. Intermittent wave action also contributes to sediment transport but mainly on the shallow coastal fringes (Grochowski *et al*., 1993). The nature and distribution of seabed type and features within the Scoping Boundary will be confirmed in more detail by new proposed geophysical surveys, planned for summer 2020.

5.2.21 The Scoping Boundary contains a variable sequence of Quaternary sediments of the Pleistocene and younger Holocene epochs, comprising a sequence of variable fine to coarse soils generally between less than a metre and up to 30m thick. The underlying solid geology, derived from British Geological Survey (BGS) Dungeness and Wight seabed sediment charts (Crosby *et al*., 1988; Curry *et al*., 1977) is characterised by Tertiary Clays and Upper Cretaceous Chalk with flint, the latter outcropping and subcropping from Beachy Head to Bognor Regis to the east. Tertiary rocks subcrop beneath seabed sediments off Worthing, Brighton and Beachy Head and extend out into the Channel.

5.2.22 Rampion 2 is located within a large embayment of open aspect, bound by two prominent headlands, Selsey Bill and Beachy Head. These features form the boundaries of a distinct coastal cell, as identified within the shoreline management plans (SMPs) as sub-cell 4d. The shoreline management policy (SMP, 2006) for much of the coastline is ‘hold the line’; for some local areas of dunes and other dynamic coastal morphology the policy is ‘managed realignment’; and for a few areas of natural cliffs the policy is ‘no active intervention’. Coastal sub-cell 4d is mostly characterised by a heavily managed shoreline consisting of beach, estuary and cliff features. Erosion of the shingle beaches is managed locally through the local use of (for example) shore perpendicular wood or rock groynes, shore

parallel breakwaters, and/or beach nourishment and reprofiling. Accretion at harbour mouths is managed by maintenance dredging, if and where required.

5.2.23 The tidal water level range within the Scoping Boundary is in the order of 2.5m and 5m, and the corresponding peak tidal current speeds are in the order of 0.45m/s and 0.9m/s, for mean neap and mean spring conditions, respectively (ABPmer, 2020, 2017; ABPmer *et al.* 2008). Both tidal range and tidal current speeds vary predictably on a variety of timescales, from hours (flood-ebb cycle) to weeks (spring–neap) to months (solstice-equinox) to years (the 18.6-year metonic cycle).

5.2.24 The position of Rampion 2 within the eastern English Channel means that exposure to larger waves originating from the North Atlantic is limited. The prevailing wind and wave direction in all data sources is from the south-west. The annual mean significant wave height in the offshore region is in the approximate range 0.9m to 1.25m (ABPmer, 2020, 2013; ABPmer *et al*. 2008). The annual mean significant wave height directly observed over ten years (January 2010 to December 2019) by the nearby Rustington wave buoy (closer to shore in shallower water) is 0.83m and the maximum recorded significant wave height in this period is 5.72m; significant wave heights only exceed 3.5m and 4.0m approximately 0.17% and 0.06% of the time at this location, respectively (Channel Coastal Observatory, 2020).

5.2.25 Suspended sediments originating from the adjacent coastline are transported alongshore in a net eastward direction (with some offshore dispersion). Analysis of sediment plumes resulting from marine aggregate activities in the vicinity of Rampion 2 have shown that increases in suspended sediment concentration (SSC) due to disturbance of the locally present sediments are a short-term localised effect (EMU, 1999). This local observation is consistent with similar observations made elsewhere in tidally dominated coastal marine environments.

Basis for scoping assessment

5.2.26 The coastal processes scoping assessment is based on the following key assumptions which are set out in more detail in **Chapter 2: The Proposed Development**:

- the Scoping Boundary extent;
- up to three offshore substations on jacket or monopile foundations;
- up to 116 WTGs on jacket or monopile foundations;
- scour protection material may be required around the base of some or all foundations;
- array and export cables will be installed via either ploughing, jetting, trenching, or post-lay burial techniques, to a target burial depth of 1m below seabed surface. The requirement for local scour protection will be considered in a Scour Protection Management Plan. Where possible, cable burial will be the preferred option for cable protection; and
- the export cable will make landfall at Climping. Up to four subsea export cable ducts will be drilled underneath the beach using HDD techniques.

Embedded environmental measures

5.2.27 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on coastal processes (see **Table 5.2.2**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.2.28 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.2.2 Relevant coastal processes embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-36	The number of turbines will not exceed that of the existing Rampion 1 project.	DCO requirements or DML condition
C-38	The selection of the foundation type will primarily be based upon the site conditions combined with the turbine that is selected. The following foundation types are being considered: Monopile and Jacket.	DCO requirements or DML condition
C-39	To maintain suitable operational conditions for the combined foundation and wind turbine structure, scour protection (typically consisting of rock aggregate or stone/ concrete mattresses) may need to be installed. The method of scour protection will generally be to use rock armour or other large size aggregate placed around the periphery of the foundation at the sea bed. However, other methods of scour protection, may also be used.	DCO requirements DML condition
C-40	There will be up to three offshore substations installed to serve the development. The exact locations, design and visual appearance will be subject to a structural study and electrical design, which is expected to be completed post consent. The offshore substations will be installed on jacket, monopile foundations, similar to those described for the turbines themselves.	DCO requirements or DML condition
C-41	The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the	DCO requirements or DML condition

ID	Environmental measure proposed	How the environmental measures will be secured
	seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	
C-42	The inter-array cables and the subsea export cables will be installed using one or a combination of the three methods: ploughing, trenching or jetting. It is likely that a combination of these methods will be adopted for localised areas depending on seabed conditions. The installation methods will be selected during detailed design and tendering phases.	DCO requirements or DML condition
C–43	The subsea export cable ducts will be drilled underneath the beach using HDD techniques.	DCO requirements or DML condition
C–44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML condition
C–45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML condition

Likely significant effects

5.2.29 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment. The likely significant effects on coastal processes receptors are summarised in **Table 5.2.3**.

5.2.30 The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for coastal processes effects (including Rampion 1 and other sufficiently analogous offshore wind farm developments), and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA process**.

5.2.31 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects ‘scoped in’ as simple or

detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

5.2.32 The table also includes potential coastal processes impacts that are required for assessment of likely significant effects on sensitive receptors by other aspects of the EIA. In most cases marine coastal processes are not in themselves receptors but are, instead, 'pathways' which have the potential to indirectly impact and cause an effect to other environmental receptors. Accordingly, although outputs from the Rampion 2 coastal processes assessment will be reported in a stand-alone ES chapter, for the most part they will not be accompanied by statements of 'effect significance'. Instead, the information on changes to marine physical processes pathways will be used to inform other EIA aspect assessments, namely:

- Other marine users;
- Fish and shellfish ecology;
- Benthic and intertidal ecology;
- Commercial fisheries;
- Marine mammals;
- Offshore ornithology;
- Shipping and navigation;
- Nature conservations;
- Archaeology and cultural heritage (Offshore); and
- Socio-economics (Offshore).

5.2.33 While marine coastal processes assessments can largely be considered as pathways, a small number of features have been identified as potentially sensitive coastal processes receptors. These are:

- the adjacent coastlines (between Selsey Bill and Beachy Head);
- nearby offshore sandbanks (including East Bank and Outer Owers Bank); and
- seabed areas contained within nationally or internationally designated sites (including Offshore Overfalls MCZ and Kingmere MCZ).

5.2.34 A range of potential impacts on these physical process receptors have been identified, which may occur during the construction, operation and maintenance (O&M), and decommissioning phases of Rampion 2. The Rampion 2 specific impacts that have been identified are summarised in **Table 5.2.3** together with a description of any proposed additional data collection (e.g. site-specific surveys) to enable an assessment of the impact.

Table 5.2.3 Likely significant coastal processes effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Changes to suspended sediment concentrations, bed levels and sediment type (installation or removal of foundations and cable burial) (Construction and Decommissioning)	Foundations: C-36; C-38; C-40 Cables: C-41; C-42; C-45	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**	Nationally or internationally designated sites	Geophysical survey and sediment samples from the Scoping Boundary.
Changes to landfall morphology (installation or removal of export cable at the landfall) (Construction and Decommissioning)	C-43	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**	Local coastline morphology	Photographic survey of the landfall area

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Changes to the tidal regime (presence of wind farm infrastructure) (Operation)	Foundations: C-36; C-38; C-39; C-40 Cables: C-41; C-43; C-44; C-45	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**	Nearby offshore sandbanks; nationally or internationally designated sites	None required
Changes to the wave regime (presence of wind farm infrastructure) (Operation)	Foundations: C-36; C-38; C-39; C-40 Cables: C-41; C-43; C-44; C-45	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**	Nearby offshore sandbanks; nationally or internationally designated sites; coastline morphology; recreational surfing wave resource	None required
Changes to the sediment transport regime (presence of wind farm infrastructure) (Operation)	Foundations: C-36; C-38; C-39; C-40 Cables: C-41; C-43; C-44; C-45	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**	Nearby offshore sandbanks; nationally or internationally designated sites	Geophysical survey and sediment samples from the Scoping Boundary.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Seabed scour (presence of wind farm infrastructure) (Operation)	Foundations: C-36; C-38; C-39; C-40 Cables: C-43; C-44; C-45	No likely significant effect on coastal processes receptors. Potential pathway of effect for other aspects	**Scoped in – simple assessment**		Geophysical survey and sediment samples from the Scoping Boundary.

Impacts scoped out of assessment

5.2.35 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed. No matters or aspects are being scoped out at this stage. This is mainly due to the potential for pathway changes to coastal processes to impact on other aspect receptors and the requirement for informing those assessments.

Cumulative effects

5.2.36 Cumulative effects on coastal processes resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.2.37 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.

- Potential changes to suspended sediment concentrations, bed levels and sediment type associated with the construction or decommissioning of Rampion 2 may act cumulatively with sediment disturbance from other marine aggregate dredging activities within the spring tidal excursion boundary of the coastal processes study area.
- Potential changes to the tidal or wave regimes associated with the presence of Rampion 2 infrastructure during the operation and maintenance phase may act cumulatively with the presence of existing infrastructure.

Transboundary effects

5.2.38 The potential effects from construction, operation (including maintenance) and decommissioning on coastal processes receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

5.2.39 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process (EPP), as set out in **Section 4.3: Consultation and the evidence plan process**.

5.2.40 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.2.41 Rampion 2 will utilise standard approaches for the assessment of changes to coastal processes as a result of the construction, operation and decommissioning. The study area and methodologies will be refined at a later stage if necessary, based on the project design information and the receptor assessment requirements of all relevant aspects. The proposed methods to be used for the coastal processes assessment will be discussed and confirmed with the relevant stakeholders as part of the EPP and development of the PEIR and so in advance of the ES.

5.2.42 The assessment approach options include a range of desktop analyses and quantitative evidence-based assessments. These assessments will be informed by new geophysical and seabed type surveys within the Rampion 2 Scoping Boundary, in conjunction with previously collected survey data for Rampion 1. Sufficient existing metocean observations are available from the local area to robustly validate longer term wave and tidal hindcast model data for use in all parts of the coastal processes study area.

5.2.43 The adjacent existing Rampion 1 project was consented based on several project-specific studies, which included the use of numerical modelling to quantify the environmental baseline, and the scheme impacts on the physical processes and environment for the realistic Maximum Development Scenario options at the time. The modelling results remain valid, with the Rampion 1 scenarios providing a conservative representation of the 'as constructed' development. As a broadly similar offshore wind farm development, in a similar environmental setting, the Rampion 1 EIA will provide a range of existing evidence to inform similar assessments for Rampion 2. Other supporting evidence may also be drawn from existing assessments and monitoring of other sufficiently similar offshore wind farm developments. It is presently considered unlikely that new numerical modelling will be required to inform design scenario specific impact assessment for Rampion 2 (with reference to the relevant best practice guidance; ABPmer & HR Wallingford, 2009).

5.3 Other marine users

Introduction

5.3.1 The other marine users (OMU) assessment will consider the potential likely significant effects on other human users of the sea that may arise from the construction, operation and maintenance, and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions across the study area, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.3.2 The receptors considered include users of the marine and intertidal environment and operators of marine infrastructure which are not otherwise considered in other sections of the EIA. OMU receptors include, but are not limited to; aggregate dredging operations, subsea cable and pipelines, other offshore wind farms, as well as recreational activities including diving, angling and sailing.

5.3.3 As mentioned above, the OMU chapter has links and interfaces with several other aspects and as such, should be considered alongside the following sections:

- **Section 5.2: Coastal processes** (changes to coastal processes have the potential to directly and/or indirectly impact OMU receptors and therefore the information from this assessment will be used to inform this OMU assessment)**;**
- **Section 5.6: Commercial fisheries** (this aspect has direct links with OMU receptors as it includes commercial fishing activities where recreational fishing

is covered within this section. They must therefore be informed and assessed together)**;**

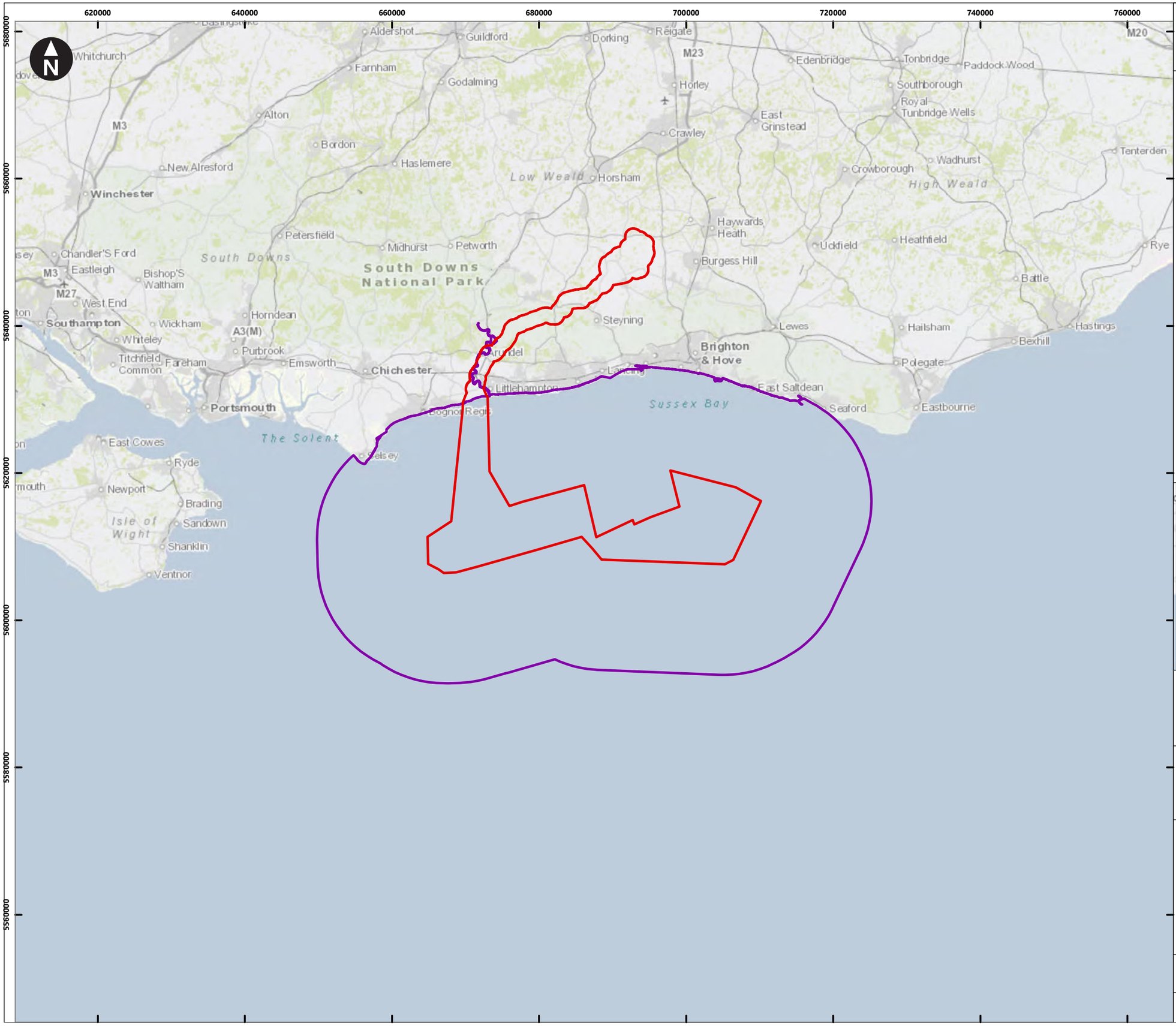
- **Section 5.10: Shipping and navigation** (the shipping and navigation aspect will include activities that cross over with the OMU assessment and therefore must be considered together)**;**
- **Section 5.12: Civil and military aviation** (this aspect includes other military activities that are not covered within this OMU assessment and therefore should be read in union);
- **Section 5.14: Marine archaeology** (the marine archaeology assessment will include any impacts on diving sites and wrecks and therefore has the potential to directly and/or indirectly impact OMU receptors, the information from this assessment will therefore be used to inform the OMU assessment); and
- **Section 5.15: Socioeconomics** (this will include an assessment of the impacts of seaside tourism and therefore has ties with this OMU assessment).

Study area

5.3.4 The study area for the OMU assessment is defined as the immediate area of the Scoping Boundary together with the relevant impact-specific Zones of Influence (ZOIs), such as the largest is the distance over which increased sediment deposition is likely to occur, as defined by **Chapter 5.2: Coastal processes**. The ZOI buffer therefore encompasses the area over which suspended sediments may travel following disturbance as a result of Rampion 2 activities, extending 15km around the array Scoping Boundary, and a distance of 10km surrounding the offshore cable corridor. For the purpose of scoping, a wider study area across the eastern English Channel has also been assumed, to assess broader area effects on receptors such as sailing and cruising routes and dive sites. The dynamic study area is presented in **Figure 5.3.1** and considers marine, coastal and estuarine waters. The study area in relation to other marine users varies in scale depending on the particular receptor. For example, as the position of existing offshore cables and pipelines are well known, the infrastructure and other users study area can be reduced to those exact locations. For each receptor described in this chapter, the spatial variability has been considered and an appropriate baseline description of that receptor's study area is provided.

5.3.5 The exact export cable route is yet to be determined. However, the Scoping Boundary includes an export cable corridor within which export cable routes will link the offshore array to the landfall location. The location of the export cable corridor Scoping Boundary is also presented in **Chapter 2: The Proposed Development**.

5.3.6 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore Rampion 2 components, the identification of specific impact pathways and in response, where appropriate, to feedback from consultation.



Data derived from RWE data © RWE 2020

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Key

- Scoping Boundary
- Other marine users Study Area: 15km buffer of array areas and 10km of offshore cable corridor areas

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.1 Other marine users Study Area

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-14-0001				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL

Assessment methodology

5.3.7 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. Whilst this has informed the approach that will be used in this OMU chapter, it is necessary to set out how this methodology will be applied and adapted as appropriate, to address the specific needs of the OMU assessment.

5.3.8 The assessment of potential impacts upon OMU receptors will be based on the maximum development scenario as identified from the design envelope (see **Chapter 2: The Proposed Development**). The key parameters will be the layout of the wind farm, the number and size of offshore structures, the type and size of foundations used, as well as the timing and duration of the proposed offshore works.

5.3.9 The ES chapter for OMU receptors will be supported by a desk-based study which will identify detail on the OMU receptors within the study area. Studies will be undertaken in parallel with consultation and meetings with specific stakeholders (as required) in order to obtain a detailed understanding of potential impacts.

5.3.10 The assessment will consider all relevant marine recreational pursuits, offshore and coastal activities, and marine infrastructure. For each of the identified receptors, impacts will be considered throughout the construction, operation and decommissioning phases of the Proposed Development.

5.3.11 Cumulative effects will be assessed by taking into consideration all other relevant developments, proposed or existing, that are in the vicinity of the development zone and which have the potential to affect the same receptors. Where other developments are expected to be completed prior to the construction of Rampion 2, and the effects of these developments are fully determined, the effects arising from the developments will be considered as part of the baseline and may also be considered as part of the construction and operational cumulative assessment. Developments forming part of the dynamic baseline, and those included in the cumulative assessment will be clearly identified in the ES.

Baseline conditions

Data sources

5.3.12 **Table 5.3.1** below presents the key data sources which have been collated and analysed to inform the baseline characterisation within this scoping section. A wealth of information regarding OMU receptors and marine infrastructure within the study area is available, having already been compiled for the EIA for the existing Rampion 1 project (E.ON 2012). This has been supplemented by more contemporary licence data and the additional sources which are provided below in **Table 5.3.1**. This information has been developed into a detailed characterisation of the existing baseline environment, which will form the basis of the assessment for the purposes of the EIA.

Table 5.3.1 Key sources of other marine users data

Source	Date	Summary	Coverage of study area
The Crown Estate offshore wind leasing sites Rounds 1 – 4.	2020	Offshore renewable bidding areas	Full coverage of the study area
The Crown Estate, The Oil and Gas Authority, EMODnet and BEIS	2019	Oil and Gas data showing all offshore oil and gas activity (surface and subsurface).	Full coverage of the study area
The Crown Estate Aggregate Licence Area Charts.	2020	Active marine Aggregate extraction areas	Full coverage of the study area
British Marine Aggregate Production Association (BMAPA) annual reports	2010 - 2019	Active and inactive marine Aggregate extraction areas for the South coast area	Full coverage of the study area
The Crown Estate and the UKs Storage Appraisal Project strategic study of the potential for UK carbon dioxide (CO_2) storage.	2019	Carbon Capture and Storage (CCS) /Natural Gas Storage	Full coverage of the study area
Centre for Environment, Fisheries and Aquaculture Science (Cefas) GIS shapefile of Disposal Sites.	2019	Disposal Sites Also includes munitions disposal areas.	Full coverage of the study area
Kingfisher Information Service – Offshore Renewables and Cable Awareness (KIS-ORCA) charts	2019	Offshore cables (active and disused), interconnectors and pipelines	Full coverage of the study area
Ocean Wise marine themes -	2019	Military of Defence (MOD) Practice and Exercise Areas (PEXAs) charts	Full coverage of the study area
SeaSearch.	2019	Recreational diving records for England and organised dives	Full coverage of the study area

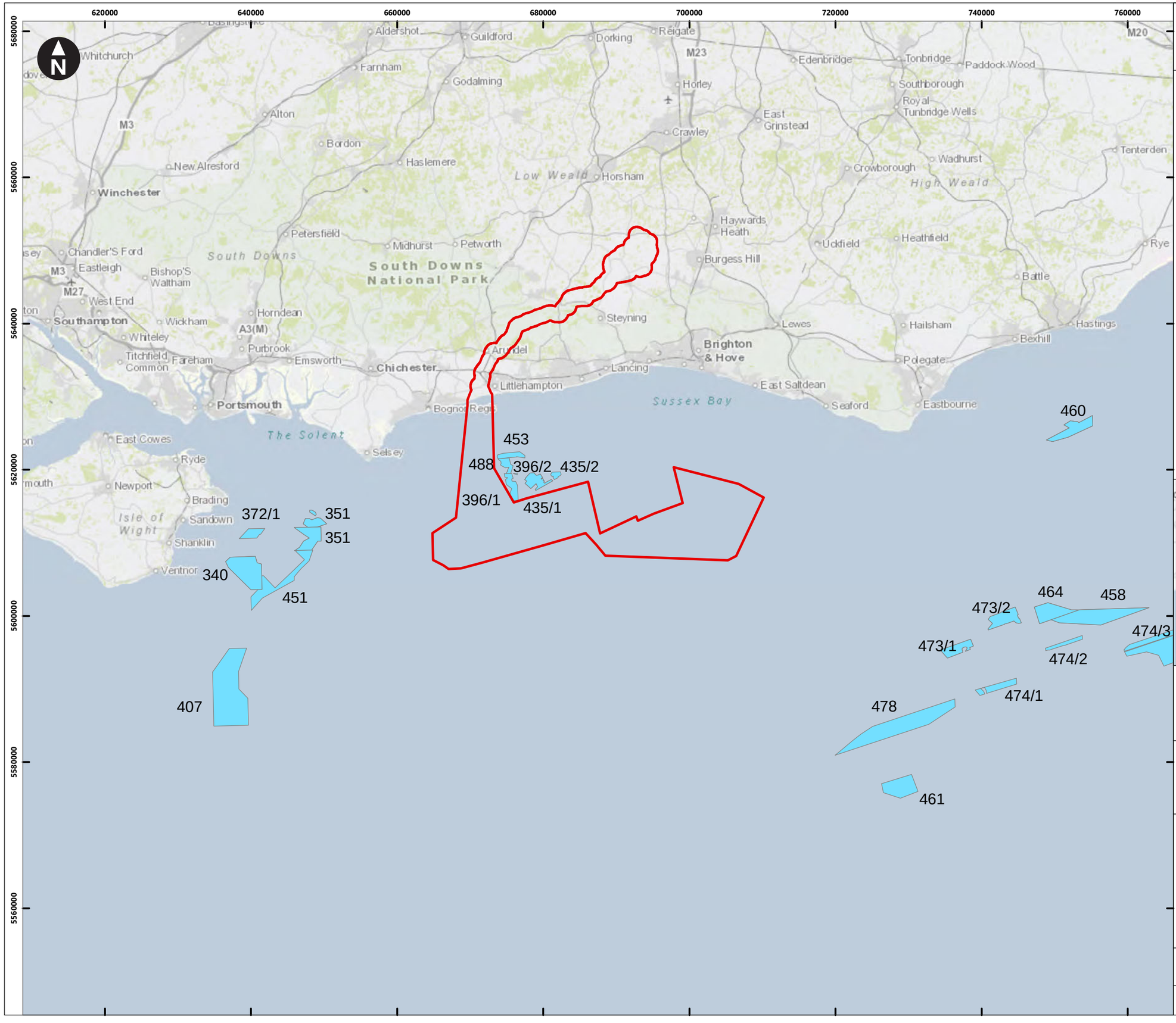
Marine aggregate extraction

5.3.13 The marine aggregate industry is licensed commercially by The Crown Estate (TCE); however, production agreements are only issued once the operator has obtained a Marine Licence under the Marine and Coastal Access Act (MCAA) (2009). A licence allows extraction to take place for a set amount of time (usually<15 years) and is accompanied by operating conditions such as maximum extraction volumes, as well as environmental measures and monitoring requirements.

5.3.14 There are six marine aggregate-extraction sites located in the study area and are listed in **Table 5.3.2** below. As shown in **Figure 5.3.2** the Inner Owers aggregate site (Licence area 396/1) which extracts flint gravel deposits (Tarmac, 2020) borders with the export cable search area. Note that there are a number of aggregate sites which are no longer active but did fall within the ZOI (BMAPA, 2019). RED will have ongoing engagement with the aggregate companies which may include, but is not limited to, data sharing.

Table 5.3.2 Marine aggregate sites located within the vicinity of the study area

Licence Area	Operator	Area Name	Status
Active Sites			
435/1	Hanson Aggregates Marine Ltd	Inner Owers	Production area
435/2	Hanson Aggregates Marine Ltd	Inner Owers	Production area
453	CEMEX UK Marine Ltd	Owers Extension	Production area
488	Tarmac Marine Ltd	Inner Owers North	Production area
396/1	Tarmac Marine Ltd	Inner Owers	Production area
396/2	Tarmac Marine Ltd	Inner Owers	Production area
Inactive Sites			
122/1A - G	Tarmac Marine Ltd	Owers bank	Licence surrendered: 2014
453/1	CEMEX UK Marine Ltd	Inner Owers	Licence surrendered: 2014
123A-G	CEMEX UK Marine Ltd	Owers Bank	Licence surrendered: 2014
124/1A – G	Hanson Aggregates Marine Ltd	Unknown	Licence surrendered: 2012
122/2	Tarmac Marine Ltd	Unknown	Licence surrendered: 2012
122/3	Tarmac Marine Ltd	Unknown	Licence surrendered: 2012



Key

- Scoping Boundary
- Active marine aggregate license areas

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.2 Active Marine Aggregate License Areas

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-14-0002				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 24/06/2020	Status: FINAL

Disposal sites

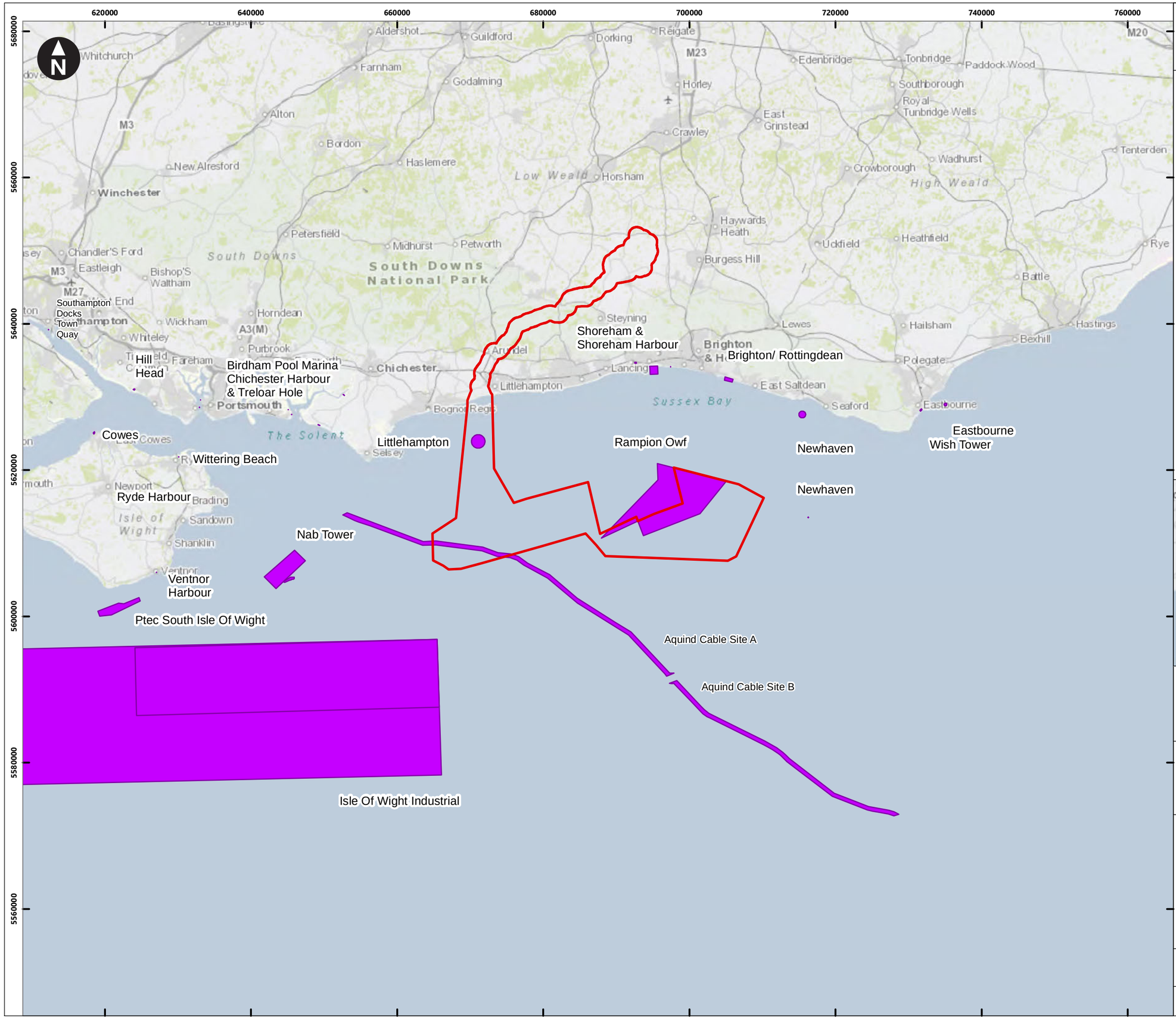
5.3.15 Since the end of 1998, most forms of disposal at sea have been prohibited. The main exceptions are the disposal of dredged material originating from ports and harbours for the purposes of maintaining navigable shipping channels and the disposal of material originating from the installation of offshore infrastructure (for instance material from sandwave clearance, seabed preparation and drilling).

5.3.16 There are seven disposal sites within the study area, as presented within **Figure 5.3.3** and **Table 5.3.3.** Of the seven sites, two are directly within the study area, these are Littlehampton, which is located within the export cable search area (closed), and the existing Rampion 1 project disposal site, which is located over the boundary of the existing Rampion 1 project and the Rampion 2 Scoping Boundary.

Table 5.3.3 Marine disposal sites located within the vicinity of the study area

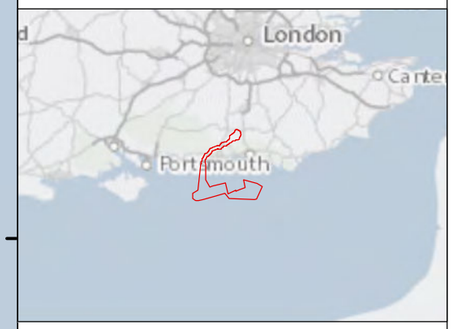
Code	Disposal Site	Category of waste	Status
WI040	Littlehampton	Unknown[1]	Closed
WI117	Rampion 1	Disposal for the existing Rampion 1 project	Open
WI031	Shoreham	Maintenance dredging	Open
WI020	Brighton/ Rottingdean	Dredged material from Brig on Marina	Open
WI012	Newhaven	Dredged material from Newhaven harbour and Ouse Estuary	Closed
WI050	Isle of Wight Industry	Unknown	Closed
WI011	Newhaven	Burial at sea	Closed
WI060	Nab Tower	Capital and maintenance dredge material	Open

[1] The category of waste is categorised as unidentified according to CEFAS online database.



Key

- Scoping Boundary
- Marine disposal sites



Kilometres

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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.3 Marine Disposal Sites

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-14-0003	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	11/06/2020	FINAL

Oil and gas

5.3.17 The Petroleum Act 1998 gives all rights to the UK's petroleum resources in the Crown and provides the Oil and Gas Authority (OGA) with the power to grant licences that cover exclusive rights to 'search and bore for and get' petroleum.

5.3.18 The English Channel isn't currently a focus area for the exploration and production of hydrocarbons and there are no licensed developments near the Scoping Boundary. There are currently no blocks licensed or pipelines for oil and gas exploration within the study area. The closest oil and gas infrastructure to the study area is an offshore well 12km to the west of the Proposed Development. The nearest developed field (for oil) is in Dorset and includes Wytch farm, one of western Europe's most productive onshore oil fields; this extends under inshore sections of the adjacent seabed (Perenco, 2020) (see **Figure 5.3.4**).

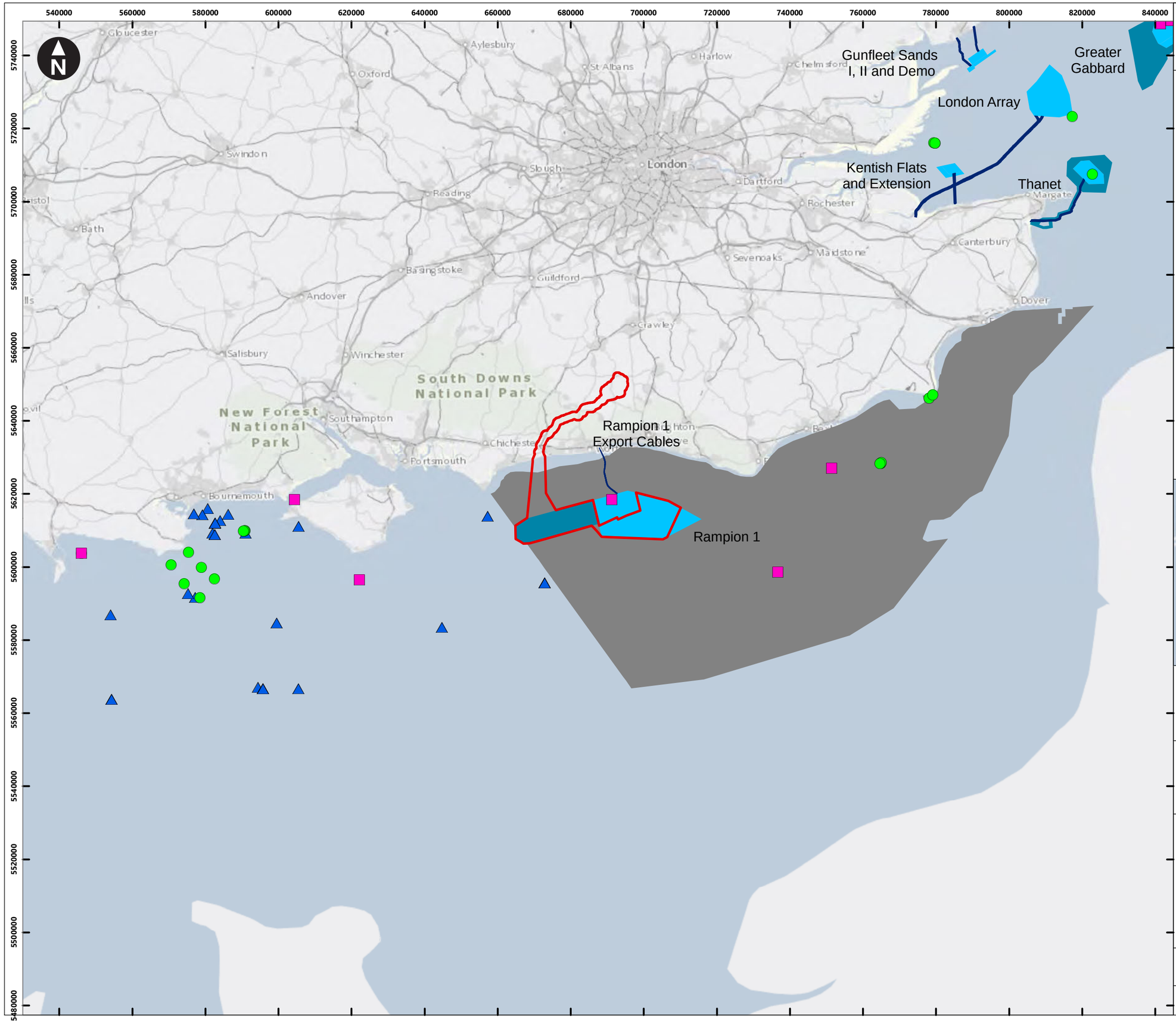
5.3.19 There is a subsurface anchor (as seen in **Figure 5.3.4**) within the existing Rampion 1 project array, which sits approximately 5km from the Scoping Boundary.

Offshore wind

5.3.20 The UK has the largest operating offshore wind capacity in the world and has a strong market for new offshore wind developments within the UK waters. The Government has made a significant commitment, passing legislation which commits the UK to a 'net-zero' greenhouse gas emissions target by 2050 – a transition in which offshore wind will continue to have a crucial role to play. Currently TCE are in the Round 4 leading process which creates the opportunity for > 7 Gigawatt (GW) of new projects in the waters surrounding the UK.

5.3.21 The existing Rampion 1 project sits in the North of the study area and the export cable runs North joining the coastline at Worthing and is currently the only operational wind farm in the south coast UK waters.

5.3.22 The Rampion 2 study area also sits within the Round 4 Leasing – South East – Bidding Area 3. (see **Figure 5.3.4**). None of these areas have been assigned as of yet, and therefore there is no current overlap with any other offshore wind farm developments. TCE have specifically stated that no part of the South East Bidding Area will be within the Rampion 2 Proposed Development, however part of the broader study area could be.



Key

- Scoping Boundary
- Oill and gas subsurface structure
- Oil and gas surface structure
- Oil and gas well
- Offshore windfarm export cable agreements
- Offshore windfarm extensions
- Offshore windfarm site agreements
- Offshore wind Round 4 bidding area 3

Kilometres
0 5 10 20 30 40
1:1,000,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.4 Oil and Gas Structures and Offshore Windfarm Areas

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-14-0004	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	15/06/2020	FINAL

Other offshore energy

5.3.23 The government estimates that wave and tidal stream energy has the potential to deliver around 20% of the UK's current electricity needs, this equates to an installed capacity of 30 – 50GW (Renewable UK, 2020).

5.3.24 The closest known offshore renewable energy project is the Perpetuus Tidal Energy Centre (PTEC), located approximately 40km to the west of the Proposed Development. PTEC have achieved planning consents and secured a connection to the electricity grid network, however it is still awaiting further investment and therefore has not progressed to construction as of yet. It is set to be the largest tidal stream energy project in England and will produce < 30 megawatts (MW) (Isle of Wight Council, 2020).

5.3.25 Carbon Capture and Storage (CCS) is likely to have a major role in reducing UK carbon dioxide (CO_2) emissions in the future, utilising empty subsea oil and gas reservoirs to store CO_2. There are no known plans for CCS or associated pipelines in the study area.

Military activity and munitions

5.3.26 A summary of Military of Defence (MoD) activities is presented in this section, further information is provided in **Section 5.12: Civil and military aviation**.

5.3.27 During the data collection exercise for military activity, no apparent munitions disposal areas within the study area or in close proximity to it (the closest is off the south of the Isle of Wight, approximately 35km from the Proposed Development). In addition, no MoD practice or exercise areas (PEXAs) overlap with the study area.

Subsea cables and pipelines

5.3.28 Subsea cables is a broad term for a range of cables that are beneath the sea surface, these cables are usually (but not exclusively) subsea telecoms, power cables and inter-connector cables.

5.3.29 The scoping exercise identified a number of subsea cables within the study area, but it should be noted that currently none overlap with the Scoping Boundary for Rampion 2. The closest is a disused cable located approximately 1.6km to the east of the Proposed Development, the 'UK-France 3' cable and another running through the mid-Channel approximately 12km to the South, the 'Atlantic Crossing 1'.

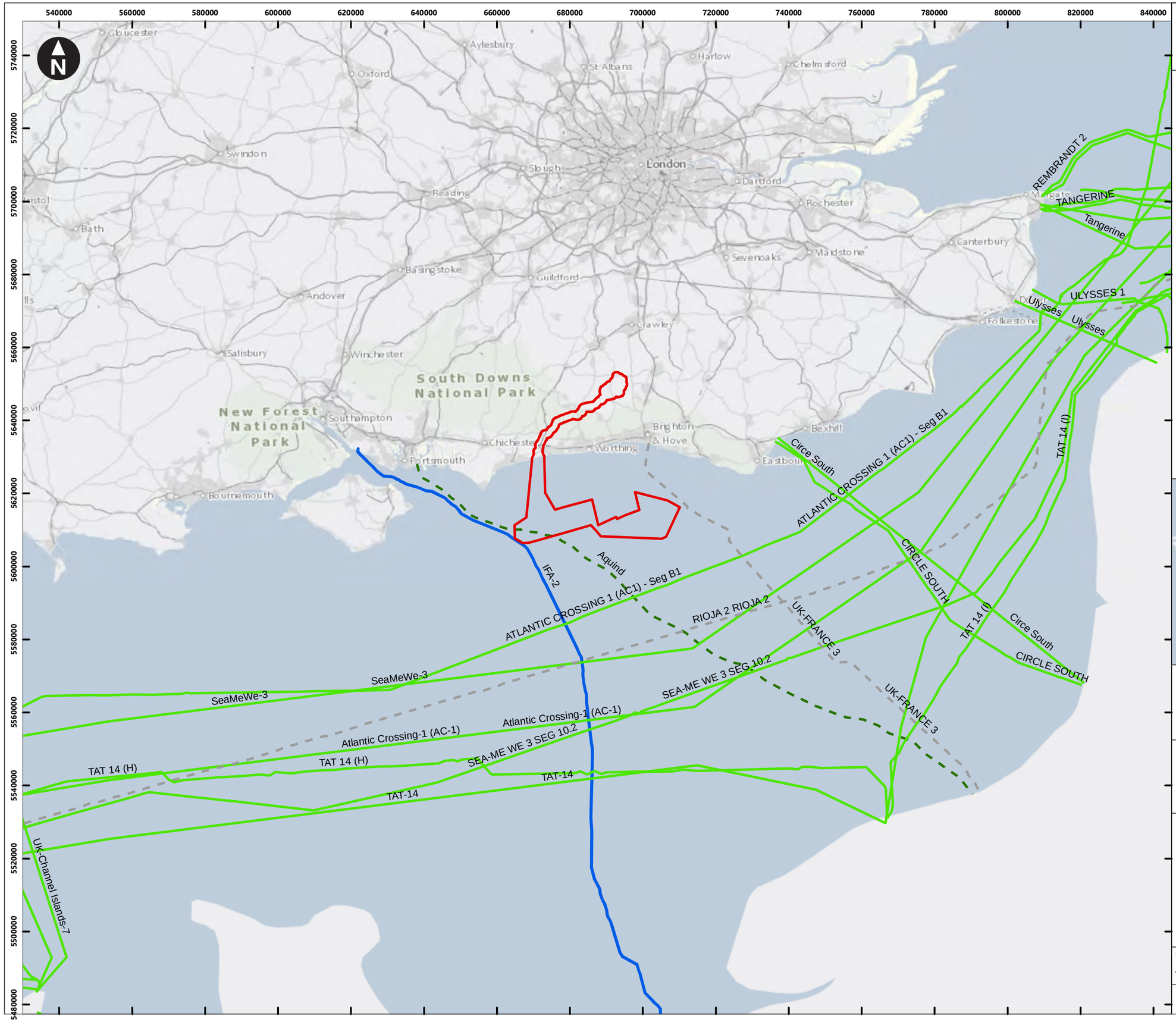
5.3.30 As mentioned above in the offshore wind baseline, (see **paragraph 5.3.21**) the existing Rampion 1 project export cable runs from the north of the study area to the coast. This is currently owned by Rampion Offshore Wind Limited, however it is anticipated that ownership will pass to an Offshore Transmission Operator later in 2020. It should be noted that this is approximately 15km to the East of the Rampion 2 export cable search area and crossing agreements will be made with the existing offshore transmission owners (OFTO).

5.3.31 In addition, there are two further cables that are planned and proposed, these are:

- The England-France High-Voltage Direct Current (HVDC) interconnector, 'Interconnexion France-Angleterre, IFA2' (planned); and
- The England-France HVDC interconnector, 'Aquind' (proposed).

5.3.32 The England-France HVDC interconnector, 'Interconnexion France-Angleterre, IFA2' runs approximately 300m to the west of the Proposed Development. It is planned to connect landfalls at the Solent (UK) and Caen (France) and is due to be commissioned and operating by the end of 2020.

5.3.33 There is also a proposed cable, which is the interconnector running between the UK and France and was accepted for examination in December 2019. This is the 'Aquind' HVDC interconnector (see **Figure 5.3.5**), connecting France (near Dieppe) and the UK (Portsmouth) (AQUIND Limited, 2017), and is expected to receive a decision on the application in late 2020. If this is accepted it will run through the west of the Proposed Development. The potential impacts of which will be assessed and reviewed as appropriate.



Key

- Scoping Boundary
- Active cables
- Planned cable
- Proposed cable
- Disused cables

Kilometres

0 5 10 20 30 40

1:1,000,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.5 Subsea Cables

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-14-0005				1.2
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 17/06/2020	Status: FINAL

Recreational boating and sailing

5.3.34 There are a number of inshore sailing clubs and organisations in the vicinity of the search area operating primarily from Littlehampton, Worthing, Lancing, Shoreham, Hove and Brighton. A number of sailing schools and other training establishments also exist along this stretch of coastline. **Section 5.10: Shipping and navigation**, discusses further the impacts on recreational boating and sailing.

5.3.35 The area is popular for dinghy sailing racing (which is undertaken from the various sailing clubs above, as well as independently from beaches and harbours) and during the summer months in particular, windsurfing, jet-skis, water skiing and small recreational motorboats are launched from the beaches along the coast. However, the majority of these recreational activities occur well inshore. It should be noted that there are two yacht races from England to France, one of which passes close to the existing Rampion 1 project.

5.3.36 There are a number of cruising routes to the west of the study area, these go along the coast (East – West) and across the Channel (in a North – South direction).

Diving and watersports

5.3.37 The nearshore coastal area is used for a variety of activities, from recreational diving to a range of water sports, for the most part due to its proximity to a large population and good access. Impacts on seaside tourism are discussed further in **Section 5.15: Socio-economics**.

5.3.38 Diving is extremely popular off of the Sussex coast (**Figure 5.3.6** presents dive sites used by SeaSearch users (SeaSearch, 2019)), taking place mostly in the summer months. There is a Sussex diving club, based in Brighton Marina which operates dives on two main features; wrecks and reefs (Sussex Diving Club, 2020). It is understood that there are a large number of varied wrecks to choose from within the Sussex area, thus making Sussex extremely popular for all grades of diver (Channel Diving, 2020). Meanwhile there is another dive club based in Brighton Marina who offer diving trips to wrecks, but also offer boat trips to the existing Rampion 1 project (Channel Diving, 2020). There are a number of other important dive centres and schools in close vicinity such as; Shoreham, Lacing, Portslade, Worthing and Selsey. The environmental measures outlined within **Table 5.2.2** include a number of measures which will be implemented in order to protect the safety of divers.

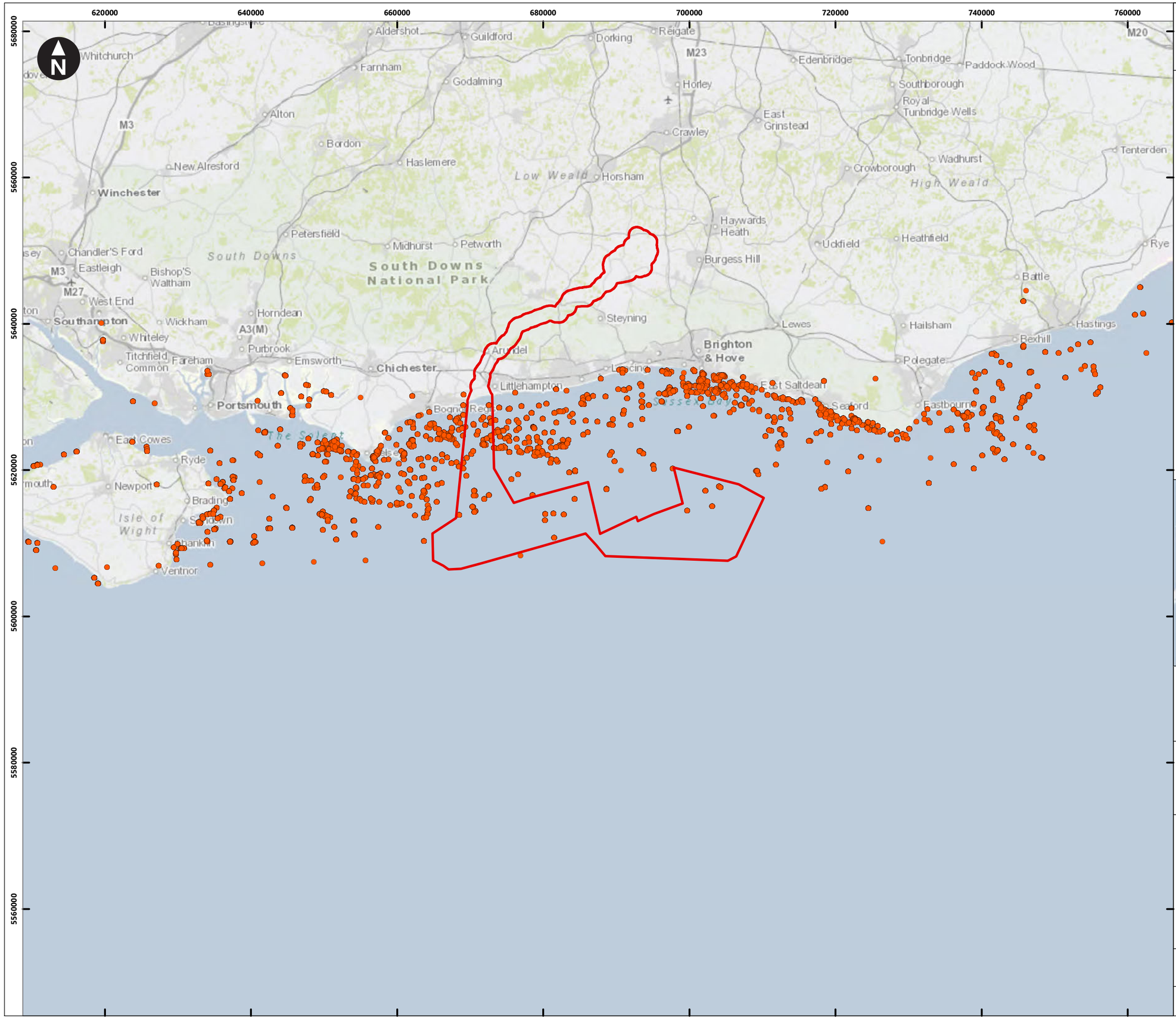
5.3.39 Surfing is highly popular along the English south coast, despite the wave regime along this section of coast being described as of relatively low quality and low consistency (Surfers Against Sewage (SAS), 2010), to those that participate in wave-related sports (stand up paddle boarding, kite surfing, wind surfing and kayaking) these inshore areas are of high value. Surfing along the Sussex coast is most popular during the summer months, with the peak surf conditions associated with the late summer and autumn months.

Recreational fishing and seaweed farming

5.3.40 Along the Sussex coast there are significant areas for recreational sea angling, due to the broad diversity of species, easy access and shallow waters. Shore angling occurs all along the Sussex coast from piers, marinas, beaches and estuaries (Sussex Inshore Fisheries and Conservation Authority (IFCA), 2020). However, Littlehampton beach itself has not been identified as a favourable fishing location (Wheretoseafish, 2015).

5.3.41 Boat-based angling is extremely popular on the Sussex coast, with a number of businesses offering charter fishing trips from harbours and marinas within the study area. **Section 5.10: Shipping and navigation** further discusses the impacts on recreational boating.

5.3.42 Spearfishing is also popular within the study area and is well established with its own spear fishing club Sussex Spearfishing Club (British Spearfishing Association, 2013).



Seasearch Marine Surveys in England (2018), accessed through NBN Atlas website

Key

- Scoping Boundary
- Seasearch dive sites (2019)

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.3.6 Recreational Diving Sites

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-14-0006	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	22/05/2020	FINAL

Basis for scoping assessment

5.3.43 The scoping assessment for OMU is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the array will consist of up to 116 WTGs, installed on monopile or jackets using percussive piling, or on suction bucket foundations which would require seabed clearance;
- there will be up to three offshore substations, installed on monopile of jacket type foundations using percussive piling;
- inter-array cables and export cables will be installed via either ploughing, jetting, trenching or post lay burial techniques;
- scour protection and cable protection may be required around the base of some or all foundations;
- Inter-array and export cables will be buried where possible, with a target burial depth of around 1m;
- the operational lifetime of Rampion 2 is assumed to be approximately 30 years; and
- decommissioning activities are assumed for the purposes of assessment to be completed in the reverse order of construction at the end of the wind farm's operational life.

Embedded environmental measures

5.3.44 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on OMU receptors and assets (see **Table 5.3.4**). These will evolve over the development process as the EIA progresses in response to consultation and potentially from provision of further data. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken in order to meet existing legislation requirements.

5.3.45 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.3.4 Relevant other marine users embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-41	The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	DCO requirements or DML conditions.
C-44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML conditions.
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins). The undertaker must ensure that a local notice to mariners is issued at least 14 days prior to the commencement of the authorised project or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant location.	DCO requirements or DML conditions.
C-50	Crossing and proximity agreements with known existing pipeline and cables operators will be sought.	DCO requirements or DML conditions.
C-51	A Vessel Management Plan (VMP) will be developed pre-construction.	DCO requirements or DML conditions.
C-56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or	Electricity application procedures (Section 95 of Energy Act 2004)

ID	Environmental measure proposed	How the environmental measures will be secured
	cables, extinguished navigation lights or other unmarked hazards.	
C-99	The risk of primary (life-threatening physical injury, or fatality) or secondary (non-life-threatening damage) injury to humans will be managed by recommending an advisory exclusion zone around all piling operations within which no-one (including construction personnel) is recommended to enter the water.	DCO requirements or DML conditions.
C-100	The soft-start programme will be determined in discussion with the Diving Liaison Officer. Consideration will be given to the potential for divers to be in the water outside of the advisory exclusion zone at the start of pile driving. This consideration will also include diving activities that could result in divers drifting into the advisory exclusion zone as part of their dive (i.e. tide and wind conditions will be assessed as part of the programme).	DCO requirements or DML conditions.
C-101	To limit potential exposure to hazardous levels of underwater noise, a comprehensive awareness and communications strategy (a Diver Communication Plan) will be developed by RED in agreement with regulatory authorities to notify the diving/spearfishing community of the timing and duration of proposed works. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat operators, Coast Guard, and facilities within jetties and marinas etc. The strategy will include widely publicising (e.g. on the internet) details of the nature, location and timing of pile driving works and the extent of any relevant advisory exclusion zones. The 'startle' reaction to underwater noise is anticipated as being less likely to occur in divers / spearfishers who have prior knowledge of the possibility of piling noise occurring.	DCO requirements or DML conditions.

Likely significant effects

5.3.46 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.3.47 The likely significant effects on OMU are summarised in **Table 5.3.5**. The scoping assessment is based on a combination of the Rampion 2 project definition at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for OMU effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

5.3.48 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered, is presented after the table, supported by evidence base.

Table 5.3.5 Likely significant other marine users effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor(s)	Further data baseline requirements
Increased vessel traffic (Construction and Decommissioning)	C-46 C-51 C-56	Increased vessel movements associated with the construction of WTGs, platforms and the installation of offshore cables may interfere with other activities. However, it is not expected that vessel number will be significantly increased compared to the baseline, and all vessel movements will be managed through a VMP.	**Scoped in simple assessment**	**Scoped in** Aggregate extraction, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and watersports, recreational fishing and seaweed farming. **Scoped out** Oil and gas, other offshore energy, military activity and munitions.	RYA Boating data
Physical presence of infrastructure and temporary Exclusion areas (Construction, Operation and Decommissioning)	C-46 C-56	Physical presence of infrastructure and temporary exclusion areas (500m) associated with the construction of the WTGs, platforms, the installation of offshore cables and major component maintenance may interfere with other activities.	**Scoped in simple assessment**	**Scoped in** Aggregate Extraction, disposal sites, offshore wind, subsea cables and pipelines, recreational boating and sailing, diving and watersports, recreational fishing and seaweed farming. **Scoped out** Oil and gas, other offshore energy, military activity and munitions.	RYA Boating data
Temporary increase suspended sediments and deposition (Construction and Decommissioning)	N/A	Temporary increase in suspended sediments and deposition associated with seabed preparation, installation of offshore cables and drilling may increase sediment deposition on the assets of other marine users and may result in reduced water clarity for recreational users.	**Scoped in simple assessment**	**Scoped in** Aggregate extraction, disposal sites, offshore wind, subsea cables and pipelines, diving and watersports. **Scoped out** Oil and gas, other offshore energy, military activity and munitions, recreational boating and sailing, recreational fishing and seaweed farming.	N/A
Increased subsea noise (Construction and Decommissioning)	C-46 C-56 C-99 C-100 C-101	Temporary increase in subsea noise associated with the installation of foundations for the WTGs and offshore platforms may directly impact recreational users, as well as have indirect effects on recreational anglers resulting from effects on fish.	**Scoped in simple assessment**	**Scoped in** Diving and watersports, recreational fishing and seaweed farming. **Scoped out**	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor(s)	Further data baseline requirements
				Aggregate extraction, disposal sites, oil and gas, offshore wind, other offshore energy, military activity and munitions, subsea cables and pipelines, recreational boating and sailing.	
Alteration in wave energy direction and period (Operation)	N/A	Alteration in wave energy direction and period from the presence of offshore infrastructure could affect recreational users (for example. surfers, kite surfers). The impact is not expected to be significant but will be informed by conclusions of the coastal processes assessment.	**Scoped in simple assessment**	**Scoped in** Diving and watersports. **Scoped out** All other receptors.	Results of **Section 5.2: Coastal processes** to inform assessment

Impacts scoped out of assessment

5.3.49 There are a number of potential effects that have been scoped out from assessment, resulting from a conclusion of no potential for a likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of the planned works and the evidence on the potential for impact. The conclusions follow existing best practice, and each scoped out receptor is considered in turn below.

5.3.50 The potential for impacts to occur on oil and gas infrastructure through the proposed Rampion 2 lifetime has been scoped out from further assessment, this is due to the fact that there is no spatial overlap of the proposed development or ZOI with active oil and gas infrastructure at this time or planned.

5.3.51 All likely significant impacts associated with military activity have been scoped out of the assessment. The receptors discussed in this chapter (munitions disposal areas and PEXAs) have no existing or planned spatial overlap with the Proposed Development or in the close vicinity, and therefore there are no pathways for effects identified.

5.3.52 As described within the baseline conditions for other offshore energy, there is currently no spatial overlap, or planned overlap, between other offshore energy infrastructures (except offshore wind, considered separately) and the search area for the Proposed Development and therefore there are no pathways for effects identified.

Cumulative effects

5.3.53 It is likely that there will be cumulative effects requiring assessment due to the spatial scope of the Proposed Development and associated assessment. A list of developments requiring consideration for the assessment will be provided at PEIR.

5.3.54 Cumulative effects on OMU aspects resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.3.55 All impacts considered for the Proposed Development alone in **Table 5.3.5** above have the potential to act cumulatively with other plans and projects within the study area. Cumulative effects occur when there is both a temporal overlap, and a spatial overlap (or overlap of the ZOI) of activities from projects not part of the baseline environment (i.e. planned) or existing activities that have ongoing effects. Due to the close proximity of the Proposed Development and the existing Rampion 1 project, as well as several active aggregate extraction areas, it is likely that there will be potentially significant cumulative effects requiring assessment. Furthermore, given the lack of confidence at this stage surrounding the potential Round 4 offshore wind farms (the bidding area for which overlaps with the Proposed Development), there may well be new plans for offshore wind farms progressing in the coming years. Therefore, at PEIR, all impacts considered for the Proposed Development alone will also be considered cumulatively with other plans and projects.

Transboundary effects

5.3.56 The potential effects from construction, operation (including maintenance) and decommissioning on OMU receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

5.3.57 The proposed approach to the assessment for the OMU chapter is to undertake a desk-based study during the EIA. The following section provides further context regarding the consultation and engagement that will be undertaken to further inform the assessment.

5.3.58 During the EIA process, a number of additional data sources will be sought to further inform the assessment including for example, RYA route data, which has not yet been included within the Scoping Report. However, it has been identified that this data will be necessary for further assessment and this, coupled with targeted consultation with relevant groups and organisations, will ensure a clear understanding of issues and a robust basis for assessment as well as encompassing the most up to date information.

5.3.59 RED will undertake consultation with all relevant offshore developers, operators and marine users to ascertain any concerns relating to the Proposed Development. Consultation will be held with key stakeholders as necessary, as set out in **Section 4.3: Consultation and the evidence plan process**. Key consultees of relevance to the OMU Chapter include: the existing Rampion 1 project and OFTO, BMAPA, SeaSearch, RYA, and SAS. Consultee responses with regard to OMU, will be addressed, and the scope of the assessment modified accordingly in the PEIR and ES chapter.

5.3.60 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.4 Fish and shellfish ecology

Introduction

5.4.1 The fish and shellfish assessment will consider the potential likely significant effects on fish and shellfish receptors that may arise from the construction, and operation and decommissioning of the Proposed Development. This section describes the methodology to be used and how these likely significant effects will be assessed for the purpose of an EIA. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions across the study area, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.4.2 The fish and shellfish assessment interfaces with other relevant aspects and as such, should be considered alongside these; namely:

- **Section 5.2: Coastal processes;** changes to coastal processes have the potential to directly or indirectly impact fish and shellfish ecology receptors,

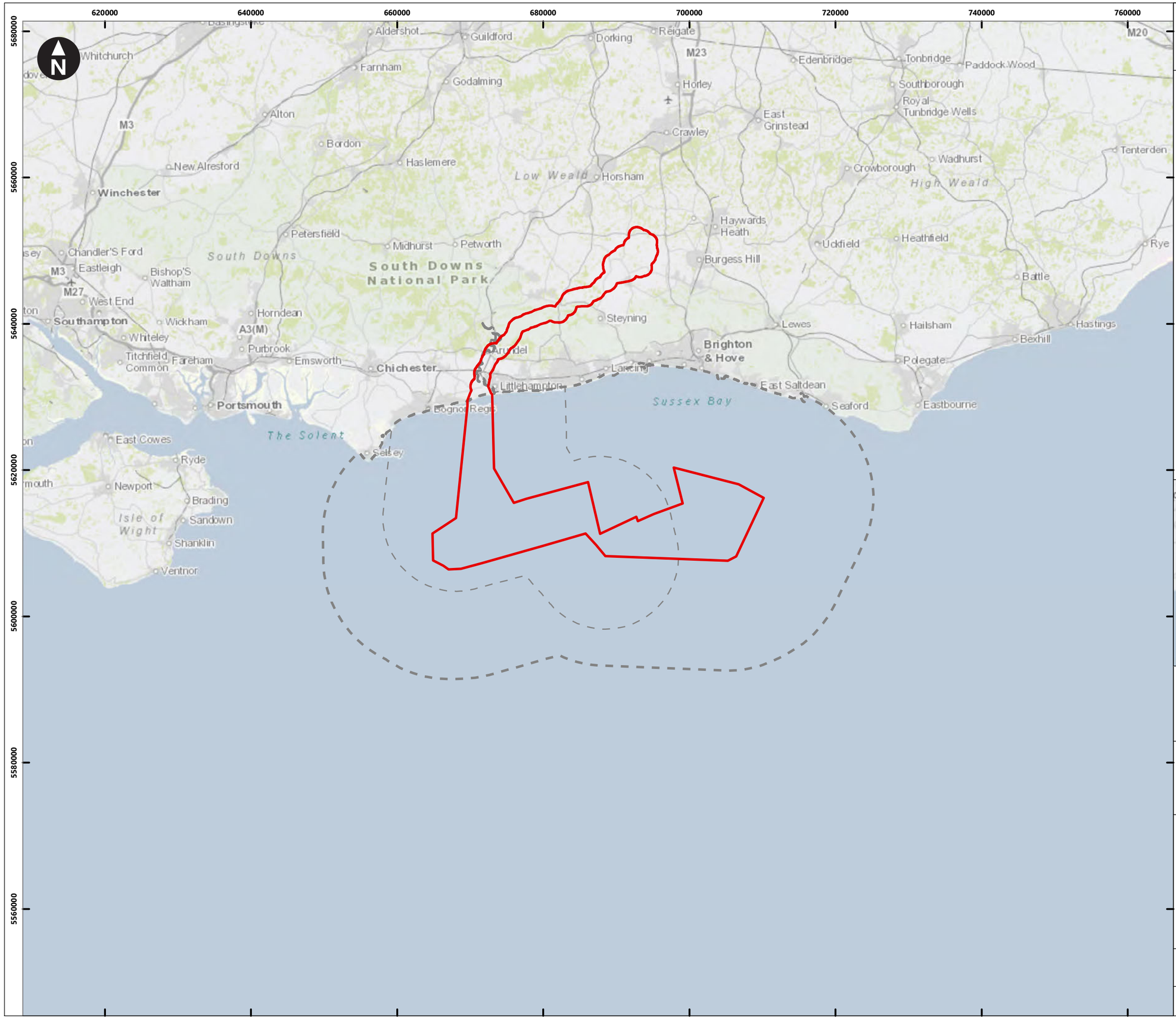
therefore the information from this assessment will be used to inform the fish and shellfish ecology assessment.

- **Section 5.5: Benthic subtidal and intertidal ecology**: benthic subtidal and intertidal ecology provides key information on subtidal habitats, used to inform the assessment on the location of key fish spawning grounds in the region. Therefore, the information will be used to inform the fish and shellfish ecology assessment.
- **Section 5.6: Commercial fisheries:** commercial fisheries includes fish species of commercial importance to the area, and therefore there is a degree of overlap between these aspects. They must therefore be informed and assessed in unison, where applicable. ; and
- informs **Section 5.11: Nature conservation:** nature conservation will include designations that relate to protected fish and shellfish ecology features and therefore must be considered together.

Study area

5.4.3 The study area for the fish and shellfish ecology assessment (**Figure 5.4.1**), is defined as the offshore Scoping Boundary together with the Zone of Influence (ZOI), which has been informed by the tidal excursion extent and coastal processes modelling undertaken to inform the existing Rampion 1 EIA (ABPmer, 2012). The ZOI buffer therefore encompasses the area over which suspended sediments may travel following disturbance as a result of Rampion 2 activities, extending a precautionary 15km around the array Scoping Boundary and 10km surrounding the offshore cable corridor Scoping Boundary. An adaptive study area for PEIR and ES will also be defined based on site specific underwater noise modelling to account for potential impacts from noise.

5.4.4 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore Scoping Boundary components, the identification of additional impact pathways and in response where appropriate to feedback from consultation. Additionally, information from the Physical Processes Technical Report and site-specific underwater noise modelling will inform the final study area, in order to incorporate the maximum distance suspended sediments disturbed by the Proposed Development might impact sensitive fish and shellfish species.



Data derived from RWE data © RWE 2020

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Key

- Scoping Boundary
- Fish and shellfish Study Area: 15km buffer of array areas and 10km of offshore cable corridor areas
- Fish and shellfish Study Area: 10km buffer of offshore cable corridor areas only

Coordinate System: WGS 84 UTM 30N

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.4.1 Fish and Shellfish Study Area

EIA Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O7-0001	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	NH	20/05/2020	FINAL

Assessment methodology

Introduction

5.4.5 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4: The EIA process**. However, whilst this has informed the approach that has been used in this fish and shellfish ecology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the fish and shellfish ecology assessment.

Desk Based Review

5.4.6 Existing site specific data from the existing Rampion 1 project and its pre-construction surveys together with considerable wider studies within the region (as detailed in **Table 5.4.1** and **paragraph 5.4.18 *et seq.***) are considered sufficient in describing the fish and shellfish resource within the Rampion 2 study area for the purposes of undertaking an EIA, and therefore, we do not propose to undertake any additional fish or shellfish surveys.

5.4.7 Geophysical survey data will be used where available to inform the likely location of black bream (*Spondyliosoma cantharus*) nesting areas; noting that there are a number of regional datasets already identified which focus specifically on the distribution of black bream nests within the ZOI of Rampion 2.

5.4.8 These existing data sources will be reviewed, along with information derived from other data sources, including International Council for the Exploration of the Sea (ICES) trawl datasets and species distribution maps, the International Herring Larvae Surveys (IHLS, 1967-2019), Marine Management Organisation (MMO) fisheries landings data for species of commercial importance to the region, and relevant species-specific research. This information will be further supplemented by findings of industry wide studies and relevant information obtained through consultation with the Sussex Inshore Fisheries & Conservation Authority (IFCA).

5.4.9 Site specific particle size analysis (PSA) data collected for the benthic ecology assessment will also be used to estimate the distribution of suitable spawning substrates within the study area for demersal spawners (for example black bream, and sandeel). The fish and shellfish ecology assessment will also be informed by noise modelling, and coastal processes modelling.

Guidance

5.4.10 The assessment of fish and shellfish receptors will comply with the following guidance documents where they are specific to this aspect:

- Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document (IEEM, 2010);
- Guidance note for EIA in respect of FEPA and CPA requirements (Cefas *et al*., 2004);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Judd, 2012); and

- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008).

5.4.11 In accordance with the Cefas *et al*., (2004) guidance the assessment phase of the EIA will consider the following aspects of the fish and shellfish resource in the study area:

- spawning grounds;
- nursery grounds;
- feeding grounds;
- overwintering areas for crustaceans; and
- migration routes.

Approach

5.4.12 To enable the potential impact of the Proposed Development to be assessed, a description of the existing fish and shellfish communities, focusing particularly on any areas or features of conservation interest, will be produced. Potential impacts that may occur on relevant fish and shellfish receptors or associated physical habitat as a result of the planned construction, operation and decommissioning of Rampion 2 will then be identified, and an assessment undertaken using a precautionary approach.

5.4.13 The precautionary approach will be defined in accordance with the design envelope approach; the geographic footprint, the foundations proposed, and the piling hammer energies will be key considerations in defining the maximum design scenarios for fish and shellfish receptors. Following this, the likely significant effects on receptors from the maximum design scenarios will be described and assessed, and where necessary, measures will be proposed to mitigate the impacts.

5.4.14 The assessment of potential impacts on fish and shellfish receptor will take into account the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. The sensitivity of difference receptors will also be considered as part of the impact assessment. The sensitivity assessment of the species will take into account the current status of the species, and its importance (locally, regionally, nationally or internationally).

5.4.15 Cumulative effects will be assessed by taking into consideration any other relevant developments, proposed or existing, that are in the vicinity of the development zone and which have the potential to affect the same receptors. Where projects are expected to be completed prior to the construction of Rampion 2, and the effects of these projects are fully determined and captured within the baseline characterisation for Rampion 1, the effects arising from the developments will be considered as part of the baseline and may also be considered as part of the construction and operational cumulative assessment. Projects forming part of the dynamic baseline, and those included in the cumulative assessment will be clearly identified in the ES.

Baseline conditions

Data sources

5.4.16 **Table 5.4.1** below sets out the key sources of data that have informed the fish and shellfish ecology scoping assessment.

5.4.17 It is important to note that at this stage, the information sources, guidelines, assessment methods and reports applied through this section, may be supplemented and / or updated where appropriate for assessments at the PEIR and ES stages of the DCO Application. Furthermore, the fish and shellfish evidence base is constantly expanding with new information becoming available regularly. RED will ensure to stay abreast of new evidence and will consider its usage where appropriate, as necessary.

Table 5.4.1 Key sources of fish and shellfish ecology data

Source	Date	Summary	Coverage of study area
Fisheries Sensitivity Maps in British Waters (Coull et al, 1998)	1998	Fisheries sensitivity maps showing spawning and nursery areas of commercially important fish and shellfish species.	Coverage of UK waters.
Spawning and nursery grounds of selected fish species in UK waters (Ellis et al, 2010)	2010	Maps indicating the main spawning and nursery grounds for 14 commercially important species.	Coverage of UK waters.
Modelled distributions of ten demersal elasmobranchs of the eastern English Channel in relation to the environment (Martin et al, 2012)	2012	Modelled distributions of elasmobranch populations within the eastern English Channel.	Coverage across the eastern English Channel.
Distribution of skates and sharks in the North Sea: 112 years of change (Sguotti et al, 2016)	2016	Distributions of elasmobranch populations in the North Sea.	Coverage of the North Sea.
Assessing the status of demersal elasmobranchs in	2005	Status of elasmobranch populations in UK waters.	Coverage of UK waters.

Source	Date	Summary	Coverage of study area
UK waters: a review (Ellis et al, 2005)			
The International Herring Larvae Surveys (IHLS) (ICES, 1967-2019)	1967-2019	Herring larvae surveys conducted in the North Sea and adjacent areas, to provide quantitative estimates of herring larval abundance, used as a relative index of changes of the herring spawning-stock biomass.	Coverage across the North Sea and English Channel.
UK sea fisheries annual statistics report (MMO, 2018)	2018	Information on landings of the UK fishing fleet, and the status of commercial fish stocks.	Full coverage of the study area.
Rampion OWF Environmental Statement (e.on 2012)	2012	Site specific fish and shellfish surveys undertaken to inform the existing Rampion 1.	Site specific data across the existing Rampion 1.
Rampion OWF Pre-construction Fish and Shellfish Monitoring Report (Natural Power, 2017)	2017	Site specific pre-construction fish and shellfish surveys undertaken to inform the existing Rampion 1.	Site specific data across the existing Rampion 1.
North Owers Black Bream Monitoring report (GoBe, 2015)	2015	Black Bream monitoring report for North Owers marine aggregate extraction area.	Regional context of black bream populations.
Area 435/396, Area 453 and Area 488 Annual Monitoring Reports (EMU, 2009; Fugro EMU Ltd. 2013 and 2014).	2009	Environmental monitoring reports for marine aggregate extraction areas (Area 435/396, Area 453 and Area 488) within the region.	Regional context.
A study of the Black Bream Spawning Ground at Littlehampton (Southern Science Ltd., 1995)	1995	Black bream spawning ground monitoring study.	Regional context.

Source	Date	Summary	Coverage of study area
Black Seabream tagging survey (Sussex IFCA, 2016)	2016 (if data available)	Black bream monitoring data from tagging surveys will be used if the data are available and have sufficient confidence to inform the EIA.	Regional context.
Black bream in the English Channel off the Sussex coast (EMU, 2012)	2012	Monitoring report of black bream in the English Channel.	Regional context.
ICES Fish Map (ICES, 2006)	2006	North Sea fish species distribution maps.	Coverage of UK waters.
Offshore beam trawl surveys (ICES, 1985-2019)	1985-2019	Offshore beam trawl surveys providing species distribution data.	Coverage across the southern North Sea and English Channel.
North Sea International Bottom Trawl Survey (ICES, 1965-2020)	1965-2020	Bottom trawl surveys providing species distribution data across the North Sea.	Coverage across the North Sea and English Channel.
Marine Aggregates Regional Environmental Assessment (MAREA) (EMU, 2010)	2010	Fisheries activity survey data, and sediment transport data across the English Channel.	Coverage across the English Channel.
Marine Aggregate Levy Sustainability Fund (MALSF) synthesis study in the central and eastern English Channel (James et al, 2011)	2011	Fisheries activity survey data, and sediment transport data across the English Channel.	Coverage across the English Channel.
Sussex Inshore Fisheries and Conservation Authority (IFCA)	N/A	Fisheries monitoring reports and research reports.	Regional context.

Source	Date	Summary	Coverage of study area
License areas 453 CEMEX UK Marine Ltd. (CMX) and 488 Tarmac Marine Ltd., Aggregate monitoring data.	2017-2019	Data covering seven survey boxes and two transects in and around the Kingmere MCZ to be purchased for ES.	Coverage in and around the Kingmere MCZ adjacent to cable route

Baseline characterisation

5.4.18 The following sections provide a brief characterisation of the fish and shellfish ecology in and around the Rampion 2 study area and on a broader scale across the English Channel where relevant.

5.4.19 A detailed literature review was undertaken to describe the use of the area by fish and shellfish species in relation to key life stages, spawning and juvenile behaviour and migratory pathways. The literature review was informed by the existing Rampion 1 project Environmental Statement (e.on, 2012), and broader surveys across the English Channel and its coastal waters.

5.4.20 Otter trawl surveys sampling demersal species undertaken to inform pre-construction fish and shellfish monitoring for Rampion 1 were dominated numerically by lesser spotted catshark (*Scyliorhinus canicular*), plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*) and thornback ray (*Raja clavata*), with smaller quantities of dab (*Limanda limanda*) and red gurnard (*Chelidonichthys cuculus*) also recorded. Seasonal variation in trawls was driven by increased abundances of dab, whiting, bib (*Trisopterus luscus*) and starry smooth hound (*Mustelus asterias*) captured during the May survey, and greater numbers of spotted ray (*Raja montagui*) and red gurnards captured during the September / October survey (e.on 2012).

5.4.21 Beam trawl surveys targeting epibenthic and demersal species were also undertaken as part of the existing Rampion 1 pre-construction monitoring. The beam trawl used a smaller mesh compared to the otter trawl, and was towed at a slower rate, allowing larger fish to avoid capture. This enabled the tow to focus on small or juvenile fish. The trawls were dominated numerically by lesser weaver (*Echiichthys vipera*), gobies (*Gobiidae sp*.), sole (*Solea solea*) and dragonet (*Callionymus lyra*). Seasonal variation within the beam trawl surveys was driven by dominance of sole during the May surveys, whereas in September thornback rays were captured in abundance. Variation in catches of invertebrates were attributed to larger catches of green sea urchin (*Psammechinus miliaris*), European squid (*Alloteuthis subulata*), and queen scallops (*Aequipecten opercularis*) in the September / October survey, and more brittle stars (Ophiuroidea spp.) in May (e.on 2012).

5.4.22 The results from the pre-construction monitoring of the existing Rampion 1 largely reflect surveys undertaken on a broader scale across the English Channel. ICES offshore beam trawl surveys in the English Channel were dominated in plaice,

European spider crab (*Maja squinado*), sole, poor cod (*Trisopterus minutus*), common dragonet (*Callionymus lyra*), thornback ray and lesser spotted catshark. Bottom trawls undertaken across the English Channel to inform the ICES International Bottom Trawl Surveys were dominated in whiting, European Squid, dab, herring, plaice, lesser spotted catshark, sprat (*Sprattus sprattus*) and poor cod (*Trisopterus minutus*) (Natural Power, 2017).

Spawning and nursery grounds

5.4.23 Information on spawning and nursery areas for fish species is based on data from Coull *et al*. (1998) and supported by data sources from Ellis *et al*. (2010). The following provides a narrative context of the spawning and nursery grounds which will be illustrated in full within the EIA; representative figures are illustrated in **Figure 5.4.2** Spawning Grounds for cod, herring, horse mackerel and lemon sole within the fish and shellfish study area

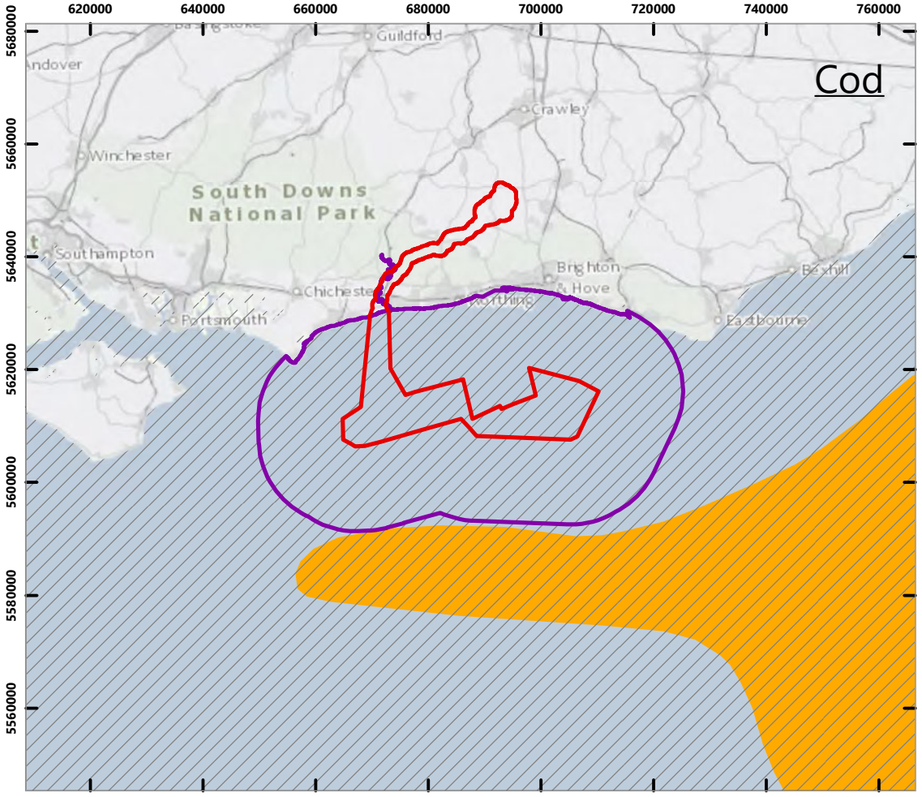
5.4.24 to **Figure 5.4.6** Spawning grounds for sprat, cod (*Gadus Morhua*) and sole overlap the full extent of the study area, and on a broader scale extend across much of the English Channel. The proposed offshore cable corridor lies within spawning grounds for lemon sole (*Microstomus kitt*), which stretch across the eastern English Channel and a large portion of the southern North Sea. Spawning grounds for plaice cross the proposed Rampion 2 array area and extend across the eastern English Channel and southern North Sea. Whiting spawning grounds also clip the eastern extent of the array area, with areas of spawning activity present across the English Channel and southern North Sea. A large herring (*Clupea harengus*) spawning ground lies 30km offshore of the study area, in the eastern English Channel. A large sandeel (*Ammodytes tobianus, Hyperoplus lanceolatus*) spawning ground clips the eastern extent of the study area lying approximately 13km from the array, in a broader context the spawning ground also stretches across the eastern English Channel and across much of the North Sea.

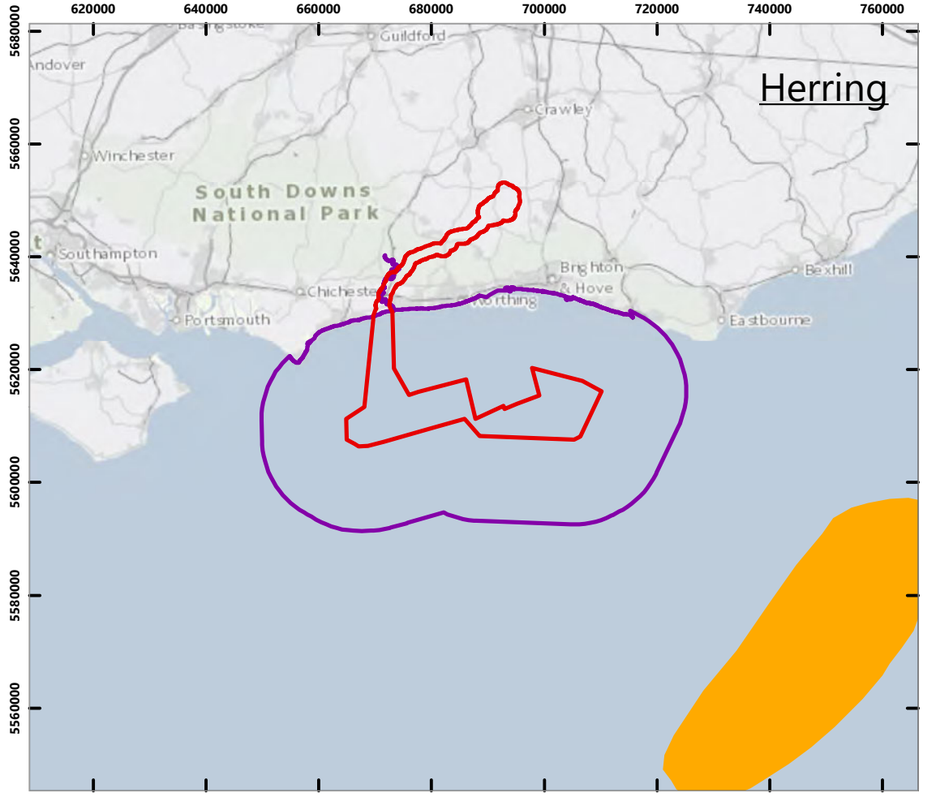
5.4.25 In a wider context, the study area for Rampion 2, has a spatially limited interaction with a small portion of the overall spawning sites for sprat, cod, sole, lemon sole, plaice, whiting, herring and sandeel. Black bream (*Spondyliosoma cantharus*) are also known to spawn in the eastern English Channel; spawning occurs in inshore areas where suitable substratum occurs. The nearest spawning ground to Rampion 2 lies along the 10m depth contour between Bognor and Worthing.

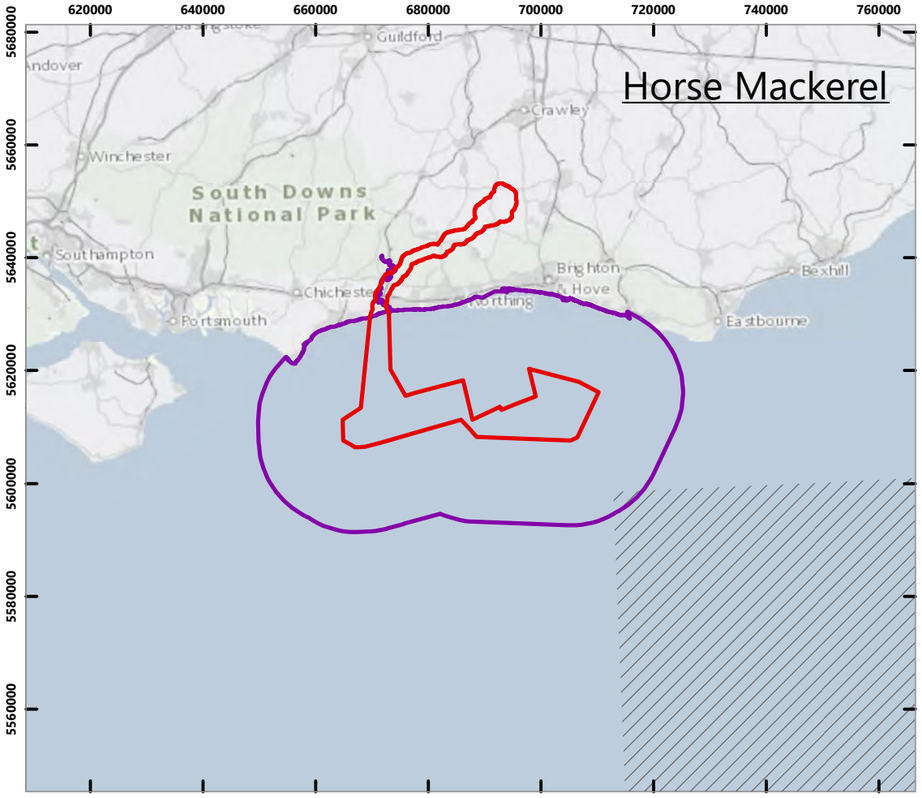
5.4.26 Nursery grounds for lemon sole overlap the proposed offshore cable corridor and array areas, extending across the eastern English Channel and along most UK coastlines. Nursery grounds for whiting cross the study area in the nearshore, and follow most of the UK coastlines, and cover most of the North Sea. Nursery areas for sandeel and mackerel (*Scomber scombrus*) both clip the eastern extent of the study area., approximately 12km, and 1.8km from the proposed array area respectively. Nursery grounds for both thornback ray and undulate ray also cross the offshore cable corridor and the array area, with both nursery grounds also extending along much of the Sussex coastline.

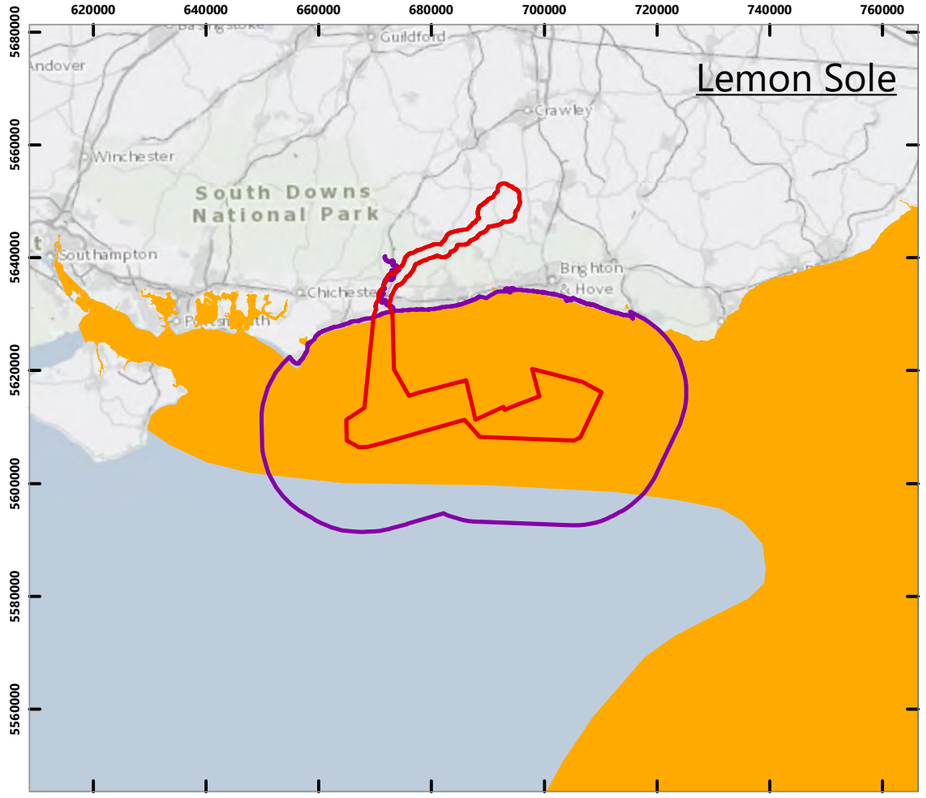
5.4.27 The key sensitive receptors with spawning or nursery grounds in the fish and shellfish study area comprise sandeel, herring, cod, black bream, sole and plaice; these species will be taken through for further consideration in the fish and

shellfish ecology Assessment. Black bream are considered sensitive to increased suspended sediment concentrations (SSC) and subsequent sediment deposition due to the demersal nature of their spawning behaviours. Herring, although a species that displays substrate dependant spawning behaviours, are not considered a concern for potential impacts to spawning grounds due to the localised nature of these impacts, and the distance of the nearest herring spawning ground to the proposed development (30km). Whilst sandeel also display demersal spawning behaviours, they are not considered sensitive to the effects of increased SSC and deposition; specifically the regional assessment for sandeels concluded that the effects of smothering of individuals through deposition from sediment plumes and sediment mobilisation would not result in significant effects in the Regional Cumulative Impact Assessments for sandeel (MarineSpace Ltd *et al*., 2013). In accordance to the Popper *et al*. (2014) noise sensitivity classifications for fish species, sandeel, herring, cod, black bream, sole and plaice are all considered sensitive to noise impacts and will therefore be taken into consideration in the Rampion 2 fish and shellfish assessment accordingly.





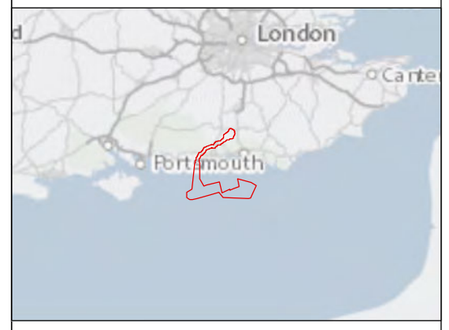




Contians data sourced from Coull et al. 1998; and Ellis et al. 2010

Key

- Scoping Boundary
- Study Area
- Spawning area Coull et al. 1998
- Spawning area Ellis et al. 2010



Kilometres

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Rampion Extension Development

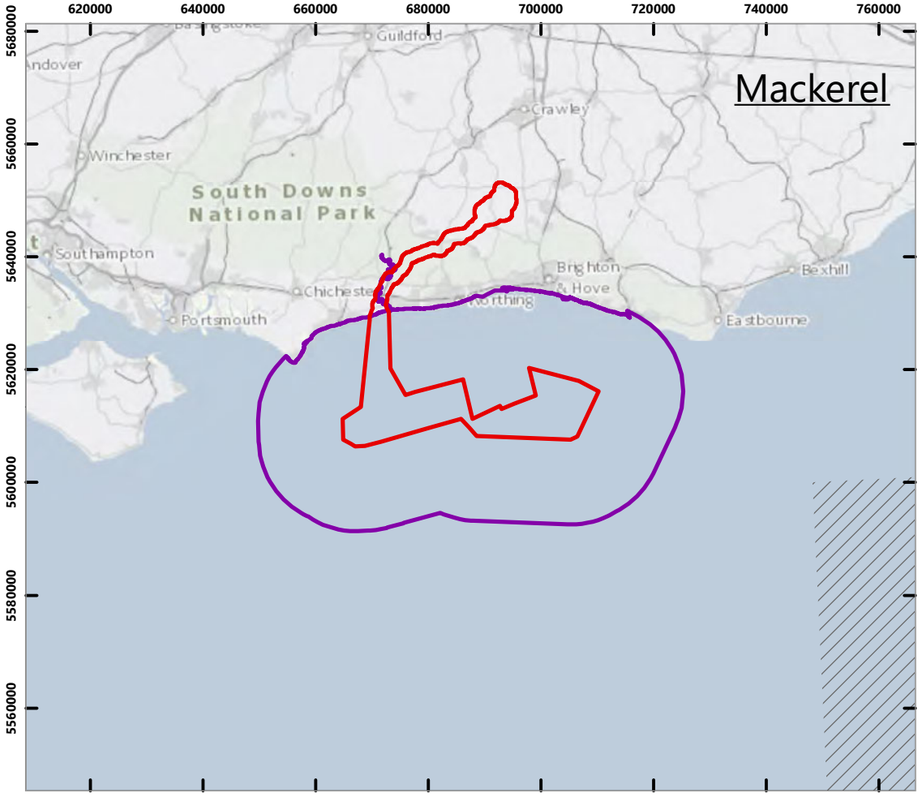
RWE

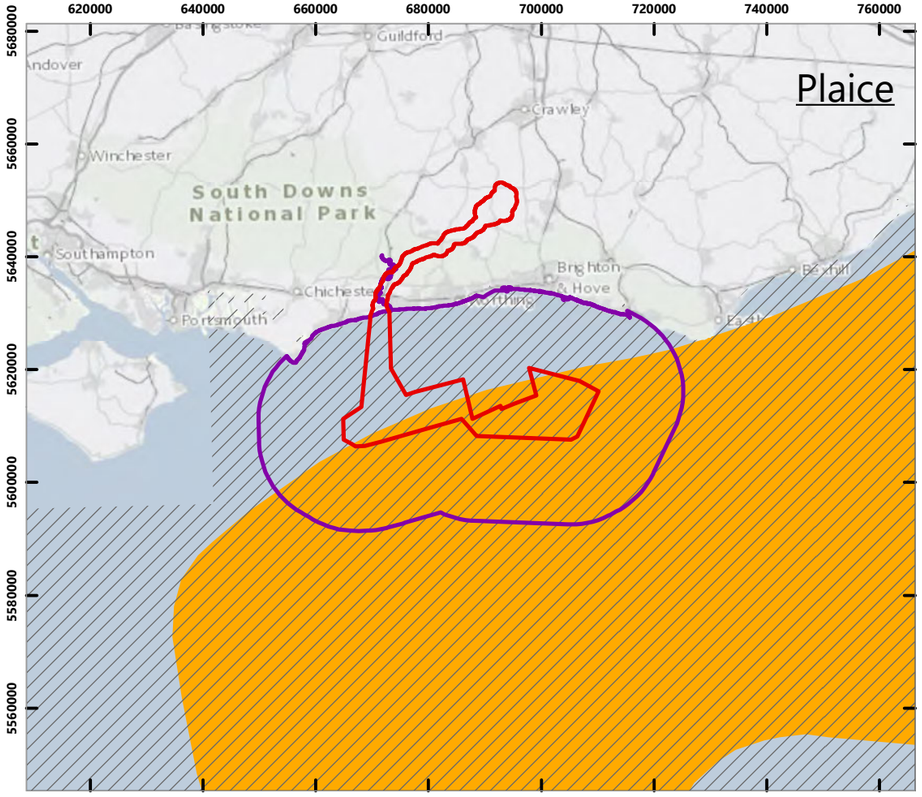
Rampion 2 Offshore Wind Farm

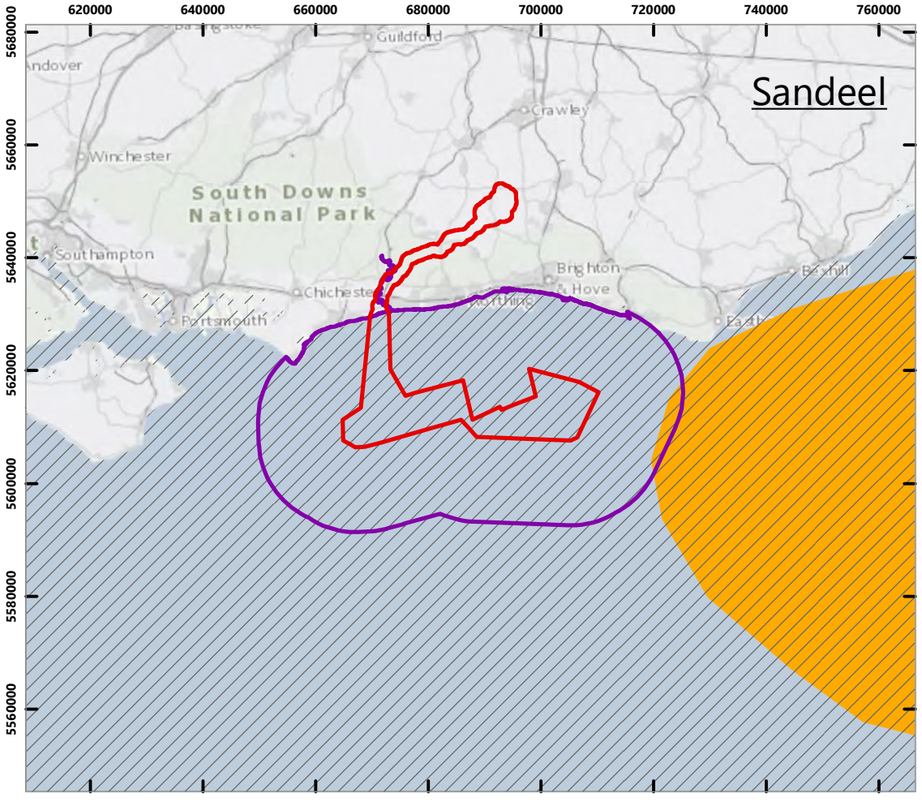
Figure 5.4.2 Spawning Grounds for Cod, Herring, Horse Mackerel and Lemon Sole

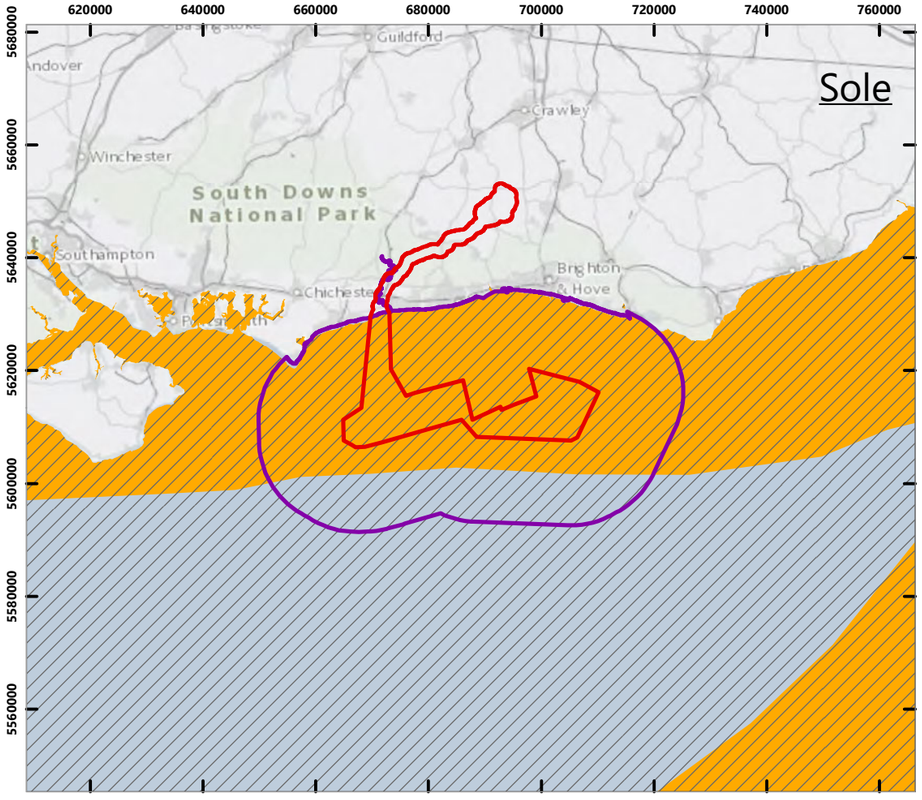
Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O7-0002				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL





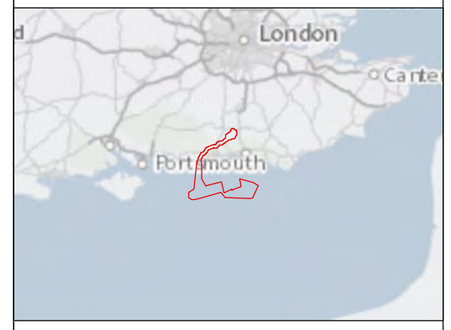




Contians data sourced from Coull et al. 1998; and Ellis et al. 2010

Key

- Scoping Boundary
- Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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Rampion Extension Development

RWE

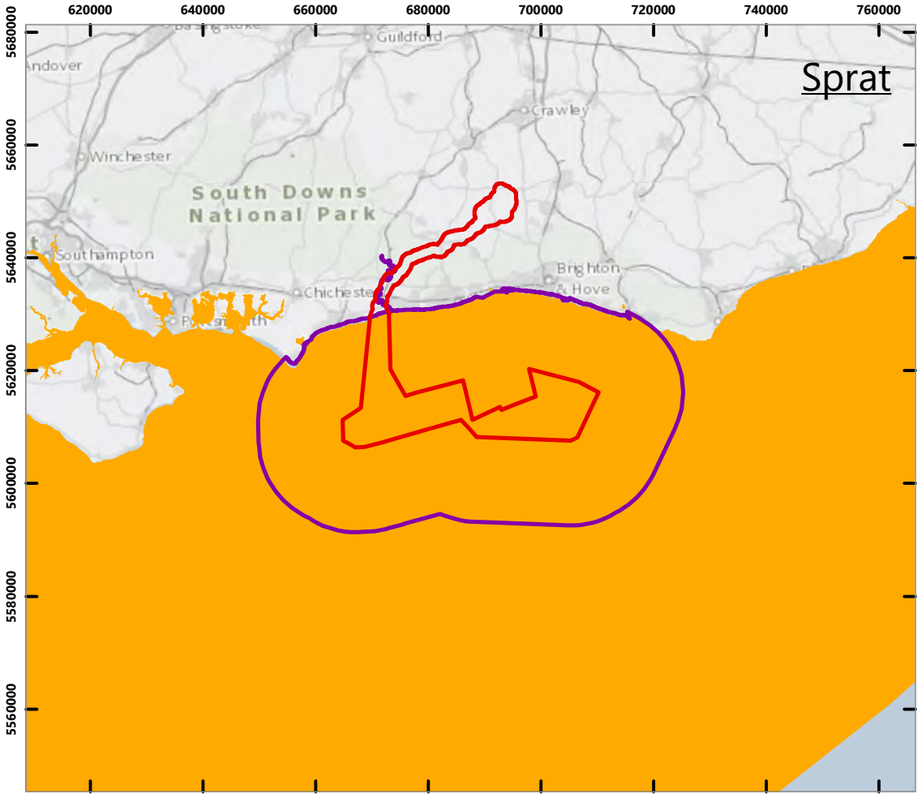
Rampion 2 Offshore Wind Farm

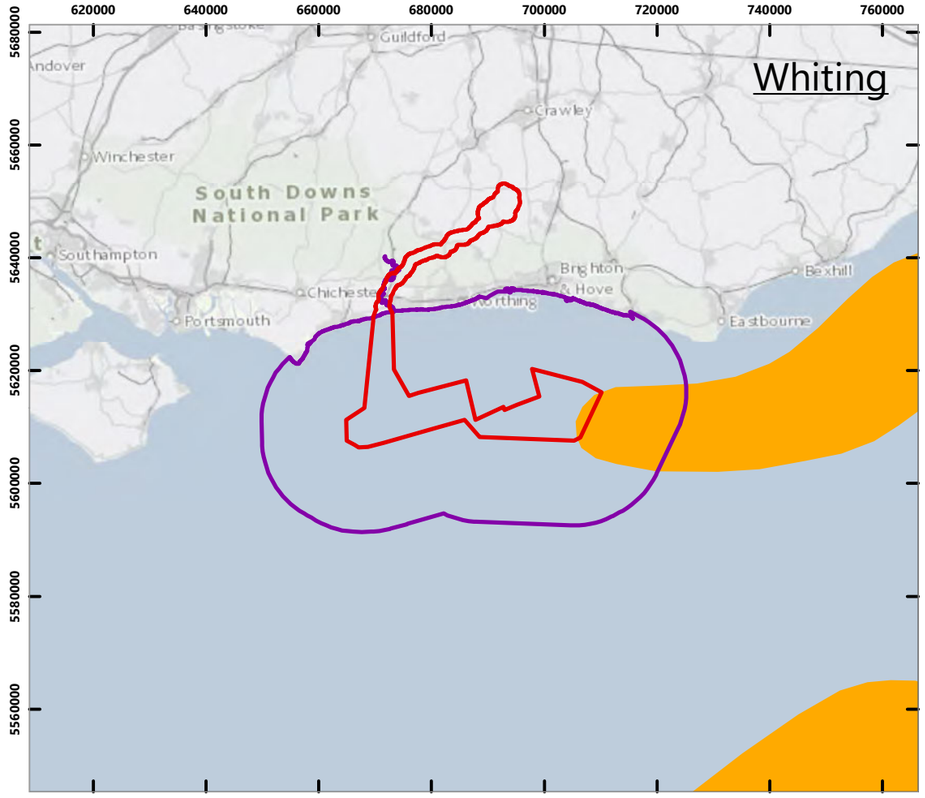
Figure 5.4.3 Spawning Grounds for Mackerel, Plaice, Sandeel and Sole

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O7-0003	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	22/05/2020	FINAL

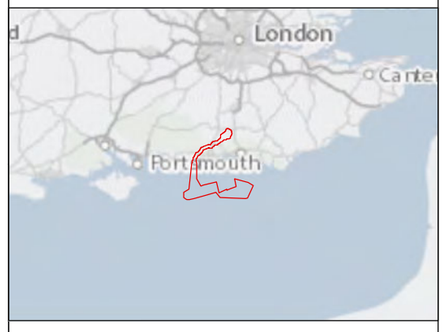




Contians data sourced from Coull et al. 1998; and Ellis et al. 2010

Key

- Scoping Boundary
- Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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Rampion Extension Development

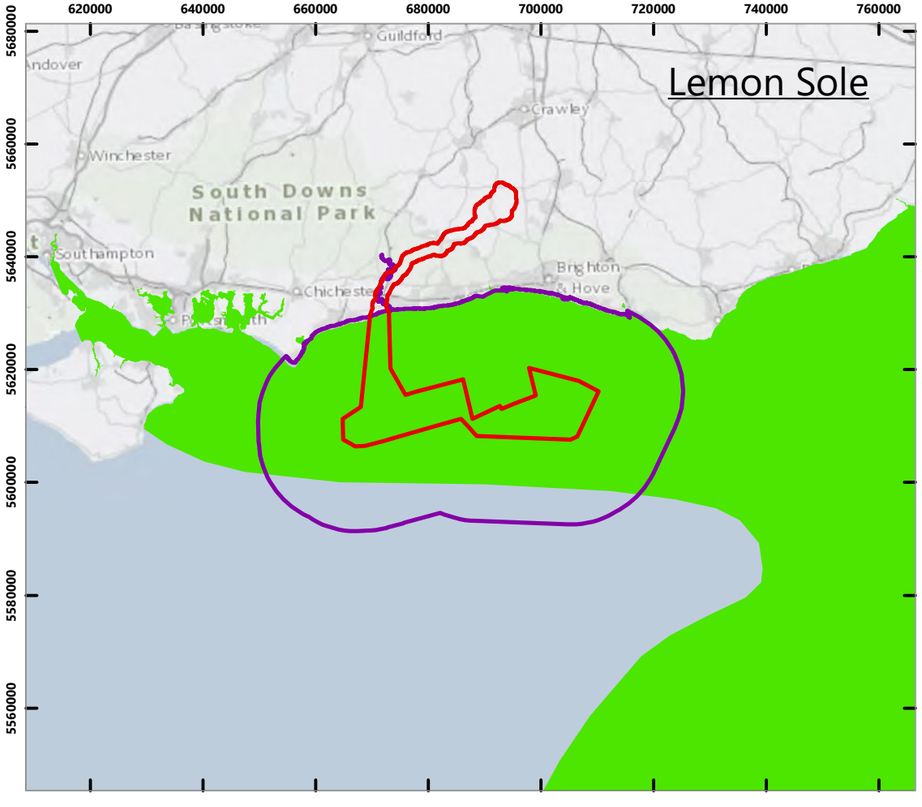
RWE

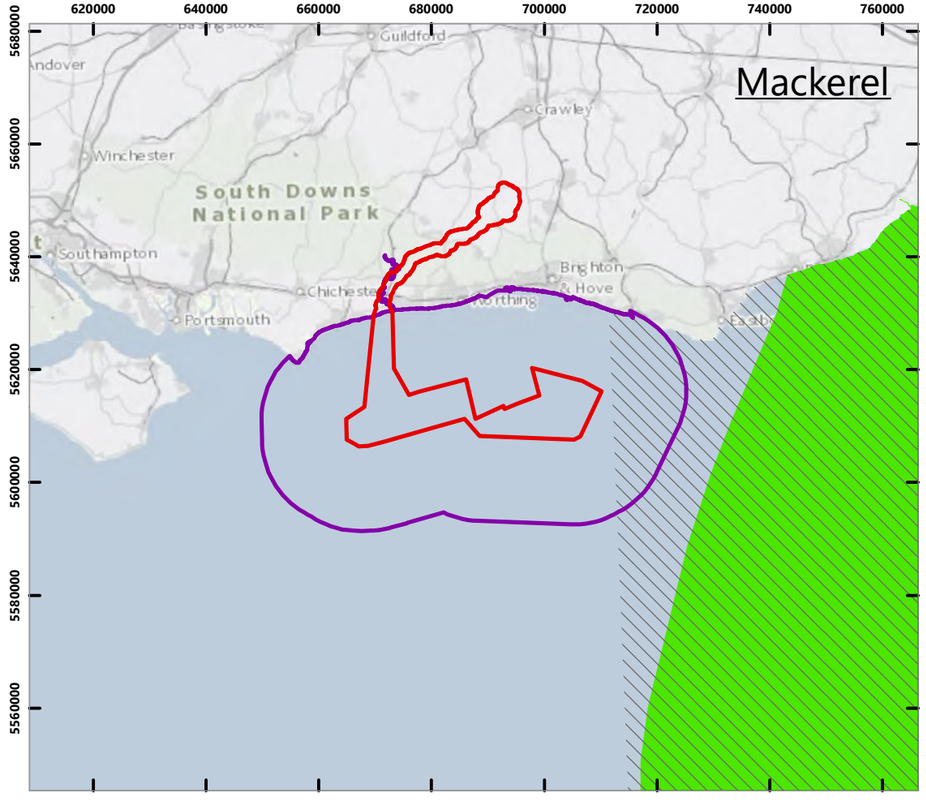
Rampion 2 Offshore Wind Farm

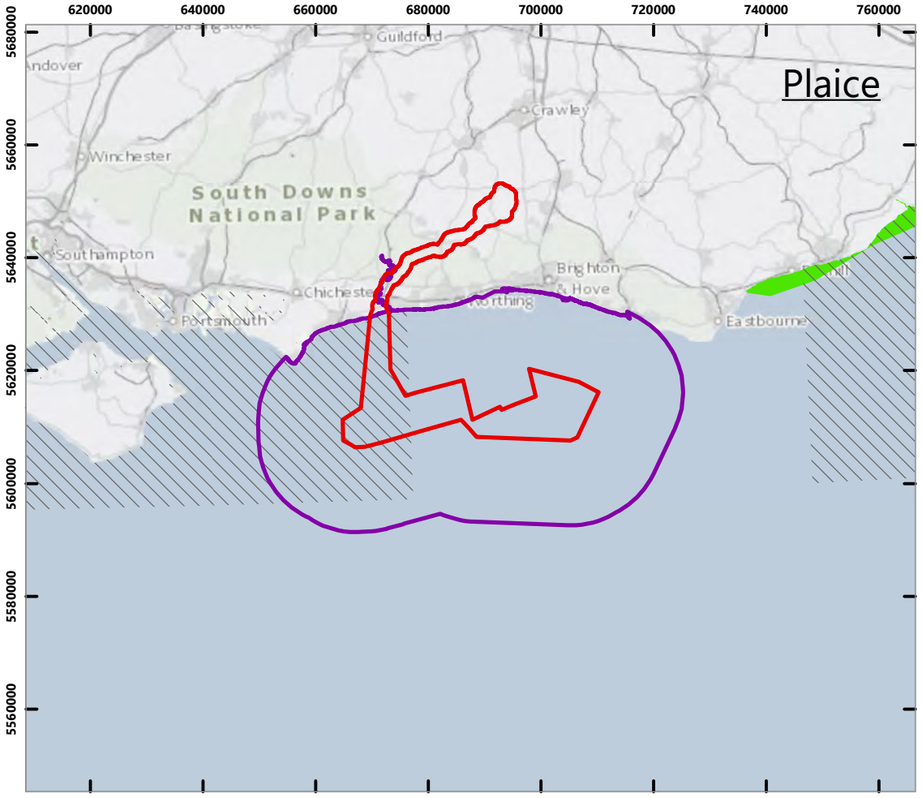
Figure 5.4.4 Spawning Grounds for Sprat and Whiting

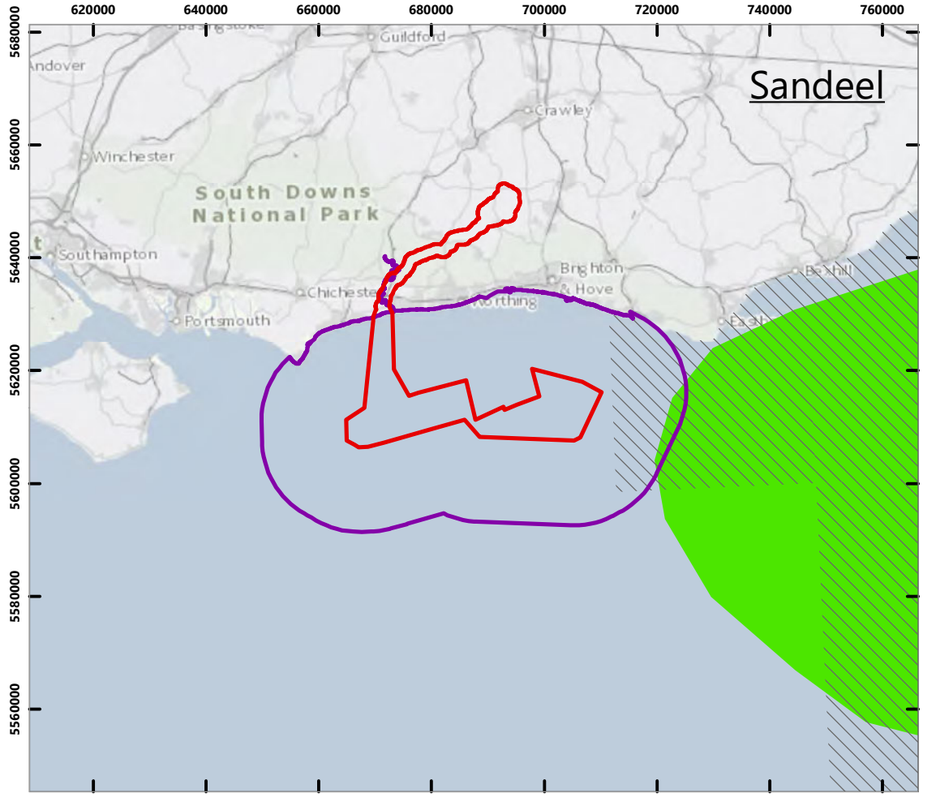
Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O7-0004				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL





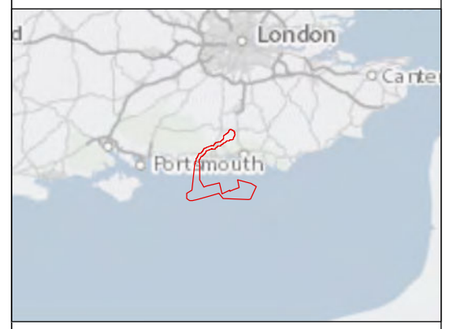




Contians data sourced from Coull et al. 1998; and Ellis et al. 2010

Key

- Scoping Boundary
- Study Area
- Nursery grounds Ellis et al. 2010
- Nursery grounds Coull et al. 1998



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Rampion Extension Development

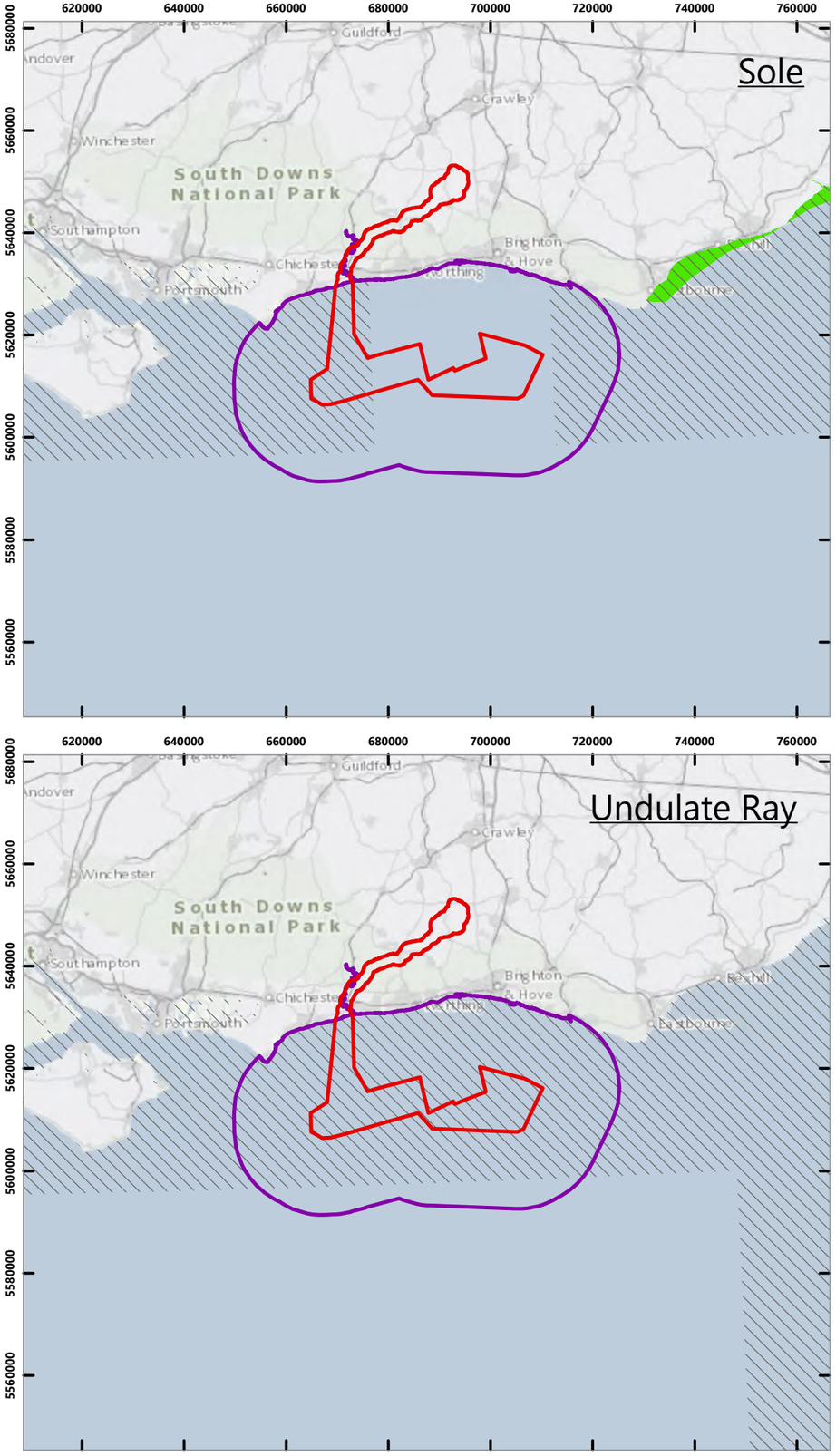
RWE

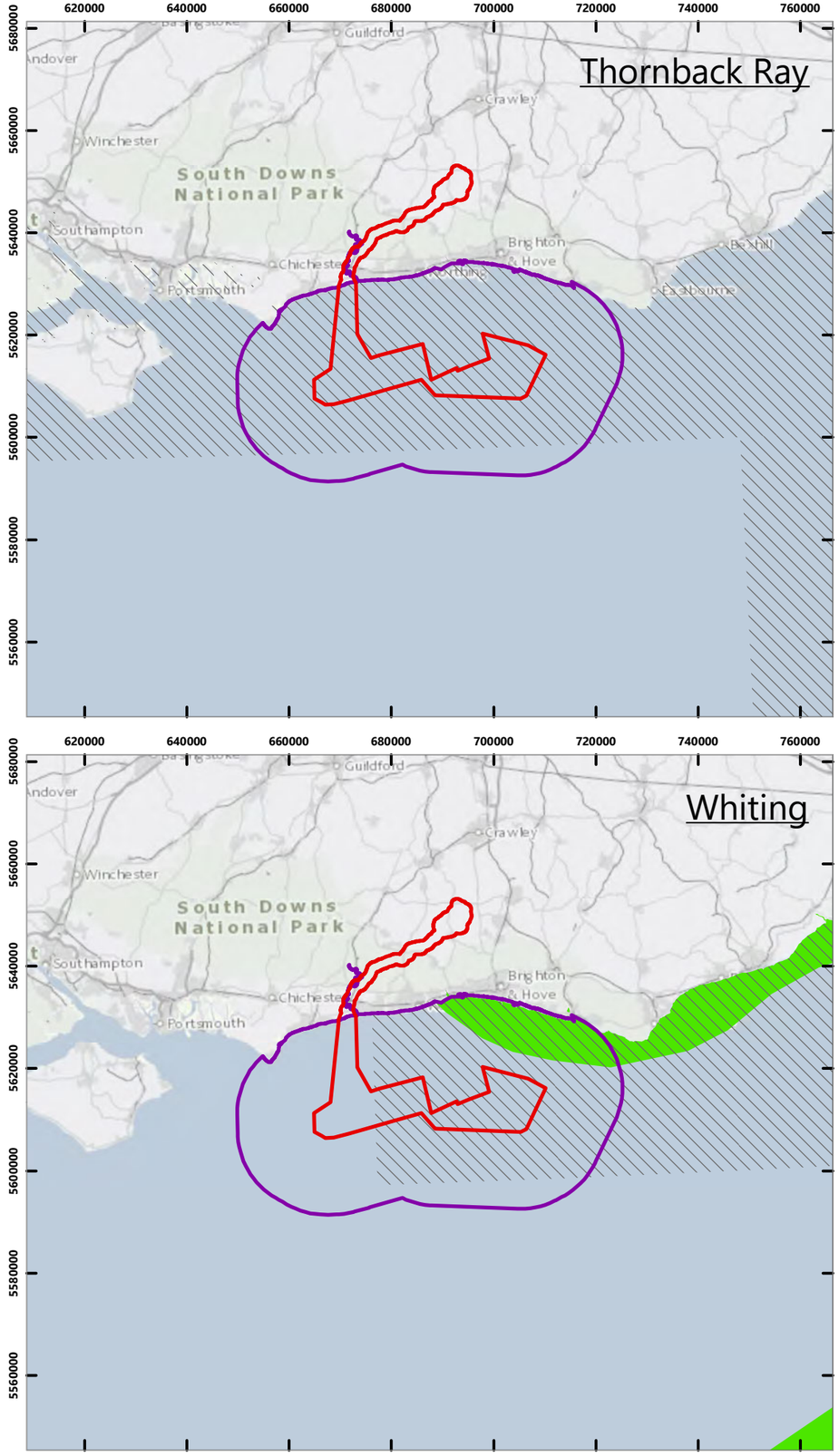
Rampion 2 Offshore Wind Farm

Figure 5.4.5 Nursery Grounds for Lemon Sole, Mackerel, Plaice and Sandeel

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O7-0006				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL

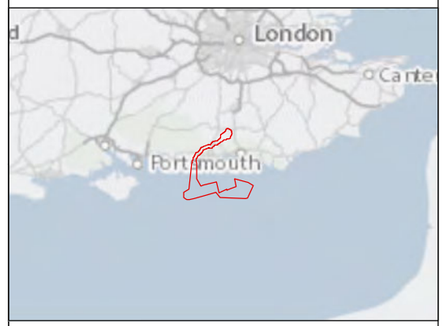




Contians data sourced from Coull et al. 1998; and Ellis et al. 2010

Key

- Scoping Boundary
- Study Area
- Nursery grounds Ellis et al. 2010
- Nursery grounds Coull et al. 1998



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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.4.6 Nursery Grounds for Sole, Thornback Ray, Undulate Ray and Whiting

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O7-0005	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	22/05/2020	FINAL

Species of commercial importance

5.4.28 Detailed information on species of commercial importance are provided in the Commercial Fisheries aspect of the Scoping Report (**Section 5.6**), which identifies whelk (*Buccinum undatum*), sole, horse mackerel (*Trachurus trachurus*), sea bass (*Dicentrarchus labrax*), lobster (*Homarus Gammarus*), scallop, cuttlefish (*Sepia officinalis*) and brown crab (*Cancer pagurus*) as species of commercial importance to the region.

5.4.29 Of these species, whelk, lobster, and scallop are considered to be potentially sensitive to the Proposed Development, based on their limited mobility (and therefore are considered unable to avoid potential disturbances). Cuttlefish are also considered to have the potential to be sensitive to noise impacts from percussive piling. These species will therefore be taken forward into the fish and shellfish assessment.

Species of conservation importance

5.4.30 Within the eastern English Channel region there are records of several marine and estuarine species protected under national, European and international legislation. Elasmobranch species that have been included as 'Priority Species' on the UK Biodiversity Action Plan (UK BAP) that have the potential to occur within the study area include undulate ray (*Raja undulata*), spurdog (*Squalus acanthias*), porbeagle shark (*Lamna nasus*), shortfin mako (*Isurus oxyrinchus*), basking shark (*Cetorhinus maximus*), tope (*Galeorhinus galeus*) and blue shark (*Prionace glauca*). Teleosts of conservation importance that have the potential to occur within study area include black bream, sea trout (*Salmo trutta trutta*), European eel (*Anguilla Anguilla*), smelt (*Atherina presbyter*), allis shad (*Alosa alosa*) and twaite shad (*A. fallax*). Both short snouted and spiny seahorses *(Hippocampus hippocampus, Hippocampus histrix*) are of conservation importance in UK waters. The species are regularly recorded in the English Channel, with the study area also being a potential overwintering area for both seahorse species. Of these species, black bream was recorded in high numbers in pre-construction otter trawl surveys conducted to inform the Rampion 1 baseline and is a feature of conservation importance for the Kingmere Marine Conservation Zone (MCZ).

5.4.31 On account of the conservation importance of these species to the region, all species listed above are considered to be sensitive receptors to the Rampion 2 development, and therefore potential impacts to these species from the proposed development will be taken into consideration in the Rampion 2 fish and shellfish ecology assessment. The potential likely significant effects on black bream as a designated feature of the Kingmere MCZ will be considered within the EIA, in the context of the EIA Regulations 2017, and in the MCZ assessment which will; accompany the EIA.

Designated sites

5.4.32 For this Scoping Report, a review has been undertaken to identify designated sites in the study area which are either designated for fish and shellfish interest or habitats / species which are dependent on or associated with fish or shellfish. The sites are presented in **Table 5.4.2** and shown in **Figure 5.4.8** below. It should be

noted that a separate HRA Screening report is being produced which will cover in more detail matters associated with European designations. On account of the presence of nature conservation designations within the study area, and the potential presence of features of interest of which the sites are designated for short-snouted seahorse, Native oyster (*Ostrea edulis*), blue mussel beds (*Mytilus edulis*) and black bream will be taken into consideration in the fish and shellfish assessment. The Beachy Head East MCZ and the Bembridge MCZ lie outside of the study area, and therefore the features of interest for these sites will not be included in the assessment.

Table 5.4.2 Marine nature conservation designations relevant to fish and shellfish ecology and Rampion 2

Site	Closest distance to Rampion 2	Features or description
Beachy Head West MCZ	13km from the array.	Short-snouted seahorse, Native oyster and Blue mussel beds
Beachy Head East MCZ	21.3km from the array	Short-snouted seahorse (*Hippocampus hippocampus*)
Kingmere MCZ	Lies adjacent to the offshore cable corridor.	Designated for black seabream
Selsey Bill and the Hounds MCZ	10km from the offshore cable corridor	Designated for Short-snouted seahorse
Bembridge MCZ	20.4km from the array	Designated for Short-snouted seahorse, Stalked jellyfish (*Calvadosia campanulate, Haliclystus species*) and Native oyster (*Ostrea edulis*).
Solent and Dorset Coast pSPA	1km from offshore cable corridor.	Potential designation for common tern, sandwich tern and little tern of which sandeel are a key prey species.

Key

- Scoping Boundary
- Study Area
- UK offshore Special Areas of Conservation (SACs)
- UK SACs with marine components
- UK Special Proected Areas (SPAs) with marine components
- England Ramsar sites
- England Marine Conservation Zones (MCZs)
- England Sites of Special Scientific Interest (SSSIs)
- Europe Natura 2000 sites

Kilometres
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Rampion Extension Development

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Rampion 2 Offshore Wind Farm

Figure 5.4.7 Designated Sites of Relevance to Fish and Shellfish

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O7-0007	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	22/05/2020	FINAL

Migratory species

5.4.33 Migratory fish are fish that spend part of their life cycle in freshwater and part in seawater; such species are termed diadromous and anadromous. European eels have the potential to occur in both intertidal and subtidal environments of the study area; adult eels descend to the sea around September for spawning, with young (elvers) returning to ascend rivers in April/May. Eels are known to be present in the rivers Adur and Ouse that lie within the study area, although in low densities. Smelt are typically found inshore and in estuaries, spawning in rivers in the spring. Shoals of smelt have been observed off the Sussex coast. Sea trout ascend rivers in the summer to spawn on gravel beds in the winter and are known to spawn in the rivers Adur, Arun and Ouse which discharge into the study area. Shad ascend rivers to spawn and are known to occur off the coast of Sussex.

Basis for scoping assessment

5.4.34 The fish and shellfish ecology scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development:**

- the array will consist of up to 116 WTGs, installed on monopile or jackets using percussive piling, or on suction caisson foundations which would require seabed clearance;
- there will be up to three offshore substations, installed on monopile of jacket type foundations using percussive piling;
- inter-array cables and export cables will be installed via either ploughing, jetting, trenching or post lay burial techniques;
- scour protection and cable protection may be required around the base of some or all foundations;
- inter-array and export cables will be buried where possible, with a target burial depth of around 1m;
- the Scoping Boundary will avoid designated areas including the Offshore Overfalls MCZ and the Kingmere MCZ;
- maintenance activities will be undertaken for both preventative and corrective requirements;
- the operational lifetime of Rampion 2 is assumed to be a minimum of 30 years;
- the decommissioning of the windfarm is anticipated to involve the removal of all offshore infrastructure above the seabed, and electrical cables will be left in-situ; and
- the decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment and environmental impacts.

Embedded environmental measures

5.4.35 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on fish and shellfish ecology (see **Table 5.4.3**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.4.36 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.4.3 Relevant fish and shellfish ecology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML conditions.
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-52	A piling Marine Mammal Mitigation Protocol (MMMP), will be implemented during construction and will be developed in accordance with JNCC (2010) guidance. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.	DCO requirements or DML conditions.
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details	DCO requirements or DML conditions.
C-58	A offshore geophysical survey (including a UXO survey) will be undertaken prior to construction and will be subject	DCO requirements or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	to a full archaeological review in consultation with Historic England.	
C-95	The assessment will take into consideration the mitigation and control of invasive species measures that will be incorporated into a Project Environmental Monitoring Programme (PEMP).	DCO requirements or DML conditions.

Likely significant effects

5.4.37 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.4.38 The likely significant effects on fish and shellfish are summarised in **Table 5.4.4**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for fish and shellfish effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

5.4.39 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.4.4 Likely significant fish and shellfish ecology effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Mortality, injury, behavioural changes and auditory masking arising from noise and vibration (Construction and Decommissioning)	C-52	Likely significant effect through mortality, injury, behavioural changes and auditory masking in sensitive receptors.	**Scoped in, detailed assessment.**	Black bream, sandeel, herring, seahorse, cod, plaice, cuttlefish and sole.	Site specific predictive noise modelling will be undertaken to inform the noise impact assessment.
Temporary localised increases in SSC and smothering (Construction and Decommissioning)	N/A	Likely significant effect through smothering of demersal spawning species.	**Scoped in, detailed assessment.**	Demersal spawners- Black bream	The assessment will be informed by the findings and assessment of the Coastal Processes section.
Direct disturbance resulting from the installation of the export cable (Construction and Decommissioning)	C-44	Likely significant effect through disturbance of demersal spawners.	**Scoped in, detailed assessment.**	Demersal spawners- Black bream and sandeel.	The assessment will be informed by a sediment characterisation and interpretation of geophysical survey data.
Long-term loss of habitat and increased hard substrate and	C-44	Likely significant effect through loss of suitable spawning	**Scoped in, detailed assessment.**	Demersal spawners-	The assessment will be informed by a sediment characterisation.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
structural complexity due to the presence of turbine foundations, scour protection and cable protection (Operation)		substrates for demersal spawners.		Black bream and sandeel	
Electromagnetic field (EMF) impacts arising from cables (Operation)	C-45	**No likely significant effect**.	**Scoped out** (see below table **paragraph 5.4.40**)	Elasmobranchs and migratory fish species.	No further baseline requirements
Accidental pollution impacts during the construction phase resulting in potential effects on fish and shellfish receptors (Construction and Decommissioning)	C-53	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A
Direct and indirect seabed disturbances leading to the release of sediment	C-53	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
contaminants (Construction and Decommissioning)					
Direct disturbance resulting from construction within the array (Construction and Decommissioning)	N/A	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A
Underwater noise as a result of operational turbines (Operation)	N/A	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A
Direct disturbance resulting from maintenance within the array area during operation and maintenance (Operation)	N/A	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Direct disturbance resulting from maintenance within the offshore cable corridor during operation and maintenance (Operation)	N/A	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A
Potentially reduced fishing pressure within the Rampion 2 array area and increased fishing pressure outside the array area due to displacement (Operation)	N/A	**No likely significant effect**	**Scoped out** (see below table **paragraph 5.4.40**)	N/A	N/A

Impacts scoped out of assessment

5.4.40 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

5.4.41 Impacts from changes in EMFs arising from cables, are not considered to result in a significant effect on fish and shellfish receptors. Studies have shown that EMFs decrease rapidly with distance from the cable and are likely only to be detectable within circa. 10m (Normandeau *et al.,* 2011), and therefore the spatial extent of EMFs will be limited to the immediate vicinity of the cable. A study by Armstrong *et al*. (2015) observed no behavioural influence of physiological responses to EMF in Atlantic Salmon, and similar results were observed by Orpwood *et al.* (2015) in European eel. Overall, there's no risk of likely significant effects, and it is therefore proposed that this impact is scoped out of the EIA.

5.4.42 Accidental pollution impacts during the construction phase of the development on fish and shellfish receptors are not considered to result in a significant effect, as the magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition to this, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will also be reduced by implementation of a Project Environmental Monitoring Programme (PEMP) and a Marine Pollution Contingency Plan (MPCP).

5.4.43 Direct and indirect seabed disturbances leading to the release of sediment contaminants during the construction phase of the development are also not considered to result in a significant effect on fish and shellfish receptors. This conclusion is informed by the baseline characterisation for the existing Rampion 1 project, which showed that contaminants within the sediments were generally low, suggesting sediment across the study area would not present any concern for seabed disturbance.

5.4.44 Direct disturbance resulting from construction within the array is not considered to result in a significant effect on fish and shellfish receptors. Any effects are expected to be of short term and intermittent nature, with limited spatial extent, affecting a small proportion of the Rampion 2 development area. Species present that will be subject to disturbance are likely to be mobile and can therefore move away from the construction activities. Any habitats that will be disturbed represent a small area of the total distribution of that habitat type in the English Channel (UKSeaMap, 2019), and therefore any impacts on spawning habitats from direct disturbance are expected to be minimal.

5.4.45 Underwater noise as a result of operational turbines is also not considered to result in a significant effect on fish and shellfish receptors; studies have shown noise from operating turbines to be detectable only in close proximity to the turbine locations (Wahlberg and Westerberg, 2005), in addition to this, noise levels will not be sufficient to result in injury and would be restricted to local behavioural responses.

5.4.46 Direct disturbance resulting from maintenance within the array area and the offshore cable corridor during operation is not considered likely to have a significant effect on fish and shellfish receptors, due to the short-term and localised nature of the impact.

5.4.47 Lastly, the potential for reduced fishing pressure within the Rampion 2 array area and increased fishing pressure outside the array area due to displacement is only expected to be of short-term duration and of limited spatial extent, and therefore there will be no significant effects on fish and shellfish receptors.

Cumulative effects

5.4.48 Cumulative effects on fish and shellfish ecology resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4 The EIA Process** and considering the other developments that have been screened in as part of the (Cumulative Effects Assessment) CEA screening exercise.

5.4.49 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- during construction, there is the potential for underwater noise to have a large spatial footprint with regard to disturbance effects and displacement of prey species, which could occur cumulatively with other developments in close proximity to Rampion 2 activity; and
- during construction, there is the potential for cumulative impacts resulting from increased SSC and deposition. These impacts are likely to be minor due to their localised nature, however there is potential for spatial cumulative impacts with regard to the operation of Rampion 1, plus other activities such as the regional aggregate sites particularly when considering cumulative impacts on spawning grounds for black bream in the Kingmere MCZ.

Transboundary Effects

5.4.50 The potential effects from construction, operation (including maintenance) and decommissioning on fish and shellfish receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

5.4.51 The proposed approach to PEIR and ES with regards the study area, method of assessment and data to inform assessment have been identified **in paragraphs 5.4.3** *et seq*. to **5.4.6** *et seq*. and **Table 5.4.1** of this aspect chapter. The following section provides further context regarding the consultation and engagement that will be undertaken to further inform the assessment.

5.4.52 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which as set out in **Section 4.3: Consultation and the Evidence Plan Process**. Key consultees of relevance to the fish and shellfish chapter include: Natural England, MMO, Cefas, Sussex Inshore Fisheries & Conservation Authority (IFCA); and the Sussex Wildlife Trust.

5.4.53 Consultee responses with regard to fish and shellfish ecology, will be addressed, and the scope of the assessment modified accordingly in the PEIR and ES chapter.

5.5 Benthic subtidal and intertidal ecology

Introduction

5.5.1 The benthic subtidal and intertidal ecology assessment will consider the potential likely significant effects on benthic subtidal and intertidal receptors, that may arise from the construction, operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.5.2 Benthic subtidal and intertidal ecology interfaces with other relevant aspects and as such, should be consider alongside these; namely:

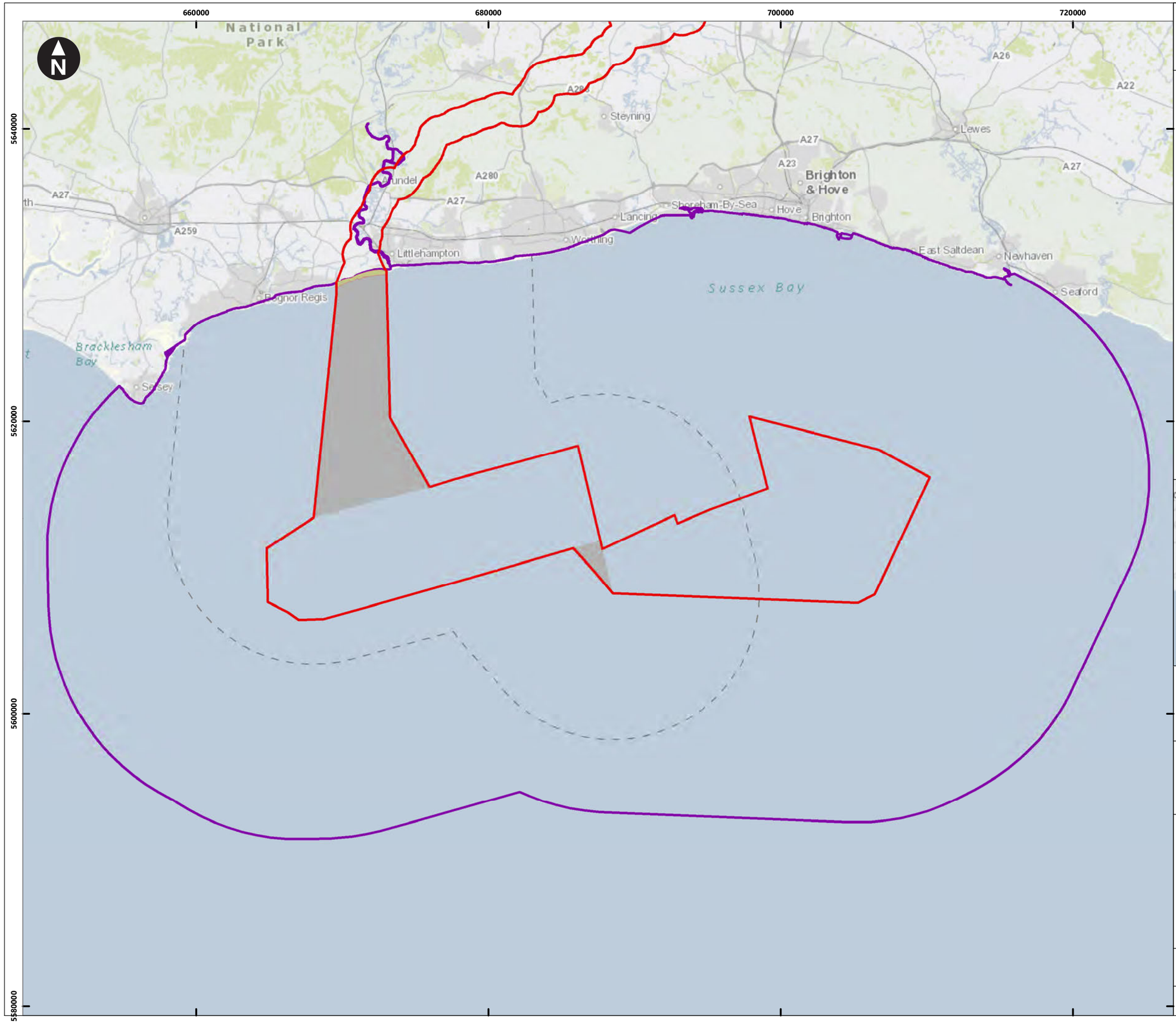
- **Section 5.2: Coastal processes:** Changes to coastal processes have the potential to directly or indirectly impact benthic subtidal and intertidal ecology receptors, therefore the information from this assessment will be used to inform the benthic subtidal and intertidal ecology assessment;
- **Section 5.4: Fish and shellfish ecology:** The fish and shellfish ecology aspect includes species that live within the benthos and therefore there is a degree of overlap between these aspects. They must therefore be informed and assessed in unison, where this applies; and
- informs **Section 5.11: Nature conservation:** The nature conservation aspect will include designations that relate to protected benthic subtidal and intertidal ecology features and therefore must be considered together.

Study area

5.5.3 The study area for the benthic subtidal ecology assessment is defined as the offshore Scoping Boundary together with the secondary impact Zone of Influence (ZOI), as shown in **Figure 5.5.1**. The secondary ZOI has been informed by the tidal excursion extent and coastal processes modelling undertaken to inform the existing Rampion 1 EIA (ABPmer, 2012). The ZOI buffer therefore encompasses the area over which suspended sediments may travel following disturbance as a result of Rampion 2 activities, extending 15km around the array Scoping Boundary, and a distance of 10km surrounding the offshore cable corridor.

5.5.4 The intertidal ecology study area is defined by the intertidal zone extending up to the Mean High-Water Spring (MHWS) mark within the offshore cable corridor Scoping Boundary.

5.5.5 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.



Data derived from RWE data © RWE 2020

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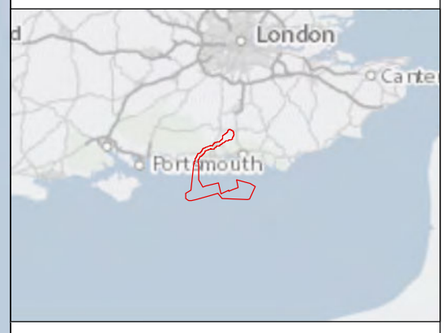
Key

- Scoping Boundary
- Intertidal area
- Offshore cable corridor
- Study Area
- 10km buffer of offshore cable corridor area



Kilometres

0 1.25 2.5 5 7.5 10

1:250,000

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Figure 5.5.1 Benthic Ecology Study Area

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Assessment methodology

Introduction

5.5.6 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this benthic subtidal and intertidal ecology chapter, it is necessary to set out how this methodology will be applied and adapted as appropriate and in accordance with relevant guidance (**paragraph 5.9.6** et seq.) to address the specific needs of the benthic subtidal and intertidal ecology assessment.

Desk-based review

5.5.7 A desk-based review of existing benthic subtidal and intertidal ecology data will be undertaken, focusing on sourcing data that have been collected within or in close proximity to the study area for the benthic subtidal and intertidal ecology assessment, including the data collected as part of the existing Rampion 1 application and monitoring. This data will be supplemented with information on benthic subtidal and intertidal ecology of the wider region where available.

5.5.8 A range of data from a variety of sources will be reviewed to inform the environmental assessment. A list of the data sources to support this Scoping Report and to be used in the final assessment have been highlighted in **Table 5.5.1** It should be noted that there is a good data coverage across the Rampion 2 benthic subtidal ecology study area (**Figure 5.5.2**).

Site-specific surveys

5.5.9 To supplement and complement the existing data sources, further information will be available for the Rampion 2 benthic subtidal and intertidal ecology study area through site-specific benthic ecology surveys which will be undertaken across the Scoping boundary during the summer of 2020.

5.5.10 Subtidal benthic habitats will be sampled via a combination of targeted benthic infaunal grab sampling and drop-down video (DDV) surveys, with particular focus on any habitats of conservation interest. Sediment samples will also be collected for contaminants and particle size analysis.

5.5.11 Intertidal benthic habitats will be characterised via a Phase I and Phase II habitat survey.

Guidance

5.5.12 Specific to the benthic subtidal and intertidal ecology assessment, the following guidance documents will be considered:

- Guidelines for EIA in Britain and Ireland. Marine and Coastal, Final Document (IEEM, 2010);
- Guidance note for EIA in respect of FEPA and CPA requirements (Cefas *et al*., 2004);

- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Judd, 2012);
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008); and
- Benthic habitat assessment guidance for marine developments and activities: Guidance for undertaking benthic marine habitat survey and monitoring (NRW, 2019).

Approach

5.5.13 To enable the potential impact of the Proposed Development to be assessed, a description of the existing benthic communities, focusing particularly on any areas or features of conservation interest, will be produced. Potential impacts that may occur on the subtidal and intertidal physical, chemical and biological environment as a result of the planned construction, operation and decommissioning will then be identified. The sensitivities of the communities present to the types of impact expected from wind farm construction, operation and decommissioning will be assessed. Where necessary, measures will be proposed to mitigate the impacts.

5.5.14 In the event that the Proposed Development has a direct impact on any sites that are designated for conservation at the European (SAC or SPA) or international level (Ramsar), as a result of qualifying habitats or species that they support, then the requisite information will be provided alongside the DCO/ES to assist the Competent Authority to carry out an Appropriate Assessment.

5.5.15 Cumulative impacts will be assessed by taking into consideration any other relevant developments, proposed or existing, that are in the vicinity of the development zone and which have the potential to affect the same receptors.

Baseline conditions

Data sources

5.5.16 A desk-based review of literature to support this Scoping Report highlighted the following data sources, which provide coverage across large parts of the Rampion 2 benthic subtidal and intertidal ecology study area, and wider region (**Table 5.5.1).**

Table 5.5.1 Key sources of benthic subtidal and intertidal ecology data

Source	Date	Summary	Coverage of study area
The existing Rampion 1 benthic ecology baseline characterisation (EMU, 2011)	Survey undertaken in April 2011	Drop-down video (DDV) and grab sampling gear were deployed to collect sediment for analysis (of benthic invertebrates, particle size, total organic carbon, and contaminants) across the existing Rampion 1 project and surrounding area as part of the baseline characterisation.	Coverage across the benthic subtidal ecology study area, including the Scoping Boundary array and offshore cable corridor.
The existing Rampion 1 cable landfall intertidal baseline characterisation (RSK Environment Ltd, 2011	Survey undertaken in May 2011	A Phase 1 habitat survey across between East Worthing and South Lancing, as well as sampling sediment with a 0.01m^2 hand-core for analysis of benthic invertebrates, particle size, total organic carbon and a range of contaminants.	No coverage within the Rampion 2 landfall but provides regional context.
The existing Rampion 1 pre-construction benthic survey report (Natural Power, 2016)	Survey undertaken in September and October 2015	DDV, benthic grab and epibenthic trawl stations were sampled. DDV was deployed to ground-truth areas suspected to be Annex I reef.	Coverage across the benthic subtidal ecology study area, including several points within the Scoping Boundary array area.
UKSeaMap (2018)	2018	EUNIS Level 4 model, detailing biological zone and substrate.	Complete modelled coverage up to MHWS.
Regional Seabed Monitoring Plan (RSMP) baseline	Samples have been collected over a period of	The dataset comprises of 33,198 macrofaunal samples (83% with associated data on sediment particle size composition) covering large parts of the UK continental	Good coverage across the benthic subtidal ecology

Source	Date	Summary	Coverage of study area
dataset (Cooper & Barry, 2017))	48 years from 1969 to 2016, although the vast majority (96%) were acquired since 2000	shelf. Data points for the Rampion 2 benthic subtidal ecology study area were extracted. Full details on the dataset can be found here: - https://www.cefas.co.uk/data-and-publications/dois/rsmp-baseline-dataset/	study area including the Scoping Boundary.
Biologically informed habitat map (Cooper *et al*., 2019)	As above.	A biologically informed habitat map produced using all available RSMP data. Full details of the habitat map can be found here: - https://doi.org/10.1111/1365-2664.13381	Complete modelled coverage up to MHWS.
Area 435/396, Area 453 and Area 488 Annual Monitoring Reports (EMU, 2009; Fugro EMU Ltd. 2013 and 2014)	2009 - 2014	Environmental monitoring reports for marine aggregate extraction areas (Area 435/396, Area 453 and Area 488) within the region.	Regional context.
South Coast Regional Environmental Characterisation (REC) (James *et al*., 2010)	2010	South Coast Regional Environmental Characterisation (REC). A multidisciplinary marine study of an extensive area of the English Channel. The full report can be found here: - http://nora.nerc.ac.uk/id/eprint/13120/1/OR09051.pdf	Regional dataset and report covering the benthic subtidal ecology study area.
The Eastern English Channel Marine Habitat Map (James *et al*., 2007)	2007	The Eastern English Channel Marine Habitat Map. The study provides regional scale geological and biological interpretations aimed to contribute to the effective stewardship of the marine environment by providing a	Regional dataset and report covering the benthic subtidal ecology study area.

Source	Date	Summary	Coverage of study area
		broader understanding of how the potential resource areas relate to the wider regional ecology and coastal processes. The full report can be found here: - https://www.cefas.co.uk/publications/techrep/tech139.pdf	
The Marine Aggregate Levy Sustainability Fund (MALSF) synthesis study in the central and eastern English Channel (James *et al*., 2011)	2011	The Marine Aggregate Levy Sustainability Fund (MALSF) synthesis study in the central and eastern English Channel. This synthesis report has as its core two regional environmental characterisation (REC) studies, the Eastern English Channel Marine Habitat Map (EECMHM) (James *et al*, 2007) and the South Coast REC (James *et al*, 2010). The full report can be found here: - http://nora.nerc.ac.uk/id/eprint/14031/1/OR11001.pdf	Regional dataset and report covering the benthic subtidal ecology study area.

Key

- Scoping Boundary
- Rampion 1 pre-construction survey
- Rampion 1 characterisation survey
- Cefas collated sediment survey data

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

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Figure 5.5.2 Historic Benthic Survey Points

Scoping Report

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Baseline

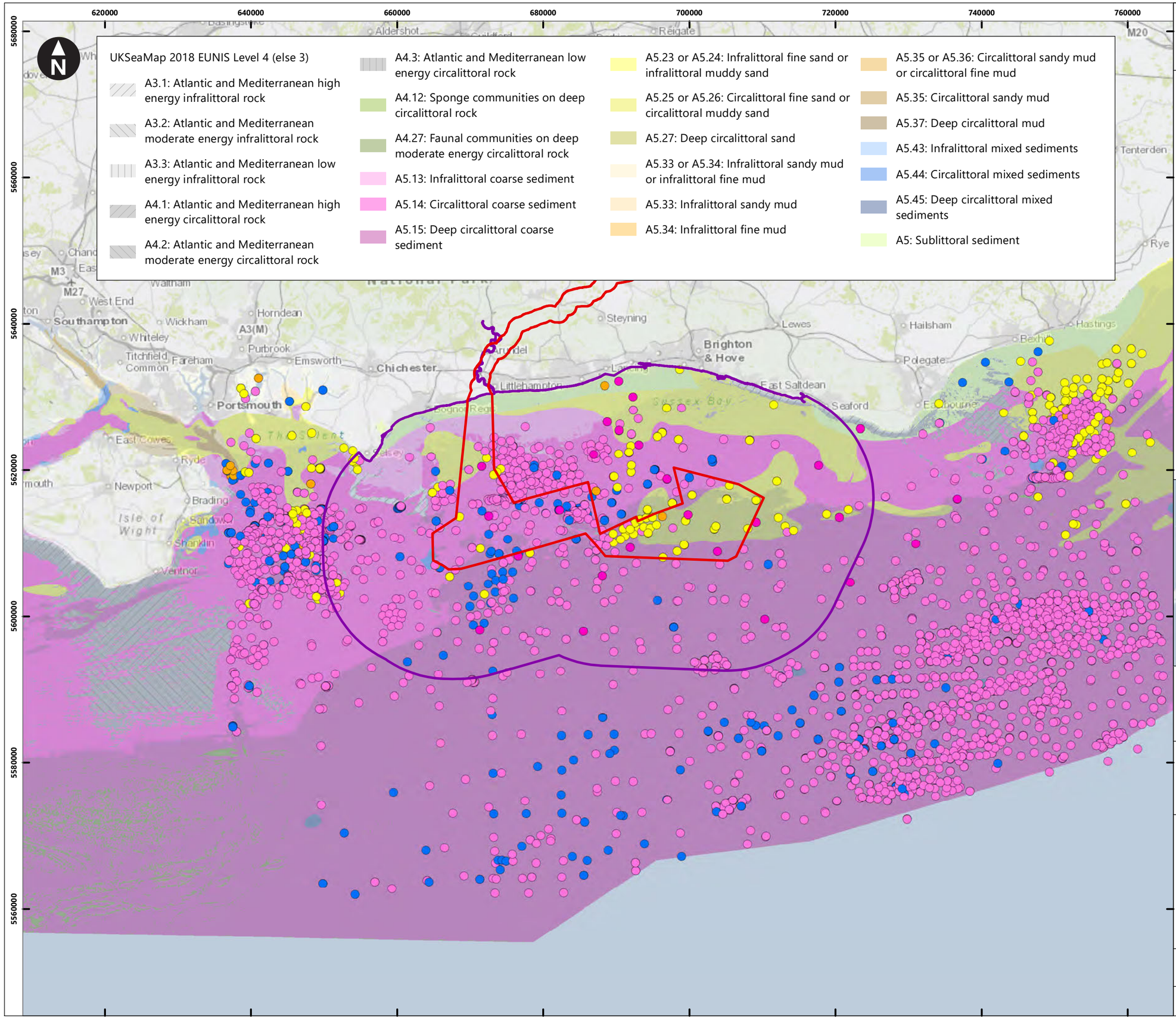
Subtidal sediments

5.5.17 Broadscale regional habitat mapping to EUNIS Level 4, detailing biological zone and substrate (UKSeaMap, 2019), indicates that the dominant habitats across the Rampion 2 Scoping Boundary are predominantly characterised by circalittoral coarse sediments, deep circalittoral coarse sediments, and deep circalittoral sand across the mid to offshore portion of the Proposed Development and by sublittoral sediments, infralittoral coarse sediments and circalittoral fine sands or circalittoral muddy sands across the inshore portion of the proposed offshore cable corridor (**Figure 5.5.3**). Similar substrates are found across the wider benthic subtidal ecology study area.

5.5.18 UKSeaMap predictions also include Atlantic and Mediterranean low energy infralittoral rock within the inshore regions of the wider benthic subtidal ecology study area. This is further recorded by studies detailing the presence of underwater chalk features in the region (Irving, 1999; James et al., 2011). Irving (1999) describes the presence of underwater chalk cliffs and gullies in the region, although these are more likely within 1km of the shore, not the deeper subtidal regions.

5.5.19 **Figure 5.5.3** represents point sediment data that have been collected across the benthic subtidal ecology study area, as part of monitoring programmes conducted at the existing Rampion 1 project (EMU, 2011; Natural Power, 2016), in addition to the Regional Seabed Monitoring Plan (RSMP) baseline dataset (Cooper & Barry, 2017). This data show that the sediments within the western section of the Scoping Boundary and offshore cable corridor are predominantly characterised by coarse and mixed sediments. Whereas, the eastern area of the Scoping Boundary have a greater proportion of sand and muddy sand sediments.

5.5.20 As part of the baseline characterisation at the existing Rampion 1 project, surface sediments were tested for a range of contaminants. The results revealed that the levels of contaminants within the sediments were generally low, suggesting sediment across the existing Rampion 1 project would not present any concern for seabed disturbance. However, eleven of the sites sampled supported levels of contaminants in excess of Action Level 1 for Arsenic and Chromium, at four of the sites (EMU, 2011).



Key

- Scoping Boundary
- Study Area

EUNIS sediment substrate

- Coarse sediments
- Mixed sediments
- Mud and sandy mud
- Sand and muddy sand

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Figure 5.5.3 Seabed Substrate

Scoping Report

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GOBE	CC	WOOD	22/05/2020	FINAL

Subtidal benthic ecology

5.5.21 As described above, the benthic subtidal ecology study area has been demonstrated to comprise of a mixture sands, muds and gravels which is typical of the wider region, representing a mosaic of different habitat types. James *et al*. (2010) described the variety of these habitats at a regional level.

- **Gravel and mixed sediment habitats** cover extensive subtidal and offshore areas of the eastern English Channel (Jones *et al*., 2004). Areas of nearshore mixed sediments tend to be formed of variable amounts of sand, gravel and cobble, often mixed with dead shells and shell gravel. In areas where these mixed sediments are stable, settlement and subsequent growth of a rich variety of plant and animal species occurs. The anemones *Anemonia viridis* and *Urticina felina* are typical of gravel areas, with *Cerianthus lloydii* also frequently encountered. The slipper limpet *Crepidula fornicata* (a non-native species) is commonly associated with gravel and its shells can form the main hard substrate in areas of soft sediments. Gravel habitats found in deeper offshore areas (>30 metres), tend to be less affected by natural disturbance than those closer inshore. As a result, these areas tend to support diverse marine fauna which may include a wide range of anemones, polychaete worms.
- **Sandy sediments** are widespread throughout the eastern English Channel. Sand sediments are found in regions of moderate to strong tidal currents where they can settle but finer particles cannot. In such situations, the sand is often coarse and clean with little mud, but with occasional shell fragments present. Mobile sands tend to be characterised by robust and sometimes impoverished faunas, typically venerid bivalves, amphipods, polychaete worms and heart urchins. Clean sand is favoured by the burrowing heart urchin *Echinocardium cordatum*, the masked crab *Corystes cassivelaunus* and the sea mouse *Aphrodita aculeata*. A number of species, such as the anemones *Urticina felina* and *Cereus pedunculatus,* are sand tolerant but require an underlying stone or hard substrate for attachment (Collins and Mallinson, 2000). Mobile species typically found in such areas include hermit crabs *Pagurus* spp. and gastropod molluscs such as *Tritia reticulata* and *Buccinum undatum*. Flatfish include brill *Scophthalmus rhombus*, plaice *Pleuronectes platessa*, dab *Limanda limanda* and Dover sole *Solea solea*.
- **Mud Habitats** are less common because of the exposed nature of the seabed in much of the eastern Channel, few areas of mud-dominated sediment are present except in deeper, sheltered, inshore waters such as the Solent. Generally, the muddy and silty sediments of the Solent contain chains of slipper limpets *Crepidula fornicata*, which provide attachment for other organisms such as hydroids (e.g., *Kirchenpaueria pinnata* and *Hydrallmania falcata*) and sponges (e.g. *Halichondria* spp. and *Suberites* spp.). A number of small crab species, such as *Pisidia longicornis*, *Macropodia rostrata* and *Pagurus bernhardus*, are found in cover provided by the slipper limpet shell epifauna. Polychaete worms, bivalve molluscs such as cockles, and brittlestars can also be numerically dominant in mud habitats where hard biogenic substrates (i.e. *Crepidula* shells) are absent.

5.5.22 The results of surveys across the existing Rampion 1 project, which included grab, DDV and trawl data from characterisation and pre-construction surveys, were used

to describe the following biotopes (both JNCC Marine Habitat Classification and EUNIS codes are presented) that have been identified within the Rampion 2 Scoping Boundary. A description of each biotope identified is presented below and the distribution of biotopes is presented in **Figure 5.5.4**.

- **Infralittoral mobile clean sand with sparse fauna[2] (JNCC code: SS.SSa.IFiSa.IMoSa; EUNIS A5.231)**: Medium to fine sandy sediment in shallow water, often formed into dunes, on exposed or tide-swept coasts often contains very little infauna due to the mobility of the substratum. Some opportunistic populations of infaunal amphipods may occur, particularly in less mobile examples in conjunction with low numbers of mysids such as *Gastrosaccus spinifer*, the polychaete *Nephtys cirrosa* and the isopod *Eurydice pulchra*. Sand eels *Ammodytes* sp. may occasionally be observed in association with this biotope.
- **Sparse fauna on highly mobile sublittoral shingle (cobbles and pebbles)[3] (SS.SCS.ICS.SSh; A5.131):** Sublittoral clean shingle and pebble habitats with a lack of conspicuous fauna. Unstable, rounded pebbles and stones (as opposed to sub-angular cobbles, which are often found lying on or embedded in other sediment) that are strongly affected by tidal steams and/or wave action can support few animals and are consequently faunally impoverished. The species composition of this biotope may be highly variable seasonally and is likely to comprise of low numbers of robust polychaetes or bivalves with occasional epibiota including echinoderms and crustacea such as *Liocarcinus* spp. and *Pagurus* spp. In more settled periods there may be colonisation by anemones such as *Urticina felina* and small populations of hydroids and Bryozoa.
- ***Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel[4] (SS.SCS.CCS.MedLumVen; A5.142)**: Circalittoral gravels, coarse to medium sands, and shell gravels, sometimes with a small amount of silt and generally in relatively deep water (generally over 15-20m), may be characterised by polychaetes such as *Mediomastus fragilis*, *Lumbrineris* spp., *Glycera lapidum* with the sea urchin *Echinocyamus pusillus*. Other taxa may include Nemertea spp., *Protodorvillea kefersteini*, *Owenia fusiformis*, *Spiophanes bombyx* and *Amphipholis squamata* along with amphipods such as *Ampelisca spinipes*.
- ***Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment[5] (SS.SMx.CMx.FluHyd; A5.444)**: This biotope represents part of a transition between sand-scoured circalittoral rock where the epifauna is conspicuous enough to be considered as a biotope and a sediment biotope where an infaunal sample is required to characterise it and is possibly best considered an epibiotic overlay. *Flustra foliacea* and the hydroid *Hydrallmania falcata* characterise this biotope; lesser amounts of other hydroids such as *Sertularia argentea, Nemertesia antennina* and occasionally *Nemertesia ramose*, occur where suitably stable hard substrata is found. The anemone

[2] https://mhc.jncc.gov.uk/biotopes/jnccmncr00000775
[3] https://mhc.jncc.gov.uk/biotopes/jnccmncr00001942
[4] https://mhc.jncc.gov.uk/biotopes/jnccmncr00002012
[5] https://mhc.jncc.gov.uk/biotopes/jnccmncr00000460

Urticina feline and the soft coral *Alcyonium digitatum* may also characterise this biotope. Barnacles *Balanus crenatus* and tube worms *Pomatoceros triqueter* may be present and the robust bryozoans *Alcyonidium diaphanum* and *Vesicularia spinosa* appear amongst the hydroids at a few sites. *Sabella pavonina* and *Lanice conchilega* may be occasionally found in the coarse sediment around the stones. In shallower (i.e. upper circalittoral) examples of this biotope scour-tolerant robust red algae such as *Polysiphonia nigrescens, Calliblepharis* spp. and *Gracilaria gracilis* are found.

- ***Spirobranchus triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles[6] (SS.SCS.CCS.PomB; A5.141)**: This biotope is characterised by a few ubiquitous robust and/or fast growing ephemeral species which are able to colonise pebbles and unstable cobbles and slates which are regularly moved by wave and tidal action. The main cover organisms tend to be restricted to calcareous tube worms such as *Spirobranchus triqueter* (or *P. lamarcki*), small barnacles including *Balanus crenatus* and *Balanus balanus*, and a few bryozoan and coralline algal crusts. Scour action from the mobile substratum prevents colonisation by more delicate species. Occasionally in tide-swept conditions tufts of hydroids such as *Sertularia argentea* and *Hydrallmania falcata* are present.

5.5.23 **Figure 5.5.4** also presents the biologically informed habitat map from Cooper *et al*. (2019). This biological-based seedbed map utilises a comprehensive dataset of macrofaunal data (33,198 samples from 777 surveys) and used these data to produce a baseline assessment for UK shelf waters. This large dataset was created by integrating empirical data acquired from both governmental and non-governmental sector (e.g., marine aggregates, offshore wind, oil and gas) monitoring efforts and is a useful resource. The model demonstrates that the macrofaunal assemblages across the Rampion 2 benthic subtidal study area were characterised by the following groupings:

- A2b – represented a faunal assemblage that was characterised by the family of polychaete worms Syllidae, Serpulidae, Terebellidae, Spionidae, Sabellariidae, Polynoidae, Capitellidae, Lumbrineridae, Cirratulidae, Phyllodocidae, Maldanidae, Sabellidae, the echinoderm family Amphiuridae, the decapod crustacean Porcellanidae, the ascidian tunicate family Styelidae, the nematode family Nemertea and the bryozoan Romancheinidae. Due to the diversity of this group and the occurrence of bryozoan it is likely this group is representative of a mixed and coarse sediment community.
- C1a - was characterised by the polychaetes Spionidae, Terebellidae, Serpulidae, Syllidae, Capitellidae, Cirratulidae, Lumbrineridae, Sabellariidae, Nemertea, Glyceridae and the nematode family Nemertea. This group is likely to be located on a variety of sandy substrates.
- C1b, was characterised by a similar assemblage to C1a but included the amphipod family Ampeliscidae and the polychaetes Phyllodocidae, Polynoidae, Scalibregmatidae and Pholoidae. This group is likely to be located on a variety of sandy substrates.

[6] https://mhc.jncc.gov.uk/biotopes/jnccmncr00000659

- D2a, represented a faunal assemblage that was characterised by the polycahetes Spionidae, Glyceridae, Terebellidae, Capitellidae, Phyllodocidae and the nematode family Nemertea. This group is likely to be located on a variety of sandy substrates.
- D2c - represented a faunal assemblage that was characterised by polychaetes including Nephtyidae, Spionidae and Opheliidae. All of which are typically found in sands and muddy sands.

5.5.24 Cooper *et al*. (2019) concluded that the spatial patterns in faunal assemblages identified were largely driven by sediment composition and hydrodynamics.

660000 680000 700000 720000

5640000 5620000 5600000 5580000

Rampion 1 characterisation biotope map

- SS.SSa.IFiSa.IMoSa
- SS.SSa.IMuSa
- SS.SCS.CCS
- SS.SCS.CCS / SS.SMx.CMx
- Mixed Hard Substrate / Rock
- Mixed sediment with emergent bedrock and potential mussel bed
- Sand veneer over hard substrate

Cefas biological-based habitat map

- A1
- A2a
- A2b
- B1a
- B1b
- C1a
- C1b
- D1
- D2a
- D2b
- D2c
- D2d

Key

- Scoping Boundary
- Study Area

Rampion 1 pre-construction survey biotopes

- SS.SCS.CCS.MedLumVen
- SS.SSa.IFiSa.IMoSa/ SS.SCS.CCS.MedLumVen
- SS.SCS.CCS.MedLumVen

Rampion 1 characterisation survey biotopes

- SS.SBR.SMus
- SS.SBR.SMusMytSS
- SS.SCS.CCS.PomB
- SS.SCS.ICS.SSh
- SS.SMx.CMx.FluHyd
- SS.SMx.IMx.CreAsAn
- SS.SSa.IFiSa.IMoSa

Kilometres

0 1.25 2.5 5 7.5 10

1:250,002

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.5.4 Benthic Biotopes

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O2-0004	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	22/05/2020	FINAL

Features of conservation interest

5.5.25 Annex I habitats are defined under the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; more commonly referred to as the EC Habitats Directive (1992) as amended. Under these regulations, species and habitats that fall into specific categories are eligible for legal protection from activities which have the potential to damage them.

5.5.26 Annex I biogenic blue mussel (*Mytilus edulis*) reef was recorded during the existing Rampion 1 characterisation study (EMU, 2010). This feature was recorded at inshore sites within the existing Rampion 1 cable corridor and is commonly found on the lower shore and in shallow estuaries and inlets across the central and eastern English Channel, where they often form extensive beds (James *et al*., 2010).

5.5.27 Two types of Annex I bedrock reef are known to occur through the inshore portion of the benthic subtidal ecology study area, these include both chalk and clay reef. These features were positively identified in the existing Rampion 1 characterisation study (EMU, 2011).

5.5.28 The reef forming worm *Sabellaria spinulosa* was recorded within grab samples collected during the existing Rampion 1 characterisation study, although no biogenic reef from this species was identified (EMU, 2011), nor was it found during the pre-construction survey (Natural Power, 2015). James *et al*. (2011) noted that although *S. spinulosa* is widespread within the central and eastern English Channel the presence of large reef structures is limited.

5.5.29 In addition to the above, Natural Environment and Rural Communities (NERC) Act (2006) Section 41 Habitats of Principal importance are known to occur across the Rampion 2 benthic subtidal study area. These include ‘Sheltered Muddy Gravels’ and ‘Subtidal Sands and Gravel’. Biogenic and geogenic reef habitat are also afforded protection by the NERC Act.

Intertidal benthic ecology

5.5.30 The location of landfall that has been identified by the Scoping Boundary is shown in **Figure 5.5.1**. Existing intertidal habitat mapping (MagicMap) suggests the biotopes present within Climping Beach and the surrounding area primarily consist of intertidal sand and gravel. The eastern part of the Scoping Boundary is dominated by finer sand (EUNIS A2.2). Coarser sediments, including gravel and cobbles (EUNIS A2,1 and A5.1), are the most abundant habitats present in the central areas and to the west. Occasional rocky areas (EUNIS A1) occur, particularly around coastal defence structures.

5.5.31 Natural Environment and Rural Communities Act (2006) Section 41 Habitats of Principal importance run along the top of the shore, particularly within the Climping Beach SSSI. These include:

- Coastal Vegetated Shingle (EUNIS B2); and
- Coastal Sand Dunes (EUNIS B1).

5.5.32 These habitats are particularly prevalent in the eastern part of the Scoping Boundary, but also extend west along the coastline.

Designated sites

5.5.33 For this Scoping Report a review has been undertaken to identify designated sites in the benthic subtidal and intertidal ecology study area, which are either designated for benthic and intertidal ecology interest or habitats/species which are dependent on or associated with benthic and intertidal ecology.

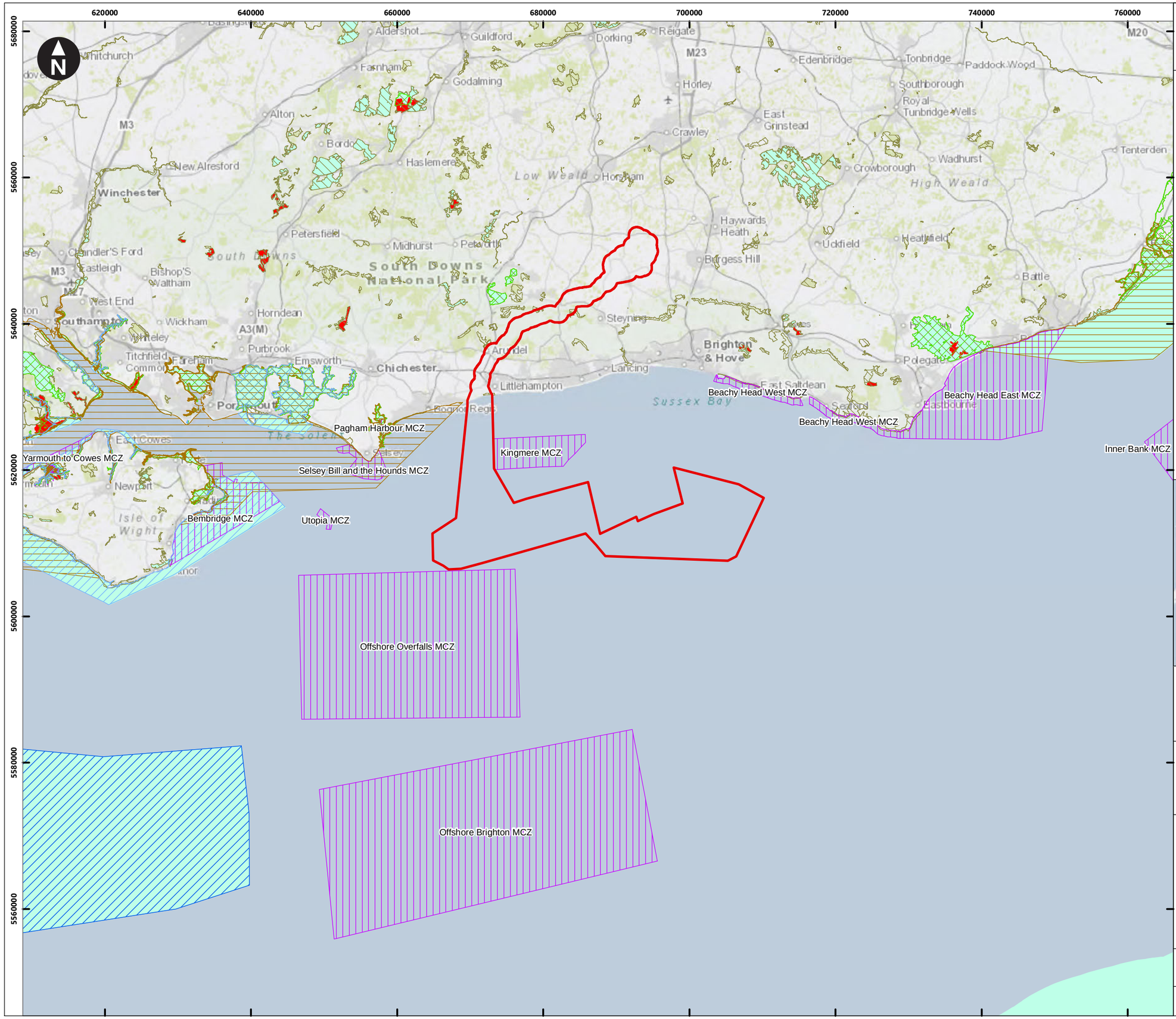
5.5.34 The nature designations that have been screened in for consideration to the benthic subtidal and intertidal ecology EIA comprise of European conservation sites (i.e. SACs, SCIs and Ramsar sites) and national designations (i.e. MCZs SSSIs and NNRs), which are listed in **Table 5.5.2** and presented in **Figure 5.5.5**. Further details on designated sites are presented in **Section 5.11: Nature conservation**.

Table 5.5.2 Marine nature conservation designations with relevance to benthic subtidal and intertidal ecology

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
International		
South Wight Maritime Special Area of Conservation (SAC)	Approximately 20km west of the proposed Scoping Boundary	This site is protected for three Annex I habitats; reefs, vegetated sea cliffs of the Atlantic and Baltic coasts and submerged or partially submerged sea caves. This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs.
Solent Maritime SAC	Approximately 22km from the proposed Scoping Boundary	Annex I habitats that are the primary reason for selection of this site include estuaries, *Spartina* swards (*Spartinion maritimae*) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). Annex I habitats that present as a qualifying feature, but not a primary reason for selection of this site include sandbanks which are slightly covered by sea water all the time, mudflats and sandflats not covered by seawater at low tide, coastal lagoons, annual vegetation of drift lines, perennial vegetation of stony banks, *Salicornia* and other annuals colonizing mud and sand and "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"").
Solent and Isle of Wight lagoons SAC	Approximately 20km from the proposed Scoping Boundary	Annex I habitats that are the primary reason for selection of this site include coastal lagoons.

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Solent and Dorset Coast Special Protection Area (SPA)	Approximately 1km from the proposed Scoping Boundary	The site has been designated to protect internationally important breeding populations of common tern (*Sterna hirundo*), Sanwich tern (*Sterna sandvicensis*) and little tern (*Sternula albifrons*).
Pagham Harbour SPA	Approximately 10km from the proposed Scoping Boundary	This site is designated as the estuarine basin is made up of an extensive central area of saltmarsh and intertidal mudflats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mudflats are rich in invertebrates and algae and provide important feeding areas for the many bird species that use the site.
National		
Kingmere Marine Conservation Zone (MCZ)	Lies adjacent to the proposed Rampion 2 offshore cable corridor	Kingmere MCZ is named after Kingmere Rocks, which is a rocky and boulder reef running through the middle of the site. There are also areas of chalk and different types of sediment. It is a place where black seabream come to breed in the spring. The features of this site are moderate energy infralittoral rock and thin mixed sediments, subtidal chalk and black seabream (*Spondyliosoma cantharus*).
Offshore Overfalls MCZ	Lies adjacent to the proposed Wind Farm array area	The site is designated for several marine habitats including; subtidal coarse sediment, subtidal mixed sediments, subtidal sand and English Channel outburst flood features
Selsey Bill and the Hounds MCZ	Approximately 11km from the proposed Scoping Boundary	This site is designated for several marine features including: Bracklesham Bay geological feature, short-snouted seahorse (*Hippocampus hippocampus*), subtidal mixed sediments, subtidal sand, rock features and peat and clay exposures.
Pagham Harbour MCZ	Approximately 10km from the proposed Scoping Boundary	This site is designated for several marine features including: Seagrass beds, defolin's lagoon snail (*Caecum armoricum*), and the Lagoon sand shrimp (*Gammarus insensibilis*).

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Utopia MCZ	Approximately 17km from the proposed Scoping Boundary	The protected features of this site include: circalittoral rock, subtidal coarse and mixed sediment, subtidal sands and fragile sponge and anthozoan communities on subtidal rocky habitats.
Beachy Head West MCZ	Approximately 30km from the propsoed Scoping Boundary	These sites protect 10 different types of habitat and their associated species and offer specific protection to 2 species of conservation importance. These include intertidal coarse sediments, subtidal mixed, mud and sand, infralittoral muds and sands, infralittorial and circalittoral rock, chalk and their associated communities, native oyster (*Ostrea edulis*) and the short snouted seahorse (*Hippocampus hippocampus*).
Climping Beach Site of Specific Scientific Interest (SSSI)	Overlaps with the proposed offshore cable corridor landfall	This site is designated for aggregations of non-breeding birds including sanderling and Calidris alba as well as coastal vegetated shingle, fixed dune grassland and sand dune communities.
West Beach Local Nature Reserve (LNR)	Overlaps with the proposed offshore cable corridor landfall	The West Beach LNR is part of the Climping Beach Site of Special Scientific Interest (SSSI). It includes sand dunes, vegetated shingle, sand flats and a small patch of saltmarsh. Sand lizards (*Lacerta agilis*), protected under the Wildlife and Countryside Act 1984, and four nationally scarce burrowing bees and wasps occur in the dunes. The vegetated shingle, though locally common, is internationally rare, and is used by a Red Data Book ant species. The sand flats host large numbers of migratory waders in the winter months.



Key

- Scoping
- UK offshore Special Areas of Conservation (SACs)
- UK SACs with marine components
- UK Special Proected Areas (SPAs) with marine components
- England pSPAs
- England Ramsars
- England Marine Conservation Zones (MCZs)
- England Sites of Special Scientific Interest (SSSIs)
- National Nature Reserves
- Europe Natura 2000 sites

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.5.5 Designated Sites

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O2-0005				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL

Basis for scoping assessment

5.5.35 The benthic subtidal and intertidal scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: The Proposed Development**:

- the array will consist of up to 116 WTGs, installed on monopile or jackets using percussive piling, or on suction caisson foundations which would require seabed clearance;
- there will be up to three offshore substations, installed on monopile or jacket type foundations using percussive piling;
- inter-array cables and export cables will be installed via either ploughing, jetting, trenching or post lay burial techniques;
- scour protection and cable protection may be required around the base of some or all foundations;
- inter-array and export cables will be buried, where possible, with a target burial depth of around 1m;
- the Scoping Boundary will avoid designated areas including the Offshore Overfalls MCZ and the Kingmere MCZ;
- maintenance activities will be undertaken for both preventive and corrective maintenance requirements;
- the operational lifetime of Rampion 2 is assumed to be a minimum of 30 years; and
- the decommissioning of the wind farm is anticipated to involve the removal of all offshore infrastructure above the seabed. Electrical cables will be left in-situ. The decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment and impact.

Embedded environmental measures

5.5.36 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on benthic subtidal and intertidal ecology (see **Table 5.2.2**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.5.37 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.5.3 Relevant benthic subtidal and intertidal embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-41	The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	DCO requirements or DML conditions.
C-43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	DCO requirements or DML conditions.
C-44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML conditions.
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details.	DCO requirements or DML conditions

Likely significant effects

5.5.38 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise, and the MMO 2012 review of post-consent monitoring, to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.5.39 The likely significant effects on benthic subtidal and intertidal ecology are summarised in **Table 5.5.4**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for benthic subtidal and intertidal ecology effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

5.5.40 This is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.5.4 Likely significant benthic subtidal and intertidal ecology effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Temporary habitat disturbance (Construction, Operation/Maintenance and Decommissioning)	C-43	Potential for significant effect to benthic and intertidal resources through temporary, direct habitat loss and disturbance	**Scoped in, detailed assessment**: The presence and extent of benthic and intertidal habitats and features will be informed though the use of existing and new site-specific survey data. The area of habitat disturbance will be defined using a precautionary approach. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats resilience and resistance to impacts.	Benthic subtidal & intertidal ecology	New site-specific data for benthic ecology receptors
Temporary increase in suspended sediment and sediment deposition (Construction, Operation/Maintenance and Decommissioning)	C-43	Potential for significant effect through smothering of sensitive benthic habitats and species.	**Scoped in, detailed assessment**: The effects on benthic and intertidal ecology from increased suspended sediment and sediment deposition will be informed by the findings and assessment of the Coastal Processes Chapter. The sensitivity of	Benthic subtidal & intertidal ecology	New site-specific data for benthic ecology receptors

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats resilience and resistance to impacts.		
Direct and indirect seabed disturbances leading to the release of sediment contaminants (Construction, Operation/Maintenance and Decommissioning)	N/A	Potential for significant effect through release of sediment bound contaminants into the water column.	**Scoped in, simple assessment**: The effects on benthic and intertidal ecology from changes to water quality will be informed by the findings and assessment of the Water Quality Assessment. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats resilience and resistance to impacts.	Benthic subtidal & intertidal ecology	The assessment will be informed by the findings of sediment contaminant analyses.
Long-term habitat loss / alteration (Operation)	C-41, C-43, C-45	Potential for significant through loss of suitable substrate or sensitive habitat	**Scoped in, detailed assessment:** The presence and extent of benthic and intertidal habitats and features will be informed though the use of existing and new site-specific survey data. The area of habitat loss will be defined	Benthic subtidal & intertidal ecology	New site-specific data for benthic ecology receptors

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			using a precautionary approach to determine the maximum loss of seabed. The presence and extent of benthic habitats and features will be informed though the use of existing and new site-specific survey data.		
Increased risk of introduction or spread of Marine Invasive Non-Native Species (MINNS) (Construction, Operation/Maintenance and Decommissioning)	C-95	Potential for significant effect through increased vessel movements during construction (e.g. ballast water) and may subsequently impact biodiversity and benthic ecology of the area.	**Scoped in, simple assessment:** The potential introduction or spread of MINNS and subsequent impact to local benthic ecology receptors will be assessed based on current industry understanding, available literature and expert knowledge.	Benthic subtidal & intertidal ecology	N/A
Colonisation of hard substrates (Operation)	C-44	Potential for significant effect through an increase in local biodiversity and alterations to benthic ecology.	**Scoped in, simple assessment:** The potential impacts on benthic ecology receptors will be considered in terms of effects on biodiversity and productivity. The area of introduction of hard substrate will be defined using a	Benthic subtidal & intertidal ecology	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			precautionary approach to determine the maximum area of impact. The sensitivity of habitat types to the impact will be determined through available literature and expert knowledge, based on the habitats resilience and resistance to impacts.		
Accidental pollution events (Construction, Operation/Maintenance and Decommissioning)	C-53	No likely significant effect	**Scoped out.** See rationale in section below **paragraph 5.5.41**.	N/A	N/A
EMF generated by inter-array and export cables (Operation)	C-41, C-45	No likely significant effect	**Scoped out.** See rationale in section below **paragraph 5.5.41**.	N/A	N/A
Noise pollution during construction related activities (Construction)	N/A	No likely significant effect	**Scoped out.** See rationale in section below **paragraph 5.5.41**.	N/A	N/A

Rationale for Impacts scoped out of assessment

5.5.41 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

5.5.42 Accidental pollution events are not considered to result in a significant effect on benthic subtidal and intertidal receptors. The magnitude of an accidental spill will be limited by the size of chemical or oil inventory on construction vessels. In addition, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by implementation of a Project Environmental Monitoring Programme (PEMP) and Marine Pollution Contingency Plan (MPCP) (embedded measure C-53), which will be approved by the relevant stakeholders and secured through DCO and COCP .

5.5.43 Impacts from changes in EMFs arising from cables, are not considered to result in a significant effect on benthic subtidal and intertidal receptors. EMFs are likely to be generated by subsea cables and detectable above background levels in close proximity to the cables. Although burial does not mask EMFs it increases the distance between species that may be affected by EMFs and the source. As the cable will be buried or protected (embedded measures C-41 and C-45) any behavioural responses would be mitigated. The magnitude is therefore considered to be negligible. It is considered unlikely that EMFs will result in a significant behavioural response that would cause a change in benthic communities within the benthic subtidal ecology study area.

5.5.44 Noise pollution on benthic ecology during construction related activities are not considered to result in a significant effect to benthic subtidal and intertidal receptors. It is generally accepted that the particle motion component of noise is most relevant to benthic species. While there are few studies looking at reactions of benthic invertebrates and in particular polychaetes and infaunal bivalves, it is likely that particle motion will dissipate in close proximity to the noise source. In addition, the noise will be temporary in nature and conditions will return to baseline following cessation of piling. It is proposed that this impact is therefore scoped out of the assessment.

Cumulative effects

5.5.45 Cumulative effects on benthic subtidal and intertidal ecology resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.5.46 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.

5.5.47 With regards to cumulative effects from offshore wind projects it should be noted that although there would be an aggregated direct and permanent loss of habitat

during the operational phase of the wind farm it is anticipated that, given the locality of the predicted impacts, cumulative impacts would not be considered significant. If the situation were to arise where several export cables were to be under construction concurrently, there may be potential for cumulative impacts to arise however these are not expected to be significant.

5.5.48 At this stage, impacts likely to be scoped into the cumulative effects assessment include:

- temporary increase in SSC and sediment deposition, during the construction phase;
- long-term habitat loss / change from the presence of foundations, scour protection and cable protection;
- colonisation of the WTGs and scour / cable protection may affect benthic ecology and biodiversity; and
- changes to seabed habitats arising from effects on coastal processes, including scour effects and changes in the sediment transport and wave regimes resulting in potential effects on benthic communities.

5.5.49 There is the potential for cumulative impacts from other activities occurring in the region, these include aggregate dredging, shipping and oil and gas exploration and development and subsea cabling. Whilst it is not considered likely that there would be significant cumulative impacts, all potential impacts (i.e. those listed for Rampion 2 in isolation) will be assessed as part of the EIA.

Transboundary effects

5.5.50 The potential effects from construction, operation (including maintenance) and decommissioning on benthic and intertidal receptors are considered in **Appendix B**. Due to the localised nature of any potential impacts, transboundary impacts are unlikely to occur and therefore it is suggested that this impact will be scoped out from further consideration within the EIA.

Proposed approach to PEIR and ES

5.5.51 The proposed approach to PEIR and ES with regards the study area of relevance, method of assessment and data to inform assessment have been identified in **paragraphs 5.9.2** et seq. The following section provides further context, including consultation and engagement, that will be undertaken to further inform the assessment.

5.5.52 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which is set out in **Section 4.3: Consultation and the evidence plan process**. Key consultees of relevance to the Benthic Subtidal and Intertidal Ecology Chapter include Natural England, the MMO, Cefas and the Sussex Wildlife Trust. Consultee responses will be addressed, and the scope of the assessment modified accordingly in the PEIR and ES chapter.

5.5.53 The benthic subtidal and intertidal ecology study area (**Figure 5.5.1**) was informed by tidal excursion and coastal processes modelling undertaken for the existing

Rampion 1 EIA (ABPmer, 2012), to reflect the furthest distance disturbed sediments are likely to travel. This study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways, and in response to feedback from consultation where appropriate. Additionally, information from site specific modelling, and information from the Coastal Processes Technical Report will also inform the final study area.

5.5.54 The baseline will be established through the compilation of both desk-based studies and site-specific field surveys. The key data sources to be utilised to inform the baseline and assessment are listed (**Table 5.5.1**) above. Site- specific surveys will help fill data gaps that currently exist across the Rampion 2 benthic subtidal and intertidal ecology study area. Surveys will identify the extent and distribution of key habitat types and features, with a focus on any species or habitats of conservation importance, that might exist across the area of interest. The methodology for the survey will be consulted on with key stakeholders in due course.

5.5.55 The precautionary approach scenarios on which the assessments will be based, will be defined in accordance with the Rochdale Envelope approach; the geographic footprint, the foundations proposed, and the piling hammer energies will be key considerations in defining the precautionary approach scenarios for benthic and intertidal receptors. Following this, the likely significant effects on receptors from the precautionary approach scenarios will be described and assessed.

5.5.56 The assessment of potential impacts on benthic and intertidal ecology receptors will take into account the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. The sensitivity of difference receptors will also be considered as part of the impact assessment. The sensitivity assessment of the species will take into account the current status of the species, and its importance (locally, regionally, nationally or internationally). The assessment will also include the consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.6 Commercial fisheries

Introduction

5.6.1 The commercial fisheries assessment will consider the potential likely significant effects on commercial fisheries receptors of relevance that may arise from the construction, operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.6.2 Commercial fisheries interfaces with other aspects and as such, should be considered alongside the following assessments:

- **Section 5.4 Fish and shellfish ecology**, which includes consideration of potential impacts on species of commercial importance**;** and
- **Section 5.10 Shipping and navigation**, which includes consideration of potential impacts on vessel routing and navigational safety.

Study area

5.6.3 The Rampion 2 Scoping Boundary is located within the northern portion of the International Council for the Exploration of the Sea (ICES) Division 7d (eastern English Channel) statistical area[7]; within the UK Exclusive Economic Zone (EEZ) waters, with the Scoping Boundary for the proposed array area located outside the 6 nautical mile (NM) limit. The majority of the array area is located between the 6 to 12 NM limits, with a small portion located outside the 12 NM limit. For the purpose of recording fisheries landings, ICES Division 7d is divided into statistical rectangles which are consistent across all Member States operating in the English Channel.

5.6.4 The study area is defined as ICES rectangle 30E9 as shown in **Figure 5.6.1**; noting that the Scoping Boundary occupies only a portion of this ICES rectangle.

5.6.5 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore project components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

[7] ICES standardise the division of sea areas to enable statistical analysis of data. Each ICES statistical rectangle is '30 min latitude by 1-degree longitude' in size (approximately 30 x 30 nautical miles). A number of rectangles are amalgamated to create ICES statistical areas.

620000 640000 660000 680000 700000 720000 740000

5680000 5660000 5640000 5620000 5600000 5580000 5560000

N

31E8 31E9 31F0

30E8 30E9 30F0

29E8 29E9 29F0

Basingstoke Farnborough Aldershot Guildford Reigate Sevenoaks Tonbridge Andover Farnham Godalming Crawley East Grinstead Haslemere Horsham Winchester Eastleigh Southampton Waterlooville Fareham Portsmouth Gosport Chichester Bognor Regis Littlehampton Worthing Hove Brighton Lewes Bexhill on Sea Hastings Eastbourne Lymington Cowes Selsey Ryde Newport Sandown

South Downs National Park

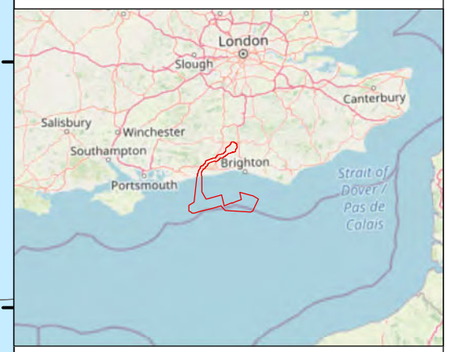
THE WEALD VALE OF KENT SOUTH DOWNS NORTH DOWNS SOLENT

Key

- Scoping Boundary
- Commercial fisheries study area

UK limits

- 12 NM
- 6 NM
- ICES statistical rectangles



Kilometres
0 2.75 5.5 11 16.5 22
1:500,000

Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 5.6.1 Study area for commercial fisheries (ICES rectangle 30E9)

EIA Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O5-0006				1.1
Company: Poseidon	Drawn By: FN	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL

Assessment methodology

Introduction

5.6.6 The project-wide approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this commercial fisheries aspect, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the commercial fisheries assessment.

5.6.7 Detailed analysis of baseline datasets (see 'Baseline conditions' below) will be undertaken in the EIA to characterise long-term (i.e. over several years) patterns in commercial fisheries activity across the study area and predict potential impacts upon future commercial fishing activities. Consultation with the commercial fishing industry will be undertaken to ground-truth available baseline data and gain further understanding of fishing activity by inshore vessels operating across the inshore portion of the study area. Analysis of data and the results of consultation will provide an extended baseline characterisation of the study area, which will underpin the impact assessment undertaken during the EIA.

5.6.8 Specific to commercial fisheries, the following guidance documents will also be considered:

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network [UKFEN] and Seafish, 2012);
- Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);
- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b); and
- Offshore Wind Farms – Guidance note for Environmental Impact Assessment in respect of Food and Environment Protection Act (FEPA) and Coast Protection Act (CPA) requirements (Cefas) , Marine Consents and Environment Unit [MCEU], Department for Environment, Food and Rural Affairs [DEFRA] and Department of Trade and Industry [DTI], 2004).

5.6.9 Impacts will be assessed for each relevant fleet / fishery active in the study area, and where relevant, impacts associated with the array area and the offshore cable corridor will be separately assessed.

Baseline conditions

Data sources

5.6.10 An initial desk-based review of literature and data sources was undertaken to support this scoping exercise, as presented in **Table 5.6.1** below.

5.6.11 **Table 5.6.1** also identifies additional sources of information that would be expected to inform assessment in the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

Table 5.6.1 Key sources of commercial fisheries data

Source	Date	Summary	Coverage of study area
Landings statistics. Sourced from the MMO.	2014 - 2018	Fisheries landings data for nationally registered fishing vessels landing to their home nation ports.	Full coverage
Vessel Monitoring System (VMS) data. Sourced from the MMO. Note that data from 2017 has been presented in this Scoping Report, but that longer term datasets will be used to inform the PEIR and ES.	2013 - 2017	VMS data for fishing vessels greater than 15m in length.	Full coverage
First sale value of fisheries landings. Sourced from the MMO and EU Market Observatory for Fisheries and Aquaculture (EUMOFA) database.	2014 - 2018	Landings sales values.	Full coverage
Key species stock assessments. Sourced from ICES, Cefas and the Sussex Inshore Fisheries and Conservation Authority (IFCA). Data from Sussex IFCA yet to be sourced, datasets will be used to inform the PEIR and ES	Various	Reports on the status of commercially fished species, which consider to what extent they are being exploited sustainably.	ICES: Full coverage Cefas: Full coverage IFCA: Coverage to 6 NM

Source	Date	Summary	Coverage of study area
Non-UK VMS data Sourced from ICES	2013 - 2017	VMS data for fishing vessels greater than 12m in length, utilising bottom contact gear. Note that VMS data for EU Member States is combined with UK VMS during this time period	Full coverage
Non-UK vessel landings Sourced from the Scientific, Technical and Economic Committee for Fisheries (STECF) and EU Member State agencies as appropriate. Data yet to be sourced.	To be sourced to inform PEIR and ES	Fisheries landings from STECF database is provided combined for the English Channel.	Full coverage
Aerial surveillance data. Sourced from the Sussex IFCA and MMO. Data yet to be sourced.	To be sourced to inform PEIR and ES	Sightings of fishing vessels recorded in UK waters on weekly surveillance fly-overs during daylight hours.	Full coverage (to be confirmed)
Regional fishing activity reports. Sourced from the East Channel Association (of marine aggregate companies).	2001 - 2014	Reports on regional fishing activity.	Full coverage
Rampion Offshore Wind Farm post-construction data/information. Sourced from Rampion Offshore Wind Ltd. Data yet to be sourced.	To be confirmed	Expected to include information on fishing activity held by the Company Fisheries Liaison Officer.	Rampion Offshore Wind Farm
Rampion Offshore Wind Farm Environmental Statement. Sourced from Rampion Offshore Wind Ltd.	2012	Commercial fisheries impact assessment. Now dated but provides useful context.	Full coverage

5.6.12 It should be noted that the quantitative datasets identified in **Table 5.6.1** may not capture all fishing activity in the commercial fisheries study area. For instance, the VMS dataset only covers vessels ≥15 m in length for the MMO dataset, and

vessels ≥12m in length for the ICES dataset. However, other published information is expected to provide a useful insight into fishing activity undertaken in inshore areas (e.g. including a number of Inshore Fisheries and Conservation Authority (IFCA) publications and aerial surveillance data) and consultation with fisheries stakeholders and will further inform assessment in the PEIR / ES. Consultation will be undertaken to gather additional baseline information and to provide insight into specific fishing grounds and activity of any vessels active in the area. Consultation will also be important to inform gear specifications for vessels active in the area, which will allow a full understanding of how they may be affected.

Baseline

5.6.13 The study area, comprising ICES rectangle 30E9, supports commercial fisheries landings with an annual average value of £5.5 million for the years 2014 to 2018 (MMO, 2019). The value of foreign vessel landings is not accounted for in this total.

5.6.14 **Figure 5.6.2** shows the top twelve species landed from the study area by annual average value. Landings of whelk (*Buccinum undatum*) accounted for almost 30 percent of the total UK vessel landed first sales value across the 2014 to 2018 period. **Figure 5.6.3** shows the top twelve species landed from the study area by weight; whelk again dominates. Whilst landings by weight of other species are markedly less, several have a high market value (e.g. sole and bass). These figures do not take into account landings made by non-UK vessels; analysis of EU-wide fisheries landings data indicates that French and Belgian vessels also actively fish in ICES rectangle 30E9, beyond the 6NM limit, targeting bass, sole and plaice, with landings of significantly less weight and value than those made by UK-registered vessels (EU DCF, 2019).

Figure 5.6.2 Top twelve species by average annual value (GBP) (2014 to 2016) landed from the study area (MMO, 2019)

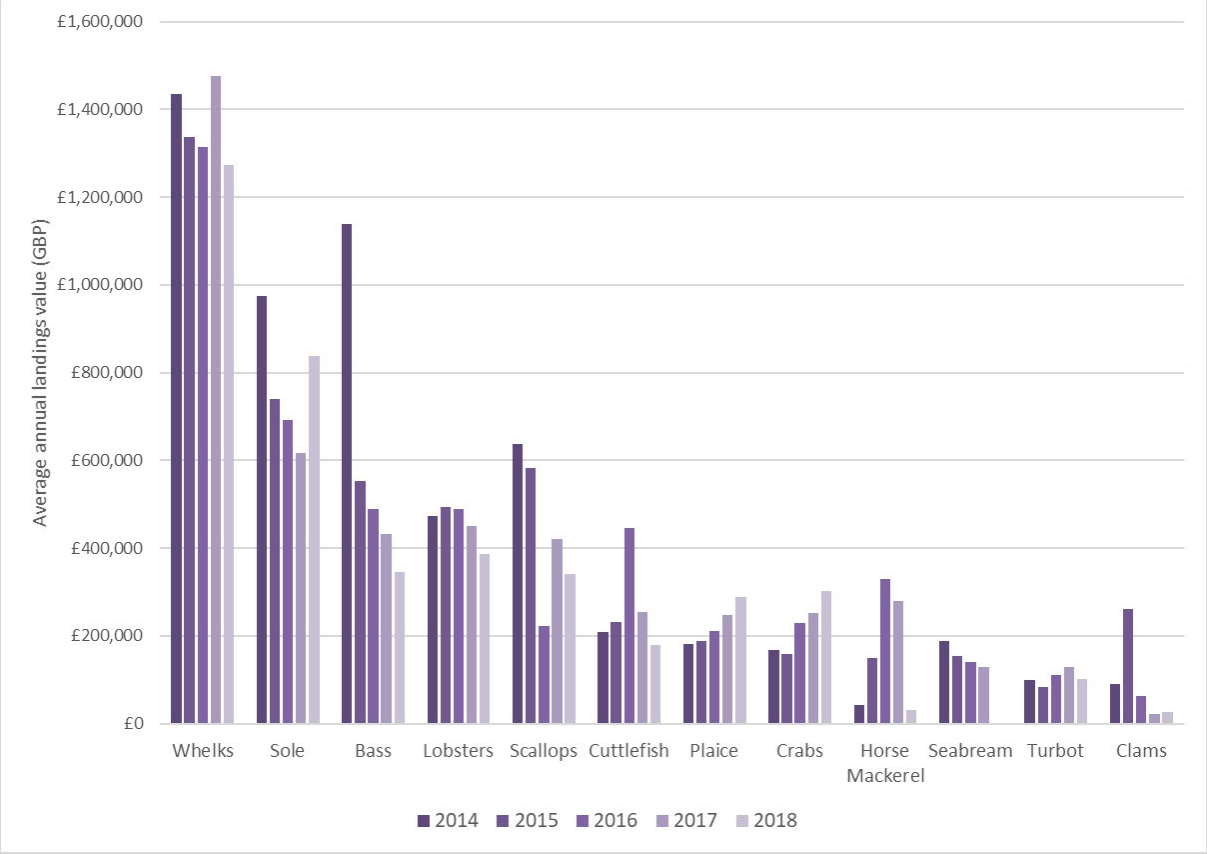
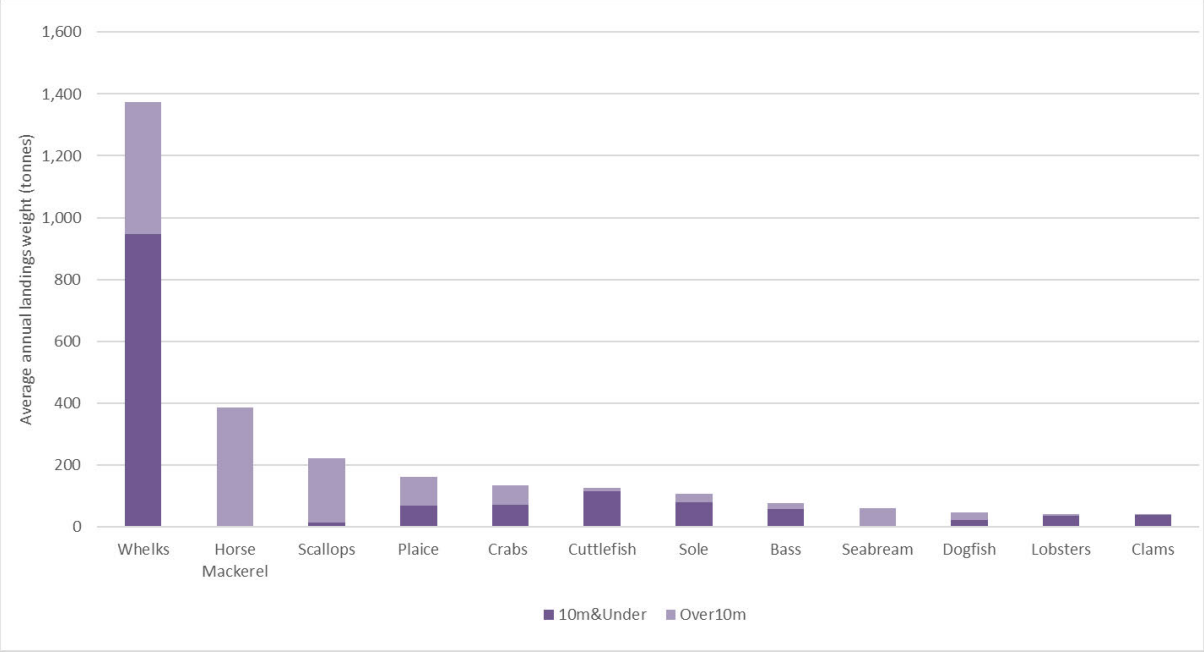


Figure 5.6.3 Top twelve species by average annual weight (tonnes) (2014 to 2016) landed from the study area, by vessel length (MMO, 2019)



5.6.16 Landings data indicates that fishing across the study area is dominated by UK, and predominantly English-registered, vessels of varying length. These vessels deploy a variety of gear types and are versatile in that many can alternate between gear types. In terms of landings value the predominant gear types are pots and traps, drift and fixed nets, and trawls. Vessels ≤10m length tend to operate inshore and land their catch daily. They target whelks (*Buccinum undatum)*, crabs, lobsters and cuttlefish (*Sepia officinalis*) with pots and traps; plaice (*Pleuronectes platessa*), sole (*Solea solea*), bass (*Dicentrarchus labrax*) and cuttlefish with nets; and bass with hooks. Vessels ≥10m length deploy pots to target the same species as the smaller vessels, and beam trawlers target plaice and sole. Demersal trawlers target mackerel (*Scomber scombrus*) and also land seabream (*Sparus aurata*) and dogfish (*Squalus acanthias*), and large dredgers target known scallop (Pe grounds, including a ground of particular local importance known as '9 Miler' (E.ON, 2012).

5.6.17 There is some presence of large (≥10m in length) Scottish vessels, targeting scallop with dredges, and of large Welsh beam trawlers primarily targeting plaice. As described above, Belgian beam trawlers target plaice and to a lesser extent sole, and French demersal and pelagic trawlers target a variety of species.

5.6.18 In terms of seasonality of fishing effort, landings data indicates that potting takes place year-round, with landings peaking in spring and summer months. Netting, demersal trawling and use of hooks and lines follows a similar trend, although higher levels of activity continue into the autumn. Landings from dredgers peak during autumn and winter months, and beam trawling activity peaks in late summer and autumn.

5.6.19 Catches from the study area are landed in local ports, including Shoreham, Portsmouth and Brixham.

5.6.20 In addition to analysis of landings data, recent VMS data have been mapped for UK vessels ≥15m in length within the commercial fisheries study area. Data indicates that some potting activity takes place within the array area at levels similar to those along the wider stretch of coastline (**Figure 5.6.4** -). Dredging also takes place within the array area, though greater dredge effort occurs further offshore to the south of the Scoping Boundary (**Figure 5.6.5**) in the middle of the English Channel. Beam and demersal trawling occurs within the Scoping Boundary, but more significant levels of trawling activity are observed inshore, inside of the 6NM limit, and offshore, beyond the 12 NM limit (**Figure 5.6.6** and **Figure 5.6.7**).

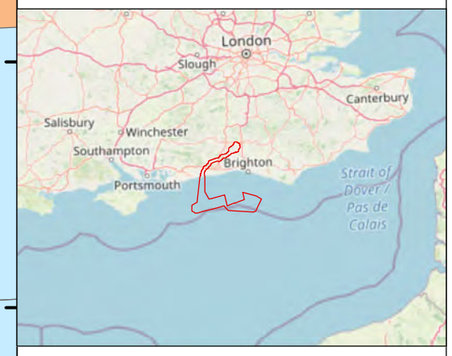
Key

- Scoping Boundary
- UK limits
  - 12 NM
  - 6 NM
- ICES statistical rectangles

UK pots and traps, 2017

Total value, £

- 0.1 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 25000
- 25001 - 50000
- 50001 - 103000



Kilometres
0 2.75 5.5 11 16.5 22
1:500,000

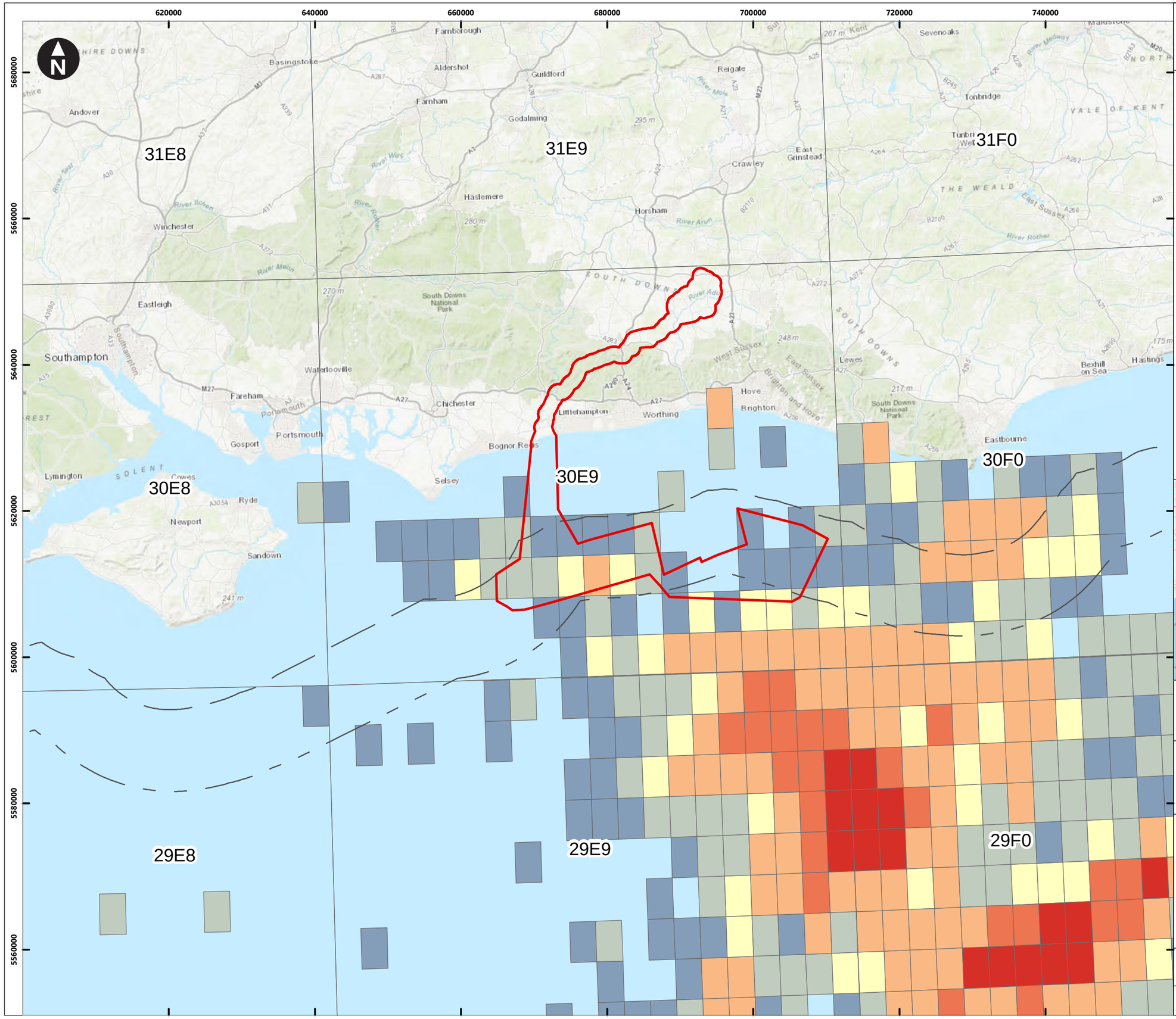
Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 5 .6.4 Vessel Monitoring System data for UK vessels (≥15m) actively fishing using pots or traps in 2017, indicating value of catch

EIA Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O5-0007				1.1
Company: Poseidon	Drawn By: FN	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL



Key

- Scoping Boundary

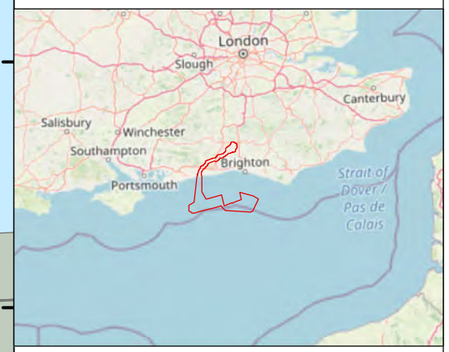
UK limits

- 12 NM
- 6 NM
- ICES statistical rectangles

UK dredge, 2017

Value, £

- 0.1 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 50000
- 50001 - 100000
- 100001 - 314000



Kilometres
0 2.75 5.5 11 16.5 22
1:500,000

Rampion Extension Development

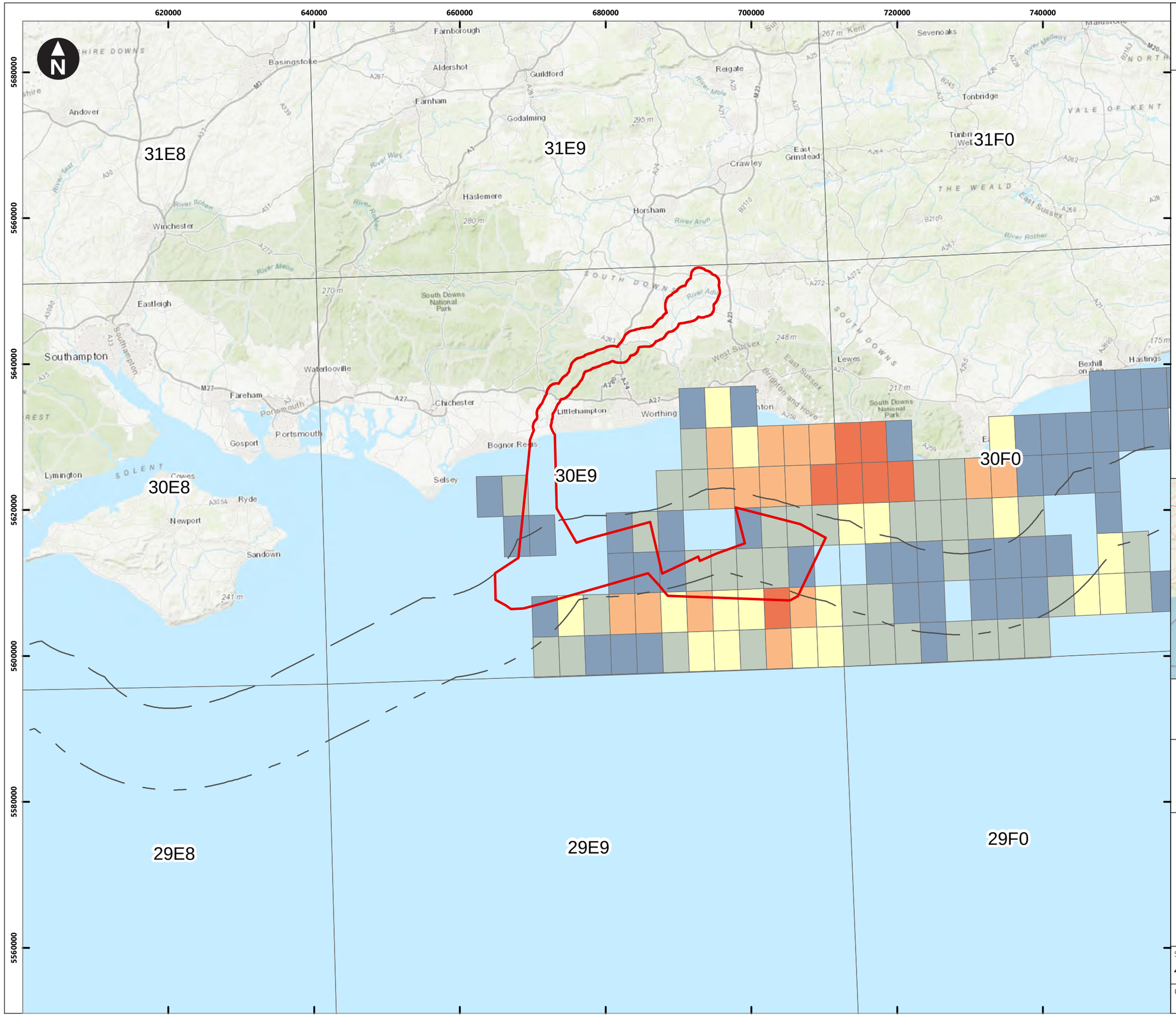
Rampion 2 Offshore Wind Farm

Figure 5.6.5 Vessel Monitoring System data for UK vessels (≥15m) actively fishing using dredge in 2017, indicating value of catch

EIA Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O5-0008	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Poseidon	FN	WOOD	21/05/2020	FINAL



Key

- Scoping Boundary

UK limits

- 12 NM
- 6 NM
- ICES statistical rectangles

UK beam trawl, 2017

Value, £

- 0.1 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 20000
- 20001 - 50000
- 50001 - 81000

Kilometres

0 2.75 5.5 11 16.5 22

1:500,000

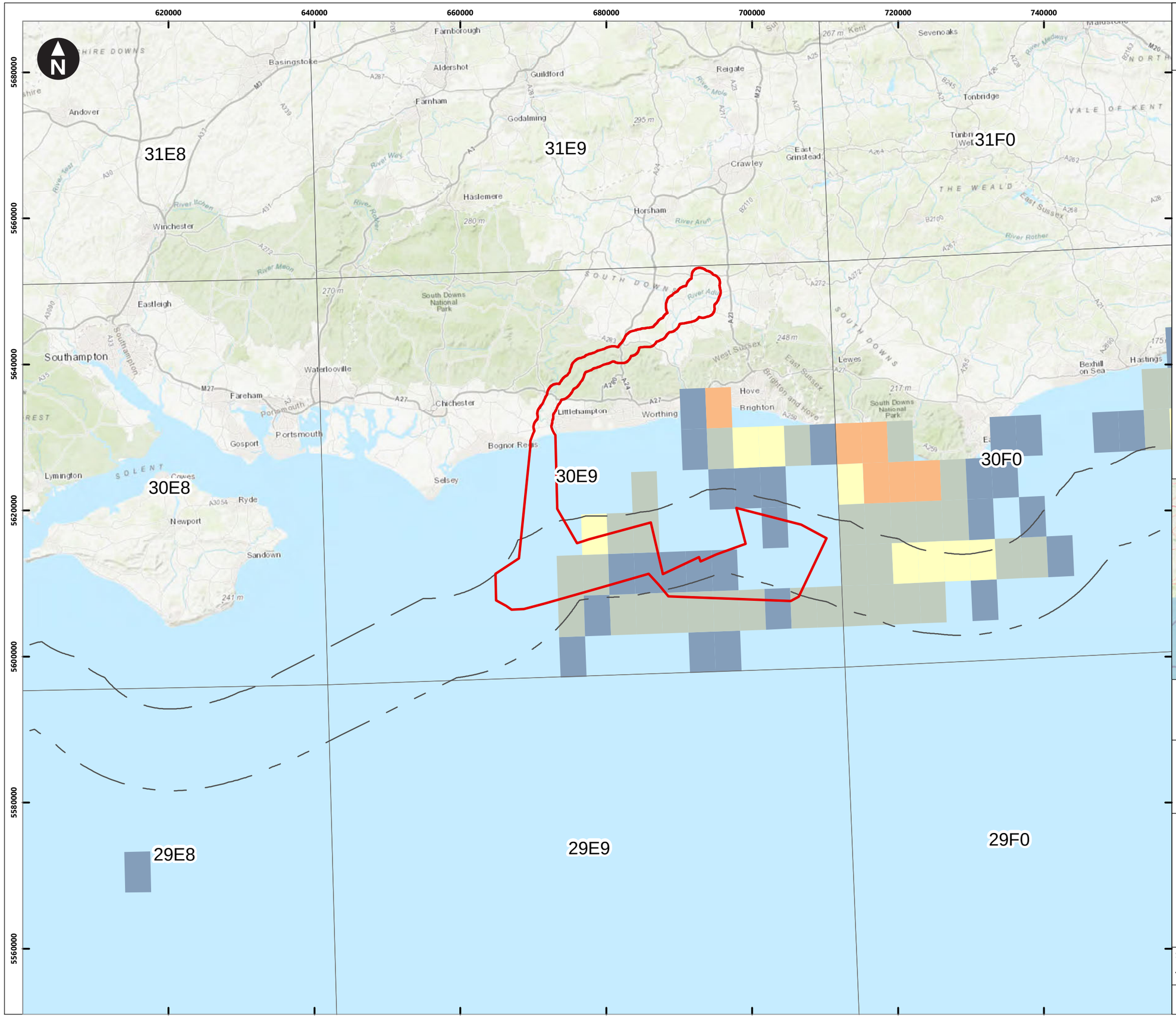
Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 5.6. 6 Vessel Monitoring System data for UK vessels (≥15m) actively fishing using beam trawl in 2017, indicating value of catch

EIA Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O5-0009				1.1
Company: Poseidon	Drawn By: FN	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL



Key

- Scoping Boundary
- UK limits
  - 12 NM
  - 6 NM
- ICES statistical rectangles
- UK otter bottom trawl, 2017
- Value, £
  - 0
  - 1 - 1000
  - 1001 - 5000
  - 5001 - 10000
  - 10001 - 25000
  - 25001 - 75000
  - 75001 - 100000

Kilometres
0 2.75 5.5 11 16.5 22
1:500,000

Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 5.6. 7 Vessel Monitoring System data for UK vessels (≥15m) actively fishing using demersal otter trawls in 2017, indicating value of catch

EIA Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O5-0010	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Poseidon	FN	WOOD	21/05/2020	FINAL

5.6.22 As noted above, VMS data do not capture the activity of smaller vessels operating inshore. Mapping of inshore fishing effort between 2013 and 2017 by the Sussex IFCA (Nunn and Nelson, 2018) based on fisheries patrol vessel sightings indicates that within the nearshore cable corridor, vessels are potting, predominantly for whelks, but also for crab, lobster and cuttlefish (the latter caught with traps), and pair trawling for seabream and bass. Fixed netting activity targeting mixed species including plaice, sole and bass is also recorded, though effort is greater to the east of the cable corridor.

Designated sites

5.6.23 In order to protect particular features of designated sites, fisheries management mechanisms may be put in place. These mechanisms can include spatial closures, permit schemes, effort controls, vessel size and fishing gear restrictions and seasonal fishing restrictions. These mechanisms are implemented by the relevant IFCA in waters out to 6NM and by the MMO in waters between 6 and 12NM.

5.6.24 Within designated sites that are proximate to the Scoping Boundary, closures to protect designated features have been established. Within Kingmere Marine Conservation Zone (MCZ), adjacent to the proposed cable corridor, spatial and temporal fishing closures and catch limits have been put in place via IFCA byelaws to aid the conservation of black seabream. Fisheries management measures within Offshore Overfalls MCZ to the south of Rampion 2 are yet to be established.

Basis for scoping assessment

5.6.25 The commercial fisheries scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- up to 116 WTGs;
- associated wind turbine foundations and scour protection;
- up to three substations and associated foundations;
- inter-array cables;
- export cables to connect the wind farm area to the landfall with an area of approximately 74km^2;
- construction activity taking place across approximately two years;
- Rampion 2 being operational for a minimum of 30 years; and
- decommissioning involving removal of the majority of wind farm infrastructure, with potential for cables and scour/cable protection remaining in-situ.

5.6.26 The basis for assessment also includes embedded mitigation, detailed below, where appropriate.

Embedded environmental measures

5.6.27 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on commercial fisheries (see **Table 5.6.2**). These will evolve over the development process as the EIA progresses and

in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.6.28 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.6.2 Embedded environmental measures relevant to commercial fisheries

ID	Environmental measure proposed	How the environmental measures will be secured
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins. The undertaker must ensure that a local notice to mariners is issued at least 14 days prior to the commencement of the authorised project or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant location.	DCO requirements or DML conditions.
C-47	Ongoing liaison with fishing fleets will be maintained during construction, maintenance and decommissioning operations via an appointed Fisheries Liaison Officer and Fishing Industry Representative.	DCO requirements or DML conditions.
C-56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and	Electricity application procedures (Section 95 of Energy Act 2004)

ID	Environmental measure proposed	How the environmental measures will be secured
	decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	
C-62	RED will comply with legal requirements with regards to shipping, navigation and aviation marking and lighting.	DCO requirements or DML conditions.

Likely significant effects

5.6.29 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.6.30 The likely significant effects on commercial fisheries are summarised in **Table 5.6.3**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for commercial fisheries effects and professional judgement. The approach to this assessment is set out in **Chapter 4**.

5.6.31 This is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.6.3 Likely significant commercial fisheries effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Reduction in access to, or exclusion from established fishing grounds (Construction, Operation and Maintenance and Decommissioning)	C-46 C-47	Installation/operation and maintenance/decommissioning activities and physical presence of constructed Rampion 2 infrastructure leading to reduction in access to, or exclusion from established fishing grounds. Potential for some loss of fishing Opportunities, though effect is expected to be localised, and the operational range of relevant fleets will not typically be limited to the array area / offshore cable corridor.	**Scoped in (simple assessment).** Baseline data analysis and consultation will be undertaken in order to characterise commercial fisheries activity in the study area and consider the dependence of fleets on grounds in the array area and offshore cable corridor, and access to alternative grounds. The effects of exclusion/reduced access will be assessed. Understanding of the baseline will be informed by the most up-to-date versions of publicly available data (see **Table 5.6.1**) and consultation with fleets active in the study area to understand the specifics of	UK and non-UK fishing fleets	Most up-to-date versions of publicly available data sources (e.g. UK landings data for 2019 will be available). Consultation with fleets active in the area to corroborate findings of data analysis and understand the specifics of fleet operation and grounds targeted.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			fleet operation and grounds targeted.		
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds (Construction, Operation and Maintenance and Decommissioning)	C-46 C-47	Displacement from the Rampion 2 array area and offshore cable corridor leading to gear conflict and increased fishing pressure on adjacent grounds. Potential for displacement of fishing activity, though effect is expected to be short-term and localised, and the operational range of relevant fleets will not typically be limited to the array area / offshore cable corridor.	**Scoped in (simple assessment).** Baseline data analysis and consultation will be undertaken in order to characterise commercial fisheries activity in the study area and consider the dependence of fleets on grounds in the array area and offshore cable corridor, and access to alternative grounds. The nature and extent of displacement and implications for/of gear conflict will be assessed. Understanding of the baseline will be informed by the most up-to-date versions of publicly available data (**Table 5.6.1**) and consultation with fleets active in the study area to	UK and non-UK fishing fleets	As above

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			understand the specifics of fleet operation and grounds targeted.		
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity (Construction, Operation and Maintenance and Decommissioning)	C44	Array area and offshore cable corridor installation/operation and maintenance/decommissioning activities activities leading to disturbance of commercially important fish and shellfish resources and therefore displacement or disruption of fishing activity.	**Scoped in (simple assessment).** Assessment will be informed by the outcomes of the Fish and Shellfish Ecology impact assessment and it will be assumed that commercial fisheries will be affected as a result of any loss of resources. The conclusions presented in the Fish and Shellfish Ecology impact assessment regarding impact significance will be considered in determining the magnitude of impact on commercial fisheries.	UK and non-UK fishing fleets	As above
Increased vessel traffic associated with Rampion 2 within fishing	C-46 C-47 C-56	Movement of vessels associated with Rampion 2 adding to the existing volume of marine traffic in the area,	**Scoped in (simple assessment).**	UK and non-UK fishing fleets	As above

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
grounds leading to interference with fishing activity (Construction, Operation and Maintenance and Decommissioning)		leading to interference of fishing activity.	Assessment will be informed by the outcomes of the Shipping and Navigation impact assessment (NRA); the conclusions presented in the Shipping and Navigation impact assessment will be considered in determining the magnitude of impact on commercial fisheries.		
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the Rampion 2 area (Construction, Operation and Maintenance and Decommissioning)	C-46 C-47	**No likely significant effect.**	**Scoped out.** Rationale provided in the section below **paragraph 5.6.32**).	N/A	N/A
Physical presence infrastructure leading to gear snagging	C-45 C-46 C-47 C-62	Standard industry practice and protocol (e.g. seabed infrastructure will be buried and/or marked on nautical	**Scoped in (simple assessment).**	UK and non-UK fishing fleets	As above

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(Operation and Maintenance and Decommissioning)		charts) will minimise the risk of gear snagging, but it remains likely to be an area of industry concern.	Baseline data analysis and consultation will be undertaken in order to characterise commercial fisheries activity in the study area and consider the dependence of fleets on grounds in the array area and offshore cable corridor and access to alternative grounds. The potential nature of gear snagging and associated implications will be assessed. Understanding of the baseline will be informed by the most up-to-date versions of publicly available data (see) and consultation with fleets active in the study area to understand the specifics of fleet operation and grounds targeted.		

Impacts scoped out of assessment

5.6.32 Additional steaming to alternative fishing grounds for vessels that would otherwise fish within Rampion 2 (during construction, operation, decommissioning) has been scoped out from further assessment.

5.6.33 This effect will be localised to safety zones and installed structures and therefore limited deviations to steaming routes are expected. Given adequate notification, it is expected that vessels, which typically have an operational range beyond that of Rampion 2 (as indicated by VMS and IFCA data presented above), will be in a position to avoid temporary construction/decommissioning areas and installed infrastructure with no or minimal impact on their steaming times.

Cumulative effects

5.6.34 It is likely that there will be cumulative effects which require assessing due to the spatial scope of the Proposed Development and associated assessment. A list of developments requiring consideration for assessment will be provided at PEIR.

5.6.35 Cumulative effects on commercial fisheries resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.6.36 The potential impacts considered in the cumulative assessment will be in line with those described above for the project-alone assessment, though it is possible that some will be screened out on the basis that the impacts are highly localised (i.e. they occur only within the Rampion 2 boundary) or where management measures in place for Rampion 2 and other projects will reduce the risk of impacts occurring.

5.6.37 For the purposes of cumulative impact assessment, it will be assumed that already-operational offshore wind farms and active licensed activities constitute part of the existing baseline environment, as commercial fisheries would already be adapted to them and any effect they might have had will be reflected in the baseline characterisation undertaken to inform impact assessment.

Transboundary effects

5.6.38 The potential effects from construction, operation (including maintenance) and decommissioning on commercial fisheries receptors are considered in **Appendix B**.

5.6.39 International fishing fleets – notably French and Belgian fleets - are known to operate in the study area. As such, transboundary impacts will be considered and their assessment will be integrated into the construction, operation, decommissioning and cumulative impact assessments.

5.6.40 Consultation with stakeholders in other relevant Member States, and data gathered from other relevant Member States, will inform the assessments.

Proposed approach to PEIR and ES

5.6.41 It is intended that full acquisition and analysis of the baseline data sources listed in

5.6.42 **Table 5.6.1** is completed to inform an extended baseline characterisation of the commercial fisheries study area, which will be presented in the PEIR. Data analysis will be supported by consultation with the fishing industry and other relevant stakeholders, including the following:

- The MMO;
- National Federation of Fishermen's Organisations (NFFO);
- Sussex IFCA;
- Local Fishermen's Associations and Producer Organisations;
- Rederscentrale (Belgium) and any other EU Member State representative organisations as identified during baseline data analysis; and
- individual fishermen as identified by the Company FLO / other means.

5.6.43 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process or the wider stakeholder engagement programme which as set out in **Section 4.3: Consultation and the evidence plan process**. Consultation will not only seek to support baseline characterisation, but to identify key stakeholder concerns to inform the impact assessment.

5.6.44 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA.**

5.7 Marine mammals

Introduction

5.7.1 The marine mammal assessment will consider the potential likely significant effects on marine mammals that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.7.2 The marine mammals assessment interfaces with several other aspects, and as such, should be considered alongside these; in particular:

- **Section 5.4: Fish and shellfish ecology** principally in relation to possible effects on prey resource and habitat; and
- **Section 5.5: Benthic subtidal and intertidal ecology** principally in relation to possible effects on prey resource and habitat.

5.7.3 All of these aspects will also be informed by underwater noise modelling, a technical report for which will follow at PEIR Study area

5.7.4 The study area for the marine mammal assessment is defined as the area of the Scoping Boundary together with the Zone of Influence (ZOIs), the latter defined by

the potential for a significant effect from underwater noise (to be defined by underwater noise modelling for PEIR) but also by wider Management Unit extents[8], to reflect the highly mobile nature of marine mammals. As such, the study area includes the Rampion 2 marine mammal survey area (**Figure 5.7.1)**, which extended across the majority of the offshore Scoping Boundary plus a 4km buffer, in the wider context of the relevant Management Unit for individual species.

5.7.5 The project specific digital aerial surveys were planned in early 2019 and therefore early during the Rampion 2 planning process. Since the initiation of the surveys, there has been the addition of Zone 6 to the potential area of development which has consequently led to an increase in the Scoping Boundary area. The result is that a small area in the extreme eastern extent of the Scoping Boundary is not covered by the digital aerial surveys. This is acknowledged and will be considered in finalising the project boundary.

[8] A defined area for management of a particular marine mammal population

660000
680000
700000
720000
5640000
5620000
5600000
5580000
N
National Park
A29
A26
A22
Steyning
A27
Lewes
A23
A27
Arundel
A280
Brighton & Hove
A27
Shoreham-By-Sea
Hove
Brighton
Lancing
A259
Worthing
Littlehampton
East Saltdean
Newhaven
Seaford
Bognor Regis
Sussex Bay
Brackleshам Bay
Selsey
London
Portsmouth

Data derived from RWE data © RWE 2020

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

Key

- Scoping Boundary
- Marine mammals survey area

Kilometres
0 1.25 2.5 5 7.5 10
1:250,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.7.1 Marine Mammals Survey Area

Scoping Report

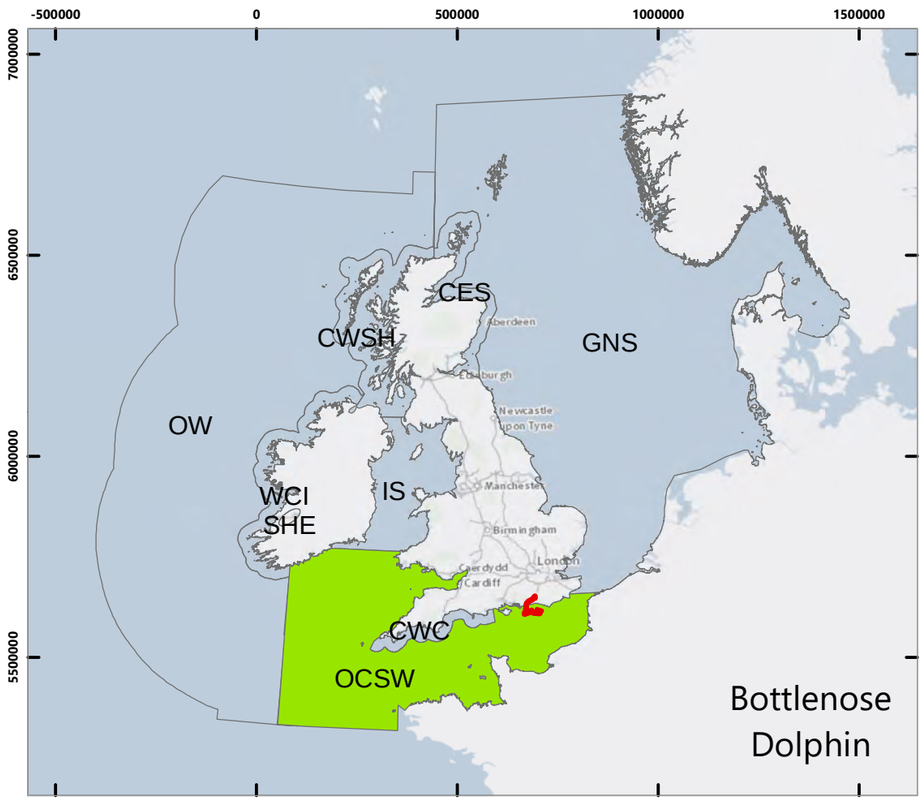
System Identifier:	Version:
42285-GOBE-SC-OF-DR-11-0001	1.1

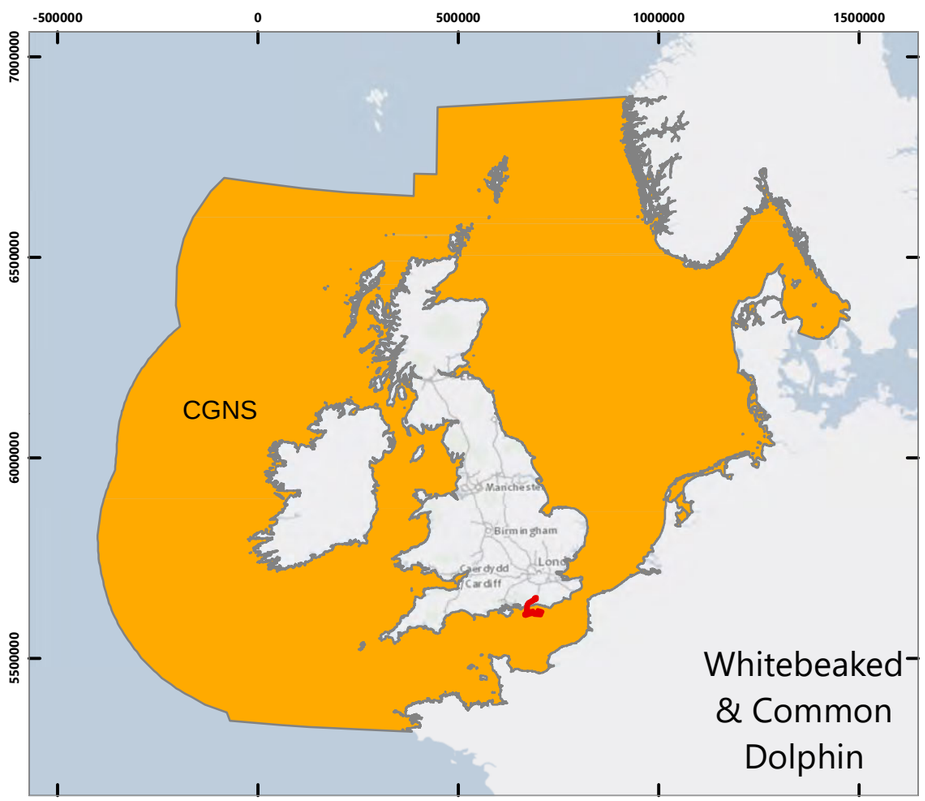
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	21/05/2020	FINAL

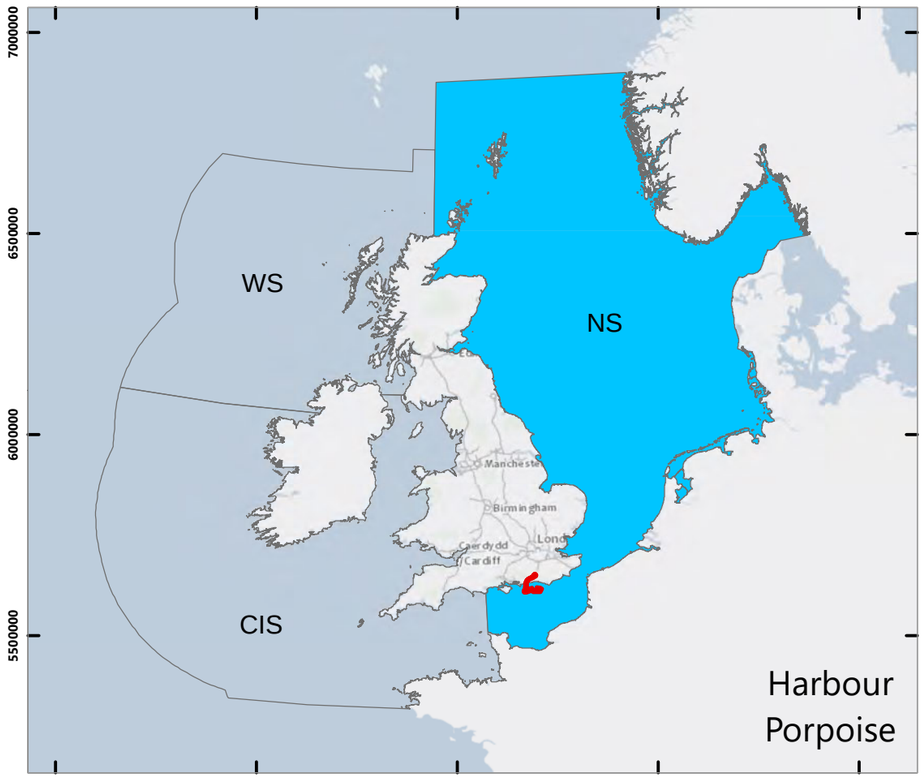
5.7.6 When considering the wider Management Unit scale study area, the potential species that may be found at Rampion 2 need to be taken into account. For the existing Rampion 1 project, the ES reported six species of marine mammal during site specific surveys: harbour porpoise, bottlenose dolphin, white-beaked dolphin, minke whale (assumed), common (harbour) seal, and grey seal. Rampion 2 surveys completed to date (January 2020) have recorded harbour porpoise, common dolphin, unidentified dolphin and unidentified phocid seal.

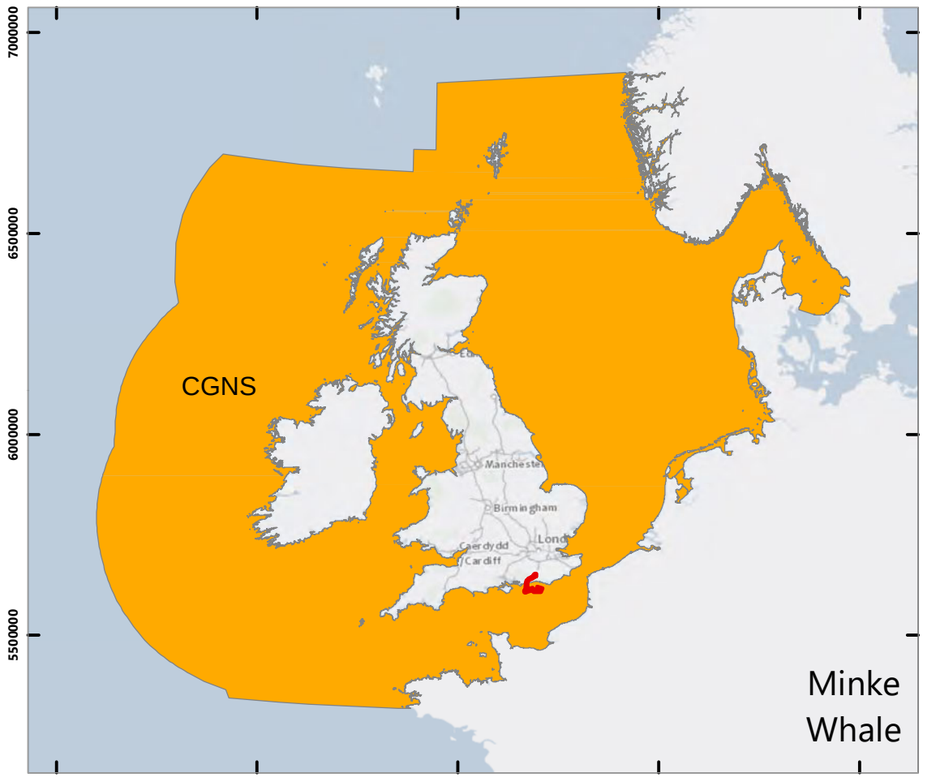
5.7.7 Different cetacean species have different Management Units, with the relevant area provided for cetacean species given in IAMMWG, 2015. For seals, Rampion 2 lies close to the boundary of two seal Management Units, the south east England and south England units (as depicted in SCOS, 2018). The relevant cetacean Management Units for species named above (i.e. harbour porpoise, bottlenose dolphin, white-beaked dolphin, common dolphin and minke whale) are depicted in **Figure 5.7.2**.

5.7.8 The study area applied at PEIR will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of impact pathways (particularly underwater noise once project specific underwater noise modelling has been completed), evidence of wider connectivity and in response where appropriate to feedback from consultation.









Key

Legend

- Scoping Boundary
- Cetacean Management Units (MU)
- North Sea (MU)
- Offshore Channel, Celtic Sea & SW England (MU)
- Celtic and Greater North Seas (MU)

Kilometres

0 85 170 340 510 680

1:15,328,792

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.7.2 Cetacean Management Units

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-11-0002				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL

Assessment methodology

Introduction

5.7.9 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this marine mammal chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the marine mammal assessment.

Broad approach to assessment

5.7.10 The first step to the assessment methodology is to define the baseline conditions across the study area, which for marine mammals primarily relates to defining the diversity and abundance / density of species present and how that varies spatially and temporally. That is being achieved for EIA through a combination of specific surveys, being conducted monthly across a two year period, together with wider marine mammal data (including that from the existing Rampion 1 project). That information will be used to provide information on species density and diversity found within Rampion 2 and the wider ZOI, including (where data are available) how diversity and density may vary during the year. The wider marine mammal data draws on a desk top assessment, including key marine mammal references across the relevant Management Units.

5.7.11 Baseline marine mammal surveys for Rampion 2 started in April 2019 and are planned to continue on a monthly basis for 2 years from that point. These surveys build on the 30 surveys undertaken for the existing Rampion 1 project, which covered a two year period between March 2010 and February 2012. These site-specific surveys are placed in a wider context of regional and national marine mammal surveys, all of which demonstrate a relatively low diversity and density of marine mammals at Rampion 2. Although it is likely that final reporting for the Rampion 2 surveys will not be available in time for PEIR, it is considered that the information that will be available will be sufficient for purpose at that stage, particularly given the marine mammal densities found at the site and the lack of any designated areas within the vicinity. It is unlikely that the later surveys would identify additional marine species (and in any case, the main hearing frequency groupings as defined by Southall *et al*, 2019, are already known to be present and will be included to an appropriate extent within the assessment). Further, the relevant embedded environmental measures (see **Table 5.2.2**) follow existing best practice and would similarly not change following additional site-specific data.

5.7.12 Where sufficient species counts are available for individual species from the site-specific surveys, species density will be calculated, with the application of appropriate corrections for availability bias.

5.7.13 Understanding of the baseline environment for marine mammals also draws on wider aspects, notably benthic ecology and fish ecology but also physical processes, as these provide information on the potential prey resource and the environment within which species occur. The potential for effect on the baseline environment has been drawn from the project design with the consideration of impacts scoped in made based on expert judgement (with supporting evidence where relevant), and in the context of embedded environmental measures.

Baseline conditions

Data sources

5.7.14 Baseline data have been sourced from the available survey reports together with an initial desk-based review of literature and existing data sources. The data sources are summarised in **Table 5.7.1** and provide details of the coverage of Rampion 2 and, where relevant, the wider study areas. Site specific surveys have adopted an aerial methodology, utilising a high-resolution camera system to capture digital still imagery. The aerial surveys capture data along transects with nodes spaced 3km apart within the Survey Area and 4km buffer. The survey method has been designed to optimise the data collection for all bird and marine mammal species, using a grid-based survey design at 2 cm resolution to achieve approximately 10% coverage. It should be noted that the Rampion 2 monthly surveys commenced in April 2019 and are scheduled to cover a two year period in total.

5.7.15 It is important to note that at this stage, the information sources, guidelines, assessment methods and reports applied through this section, may be supplemented and / or updated where appropriate for assessments at the PEIR and ES stages of the DCO Application. Furthermore, the marine mammal evidence base is constantly expanding with new information becoming available regularly. RED will ensure to stay abreast of new evidence and will consider its usage where appropriate, as necessary.

Table 5.7.1 Key sources of marine mammal data

Data source	Date	Summary	Coverage of study area
Rampion 2 Monthly Report Final	Monthly from April 2019 to present (most recent report January 2020)	Monthly aerial surveys over the English Channel. Species sighted are recorded, including if the individual animal was surface or submerged. Note that as a result of COVID-19, the April 2020 survey was conducted in late March with approval from Natural England.	Scoping Boundary plus 4km buffer
Existing Rampion 1	March 2010 to February 2012	Scope of the monthly boat based surveys agreed with Natural England, with 30 surveys completed at a rate of 1-2 surveys per month. Six marine mammal species identified; harbour porpoise, bottlenose dolphin, white-beaked dolphin, minke whale, harbour/common seal and grey seal. The ES provides density of harbour porpoise, with interpretation of Figure 10.9 indicating a density from 0-0.14 animals/km^2, and all median values being below 0.05 animals/km^2.	Survey area included The Crown Estate Zone 6 with a 5km buffer, the adjacent control areas and the proposed export cable corridor.
Seawatch Foundation	Ongoing	Rampion 2 sits within Seawatch area 16-18 (Dungeness, Worthing, Christchurch). Recent sightings are dominated by harbour porpoise, bottlenose dolphin and common dolphin.	Extends across the Rampion 2 Scoping Boundary and wider eastern Channel region.
Russell *et al*, 2017. Updated Seal Usage Maps: The Estimated at-sea	2017	Includes data on seal haul out counts and seal tagging (seals tagged in the UK). Raw tagging and haul out data indicate no usage of the English Channel by grey seal and some usage by harbour seal around the	Extends to UK waters – therefore covers the entire Rampion 2 study area

Data source	Date	Summary	Coverage of study area
Distribution of Grey and Harbour Seals		Solent and surrounding harbours. Mean at sea usage (modelled) for grey and harbour seals across the Rampion 2 study area is 0<1 animals/km^2.	
ORCA The State of European Cetaceans	2019	Includes cetacean sightings data from a variety of sources with survey effort across English Channel (the closest to Rampion 2 being the Portsmouth to Caen ferry crossing) being relatively high. The English Channel has relatively lower sightings rates than other areas of the UK, with sightings east of the Isle of Wight towards the North Sea dominated by harbour porpoise.	Extends to UK waters – therefore covers the entire Rampion 2 study area
Hammond *et al*, 2017 Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys	2017	The third large scale survey of cetaceans in the NE Atlantic, undertaken by air and boat. Provides abundance estimates for main species. Rampion 2 is in Block C, with an estimated density of harbour porpoise of 0.213 animals/km^2. Common or striped dolphin have a density of 0.022 animals/km^{2,} minke whale density is 0.002 animals/km^2. Low sightings numbers for all species other than harbour porpoise in Block C meant abundance and density estimates were limited to few species.	Extends to UK waters – therefore covers the entire Rampion 2 study area
Heinanen & Skov, 2015 The identification of discrete and persistent areas of relatively high	2015	Analysis of 18 years of survey data to predict areas of persistent high harbour porpoise density in UK waters, used to determine potential locations for Special Areas of Conservation for harbour porpoise.	Extends to UK waters – therefore covers the entire Rampion 2 study area

Data source	Date	Summary	Coverage of study area
harbour porpoise density in the wider UK marine area			
SCOS, 2018	2018	Annual report on UK harbour and grey seal haul out and pupping including population trends. The closest grey seal colonies to Rampion 2 highlighted two less frequently surveyed colonies, one in south Devon and one just east of Dover. Harbour seal count numbers are provided for area 10 (southern England, from south Devon to Camber) and area 9 (south east England, from Camber to Flamborough Head).	Extends to UK sites – therefore covers the entire Rampion 2 study area
Vincent *et al*, 2017 Grey and harbour seals in France: Distribution at sea, connectivity and trends in abundance at haul-out sites	2017	Both harbour seal and grey seal haul outs along the French coastline of the English Channel have increased (1990-2015). Grey seal at sea density in the immediate vicinity of Rampion 2 appears to be low, increasing east of Dungeness. Harbour seal tagging in French waters appears to show no connectivity to the UK, whereas grey seal tagged data indicates connectivity to the eastern end of the English Channel and separately towards the western end of the Channel.	Data from the north and west French coast and English Channel, extending to the UK. Includes the study area as far as the English Channel extents.
Waggitt *et al*, 2019 Distribution maps of cetacean and seabird	2019	Combines a number of datasets to provide heat map distribution data for key cetacean species across UK waters for January and July.	Extends to UK waters – therefore covers the entire Rampion 2 study area

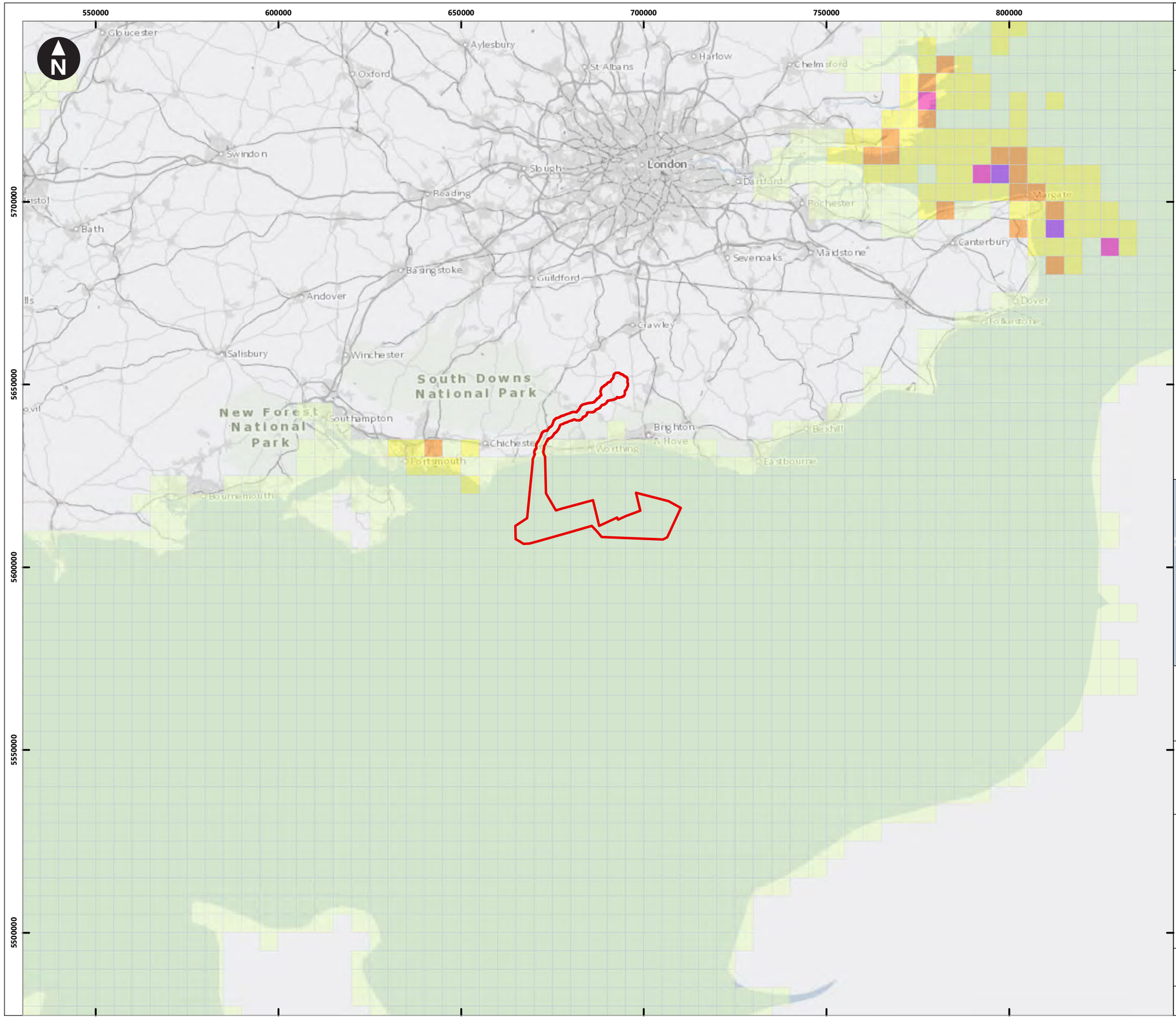
Data source	Date	Summary	Coverage of study area
populations in the North-East Atlantic			

Baseline

5.7.16 The broadscale marine mammal data available clearly shows that the eastern English Channel (east of the Isle of Wight to Dungeness) typically holds a relatively low density and diversity of cetacean species. Harbour porpoise are the species most commonly found, with Hammond *et al.* (2017) reporting an average density of 0.213 animals/km^2 within the eastern English Channel. Harbour porpoise, which are relatively common throughout UK coastal waters, increase in density within the North Sea where they can be found at densities in excess of 0.8 animals/km^2 in several of the SCANS units. Heinenan and Skov (2015) modelled where a high density of harbour porpoise was predicted to occur over time and throughout the year, confirming relatively low densities in the English Channel. Other cetacean species that may be found in the wider English Channel (drawing on the literature summarised in **Table 5.7.1** include common dolphin and bottlenose dolphin, together with (less commonly) Risso's dolphin and minke whale although density values, where provided in Hammond *et al* (2017) for the English Channel, tend to be much lower than for harbour porpoise (by an order of magnitude or more).

5.7.17 Both harbour and grey seals can be observed within the English Channel, albeit at typically lower numbers than other areas of the UK. The closest location where harbour seals are likely to haul out is around the Solent and adjacent harbours, where low numbers of harbour seal hauled out have been counted (5-23 individuals, SCOS, 2018). Significantly larger harbour seal haul outs can be found moving into the North Sea, including the outer Thames, around Norfolk and the Wash. Seal tagging data (Russell *et al*, 2017) indicates low harbour seal densities at sea in the English Channel, being less than 1 individual/km^2. The UK harbour seal population was estimated to be 32,600 individuals in the period 2015-2017 (SCOS, 2018). Harbour seal at sea density is depicted in **Figure 5.7.4.**

5.7.18 In the UK, the closest grey seal haul out sites to Rampion 2 (SCOS, 2018) are found at two infrequently surveyed locations in south Devon (total SW England grey seal pup numbers in 2015 were 350) and to the east of Dover (no numbers provided). The UK grey seal population in 2017 was estimated at 150,000. Grey seal tagging data indicates a degree of connectivity between grey seals towards the western end of the English Channel and those towards the eastern end of the English Channel, but not connectivity east to west (Vincent *et al*, 2017). Seal tagging data (Russell *et al.,* 2017) indicates low grey seal densities at sea in the English Channel, being less than 1 individual/km^2. Grey seal density at sea is depicted in **Figure 5.7.4**.



Key

Scoping Boundary

Number of Harbour Seals per 5 x 5 km grid

- >0 - 1
- 1 - 5
- 5 - 10
- 10 - 15
- 15 - 50

Russell, D.J.F., Jones, E.L and Morris, C.D., (2017). Updated Seal Usage Maps: The Estimated at-sea Distribution of Grey and Harbour Seals. Scottish Marine and Freshwater Science . Vol 8 No 25.

Kilometres

0 5 10 20 30 40

1:1,000,000

Rampion Extension Development

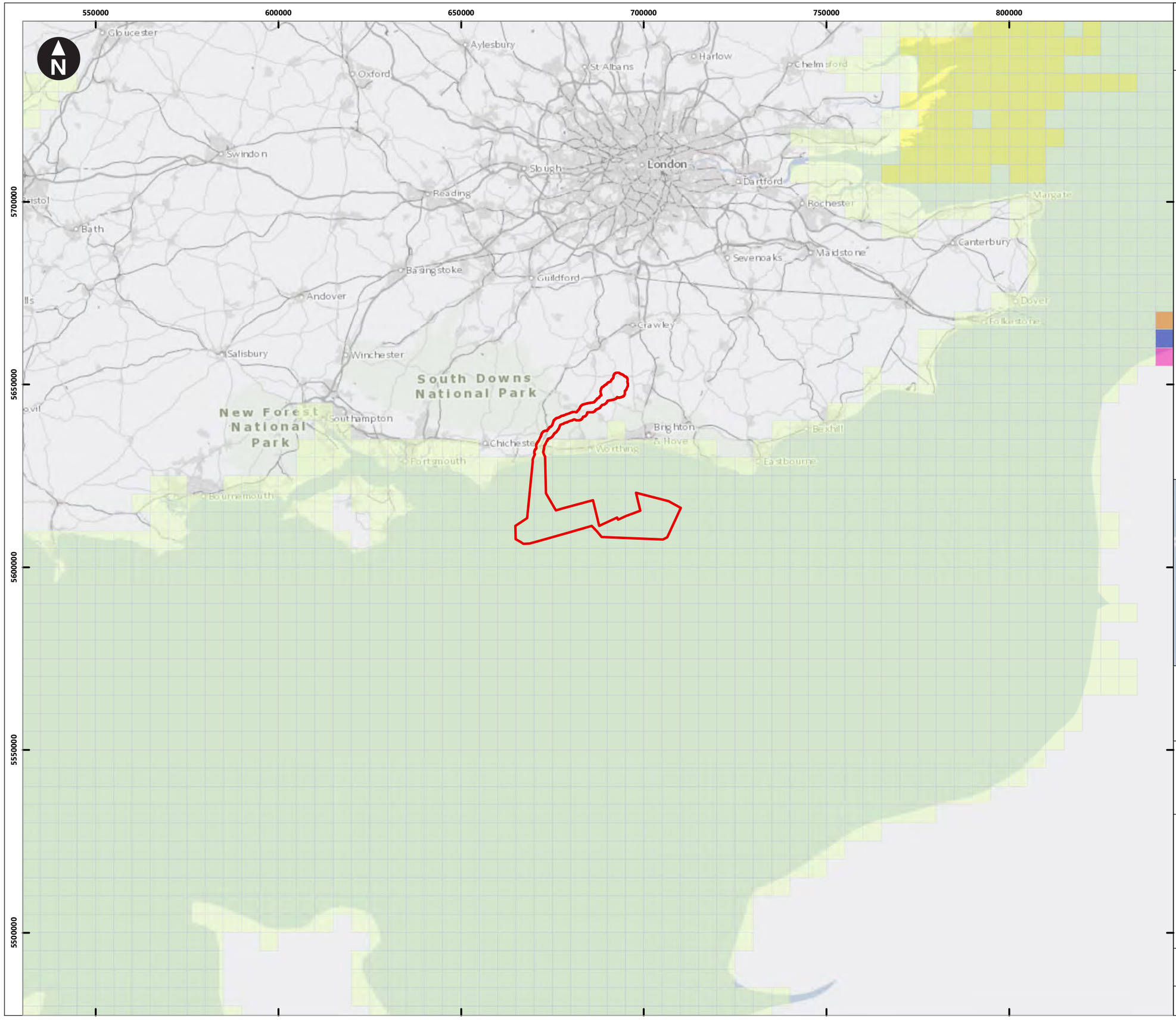
RWE

Rampion 2 Offshore Wind Farm

Figure 5.7.3 Harbour Seal Density

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-11-0003				1.1
Company: GOBE	Drawn By: CC	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL



Key

Scoping Boundary

Number of Grey Seals per 5 x 5 km grid

- >0 - 1
- 1 - 5
- 5 - 10
- 10 - 15
- 15 - 50
- 50 - 800

Russell, D.J.F., Jones, E.L and Morris, C.D., (2017). Updated Seal Usage Maps: The Estimated at-sea Distribution of Grey and Harbour Seals. Scottish Marine and Freshwater Science . Vol 8 No 25.

Kilometres

0 5 10 20 30 40

1:1,000,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.7.4 Grey Seal Density

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-11-0004	1.1

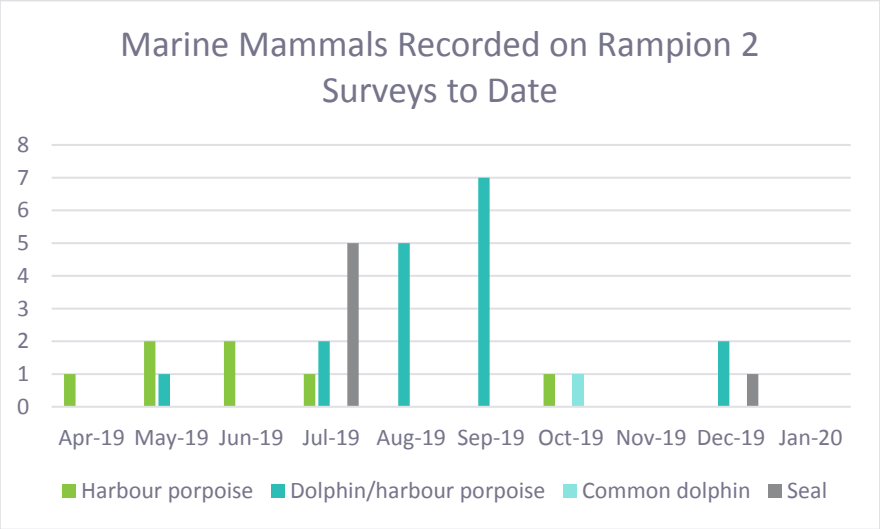
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	
GOBE	CC	WOOD	21/05/2020	FINAL FINAL

5.7.19 The data collected for the existing Rampion 1 project (Rampion ES Chapter 6.1.10, RSK Environmental Ltd, 2012) covered the Rampion 1 boundary and is therefore directly adjacent to Rampion 2, with some cross over given the buffer applied. The Rampion 1 specific surveys included a total of 30 boat-based surveys, carried out between 9 March 2010 and 7 February 2012 at an interval of one-to-two surveys per month. A total of six species of marine mammals were positively identified during 113 encounters with ca. 212+ individuals during line transect surveys. These species were harbour porpoise, bottlenose dolphin, white-beaked dolphin, minke whale (assumed), common (harbour) seal, and grey seal. Three harbour porpoises and one bottlenose dolphin were identified as a calf or juvenile.

5.7.20 Sightings of harbour porpoise during the Rampion 1 surveys were highest during spring/early summer, whereas bottlenose dolphin encounters occurred at various points throughout the year. Sightings of seals (grey, common and unidentified) occurred in all areas within the surveyed area, all with sightings of single animals. On one occasion, a single unidentified whale (probably minke) was observed, with a single white-beaked dolphin seen. There appears to be a low level of marine mammal activity in the Rampion 1 study area during the winter months (December to February). As noted above in **Table 5.7.1** the Rampion 1 ES provides density estimates for harbour porpoise (with no density estimates provided for other species, presumed to be a result of the low numbers encountered), with interpretation of Figure 10.9 from Chapter 6.1.10 indicating a harbour porpoise density from 0-0.14 animals/km^2, with all median values being below 0.05 animals/km^2.

5.7.21 The Rampion 2 surveys conducted and reported to date (January 2020) reveal a low abundance and diversity of marine mammal species (**Figure 5.7.6**). Confirmed sightings to date (January 2020) include seals (not speciated), with between zero (on eight of the ten monthly surveys reported to date) and five individual seals (July survey) recorded. Slightly more commonly seen are cetaceans, primarily harbour porpoise where a species has been confirmed. Confirmed harbour porpoise sightings are low, up to two individuals per survey during the spring / early summer, however unidentified cetaceans (dolphin or porpoise) are higher in number during the summer, reaching seven individuals in September. A single common dolphin was sighted in October.

Figure 5.7.6 Marine Mammals Recorded on Rampion 2 Surveys until January 2020



Basis for scoping assessment

5.7.22 The marine mammal scoping assessment is based on the following key assumptions, which are also set out in **Chapter 2: The Proposed Development**:

- the key marine mammal species to be considered are limited to those recorded during a Rampion 2 or the existing Rampion 1 project survey (namely harbour porpoise, harbour seal, grey seal, common dolphin, bottlenose dolphin, white-beaked dolphin and minke whale, all in the context of the relative importance of the Rampion 2 ZOI for each species);
- that the assessment will assume the following key points:
  - the construction and operation of Rampion 2 up to 1200MW in capacity, with up to 116 WTGs, involving monopile, jacket or suction bucket foundations;
  - the construction and operation of up to three offshore substations, involving monopile or, jacket foundations;
  - the construction and operation of offshore export cables, inter-array cables and associated cable protection (where possible, cable burial is the preferred option for protection);
  - the maintenance of the above infrastructure during operation;
  - the potential clearance of unexploded ordnance (UXO); and
  - the requirement for decommissioning.
- the assessment will also assume the embedded environmental measures identified below will apply.

Embedded environmental measures

5.7.23 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on marine mammals (see **Table 5.7.2**). These will evolve over the development process as the EIA progresses and

in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.7.24 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.7.2 Relevant marine mammal embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-51	A Vessel Management Plan (VMP) will be developed pre-construction.	DCO Requirements or DML Conditions
C-52	A piling Marine Mammal Mitigation Protocol (MMMP), will be implemented during construction and will be developed in accordance with JNCC (2010) guidance. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.	DCO Requirements or DML Conditions
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details.	DCO Requirements or DML Conditions
C-54	A Decommissioning Marine Mammal Mitigation Protocol (MMMP), will be implemented during decommissioning. The Decommissioning MMMP will be in line with the latest relevant available guidance.	DCO Requirements or DML Conditions
C-102	Appropriate management of PTS risk from UXO clearance. The implementation of a UXO MMMP, in consultation with Natural England, to appropriately manage the risk to marine mammals during UXO clearance.	DCO Requirements or DML Conditions

Likely significant effects

5.7.25 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise, and the MMO 2012 review of post-consent monitoring, to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment. The likely significant effects on marine mammals are summarised in **Table 5.7.3**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for marine mammal effects, the experience gained from the existing Rampion 1 project (especially with respect to underwater noise), and professional judgement. The approach to this assessment is set out in **Chapter 4 The EIA process**.

5.7.26 This is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.7.3 Likely significant marine mammal effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
PTS (injury) risk (Construction)	C-52 C-102 Soft start to piling Piling MMMP UXO MMMP	Underwater noise resulting from percussive piling and clearance of UXO has the potential to result in PTS (injury) in marine mammals, should levels be sufficiently high and marine mammals be sufficiently close.	**Scoped in - detailed assessment** approach, requiring underwater noise modelling and species-specific density data, to enable the number of animals potentially impacted to be calculated. Noting the different levels of empirical data available for piling noise and UXO noise, with the assessment reflecting that available data.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Underwater noise modelling Technical report on marine mammals
Disturbance risk (Construction)	C-51 C-52	Evidence from numerous offshore wind farm projects is that various work elements during construction can result in disturbance of marine mammal species. The significance of that disturbance is linked to the duration and	**Scoped in - detailed assessment** approach, requiring underwater noise modelling and species-specific density data, combined with a dose-response curve, to enable the number of animals potentially impacted to be calculated. Noting the different levels of empirical data available for piling noise and UXO noise, with the assessment reflecting	Named marine mammal species	Ongoing baseline surveys of marine mammal species Underwater noise modelling Technical report on marine mammals

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		timing of the disturbance.	that available data. Should insufficient disturbance data be available for UXO (insufficient published to date), the JNCC guidance on EDRs within harbour porpoise SACs will instead be relied on for harbour porpoise (JNCC *et al*, 2020).		
TTS risk (Construction)	C-52 C-102 Soft start to piling Piling MMMP UXO MMMP	**No likely significant effect** Underwater noise resulting from percussive piling and clearance of UXO has the potential to result in TTS in marine mammals. However, use of TTS currently does not allow for a biologically significant level of impairment to be determined, which is instead addressed through risk of injury (PTS) and risk of disturbance.	**Scoped out.** No further assessment required (please see **paragraph 5.7.28** below).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Other project related noise (eg cable laying, ground clearance, dredging etc) (Construction)	None	**No likely significant effect** Empirical data for such activities suggests potential for impact to be highly localised and short term, and likely to be contained within the potential for vessel related disturbance (considered separately).	**Scoped out.** No further assessment required (please see **paragraph 5.7.30** below).	N/A	N/A
Vessel collision risk (Construction)	C-51 Vessel Management Plan	No significant increase in vessel activity above baseline is expected, with vessel movements managed through the Vessel Management Plan. Although an increase in baseline collision risk is considered unlikely, the consequences for an individual should	**Scoped in - simple assessment** required, to consider existing vessel movements and existing collision risk in the study area, with consideration of the increased risk posed by construction vessels.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Navigation Risk Assessment Technical report on marine mammals

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		collision occur is significant.			
Vessel disturbance (Construction)	C-51 Vessel Management Plan	No significant increase in vessel activity above baseline is expected, with vessel movements managed through the Vessel Management Plan.	**Scoped in - simple assessment** required, to consider existing vessel movements and current knowledge of marine mammal response to vessel disturbance, with consideration of the potential for increased disturbance from construction vessels.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Navigation Risk Assessment Technical report on marine mammals
Reduction in prey availability (Construction)	None	**No likely significant effect** Evidence from previous offshore wind farms is negligible impacts on prey species, with marine mammals having a large foraging area.	**Scoped out**. No further assessment required.	N/A	N/A
Accidental pollution (Construction)	C-53 Marine Pollution	**No likely significant effect**	**Scoped out**.	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
	Contingency Plan (MPCP)	The requirement for project level mitigation results in no likely significant effect.	No further assessment required (please see **paragraph 5.7.33** below).		
Disturbance to seal haul out sites at landfall (Construction)	None	**No likely significant effect** No known seal haul out sites in the vicinity of the land fall location.	**Scoped out**. No further assessment required (please see Operation below).	N/A	N/A
Operational noise (Operation)	None	Operational noise from offshore wind farms to date has been found to be not significant for marine mammals. However, the size of turbines planned at Rampion 2 do not have empirical data for operational noise and therefore scoped in as a precaution.	**Scoped in - simple assessment** required. Scoped in as a precaution and limited to a consideration of evidence and marine mammal density.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Technical report on marine mammals

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Vessel collision risk (Operation)	C-51 Vessel Management Plan	No significant increase in vessel activity above baseline is expected, with vessel movements managed through the Vessel Management Plan. Although an increase in baseline collision risk is considered unlikely, the consequences for an individual should collision occur is significant.	**Scoped in - simple assessment** required, to consider existing vessel movements and existing collision risk in the study area, with consideration of the increased risk posed by operation and maintenance vessels.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Navigation Risk Assessment Technical report on marine mammals
Vessel disturbance (Operation)	C-51 Vessel Management Plan	No significant increase in vessel activity above baseline is expected, with vessel movements managed through the Vessel Management Plan.	**Scoped in - simple assessment** required, to consider existing vessel movements and current knowledge of marine mammal response to vessel disturbance, with consideration of the potential for increased disturbance from operation and maintenance vessels.	Named marine mammal species	Ongoing baseline surveys of marine mammal species Navigation Risk Assessment Technical report on marine mammals

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Reduction in prey availability (Operation)	None	**No likely significant effect** Evidence form previous offshore wind farms is negligible impacts on prey species, with marine mammals having a large foraging area.	**Scoped out**. No further assessment required (please see **paragraph 5.7.31** below).	N/A	N/A
Accidental pollution (Operation)	C-53 Marine Pollution Contingency Plan (MPCP)	**No likely significant effect** The requirement for project level mitigation results in no likely significant effect.	**Scoped out**. No further assessment required (please see **paragraph 5.7.33** below).	N/A	N/A
EMF (Operation)	C-41 C-42 C-44 C-45 Together aim for preferred installation method, burial depth and any	**No likely significant effect** No significant effect detected from offshore wind farms.	**Scoped out**. No further assessment required (please see **paragraph 5.7.35** below).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
	additional cable protection required				
Decommissioning	As for construction, but likely to be less.				

Impacts scoped out of assessment

5.7.27 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

5.7.28 The potential for a temporary threshold shift (TTS) to occur during construction has been scoped out from further assessment, with the assessment instead focusing on the potential for disturbance and auditory injury (the latter defined as the onset of permanent threshold shift, PTS). A threshold shift (temporary or permanent) is essentially a reduction in hearing sensitivity, which can result following exposure to sounds. That reduction can be temporary (i.e. full recovery follows) or permanent (a permanent change in an animal's sensitivity to noise). Such a reduction in hearing sensitivity has the potential to affect individuals, for example through a reduction in their ability to forage or communicate. For TTS, the significance of any such consequences would be linked to unknown factors such as duration of TTS, magnitude of TTS, what aspect of an animals hearing has been affected etc. Therefore, the application of current TTS onset thresholds do not allow for an assessment of the likely consequences of any such effect on individuals or at population level. The focus of the assessment on auditory injury risk (PTS onset) and disturbance means, in any case, that potential consequences from TTS would be captured within the overall envelope of potential impact.

5.7.29 The lack of any defined biological consequences from current thresholds for TTS, combined with the inclusion of any potential TTS consequences within the impact envelope covered by the assessment of disturbance and PTS, means that TTS as a measure is scoped out from further assessment.

5.7.30 The assessment of underwater noise is focused on those activities resulting in the most underwater noise. However, it is acknowledged that other project related activities are anticipated to result in some level of underwater noise. Such activities may include cable laying, ground clearance etc. However, the potential for underwater noise to be generated during these activities is low in terms of intensity and duration, with a very localised risk. That potential for risk is contained within the 'vessel disturbance' activity and ZOI and therefore considered as part of that impact measure. There is therefore no need to assess the same impact twice, and noise resulting from these activities are scoped out from further assessment.

5.7.31 The potential for a reduction in prey availability to result in a significant effect on marine mammals has been highlighted during construction and operation. Marine mammals target a variety of prey species, depending on marine mammal species and prey availability. Given that marine mammals are dependent upon such prey, there is the potential for an indirect effect on marine mammals should their prey species be subject to a significant effect as a result of Rampion 2. Equally, if no significant effect on such prey species is determined as a consequence of Rampion 2, it follows that the marine mammal species dependant on those prey species will similarly not be subject to an indirect significant effect. At Scoping, it is currently concluded that Rampion 2 will not result in a significant effect on prey

species during construction or operation (specifically within the Benthic Ecology and Fish and Shellfish Ecology Aspects). Therefore, a potential for a reduction in prey availability is scoped out from further assessment during construction and operation.

5.7.32 Further, it should be noted that there is evidence for seals that in operation, an offshore wind farm may actually be utilised by foraging seals (e.g. Russell *et al.,* 2016), with harbour porpoise regularly detected within operational offshore wind farms (e.g. Lindeboom *et al*., 2011). However, such a potentially beneficial effect cannot be quantified and has not been scoped into assessment (particularly given the low densities of marine mammals present).

5.7.33 The risk of accidental pollution occurring during construction, operation & maintenance or decommissioning of Rampion 2 is addressed through the Marine Pollution Contingency Plan (MPCP, C-53). As a result, it is not expected that there will be any risk from accidental pollution as a result of Rampion 2. The MPCP will include measures to prevent any such pollution but also emergency plans to be implemented in the unlikely event that any such incident occurs. In line with other offshore wind farms, it is not expected that there is a significant risk of leachate from toxic compounds from Rampion 2. Therefore, no likely significant effect is concluded, and accidental pollution is scoped out from further assessment.

5.7.34 The potential for construction phase works to result in disturbance at a seal haul out site is dependent on the proximity of such works to known seal haul out sites. It is clear from the baseline information presented that there is approximately 25-30km between Rampion 2 and the relevant harbours. Therefore, no likely significant effect is concluded and potential for disturbance to seal haul out sites is scoped out from further assessment.

5.7.35 Cabling associated with offshore wind farms are known to result in Electromagnetic Fields (EMF). However, the evidence base (e.g. Copping, 2018) is clear that there is no evidence of any resulting impact (positive or negative) from such cabling on marine mammals. EMF risk relates to the operational phase of a project only and given that, as noted above, evidence indicates that marine mammals are known to visit operational wind farms (g. Russell *et al*, 2016 and Lindeboom *et al*, 2011), together with the lack of evidence of any negative effect resulting from EMF, the conclusion is of no likely significant effect and EMF is therefore scoped out of assessment.

Cumulative effects

5.7.36 Cumulative effects on marine mammals resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.7.37 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- injury risk (during construction and potentially decommissioning, with other plans and projects to be identified for assessment within a spatial area to be defined through underwater noise modelling and evidence of potential connectivity);

- disturbance (during construction, operation and decommissioning, with other plans and projects to be identified for assessment within a spatial area to be defined through underwater noise modelling and evidence of potential connectivity);
- vessel collision risk (during construction, operation and decommissioning, with other plans and projects to be identified for assessment within a spatial area to be defined through evidence of potential connectivity);
- vessel disturbance (during construction, operation and decommissioning, with other plans and projects to be identified for assessment within a spatial area to be defined through evidence of potential connectivity); and
- operational noise (during operation only, with other plans and projects to be identified for assessment within a spatial area to be defined through evidence of potential connectivity).

Transboundary effects

5.7.38 The potential effects from construction, operation (including maintenance) and decommissioning on marine mammal receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

5.7.39 The impact assessment to be presented at PEIR will draw on the baseline environmental information described in **paragraph 5.7.11**, together with the project design envelope, to enable the potential for the effects scoped in within **Table 5.7.3** to be assessed. That assessment will further draw on relevant project literature including, where appropriate, the existing Rampion 1 project documents including those produced post consent and during construction. The assessment will also draw on the following environmental aspect assessments:

- **Section 5.2: Coastal processes**;
- **Section 5.4: Fish and shellfish ecology**;
- **Section 5.5: Benthic subtidal and intertidal ecology**;
- **Section 5.11: Nature conservation**;
- **Section 5.10: Shipping and navigation**;
- Technical Report to follow during PEIR: Underwater noise modelling; and
- Technical Report to follow during PEIR: Navigation risk assessment.

5.7.40 A particular point in relation to the above is in respect of the criteria to be applied to the assessment of underwater noise. The most recent publication of relevance is Southall *et al.* (2019), with the relevant values to be applied within the Rampion 2 underwater noise impact assessment (unless further evidence is published in the interim). Given that piling noise (and UXO noise) is considered an impulsive noise source, the risk of injury through PTS will be based on the dual metric criteria of cumulative sound exposure level (SELcum) and peak sound pressure level (peak SPL), with the relevant values defined in **Table 5.7.4** . These values will be modelled, with a defined soft start, to understand the potential footprint of

underwater noise and inform the subsequent assessment. Specific details of that modelling will be discussed and agreed within the Evidence Plan Process, more details of which are set out in which as set out in **Section 4.3: Consultation and the evidence plan process**.

Table 5.7.4 Southall et al (2019) PTS thresholds for impulsive noise that will be used in this assessment for each of the marine mammal hearing groups

Hearing Group	Relevant species for Rampion 2[9]	SELcum [dB re 1 µPa2 s] weighted in water (unless stated)	Peak SPL [dB re 1 µPa] unweighted
Low frequency	Minke Whale	183	219
High frequency	Unnamed dolphin species, bottlenose dolphin, white beaked dolphin, common dolphin	185	230
Very high frequency	Harbour porpoise	155	202
Phocid seals in water	Unnamed seals, harbour (common) seal, grey seal	185	218
Phocid seals in air		138	161

5.7.41 The assessment of the potential consequences of the modelled underwater noise results will then be determined, with the assessment of PTS drawing on a recent BEIS funded expert elicitation workshop (Booth and Heinis, 2018, and Booth *et al*, 2019) that discussed the nature, extent and potential consequence of PTS to UK marine mammal species. The disturbance assessment will follow current best practice methodology, drawing on the appropriate scientific evidence. Given current practice, it is therefore likely to involve the application of a species-specific dose-response approach. The approach to the assessment will be discussed and agreed within the Evidence Plan process, including the extent to which individual species are included (with the most commonly seen species being considered in most detail).

5.7.42 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which is set out in **Section 4.3: Consultation and the evidence plan process**. Consultees will include Natural England, The Wildlife Trusts, Whale and Dolphin Conservation, Marine Management Organisation and Cefas.

[9] Note – the species positively identified during Rampion 2 and Rampion 1 Offshore Wind Farm surveys

5.7.43 Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.8 Offshore ornithology

Introduction

5.8.1 The offshore ornithology assessment will consider the potential likely significant effects on birds in the offshore and intertidal environment (namely seabirds and shorebirds) that may arise from the construction, operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area.

5.8.2 This section describes the methodology to be used and how these potential likely significant effects will be assessed for Important Ornithological Features (IOFs) (CIEEM, 2018 updated 2019) for the purpose of an EIA.

5.8.3 As birds rely on and interact with other habitats and species this offshore ornithology chapter should be considered alongside other chapters; namely:

- **Section 5.4 Fish and shellfish ecology** (in terms of key prey resources available to birds)**;** and
- **Section 5.5 Benthic subtidal and intertidal ecology** (in terms of relevant habitat and key prey resources available to birds)**.**

Study area

5.8.4 The study area for offshore and intertidal ornithology is defined as the offshore part of the Scoping Boundary together with the Zones of Influence (ZOIs) and is based on an area which is considered to represent a realistic maximum spatial extent of potential impacts to IOFs. The study area for the offshore and intertidal ornithology assessment includes the Rampion 2 array survey area with a 4km buffer, the export cable corridor and the cable landfall area (**Figure 5.8.1**).

5.8.5 The project specific digital aerial surveys were planned in early 2019 and therefore early during the Rampion 2 planning process. Since the initiation of the surveys, there has been the addition of Zone 6 to the potential area of development which has consequently led to an increase in the Scoping Boundary area. The result is that a small area in the extreme eastern extent of the Scoping Boundary is not covered by the digital aerial surveys. This is acknowledged and will be considered in finalising the project boundary.

5.8.6 To aid clarity of this aspect chapter a split between the offshore and intertidal components has been taken in order to refine the focus of the ornithological assessments. The intertidal area and related assessments consider IOFs using the habitat between marine high-water springs (MHWS) and mean low-water springs (MLWS), while recognising that some IOFs may nest or roost on the shore above the MHWS. The offshore components of the assessment relate to the IOFs using the habitat seaward of MLWS within the offshore cable route out to the Rampion 2 array area and a 4 km buffer surrounding it.

5.8.7 Consideration is also given to the mobile nature of birds noting that birds which nest outside of the study area but may fly into or across the Rampion 2 array area during migration. This includes seabirds and waterbirds moving across or through the English Channel as well as movements of passerines and non-passerines moving from the UK mainland to France and vice versa.

5.8.8 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

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Chichester and Langstone Harbours SPA & Ramsar

Pagham Harbour SPA & Ramsar

Pevensey Levels Ramsar

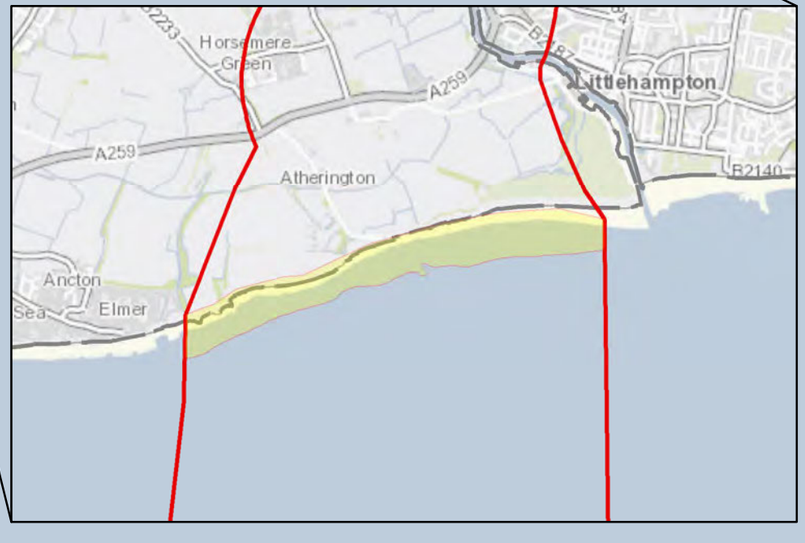
Dungeness, Romney Marsh and Rye Bay Ramsar

Dungeness, Romney Marsh and Rye Bay SPA

Solent and Dorset Coast SPA

Portsmouth Harbour SPA & Ramsar

Solent and Southampton Water SPA & Ramsar



Key

- Scoping Boundary
- UK Special Protcted Areas (SPAs)
- Ramsar sites
- Intertidal area

Kilometres
0 2.75 5.5 11 16.5 22
1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.8.1 Rampion 2 Scoping Boundary and Relevant SPAs and Ramsar Sites for Ornithological Features

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-13-0001	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
GOBE	CC	WOOD	11/06/2020	FINAL

Assessment methodology

Introduction

5.8.9 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this offshore ornithology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the offshore ornithology assessment on IOFs. Where appropriate additional key guidance, assessment documents, supporting literature and expert opinion aid the identification, quantification, consideration and assessment of potential impacts from offshore wind farms on IOFs, such as CIEEM guidance (2018; updated 2019) have also been incorporated.

5.8.10 The assessment approach will use a 'source-pathway-receptor' model, which identifies likely impacts on IOFs resulting from the proposed construction, operation and decommissioning of the offshore infrastructure. The parameters of this model are defined as follows.

- Source – the origin of a potential impact (noting that one source may have several pathways and receptors) e.g. an activity such as cable installation and a resultant effect such as re-suspension of sediments.
- Pathway – the means by which the effect of the activity could impact an IOF e.g. for the example above, re-suspended sediment could settle and smother the seabed.
- Receptor – the element of the receiving environment that is impacted e.g. for the above example, bird prey species living on or in the seabed are unavailable to foraging birds.

5.8.11 The offshore ornithology aerial digital surveys currently being undertaken by APEM Ltd will provide information on species (or species-groups if species identification is not possible), abundance, distribution, behaviour, location, numbers, sex and age (where possible), and flight height and direction of ornithological receptors. Data also exists from the existing Rampion 1 project which will be reviewed during the desk based study, along with the other data sources presented in **Table 5.8.1**. The EIA will identify the nature of the use of the proposed development area by birds recorded - i.e. seasonal differences and activities (i.e. foraging, overwintering, migrating or other) in order to determine the importance of the proposed development area relative to the wider area for seabirds throughout the year.

5.8.12 Detailed analysis of survey data will include abundance and density estimates (with associated confidence intervals and levels of precision). Site-specific flight height data will be reported from the aerial digital surveys and will be considered as well as that from the generic flight height data (Johnston et al., 2014a, 2014b) for use in collision risk modelling following consultation with SNCBs.

5.8.13 The following sections of this document provide a high-level description of the proposed impact assessment approach which will be applied to the offshore and intertidal ornithology IOFs.

5.8.14 Two key components of the assessment will be collision risk analysis and displacement analysis. Collision risk modelling (CRM) at offshore wind farms is usually undertaken using the Band (2012) model, with variations applied to account for the variation around standard deviation or mean values for parameters. A new stochastic collision risk model (sCRM, Donovan, 2018) has recently been made available which incorporates parameter variability and therefore accounts for a varying degree of uncertainty in input parameters. The exact CRM option to be used, avoidance rates, flight height data, nocturnal activity rates and parameters for modelling will be based upon the best available evidence and will be agreed with consultees and stakeholders (through the Evidence Plan Process) and clearly defined within the EIA and HRA.

5.8.15 Displacement analysis will be undertaken in line with SNCB guidance (JNCC et al., 2017) using the matrix approach. Species included within the displacement analysis, along with the species-specific mortality rates and displacement rates will be based upon the best available evidence and will be agreed with consultees and stakeholders and clearly defined within the EIA and HRA. Additionally, the population-level impacts of the resulting potential additional mortality of both collision and displacement will be considered.

5.8.16 Bird behaviour and abundance differs depending on time of the year and season. In order to account for this, separate bio-seasons will be recognised in the baseline technical reporting for Rampion 2 and subsequent impact assessments to establish the importance of IOFs at Rampion 2 at a particular period of time. Bio-seasons for each species will be determined in line with Furness (2015) with relevant amendments made to accommodate for site specific differences, where an evidence base exists which supports this. For species not included in Furness (2015), bio-seasons will be agreed with Natural England throughout the Evidence Plan Process.

Baseline conditions

Data sources

5.8.17 An initial desk-based review of literature and data sources has been undertaken to support this Scoping Report. These key sources of data, presented in **Table 5.8.1**, will be used to characterise the study area for offshore and intertidal bird species for the purposes of Scoping.

Table 5.8.1 Key sources of ornithology data

Source	Date	Summary	Coverage of study area
Rampion 2 – Digital aerial survey data	2019-2021	Digital aerial surveys conducted by APEM Ltd. on a monthly basis between April 2019 and June 2021. 12 months of survey data have been summarised below in **Table 5.8.2**.	Rampion 2 array part of the Scoping Boundary plus 4km buffer.
Rampion 1 Offshore Wind Farm - Baseline characterisation surveys [10]	2010-2012	Boat-based surveys across the Rampion zone and 5km buffer plus an adjacent control zone to the east of Rampion 1. Data collection initiated in March 2010 for two years (end date February 2012).	Approximately 40% coverage of the Rampion 2 array part of the Scoping Boundary.
Rampion 1 Offshore Wind Farm - Baseline characterisation surveys	2011-2012	Aerial surveys across Rampion zone and 5 km buffer plus an adjacent control zone to the east of Rampion 1. Data collected for one year (August 2011-August 2012).	Approximately 40% coverage of the Rampion 2 array part of the Scoping Boundary.
BTO Non-Estuarine Waterbird Surveys (NEWS)	1984 - 2016	NEWS were conducting in 1984/1985, 1997/98, 2006/07 and 2015/16 and provides recordings focused on intertidal habitats along the UK coastline.	Covers the export cable corridor and cable landfall area.
Wetland Bird Survey (WeBS)	Annual Reports	Annual survey reports of wetland waterbirds. Most recent being Frost et al., (2020).	Coverage of UK intertidal and wetland zones. Source contains information which can be drawn upon at a

[10] It should be noted that there is no monitoring data available for Rampion Offshore Wind Farm.

Source	Date	Summary	Coverage of study area
			Rampion 2 specific scale, or a wider regional scale.
Local / County bird reports and atlases	Annual Reports	County atlases covering breeding and non-breeding birds within the surrounding south coast counties. Annual publications produced by local birdwatching groups (e.g. Sussex Ornithological Society) which summarise sightings and surveys results for Sussex and the wider south coast region.	Coverage across region at various intertidal and wetland and coastal areas.
Wildfowl and Wetlands Trust – Aerial surveys of waterbirds in the UK	2004-2009	Aerial surveys of waterbirds around the UK. Surveys undertaken by WWT on behalf of DTI (now BEIS but also previously referred to as BERR and DECC).	Coverage of inshore waters relevant to Rampion 2 from survey grids SE3, SE4 and SE5.
Existing offshore wind farm grey literature	Various dates	Information obtained from various offshore wind farm Environmental Statements (i.e. Thanet Extension, Kentish Flats, Greater Gabbard).	No coverage of Rampion 2 study area but provides data on birds in the context of the English south east coast.
Designated sites	Various dates	Information of Special Protection Areas (SPAs) and other designations relevant to IOFs with potential connectivity to Rampion 2. Key source of information will be Natural England designated sites portal.	Country wide information on designated sites.
National Bird Atlas (Balmer et al., 2013)	2007-2011	Results of five years of breeding season and wintering surveys across the UK at a 10 km resolution.	Cable route part of the Scoping Boundary overlaps with 20km squares TQ_A and TQ_F.

Source	Date	Summary	Coverage of study area
Potential impacts of offshore wind farms on birds	Various dates	Published, peer reviewed scientific literature on bird behaviour and potential impacts from OWF e.g. (Garthe and Hüppop, 2004; Drewitt and Langston, 2006; Stienen et al., 2007; Speakman et al., 2009; Langston, 2010; Band, 2012; Cook et al., 2012; Furness and Wade, 2012; Wright et al., 2012; Furness et al., 2013; Johnston et al., 2014a,b; Cook et al., 2014; Dierschke et al., 2017; SNCB, 2017; Jarrett et al., 2018; Leopold & Verdaat, 2018; Mendel et al., 2019);	Generic information applicable to Rampion 2 IOFs.
Bird distribution	Various dates	Publicly available reports of seabird distribution e.g. Stone et al., 1995; Brown and Grice, 2005; Kober et al., 2010; Waggitt et al., 2019; Cleasby et al., 2020; Bradbury et al., 2014.	UK wide coverage with information that can be drawn upon at a Rampion 2 specific scale, or a wider regional scale.
Bird breeding ecology	Various dates	Information on the breeding ecology of various bird species e.g. Cramp and Simmons, 1977-94; Del Hoyo et al., 1992-2011; Robinson, 2005.	Generic information applicable to Rampion 2 IOFs.
Bird population estimates and demographic rates	Various dates	Data on seabird populations and demographic rates for use in assessments e.g. Mitchell et al., 2004; BirdLife International, 2004; Holling et al., 2011; Frost et al., 2019; Musgrove et al., 2013; Furness, 2015; Horswill et al., 2017, JNCC, 2020.	These sources contain information which can be drawn upon at a Rampion 2 specific scale, or a wider regional scale.
Bird migration and foraging movements	Various dates	Bird movements during breeding season foraging trips and migration e.g. Wernham et al., 2002; Thaxter et al., 2012; Wright et al., 2012; Furness et al., 2018; Woodward et al., 2019; Wakefield et al., 2017; Wakefield et al., 2013; RSPB FAME & STAR tracking data.	These sources contain information which can be drawn upon at a Rampion 2 specific scale, or a wider regional scale.

Baseline

5.8.18 Following an initial desk-based review of the data sources identified in **Table 5.8.1** the distribution, abundance, conversation status, biological seasons, behaviour and characteristics of birds in the offshore and intertidal environment that have been used to characterise the study area for the purposes of Scoping.

5.8.19 It is important to note that at this stage, the information sources, guidelines, assessment methods and reports applied through this section, may be supplemented and / or updated where appropriate for assessments at the PEIR and ES stages of the DCO Application. Furthermore, the ornithological evidence base is constantly expanding with new information becoming available regularly. RED will ensure to stay abreast of new evidence and will consider its usage where appropriate, as necessary.

5.8.20 The offshore waters of the English Channel provide an important habitat for a number of bird species throughout the year. During the breeding season, the region provides foraging, loafing and preening habitat for a range of seabirds breeding on the south coast, including various species of terns and gulls. Breeding birds from colonies further afield also utilise these waters during the breeding season, such as gannet and kittiwake.

5.8.21 During the non-breeding season the region supports numerous species; divers and seaducks reside in more inshore waters, while auks are found further offshore. The English Channel is also subject to pronounced passages of birds during spring and autumn with gannets, skuas, gulls, terns and auks travelling to and from the North Sea. It is also subject to migratory movements of non-seabirds moving from the UK to mainland Europe such as waders, wildfowl, passerines and non-passerines.

5.8.22 The most detailed and up-to-date site-specific data on offshore ornithology available cover are from the first 12 months of aerial digital surveys. These surveys, completed by APEM Ltd, were carried out between April 2019 and March 2020[11] were statistically analysed to provide abundance estimates from the raw survey data for Rampion 2. These seabird population data have been summarised for the scoping boundary only (noting the difference between this and the survey scope as discussed in **Paragraph 5.8.5**) in **Table 5.8.2** to provide an initial insight into key species likely to be present at Rampion 2 based on one year's survey effort.

Table 5.8.2 Abundance Estimates of Seabirds recorded within the Rampion 2 Scoping Boundary from year 1 digital aerial surveys

Species / Month	Apr 19	May 19	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
Red-throated diver	21	1	0	0	0	0	0	0	0	18	9	0

[11] Due to COVID-19 related issues, the April offshore ornithological survey was completed in late March. This was agreed with and approved by Natural England.

Species / Month	Apr 19	May 19	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
Fulmar	1	0	0	0	0	0	0	0	0	0	1	0
Gannet	0	20	20	147	108	56	88	44	9	0	91	17
Storm-petrel species	0	0	0	0	0	0	9	0	0	0	0	0
Herring gull	0	0	10	950	0	0	0	71	9	9	124	562
Lesser black-backed gull	0	0	0	9	0	0	0	0	0	0	0	40
Great black-backed gull	10	10	0	83	9	103	0	44	0	35	39	111
Commic[12] tern	0	0	0	0	0	19	0	0	0	0	0	0
Sandwich tern	0	0	0	0	18	0	0	0	0	0	0	0
Kittiwake	0	10	0	46	0	0	18	36	0	0	833	55
Common gull	0	0	0	0	0	0	0	44	0	0	221	18
Little gull	0	0	0	0	0	0	18	0	0	0	10	0
Guillemot	129	67	0	22	0	0	49	75	75	412	5768	61
Razorbill	25	3	0	32	9	0	21	32	32	177	2472	26

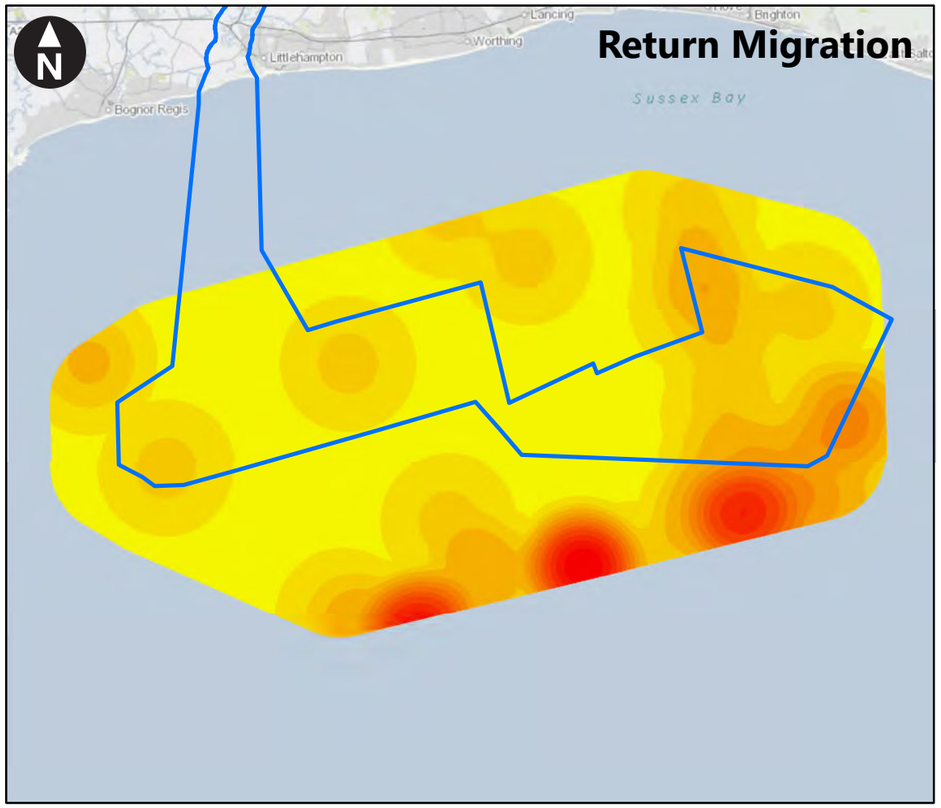
5.8.23 Of the key species listed in **Table 5.8.2** the main species of interest for offshore ornithology are gannet, herring gull, great black-backed gull, guillemot and razorbill. Heat maps have been provided to convey at an early stage, the most abundant species and their distribution within the Rampion 2 Scoping Boundary. These data are provided in **Figure 5.8.3** to **Figure 5.8.6** and were produced using bird densities from 12 months survey data and split between two broad biological seasons, breeding season and extended non-breeding season (where relevant), according to Furness (2015). Furthermore, the heat maps were produced using flying bird estimates for gannet, herring gull and great black-backed gull and birds on the water estimates for guillemot and razorbill.

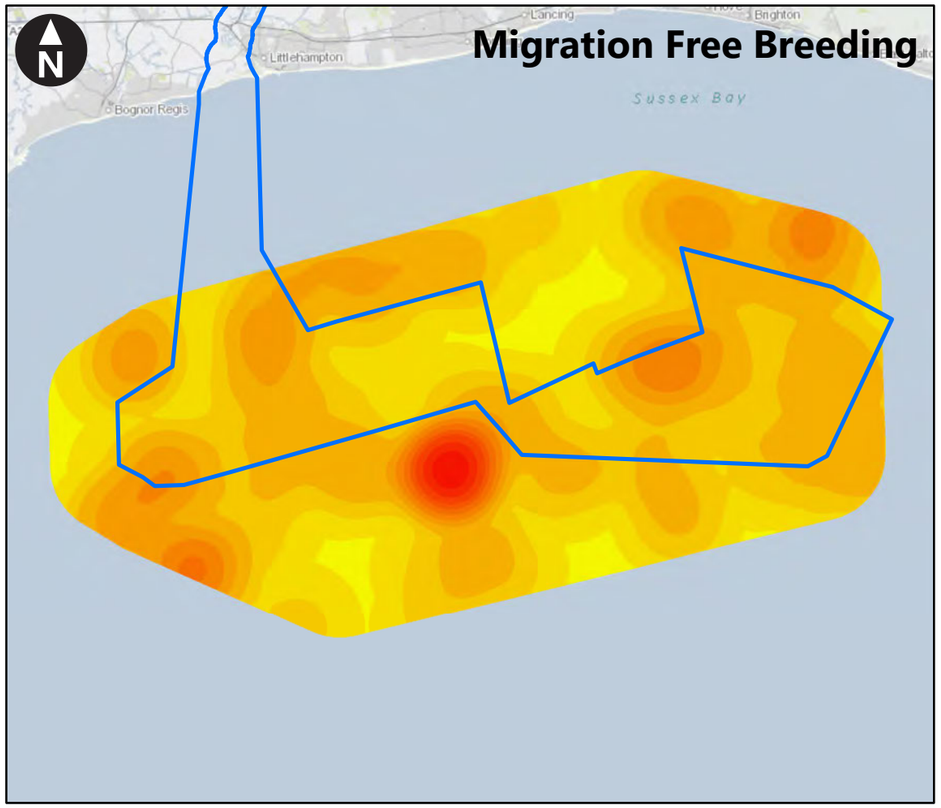
5.8.24 The initial interpretation of **Figure 5.8.3** indicates that gannet are generally evenly distributed across the Scoping Boundary with an area of pronounced higher density in the centre of the Scoping Boundary during the breeding season. **Figure 5.8.3** also shows a pronounced higher density offshore (south of array) during both spring and autumn migration. **Figure 5.8.4** shows herring gull density during the non-breeding season is concentrated in the north east of the Scoping Boundary.

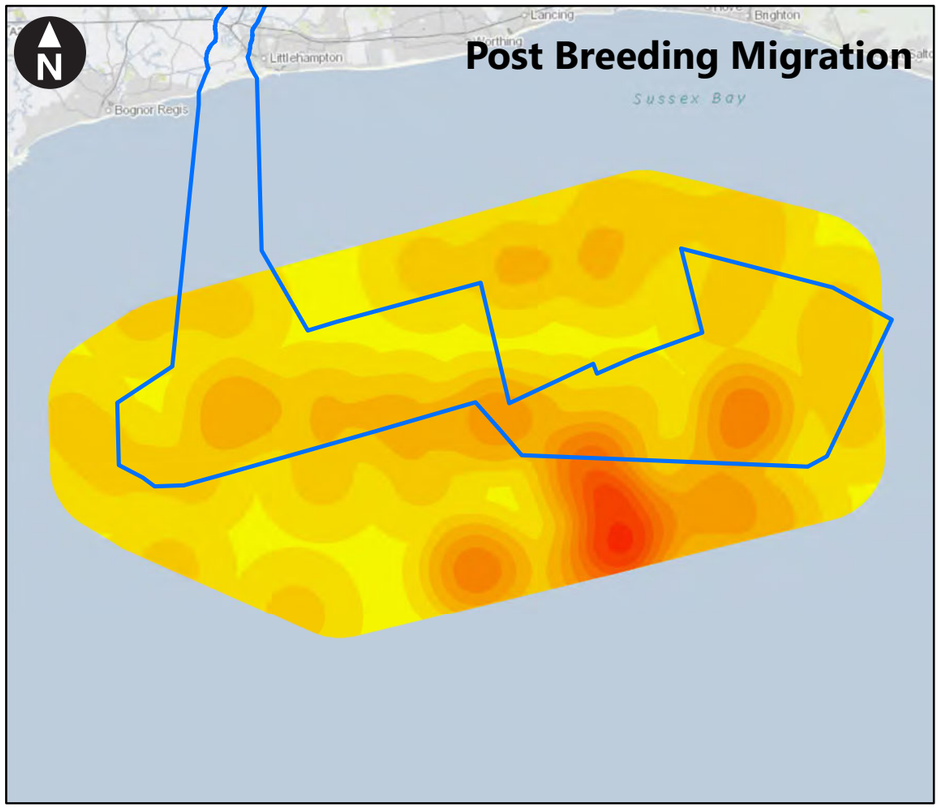
[12] Common or Arctic Tern

For great black-backed gull during the non-breeding season, **Figure 5.8.5** highlights areas of higher density in the north western and eastern areas of the Scoping Boundary while for the breeding season density is highest towards the north eastern extent of the Scoping Boundary (**Figure 5.8.5**). For auks, **Figure 5.8.6** shows relatively low density across the Scoping Boundary during the breeding season. During the non-breeding season, auk density was higher across the Scoping Boundary but declining in areas closer to the shore (**Figure 5.8.6).** It is important to note that data provided in the figures listed above is relative density in relation to the survey area and may not be representative of the wider regional context.

5.8.25 It is acknowledged that some species have been recorded in relatively high numbers during the February 2020 survey, in comparison to other months. The February survey was undertaken following a period of very high winds from the south east which coincided with movements of these species on their northward migration. It is therefore likely that those birds which were migrating at a greater distance offshore, and beyond the Rampion 2 Scoping Boundary during this period, were forced into the inshore waters along the south coast and were recorded by the survey. A more realistic overview of seabird abundance will be gained considering inter-annual variability following the second year of survey, and presented in the ES.





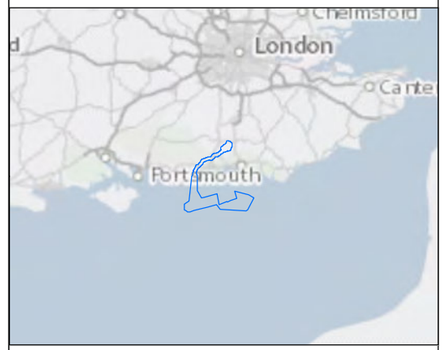


Key

- Scoping Boundary

Gannet relative density (birds per km^2)

- 0
- 0.01 - 0.6
- 0.61- 1.6
- 1.61 - 3.1
- 3.11 - 4.6
- 4.61 - 6.5
- 6.51 - 8.4
- 8.41 - 10.1
- 10.11 - 12.5
- 12.51 - 14.8
- 14.81 - 17.6
- 17.61 - 20.5



Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Gannet Bio Season Distribution

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-13-0006	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
APEM	MB	WOOD	24/06/2020	FINAL

660000 675000 690000 705000

5635000 5620000 5605000

Arundel Rustington Worthing Lancing Shoreham-By-Sea Portslade-By-Sea Brighton & Hove Hove Brighton East Saltdean Bognor Regis

South Downs National Park

Sussex Bay

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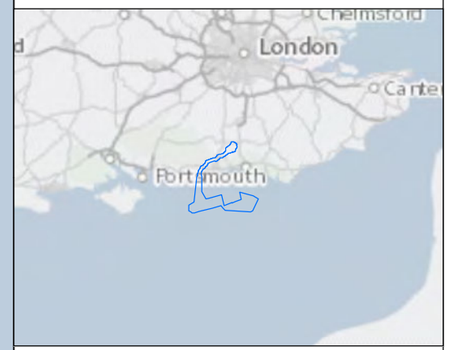
Key

- Scoping Boundary
- Herring gull relative density (birds per km²)
  - 0
  - 0.01 - 2.5
  - 2.51 - 7.5
  - 7.51 - 19.7
  - 19.71 - 37.4
  - 37.41 - 57.7
  - 57.71 - 80.9
  - 80.91 - 102.1
  - 102.11 - 121.9
  - 121.91 - 140.5
  - 140.51 - 160.3
  - 160.31 - 179.1



Kilometres
0 1 2 4 6 8

1:170,000

Rampion Extension Development

RWE

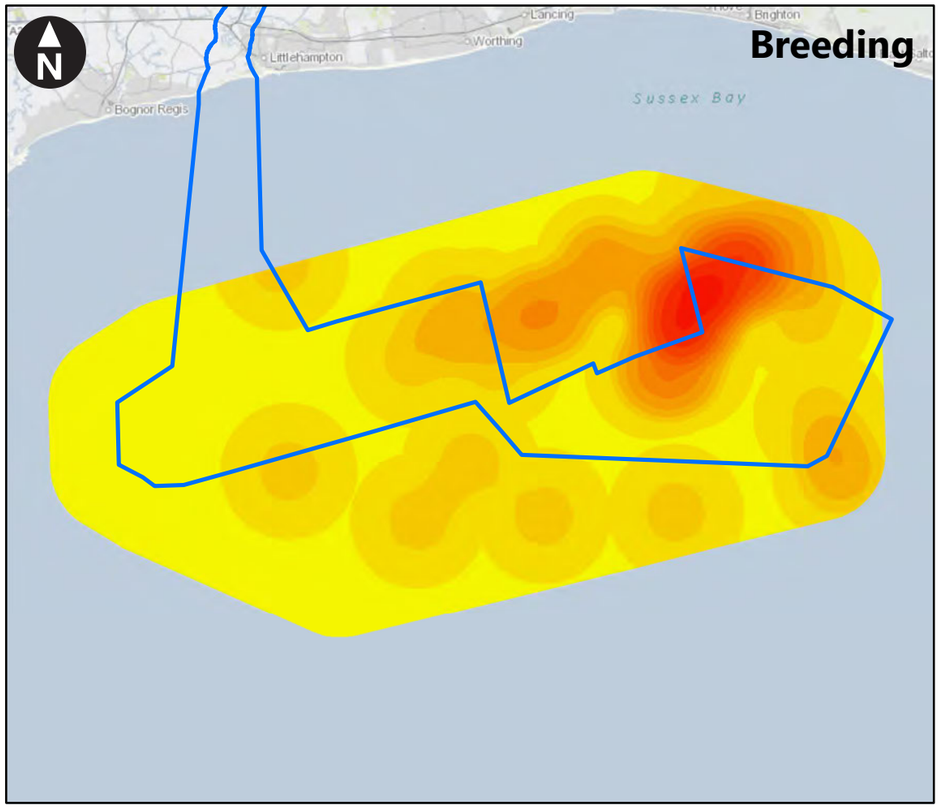
Rampion 2 Offshore Wind Farm

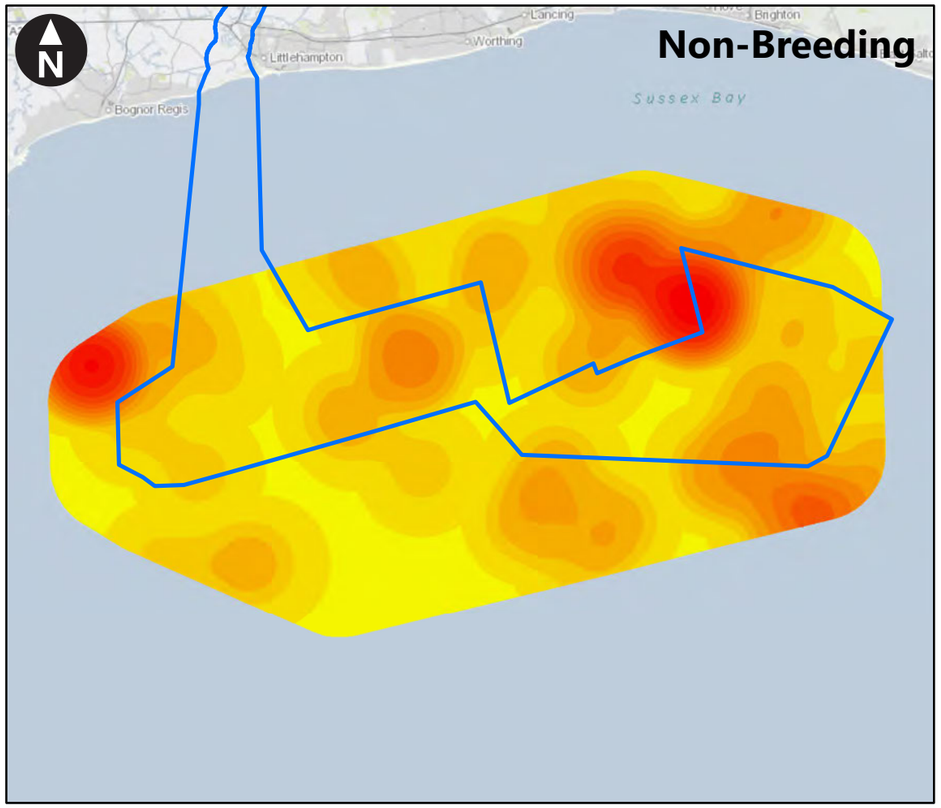
Herring Gull Non-breeding Bio Season Distribution

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-13-0007	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
APEM	MB	WOOD	26/06/2020	FINAL



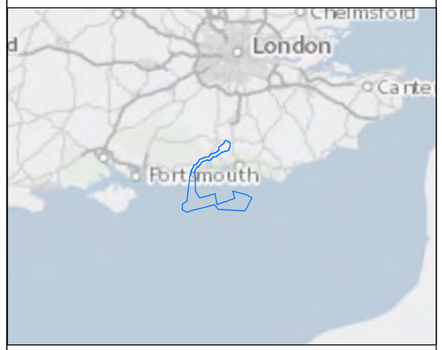


Key

Scoping Boundary

Great black-backed gull relative density (birds per km^2)

- 0
- 0.01 - 0.6
- 0.61 - 1.2
- 1.21 - 2.1
- 2.11 - 3.6
- 3.61 - 5.2
- 5.21 - 7.1
- 7.11 - 9.0
- 9.01 - 11.4
- 11.41 - 14.7
- 14.71 - 17.8
- 17.81 - 21.3



Rampion Extension Development

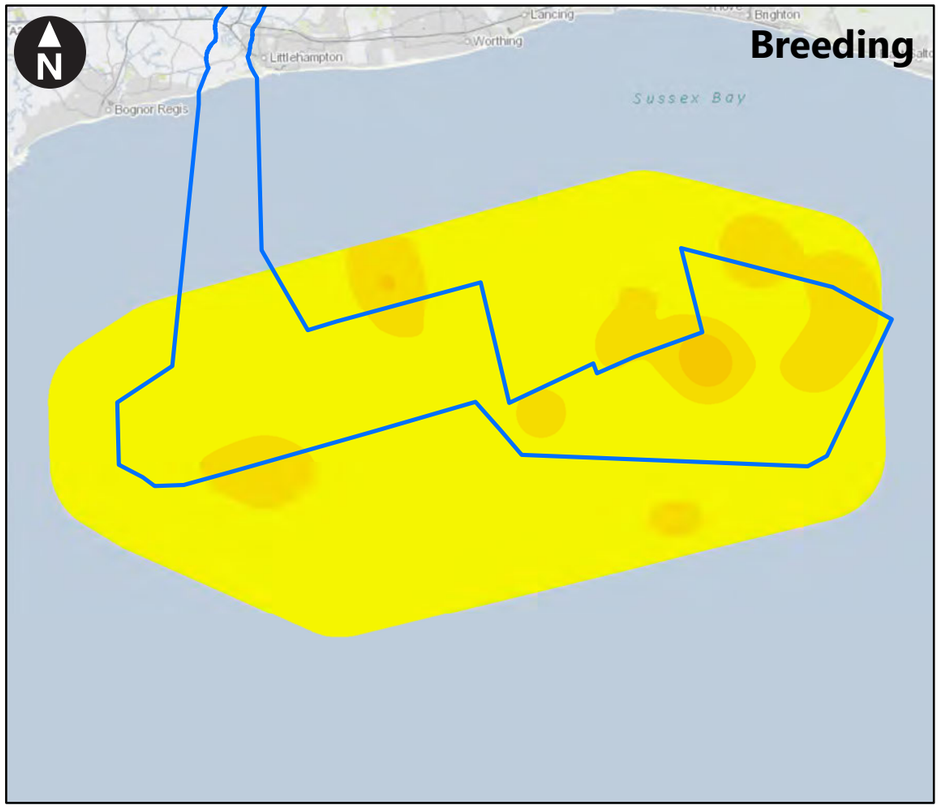
RWE

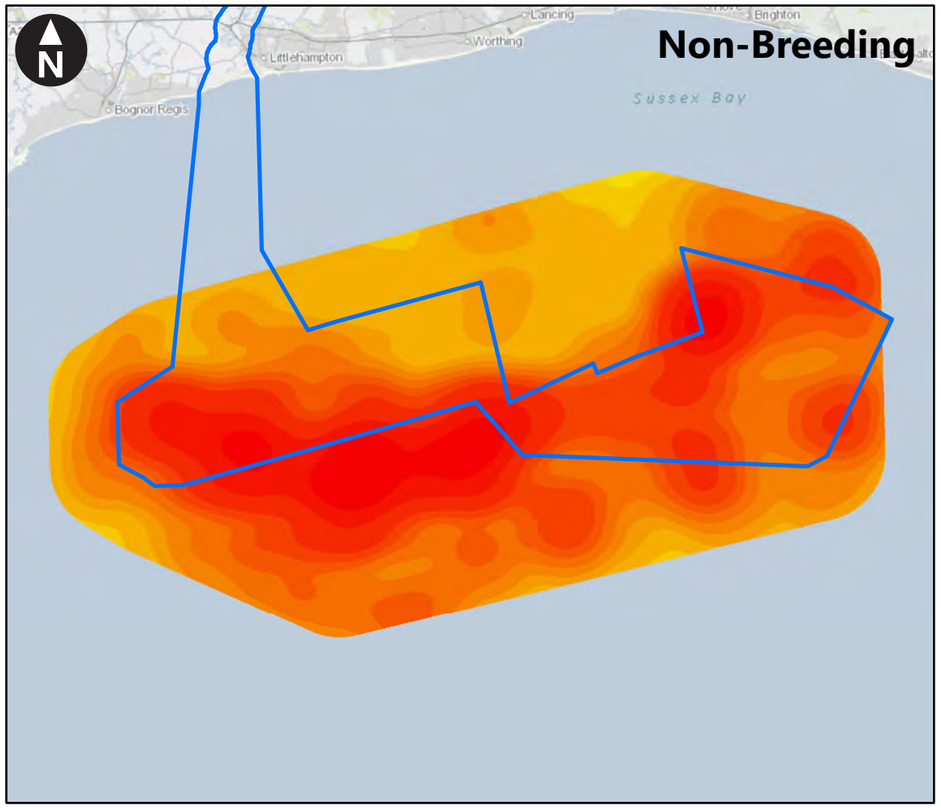
Rampion 2 Offshore Wind Farm

Great Black-backed Gull Bio Season Distribution

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-13-0008				1.1
Company: APEM	Drawn By: MB	Chk/Aprvd: WOOD	Drawn Date: 24/06/2020	Status: FINAL



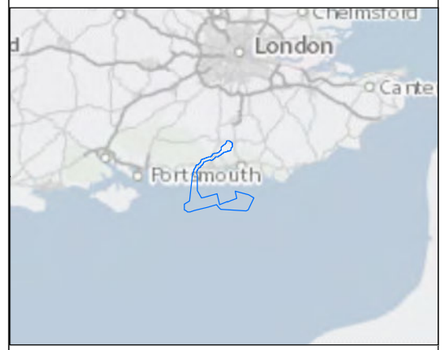


Key

Scoping Boundary

Guillemot/Razorbill (combined) relative density (birds per km²)

- >2
- 2.21 - 4.3
- 4.31 - 7.7
- 7.71 - 15.0
- 15.01 - 21.1
- 21.11 - 29.7
- 29.71 - 40.0
- 40.01 - 49.0
- 49.01 - 61.9
- 61.91 - 92.5
- 92.51 - 121.3
- 121.31 - 157.5



Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Guillemot/Razorbill (combined) Bio Season Distribution

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-13-0010	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
APEM	MB	WOOD	24/06/2020	FINAL

5.8.26 While gannet, herring gull, great black-backed gull, guillemot and razorbill have been recorded in the first year of site-specific aerial digital surveys as the most abundant species and are therefore likely to be the main species in relation to Rampion 2, they may be accompanied by other species which are also deemed IOFs. Those key species likely to be taken forward to impacts assessment as IOFs will be those recorded during surveys within the Scoping Boundary and which are considered to be at potential risk due to either to their abundance, sensitivity to potential wind farm impacts or due to biological characteristics (such as the proportion of time spent flying at rotor height) which make them potentially susceptible. Additional species have been added to **Table 5.8.3** as a result of the desk-based review of data sources presented in **Table 5.8.1**.

5.8.27 Prior to the completion of the ongoing site-specific surveys, a list of species most likely to be considered IOFs are presented in **Table 5.8.3** along with their relevant nature conservation value. It should be noted that the species presented in **Table 5.8.3** may be subject to change following the results of the ongoing digital aerial surveys and stakeholder consideration.

Table 5.8.3 Summary of Important Ornithological Features (IOFs) and associated nature conservation value for Rampion 2

Species	Nature Conservation Value
Red-throated diver	Birds of Conservation Concern (BoCC) (Eaton et.al, 2015) Green listed, Birds Directive Migratory Species, Birds Directive Annex I, International Union for Conservation of Nature (IUCN) Red List 'Least Concern'
Gannet	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Least Concern' status
Kittiwake	BoCC Red listed, Birds Directive Migratory Species, IUCN Red List 'Vulnerable' status
Common gull	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Least Concern' status
Herring gull	BoCC Red listed, Birds Directive Migratory Species, IUCN Red List 'Near Threatened' status
Lesser black-backed gull	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Least Concern' status
Great black-backed gull	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Least Concern' status
Little gull	BoCC Green listed, Birds Directive Migratory Species, IUCN Red List 'Near Threatened' status
Sandwich tern	BoCC Amber listed, Birds Directive Annex I, Migratory Species, IUCN Red List 'Least Concern' status

Species	Nature Conservation Value
Common tern	BoCC Amber listed, Birds Directive Annex I, Migratory Species, IUCN Red List 'Least Concern' status
Arctic tern	BoCC Amber listed, Birds Directive Annex I, Migratory Species, IUCN Red List 'Least Concern' status
Little tern	BoCC Amber listed, Birds Directive Annex I, Migratory Species, IUCN Red List 'Least Concern' status
Guillemot	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Least Concern' status
Razorbill	BoCC Amber listed, Birds Directive Migratory Species, IUCN Red List 'Near Threatened' status

5.8.28 With regard to ornithology within the intertidal region of the south coast, a number of species are likely to be reliant on local habitats. For the purpose of this Scoping report a review of the BTO NEWS survey data covering the area of interest along the West Sussex Coast and Climping Beach, where the cable landfall is proposed, are summarised in **Table 5.8.4**. This provides an indication of bird species present within the intertidal over a prolonged period of time to consider what the potential key species are for assessment purposes. [13]

Table 5.8.4 Summary of the BTO NEWS data for the West Sussex Coast and Climping Beach

Species	Survey				West Sussex coastal population	Great Britain 1% Thresholds
	1984/85	1997/98	2006/07	2015/16		
Dark-bellied brent goose	nc[14]	0	0	0	502	910
Mute swan	nc	0	0	0	7	740
Wigeon	nc	0	0	0	31	4,400
Teal	nc	0	0	0	1	2,100
Red-breasted merganser	nc[3]	1 to 3	0	0	9	84

[13] N.B. This list is provided as an indication of potential key intertidal species relevant to the Rampion 2 Scoping boundary and does not represent the full list of intertidal IOFs. The species listed here may be subject to change following the results of the ongoing surveys and stakeholder consideration.

[14] No count conducted along Climping Beach for the 1984/85 survey.

Species	Survey				West Sussex coastal population	Great Britain 1% Thresholds
	1984/85	1997/98	2006/07	2015/16		
Little grebe	nc[3]	0	0	0	3	160
Great crested grebe	nc[3]	0	0	0	1	190
Oystercatcher	nc[3]	81 to 120	21 to 40	1 to 30	191	3,200
Grey plover	nc[3]	0	1 to 50	1 to 50	170	430
Ringed plover	nc[3]	21 to 30	31 to 60	0	13	340
Curlew	nc[3]	0	0	0	6	1,400
Turnstone	nc[3]	1 to 30	121 to 180	1 to 60	341	480
Sanderling	nc[3]	121 to 180	61 to 120	1 to 200	424	160
Dunlin	nc	1 to 400	0	0	369	3,500
Redshank	nc	1 to 4	1 to 10	0	45	1,200
Black-headed gull	nc	nc	nc	1 to 200	1075	20,000
Mediterranean gull	nc	nc	nc	11 to 20	24	18
Common gull	nc	nc	nc	1 to 30	91	16,400
Great black-backed gull	nc	nc	nc	1 to 10	33	4,200
Herring gull	nc	nc	nc	1 to 300	2218	10,200
Lesser black-backed gull	nc	nc	nc	0	7	5,500

Species	Survey				West Sussex coastal population	Great Britain 1% Thresholds
	1984/85	1997/98	2006/07	2015/16		
Cormorant	nc	0	1 to 10	0	32	350
Grey heron	nc	0	0	0	2	610
Little egret	nc	0	0	0	4	45

Designated sites

5.8.29 The impact assessment will consider potential connectivity of Rampion 2 with statutory designated sites for nature conservation, which have birds listed as qualifying features. Four classes of statutory designated sites will be considered: SPAs, pSPAs, Ramsar sites and SSSIs.

5.8.30 Sites which may have qualifying features with connectivity to Rampion 2 include those designated for breeding seabirds and those for terrestrial, coastal or marine bird interests (typically migratory and / or non-breeding aggregations).

5.8.31 The Scoping Boundary does not directly overlap with any ornithological designations (**Figure 5.8.1**). However, as breeding seabirds can travel significant distances it is necessary to give consideration to designated sites beyond the array Boundary. The extent of connectivity between seabird relevant designated sites and offshore wind farms during the breeding season is largely a function of distance and species-specific foraging ranges (i.e. those identified in the review by Woodward et al., (2019)). Outside the breeding season patterns of migration are used to infer the origins of species recorded. Terrestrial / coastal sites designated for migrant species outside the breeding season may therefore be connected on the grounds of passage movements through the Site.

5.8.32 Full consideration of connectivity of European Sites (SPAs and Ramsar sites) will be provided in a separate HRA Screening report, which will cover in more detail matters associated with European designations and will also be discussed with SNCBs as part of the Application process. For the EIA, a review of SSSIs (often overlapping in extent with SPAs and Ramsar sites) will be undertaken to consider potential connectivity with Rampion 2.

5.8.33 For the benefit of this document, **Figure 5.8.1** shows the key SPAs and Ramsar sites in close proximity to the study area. Those sites include: Pagham Harbour SPA and Ramsar, Chichester and Langstone Harbours SPA and Ramsar, Solent and Southampton Water SPA and Ramsar, Portsmouth Harbour SPA and Ramsar, Dungeness, Romney Marsh and Rye Bay SPA and Ramsar.

Basis for scoping assessment

5.8.34 The offshore and intertidal ornithology scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the construction and operation of a project up to 1200MW in capacity, with up to 116 WTGs, involving monopile, jacket or suction bucket foundations;
- the construction and operation of up to three offshore substations, involving monopile or, jacket foundations;
- the construction and operation of offshore export cables, inter-array cables and associated cable protection (where possible, cable burial is the preferred option for protection);
- the maintenance of the above infrastructure during operation;
- the potential clearance of unexploded ordnance (UXO); and
- the requirement for decommissioning.

5.8.35 The basis for assessment also includes the embedded mitigation (detailed in the following section) where appropriate.

Embedded environmental measures

5.8.36 As part of the design process for Rampion 2, a number of embedded measures are proposed to reduce the potential for impacts on offshore and intertidal ornithological receptors (see **Table 5.2.2**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.8.37 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.8.5 Relevant offshore and intertidal ornithological embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	DCO requirements or DML conditions.
C-52	A piling Marine Mammal Mitigation Protocol (MMMP), will be implemented during construction and will be	DCO or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	developed in accordance with JNCC (2010) guidance. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.	
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details	DCO requirements or DML conditions.
C-63	Development of, and adherence to, a Code of Construction Practice (CoCP) to reduce direct and indirect disturbance and displacement effects to ornithological features.	DCO requirements or DML conditions.
C-64	Selection of the WTG specifications which allow a minimum lower blade tip height above MHWS / LAT, which reduces collision risks, based on evidence which shows that typical seabird flight height distribution is skewed towards low altitudes.	DCO requirements or DML conditions.
C-65	The proposed offshore cable corridor and cable landfall (below MHWS) will avoid all statutory marine designated areas.	DCO requirements or DML conditions.

Likely significant effects

5.8.38 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.8.39 The likely significant effects on IOFs are summarised in **Table 5.8.6**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for offshore and intertidal ornithological effects related to Rampion 2 and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process.**

5.8.40 This process is aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.8.6 Likely significant offshore and intertidal ornithology effects

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Disturbance and displacement: Array - Construction activities within the array area associated with foundations and WTGs may lead to disturbance and displacement of species within the array and potentially within surrounding buffers to a lower extent. (**Construction)**	C-63 C-52	Potential significant effect minor depending on species assessed without mitigation. This is due to potential impacts being spatially restricted to a small number of foundations/ WTGs being constructed at any one time. Potential impacts also limited temporally due to limited duration of construction phase.	**Scoped in – simple assessment** In order to focus the assessment of disturbance and displacement, a screening exercise will be undertaken to identify those species most likely to be at risk. Any species recorded only in very small numbers within the study area or with a low determined sensitivity to disturbance and displacement (as per e.g. Bradbury et al. 2014; Furness et al. 2013) will be screened out of further assessment. The assessment of remaining IOFs will be based on relevant disturbance-displacement scientific studies which will aid determination of magnitude of displacement and resultant effects.	Those species identified as sensitive to disturbance and displacement (i.e. auks).	Array area: Rampion 2 has commissioned monthly aerial surveys across the array area and a minimum 4 km buffer. These surveys commenced in April 2019 and will continue to 2021. An analysis of existing survey data for Rampion 2 will be conducted and this will supplement the site-specific bird surveys, for use in determining numbers of individuals of each IOF potentially affected.
Disturbance and displacement: Offshore export cable - Construction activities associated with export cable installation may lead to disturbance and displacement of species within the export cable corridor and potentially within surrounding buffers to a lower extent. (**Construction**).	C-65	Potential significant effect minor depending on species assessed, without mitigation. This is due to potential impacts being spatially restricted due to the presence of a single cable laying vessel being used. Potential impacts also limited temporally due to limited duration of construction phase.	**Scoped in – simple assessment** In order to focus the assessment of disturbance and displacement, a screening exercise will be undertaken to identify those species most likely to be at risk. Any species recorded only in very small numbers within the study area or with a low determined sensitivity to disturbance and displacement (as per e.g. Bradbury et al., 2014; Furness et al., 2013) will be screened out of further assessment. The assessment of remaining IOFs will be based on relevant disturbance-displacement scientific studies which will aid determination of magnitude of displacement and resultant effects.	Those species identified as sensitive to disturbance and displacement (i.e. divers and sea ducks).	Offshore cable route: It is considered that there is sufficient data (available from the sources outlined above) to describe the ornithological baseline of the offshore components of the cable route and no further specific surveys are proposed.
Disturbance and displacement: Intertidal export cable - Construction activities associated with export cable installation may lead to disturbance and displacement of intertidal waterbird species within the export cable corridor and potentially within close proximity surrounding the works. (**Construction**).	C-43 C-63	Potential significant effect not significant to minor as very few waterbirds reside in the intertidal area (without mitigation). Additionally, most species are tolerant to	**Scoped in – simple assessment** In order to focus the assessment of disturbance and displacement, a screening exercise will be undertaken to identify those species most likely to be at risk. Any species recorded only in very small numbers within the study area or with a low determined sensitivity to disturbance and displacement will be screened out of further	Those species identified as sensitive to disturbance and displacement (i.e. intertidal waterbirds).	Intertidal cable route: It is considered that there is sufficient data (available from the sources outlined above) to describe the ornithological baseline of the intertidal

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		disturbance from anticipated activities as they are limited both spatially and temporally.	assessment. The assessment of remaining IOFs will be based on relevant disturbance-displacement scientific studies which will aid determination of magnitude of displacement and resultant effects.		components of the cable route and no further specific surveys are proposed.
Indirect impacts on IOFs due to impacts on prey species habitat loss: Array –Impacts include those resulting from underwater noise (e.g. during piling) or the production of suspended sediments (e.g. during preparation of the seabed for foundations) that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds. (**Construction**).	C-53 C-65	Potential significant effect not significant to minor depending on the species assessed, without mitigation.	**Scoped in – simple assessment** A review of the data and impact assessments for Benthic and Intertidal Ecology and Fish and Shellfish will be conducted within the context of the potential impacts on offshore and intertidal ornithology.	Those species identified as sensitive to effect.	Array area: Indirect impacts on prey species will be covered by the relevant receptor chapters, namely: **Section 5.5 Benthic subtidal and intertidal ecology, Section 5.4 Fish and shellfish ecology** and **Section 5.2 Coastal processes.**
Indirect impacts on IOFs due to impacts on prey species habitat loss: Export cable route – Impacts include the production of suspended sediments (e.g. during installation of cables) that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds. (**Construction**).	C-53 C-43	Potential significant effect not significant to minor depending on the species assessed, without mitigation.	**Scoped in – simple assessment** A review of the data and impact assessments for Benthic and Intertidal Ecology and Fish and Shellfish will be conducted within the context of the potential impacts on offshore and intertidal ornithology.	Those species identified as sensitive to effect.	Cable route: Indirect impacts on prey species will be covered by the relevant receptor chapters, namely: **Section 5.5 Benthic subtidal and intertidal ecology, Section 5.4 Fish and shellfish ecology** and **Section 5.2 Coastal processes.**
Disturbance and displacement: Array - Activities associated with the operation and maintenance of WTGs and the presence of WTGs themselves may disturb and displace species within the array area and potentially within surrounding buffers to a lower extent. (**Operation**).		Potential significant effect not significant to minor/ moderate depending on species assessed, without mitigation.	**Scoped in** – **detailed assessment** Information on the assessment of disturbance and displacement is included in the *Proposed assessment* methodology section above. A matrix approach following JNCC et al. (2017) guidance will be used to calculate a range of predicted impact magnitudes. These relate varying levels of displacement (within particular species-specific buffer distances from WTGs) to varying levels of additional mortality, with consideration then given to the population-level impacts of the potential additional mortality. Values	Those species identified as sensitive to disturbance and displacement (i.e. auks).	Array area: Rampion 2 has commissioned monthly aerial surveys across the array area and a minimum 4km buffer. These surveys commenced in April 2019 and will continue to 2021. An analysis of existing survey data for Rampion 2 will be conducted and this will

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			and ranges of outputs would be discussed and agreed with SNCBs as appropriate.		supplement the site-specific bird surveys, for use in determining numbers of individuals of each IOF potentially affected.
Disturbance and displacement: Offshore export cable –Maintenance activities associated with the export cable during the operational stage of the Project may lead to disturbance and displacement of species within the export cable corridor and potentially within surrounding buffers to a lower extent. (**Operation**).	C-63	**No potential significant effect.**	**Scoped out** Rationale provided in the section below **paragraph 5.8.40**.	N/A	N/A
Disturbance and displacement: Intertidal export cable - Maintenance activities associated with the export cable during the operational phase of the Project may lead to disturbance and displacement of intertidal waterbird species within the export cable corridor and potentially within close proximity surrounding the works. (Operational phase).	C-63	**No potential significant effect.**	**Scoped out** Rationale provided in the section below **paragraph 5.8.40**.	N/A	N/A
Collision risk: Array – Seabirds flying through the array area during the operational phase of the Project may be at risk of collision with WTGs. Collisions are assumed to be fatal. (**Operation**).	C-64	Potential significant effect not significant and moderate/ major, without mitigation.	**Scoped in – detailed assessment** Collision risk modelling (CRM) will be undertaken using industry-standard approaches (i.e. Band, 2012, Donovan, 2018) to predict potential collision rates from this impact. The population-level impacts of the resulting potential additional mortality will be considered. The exact option and version of the collision risk model to be used, avoidance rates, flight height data, nocturnal activity rates and parameters for modelling will be based upon the best available evidence and will be agreed with stakeholders and clearly defined within the EIA and HRA.	Those species identified as sensitive to collision (i.e. gulls, gannet, terns).	Array area: Rampion 2 has commissioned monthly aerial surveys across the array area and a minimum 4km buffer. These surveys commenced in April 2019 and will continue to 2021. An analysis of existing survey data for Rampion 2 will be conducted and this will supplement the site-specific bird surveys, for use in determining numbers of individuals of each IOF potentially affected.
Collision risk: Array – Migrant seabirds, waterbirds and other non-seabirds flying through the array area during the operational phase of the	C-64	Potential significant effect not significant or minor based on previous offshore wind	**Scoped in – detailed assessment** Collision risk modelling (CRM) will be undertaken using industry-standard approaches (i.e. Band, 2012) to predict potential collision rates from this	Those species identified as sensitive to collision (i.e.	Array area: Rampion 2 has commissioned monthly aerial surveys across the array area

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Project may be at risk of collision with WTGs. Collisions are assumed to be fatal. (**Operation**).		farm assessments regarding migratory waterbirds, without mitigation.	impact. The population-level impacts of the resulting potential additional mortality will be considered. The exact option and version of the collision risk model to be used, avoidance rates, flight height data, nocturnal activity rates and parameters for modelling will be based upon the best available evidence and will be agreed with stakeholders and clearly defined within the EIA and HRA.	migratory seabirds such as skuas, waterbirds such as swans and geese or non-seabirds such as nightjar).	and a minimum 4km buffer. These surveys commenced in April 2019 and will continue to 2021. An analysis of existing survey data for Rampion 2 will be conducted and this will supplement the site-specific bird surveys, for use in determining numbers of individuals of each IOF potentially affected.
Indirect impacts on IOFs due to impacts on prey species habitat loss: Array – Impacts include those resulting from underwater noise (e.g. during piling) or the production of suspended sediments (e.g. during preparation of the seabed for foundations) that may alter the distribution, physiology or behaviour of bird prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active construction works to foraging seabirds. (**Operation**).	C-52	Potential significant effect not significant to minor depending on the species assessed.	**Scoped in** – Simple assessment A review of the data and impact assessments for Benthic and Intertidal Ecology and Fish and Shellfish will be conducted within the context of the potential impacts on offshore and intertidal ornithology.	Those species identified as sensitive to effect.	Array area: Indirect impacts on prey species will be covered by the relevant receptor chapters, namely: **Section 5.5 Benthic subtidal and intertidal ecology, Section 5.4 Fish and shellfish ecology** and **Section 5.2 Coastal processes.**
Barrier effect: Array – The presence of the array area could create a barrier to movements of breeding seabirds during foraging trips or to migratory movements. This may result in increased energy expenditure. (**Operation**).	None	**No likely significant effect.**	**Scoped out** Rationale provided in the section below **paragraph 5.8.40**.	N/A	N/A
Disturbance and displacement: Array – Decommissioning activities associated with foundations and WTGs may lead to the disturbance and displacement of species within the array area and potentially within surrounding buffers to a lower extent. (**Decommissioning**).	C-52 C-63	Potential significant effect not significant to minor depending on species assessed, without mitigation. This is due to potential impacts being spatially restricted to a small number of foundations/ WTGs being constructed at	**Scoped in – simple assessment** In order to focus the assessment of disturbance and displacement, a screening exercise will be undertaken to identify those species most likely to be at risk. Any species recorded only in very small numbers within the study area or with a low determined sensitivity to disturbance and displacement (as per e.g. Bradbury et al. 2014; Furness et al. 2013) will be screened out of further assessment. The assessment of remaining IOFs will be based on relevant disturbance-displacement	Those species identified as sensitive to disturbance and displacement (i.e. auks).	This is reliant upon the agreed potential likely significant effect of construction and operational disturbance and displacement assessments.

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		any one time. Potential impacts also limited temporally due to limited duration of construction phase.	scientific studies which will aid determination of magnitude of displacement and resultant effects.		
Disturbance and displacement: Offshore export cable – Indirect impacts during the decommissioning phase within the offshore export cable corridor and areas of intertidal landfall through effects on habitats and prey species. (**Decommissioning**).	C-53 C-63	Potential significant effect not significant to minor depending on species assessed, without mitigation. This is due to potential impacts being spatially restricted to a small number of foundations/ WTGs being constructed at any one time. Potential impacts also limited temporally due to limited duration of construction phase.	**Scoped in – simple assessment** In order to focus the assessment of disturbance and displacement, a screening exercise will be undertaken to identify those species most likely to be at risk. Any species recorded only in very small numbers within the study area or with a low determined sensitivity to disturbance and displacement (as per e.g. Bradbury et al. 2014; Furness et al. 2013) will be screened out of further assessment. The assessment of remaining IOFs will be based on relevant disturbance-displacement scientific studies which will aid determination of magnitude of displacement and resultant effects.	Those species identified as sensitive to disturbance and displacement (i.e. red-throated diver).	This is reliant upon the agreed potential likely significant effect of construction and operational disturbance and displacement assessments.
Indirect impacts on IOFs due to impacts on prey species habitat loss: Export cable route – Impacts include those resulting from underwater noise or the production of suspended sediments that may alter the distribution, physiology or behaviour of prey species and thereby have an indirect effect. These mechanisms could potentially result in less prey being available in the area adjacent to active decommissioning works to foraging seabirds. (**Decommissioning**).	C-43 C-53 C-63	Potential significant effect not significant to minor depending on the species assessed without mitigation.	**Scoped in – simple assessment** A review of the data and impact assessments for Benthic and Intertidal Ecology and Fish and Shellfish will be conducted within the context of the potential impacts on offshore and intertidal ornithology.	Those species identified as sensitive to effect.	This is reliant upon the agreed potential likely significant effect of construction and operational indirect impacts on IOFs due to impacts on prey species habitat loss assessments.

Impacts scoped out of assessment

5.8.41 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

5.8.42 Disturbance and displacement: Offshore and intertidal export cable – Operational phase. Given that potential impacts along the offshore and intertidal export cable route would be highly localised and episodic (i.e. limited to any maintenance or repair of the export cables) and do not overlap with any SPAs or Ramsar sites it is proposed that this impact should be scoped out from further consideration within the EIA in relation to the cable, with the focus of operational disturbance-displacement on the array only. Embedded measures listed in **Table 5.2.2** will further ensure that no potential impact will exist.

5.8.43 Barrier effect: Array – Operational Phase. For the purposes of assessment of displacement for resident birds, it is usually not possible to distinguish between displacement and barrier effects. E.g. to define where individual birds may have intended to travel to, or beyond an offshore wind farm, even when tracking data are available. Therefore, in the impact assessment the effects of displacement and barrier effects on resident IOFs are considered together. The small risk of impact to migrating birds resulting from flying around rather than through the WTG array of an offshore wind farm is considered a potential barrier effect but has been scoped out of the assessment. Masden et al. (2010, 2012) and Speakman et al. (2009) calculated that the costs of one-off avoidances during migration were small, accounting for less than 2% of available fat reserves. Therefore, the impacts on birds that only migrate through the scoping boundary (including seabirds, waders and waterbirds on passage) are considered negligible and these would be scoped out of detailed assessment.

Cumulative effects

5.8.44 Given the widespread nature of ornithological receptors present at Rampion 2 the potential for cumulative effects cannot be ruled out. A list of developments requiring consideration for assessment will be provided at PEIR.

5.8.45 Cumulative effects on offshore and intertidal ornithology resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.8.46 The potential impacts that are likely to be scoped into the cumulative impact assessment are operational disturbance and displacement, and collision risk. Cumulative construction and decommissioning impacts are likely to be scoped out as the likelihood that there would be a cumulative impact is low. The contribution from the Proposed Development is likely to be small, and is dependent on a temporal and spatial co-incidence of disturbance / displacement from other plans or projects (significant additive effects associated with simultaneous construction phases are considered unlikely based on project information presented in the

Crown Estate's (2019) OWF Extensions Plan-level Habitats Regulations Assessment).

5.8.47 Regarding offshore wind there is a potential for cumulative impacts on birds due to operational, consented and planned offshore wind farms. As many bird species are highly mobile, there is the potential for the same bird populations to be affected by several wind farms. Furthermore, there is also the possibility that cumulative impacts may arise from onshore and/ or intertidal activities which may have a combined effect on IOFs. As appropriate, these will be considered cumulatively and reported upon in the relevant onshore or offshore section of the ES. Overall, the potential for cumulative impacts will be species-specific as the impacts will be dependent upon the individual sensitivities of each species, where the birds have originated from, and their potential to interact with other wind farms (i.e. on migratory or foraging travel).

5.8.48 Wherever possible the cumulative assessment will be quantitative (i.e. where data in an appropriate format have been obtained). However, the level of data available and the ease with which impacts can be combined across the windfarms is quite variable, reflecting the availability of relevant data for older projects and the approach to assessment taken. Where this has not been possible (e.g. for older projects) a qualitative assessment will be undertaken.

5.8.49 There is also the potential for other activities to potentially have a cumulative impact on offshore IOFs, including: marine aggregate extraction, oil and gas exploration and extraction, sub-sea cables and pipelines, and commercial shipping.

5.8.50 The cumulative assessment will take into account the fact that birds may already be habituated to on-going activities and therefore these may be considered to be part of the baseline conditions to avoid double-counting or exaggeration of potential impacts.

Transboundary Effects

5.8.51 It is likely from the baseline data presented that transboundary considerations will feature in the offshore ornithology assessment at PEIR. Further information on transboundary matters is provided in **Appendix B.**

Proposed approach to PEIR and ES

5.8.52 The impact assessment methodology will be based on that described in **Chapter 4: The EIA process**, adapted to make it applicable to IOFs, and aligned with the key guidance documents produced on impact assessment of ecological/ornithological receptors (CIEEM, 2018; updated 2019), evidence from other offshore wind farms and species-specific studies and expert opinion.

5.8.53 As Rampion 2 develops, a more detailed methodology for the EIA will be agreed with SNCBs. This will include the production of a method statement and Expert Topic Group (ETG) meetings where the methodology will be discussed and adopted accordingly based on relevant advice and perceived risk, progressed as part of the Evidence Plan Process. The process and record of agreements and any unresolved issues will be presented within the ES chapter. It is anticipated that

a PEIR will be produced in advance of the final assessment. This will be submitted to relevant stakeholders for review and with the final assessment informed by the comments received.

5.8.54 The ongoing programme of monthly digital aerial bird surveys for the Rampion 2 array (and associated buffer) will continue until 2021 and will provide the key data source for the ornithology site characterisation and quantification of parameters for the impact assessment (e.g. CRM). Additionally, information from previous surveys in the wider area will be collated and provide further contextual information, alongside the literature and information sources outlined in **Table 5.8.1**.It should be noted that the currently digital aerial surveys at Rampion 2 are due to be completed in June 2021 and therefore will not be fully completed in time for PEIR. However, the survey data will be analysed as much as possible in order to inform the PEIR assessment, with a full analysis of all survey data possible for ES assessment.

5.8.55 Reference populations for each species and population sizes (i.e. Furness (2015) and data from the National Seabird Monitoring Programme) will be based on the best available information at the time of undertaking the assessment and will be agreed with key stakeholders.

5.8.56 The sensitivity of each species will be determined based on the size of its population, its conservation status and its known sensitivity to offshore windfarms. Species identified as IOFs will be subject to full impact assessment against the impacts listed in **Table 5.8.6**. The impact assessment will be undertaken in line with guidance by CIEEM (2018; updated 2019) and expert opinion.

5.8.57 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which as set out in **Section 4.3: Consultation and the evidence plan process.**

5.9 Underwater noise

Introduction

5.9.1 This section of the Scoping Report provides a summary of underwater noise considerations of relevance to the construction, operation and maintenance, and decommissioning of the Proposed Development. It is important to note that the intention of this section is not to provide assessment or consideration of noise effects in order to scope in or scope out potential impacts as this will be undertaken within the aspects chapters that consider impacts on receptors potentially sensitive to noise emissions. In particular this will relate to the following:

- **Chapter 5.7: Marine mammals** (describes pathways of effect from noise sources on sensitive marine mammal receptor species);
- **Chapter 5.4: Fish and shellfish ecology** (describes pathways of effect from noise sources on sensitive fish and shellfish receptor species);
- **Chapter 5.6: Commercial fisheries** (describes pathways of effect from noise sources on sensitive commercial fisheries receptor species); and

- **Chapter 5.3: Other marine users** (describes pathways of effect from noise sources on sensitive other marine users)**.**

Study area

5.9.2 The study area for underwater noise is defined by the sensitive receptor within each of the aspects chapters identified above.

Assessment methodology

Introduction

5.9.3 The underwater noise assessment will be included as an appended technical report to the PEIR and ES rather than a specific aspect chapter. The technical report will include an assessment of the level of underwater noise generated from the Proposed Development.

5.9.4 The project-wide approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approaches that will be adopted in the aspect chapters which rely on the underwater noise assessment outputs to support the EIA process, specific aspects of relevance to underwater noise and the approach that will be adopted are set out below. Relevant guidance, albeit general, is noted in **paragraph 5.9.6**.

Desk-based review

5.9.5 A desk-based review of existing information and current literature on underwater noise, notably including modelling undertaken as part of the existing Rampion 1 project application and data from the construction monitoring. These data will be reviewed and used, where applicable, to inform the underwater noise assessment and modelling strategy for Rampion 2.

Guidance

5.9.6 The underwater noise assessment will consider and relevant legislation and guidance including the European Union (EU) Marine Strategy Framework Directive (Directive 2008/56/EC), as transposed into UK law by the Marine Strategy Regulations 2010,which seeks to achieve Good Environmental Status (GES) in Europe's seas by 2020 and includes specific consideration of underwater noise sources 'that do not adversely affect the marine environment' in the determination process of GES; and the relevant provisions within NPS EN-1 (section 5.11, noise and vibration) (DECC, 2011).

Approach

5.9.7 There is a wide array of anthropogenic activities along this stretch of coastline that will contribute to background marine noise levels. Commercial fishing activity, general commercial shipping traffic, marine aggregate extraction and a range of recreational water sports and motor boating all occur in this region.

5.9.8 Offshore construction operations at Rampion 2, particularly piling activities, will generate noise and vibration which may have the potential to affect sensitive

receptors. Drawing on experience gained through the existing Rampion 1 project, together with a large number of other offshore wind projects in UK waters, an underwater noise assessment, including noise propagation modelling, is considered likely to be required.

5.9.9 The detailed scope, specification and methodology of the noise propagation modelling will be discussed and agreed with Statutory Nature Conservation Bodies (SNCBs) through the Evidence Plan Process. However, it is anticipated that the noise assessment will include the following:

- a review of the publicly available literature and studies of the impact of impulsive underwater noise on marine mammal and fish species, including an assessment of the sensitivity of fish and marine mammals to underwater sound, and derivation of criteria for estimating the impact to be agreed with the SNCBs;
- estimation of source level noise for impact piling operations at Rampion 2 based on engineering input in respect of pile diameters, seabed composition and attendant hammer energy requirements;
- noise propagation modelling to estimate potential impact ranges for injury to marine mammals, fish and marine users (human divers) as a result of piling during construction;
- noise propagation modelling to estimate potential impact ranges for behavioural effects to marine mammals and fish as a result of piling during construction; and
- consideration of underwater noise effects associated with the operation and maintenance phase and decommissioning phases of the Proposed Development.

5.9.10 Detail for the assessment of the environmental consequence of underwater noise generated by Rampion 2 will be determined within the relevant aspects chapters of the PEIR and ES and through consultation with SNCBs under the EPP process. This will include discussion and agreement of the project parameters representing the worst case for assessment across both spatial and temporal scales. Even so, it is anticipated that the impact criteria will be based on relevant published injury and behavioural thresholds for marine mammals and fish which will be discussed and agreed in advance with the SNCBs. These thresholds are expected to be derived from the most recent publication of relevance is Southall et al. (2019), (unless further evidence is published in the interim)for marine mammal receptors and from Popper *et al*. (2014) in respect of fish.

5.9.11 Exposure of recreational divers to underwater pile driving noise will also be considered within the **Chapter 5.3 Other marine users**. It is proposed that this aspect of the assessment will be based on criteria from two sources: i) criteria outlined by Fothergill *et al*. (2001) to assess the likelihood of a diver aborting a dive; and ii) a Health and Safety Executive (HSE) guidance document (Anthony *et al.*, 2009) for implementation of the Control of Noise at Work Regulations (the Control of Noise at Work Regulations are based on ISO 9612:2009 which specifies the levels to which an individual can safely be exposed). In addition, the noise modelling will draw upon thresholds and information given in Parvin *et al.* (2007), which presents a comprehensive review of information on physical impacts on

marine species (including humans underwater). Care will be taken to follow agreed approaches pursued for the Rampion 1 EIA.

Baseline conditions and Basis for Assessment

5.9.12 The baseline conditions and basis for assessment of underwater noise will be detailed within the relevant aspects chapters that consider impacts on receptors potentially sensitive to underwater noise emissions. In particular this will relate to the following:

- **Chapter 5.7: Marine mammals;**
- **Chapter 5.4: Fish and shellfish ecology;**
- **Chapter 5.6: Commercial fisheries;** and
- **Chapter 5.3: Other marine users.**

Embedded environmental measures

5.9.13 As part of the Rampion 2 design process, a number of embedded measures, for example development of and adherence to an agreed marine mammal mitigation protocol (MMMP), are proposed to reduce the potential for impacts from Underwater noise on marine mammals (see **Table 5.7.2**) fish and shellfish (see **Table 5.4.3**), commercial fisheries (see **Table 5.6.2**) and other marine users (see **Table 5.3.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that will be undertaken to meet existing legislative requirements.

5.9.14 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Likely significant effects

5.9.15 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise, and the MMO 2012 review of post-consent monitoring to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.9.16 The likely significant effects of underwater noise to each relevant receptor are summarised in the following aspect Tables:

- Marine mammals **Table 5.7.3**;
- Fish and shellfish ecology **Table 5.4.4**;
- Other marine users **Table 5.3.5**; and

- Commercial fisheries **Table 5.6.3**.

5.9.17 The scoping assessments presented within these chapters is based on a combination of the Rampion 2 project design as defined at this stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for impacts on relevant receptors, experience and evidence gained from the existing Rampion 1 project (especially with respect to underwater noise), and professional judgement. The approach to this assessment is set out in **Chapter 4 The EIA process**.

Cumulative Effects

5.9.18 Cumulative effects on the relevant underwater noise aspects resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise. Further details on each aspect cumulative effect assessment, including impacts relevant to underwater noise generation during the can be found in the following chapters,

- **Chapter 5.7: Marine mammals**;
- **Chapter 5.4: Fish and shellfish ecology**;
- **Chapter 5.6: Commercial fisheries**; and
- **Chapter 5.3: Other marine users**.

Transboundary Effects

5.9.19 The potential effects from construction, operation (including maintenance) and decommissioning on marine mammal receptors are considered in **Appendix B**.

5.10 Shipping and navigation

Introduction

5.10.1 The shipping and navigation assessment will consider the potential likely significant effects on shipping and navigation that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions across the study area, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.10.2 Shipping and navigation interfaces with several other aspects and as such, it should be considered alongside the following chapters:

- **Section 5.3: Other marine users;**
- **Section 5.6: Commercial fisheries;** and
- **Section 5.12: Civil and military aviation.**

5.10.3 The shipping and navigation assessment focuses on vessels in transit with other marine activities (including commercial fishing) assessed as part of **Section 5.3: Other marine users** and **Section 5.6: Commercial fisheries**. Likewise, with respect to aviation, the shipping and navigation assessment focuses on emergency response and in particular the effect on emergency response resources and search and rescue capability with other aviation activities assessed as part of **Section 5.12: Civil and military aviation**.

Study area

5.10.4 The study area for the shipping and navigation assessment is defined as the Scoping Boundary together with the Zone of Influence (ZOI) which is represented by a ten nautical mile (nm) buffer. The 10nm buffer is standard for shipping and navigation assessments as it is large enough to encompass vessel routeing which may be impacted, while still remaining site specific to the Proposed Development being studied.

5.10.5 Where necessary, this 10nm buffer has been cropped to the UK coastline, so as not to include irrelevant vessels at anchor further inland.

5.10.6 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Assessment methodology

Introduction

5.10.7 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has been considered in approach that has been used in this shipping and navigation aspect chapter, the actual approach including the matrix used does differ in order to align with regulator and stakeholder requirements. Therefore, this section sets out this methodology and how will be applied to address the specific needs of the shipping and navigation assessment.

5.10.8 It is noted that the proposed approach to assessment for shipping and navigation will be agreed at a high level with the Maritime and Coastguard Agency (MCA) and Trinity House prior to any assessments being undertaken.

5.10.9 The key guidance document that will be considered within the shipping and navigation aspect of the EIA is the MCA's Marine Guidance Note (MGN) 543[15] and its annexes (MCA, 2016). Other key guidance is as follows:

- Revised Guidelines for Formal Safety Assessment (FSA) (International Maritime Organization (IMO), 2018);

[15] It is noted that consultation is currently ongoing for MGN 543 and MGN 372 – the relevant guidance at the time of the commencement of the NRA will be followed.

- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2013);
- MGN 372 Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA 2008);
- Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI) (MCA, 2013); and
- The Royal Yachting Association's (RYA) Position on Offshore Energy Developments: Paper 1 – Wind Energy (RYA, 2015).

5.10.10 As per the MCA methodology (MCA, 2013), a Navigational Risk Assessment (NRA) will be undertaken, where impacts will be assessed on a preliminary basis to determine which should be included within the EIA. This will be a technical document that supports the PEIR and ES. The outputs of this scoping process will therefore inform the NRA.

5.10.11 The IMO FSA Methodology (IMO, 2018) is the internationally recognised approach for assessing impacts to shipping and navigation receptors, and is the approach required under the MCA methodology (MCA, 2013). This methodology is centred on risk control and assesses each impact in terms of its frequency and consequence in order that its significance can be determined as "broadly acceptable", "tolerable", or "unacceptable". Any impact assessed as "unacceptable" will require additional environmental measures implemented beyond those considered embedded in order that the impact is reduced to within "tolerable" or "broadly acceptable" parameters.

5.10.12 Impact significance for the Application will be determined via a risk ranking matrix assessing frequency and consequence. The frequency and consequence, as part of the NRA process, will be related to the parameters required by the IMO FSA and agreed at the Hazard Workshop. The risk ranking matrix is illustrated in **Table 5.10.1** Risk ranking matrix

5.10.13 below. The frequency and consequence rankings per impact will be determined using a number of inputs, notably:

- quantitative modelling undertaken in the NRA (Anatec's CollRisk software);
- output of the baseline assessment including vessel traffic surveys;
- consideration of embedded environmental measures in place;
- lessons learnt from other offshore wind farm projects;
- level of stakeholder concern; and
- consultation output.

Table 5.10.1 Risk ranking matrix

Consequence	Major	Tolerable	Tolerable	Unacceptable	Unacceptable	Unacceptable
	Serious	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable
	Moderate	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable
	Minor	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable
		Negligible	Extremely Unlikely	Remote	Reasonably Probable	Frequent
		Frequency				

Consultees

5.10.14 The following statutory and non-statutory organisations deemed relevant to shipping and navigation will be included in further consultation:

- MCA;
- Trinity House;
- United Kingdom (UK) Chamber of Shipping;
- RYA;
- Cruising Association (CA);
- British Marine Aggregate Producers Association (BMAPA) and associated operators;
- National Federation of Fishermen's Organisations (NFFO);
- Regular commercial operators;
- Local fishing and recreational representatives; and
- Local port authorities.

Baseline conditions

Data sources

5.10.15 **Table 5.10.2** summarises the key sources of shipping and navigation data used to establish the shipping and navigation baseline in this Scoping Report. **Figure 5.10.1** presents an overview of the study area which has been used to assess the baseline.

Table 5.10.2 Key sources of shipping and navigation data

Source	Date	Summary	Coverage of study area
Automatic Identification System (AIS) data	7 to 20 July 2019 / 6 to 19 December 2019	Vessel traffic data covering a 28-day period, collected from coastal receivers and covering summer and winter periods.	Ten nautical mile buffer of the Scoping Boundary, cropped to the UK coastline.
Incident data provided by the Marine Accident Investigation Branch (MAIB)	2008 to 2017	Maritime incident data including the locations and details of all MAIB reported incidents within the study area.	Ten nautical mile buffer of the Scoping Boundary, cropped to the UK coastline.

Source	Date	Summary	Coverage of study area
Incident data provided by the Royal National Lifeboat Institution (RNLI)	2008 to 2017	Maritime incident data including the locations and details of all RNLI reported incidents within the study area.	Ten nautical mile buffer of the Scoping Boundary, cropped to the UK coastline.
British Marine Aggregate Producers Association (BMAPA)	2013 (downloaded 2020)	BMAPA transit routes, indicating marine aggregate dredger activity.	Ten nautical mile buffer of the Scoping Boundary, cropped to the UK coastline.
United Kingdom Hydrographic Office (UKHO) Admiralty Charts 2450-0, 2675-0, 2656-0 and 1652-0	2020	Admiralty charts and historic mapping relevant to the defined study area.	Ten nautical mile buffer of the Scoping Boundary.
UKHO Admiralty Sailing Directions – Dover Strait Pilot NP28 & Channel Pilot NP27	2017	Pilot books with information on the surrounding area.	Ten nautical mile buffer of the Scoping Boundary.

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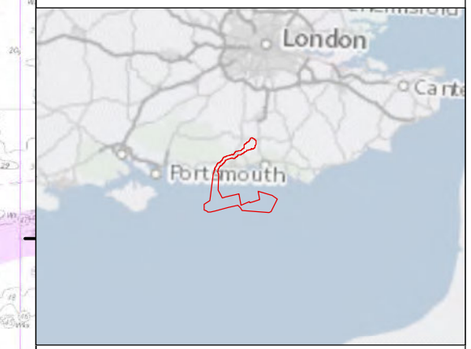
Key

- Scoping Boundary
- Study Area



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Rampion Extension Development

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Rampion 2 Offshore Wind Farm

Figure 5.10.1 Overview of Rampion 2 Study Area

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-16-0001				1.1
Company: ANATEC	Drawn By: DS	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL

Baseline

Navigational features

5.10.16 This section presents the baseline conditions for navigational features, which have been identified via review of UKHO Admiralty Charts as per **Table 5.10.2**. An overview of navigational features is presented in **Figure 5.10.2**, with key features listed below.

5.10.17 The Dover Strait Traffic Separation Scheme (TSS), shown in **Figure 5.10.2** is located at the south-eastern extent the study area and is utilised by vessels making passage through the English Channel. While not within or in the proximity of the study area, the Off Casquets TSS to the south-west of the study area is considered relevant as vessels in transit through the complete English Channel will likely remain on a consistent transit between the two TSSs.

5.10.18 An inshore traffic zone (ITZ) is designated around an area of coastline intersecting the north-east of the study area and is designed for use by non-through traffic and vessels of less than 20m in length, for instance recreational craft or fishing vessels

5.10.19 There are nine marine aggregate dredging areas intersecting the study area, all of which are currently in production and do not overlap the development Scoping Boundary. A total of 56 BMAPA transit routes intersect the study area, of which 42 intersect the Scoping Boundary. It is noted that the BMAPA transit routes do not indicate the frequency of use and therefore some of these routes may be used intermittently.

5.10.20 A UK Ministry of Defence (MoD) practice area is located intersecting the south-west of the study area, and is used for onshore rifle firing practice, but is only used when the area is clear of vessels.

5.10.21 A total of 159 charted wrecks were recorded within the study area, 29 of these wrecks were recorded within the Scoping Boundary.

5.10.22 Key ports local to the Proposed Development include those listed in **Table 5.10.3**. The Solent is located to the west and includes several notable commercial ports including Southampton and Portsmouth, with related traffic from the east encompassed within the study area which will be assessed. Additionally, there are pilot boarding stations located within the study area associated with local ports.

Table 5.10.3 Ports in Vicinity of Rampion 2

Port	Distance from Rampion 2 (nm)	Principal Traffic[16]
Brighton	7.4	Recreation
Shoreham	7.8	Fishing, commercial including marine aggregate dredgers

[16] Based upon vessel traffic data analysed for the scoping assessment

Port	Distance from Rampion 2 (nm)	Principal Traffic[16]
Newhaven	8.0	Recreation, fishing, commercial including passenger and wind farm support vessels
Littlehampton	13.1	Recreation

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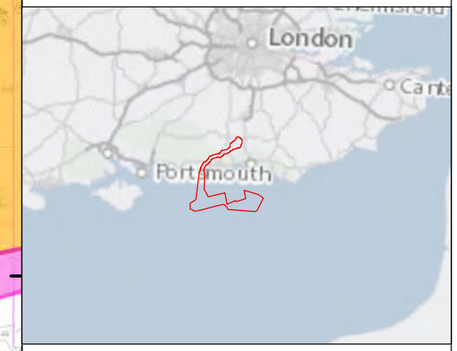
Shoreham
Littlehampton
Brighton
Newhaven

Key

- Scoping Boundary
- Study Area
- TSS
- Rampion OWF
- Inshore Traffic Zone
- Firing Practice Area
- Dredging Area
- Charted Wreck
- Pilot Boarding Station
- AtoN
- Anchorage
- Port



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Rampion Extension Development

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Rampion 2 Offshore Wind Farm

Figure 5.10.2 Navigational Features in Proximity to Rampion 2 Site

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-16-0004				1.1
Company: ANATEC	Drawn By: DS	Chk/Aprvd: WOOD	Drawn Date: 22/05/2020	Status: FINAL

Vessel Traffic

5.10.23 The vessel traffic data collected during the summer and winter 2019 AIS survey periods **(see Table 5.10.1)** are shown in **Figure 5.10.3** and **Figure 5.10.4**, respectively. It is noted that vessels deemed as representing temporary traffic (for example vessels engaged in surveys) have been removed. It has been assumed that vessels visiting operational offshore wind farms in the area (for instance. the existing Rampion 1) represent operational traffic and thus have been retained.

5.10.24 An average of 206 vessels were recorded per day within the study area during summer, with 32 unique vessels per day intersecting the Scoping Boundary. This represents an increase over the winter period, when an average of 141 vessels per day were recorded within the study area, with 16 unique vessels per day intersecting the Scoping Boundary. Traffic in the area consisted primarily of cargo vessels (40 percent), recreational vessels (19 percent), tankers (18 percent), fishing vessels (9 percent) and marine aggregate extraction (2 percent) throughout the survey periods.

5.10.25 A large proportion of commercial (cargo and tanker) traffic within the study area was observed to be associated with the Solent and utilised the Dover Strait TSS. It is noted that some vessels exiting the westbound lane of the TSS and heading for the Solent were observed intersecting the Scoping Boundary.

5.10.26 Recreational traffic was observed to be most prominent within the northern section of the study area, including use of the ITZ. The majority (88 percent) of the recreational traffic was recorded during the summer period. From experience, a significant proportion of recreational vessels do not broadcast via AIS and as such the vessel traffic data presented likely does not represent the total recreational vessel activity.

5.10.27 The study area is used by a variety of recreational activity including sea angling, dive charter, wind farm sightseeing trips and recreational races.

5.10.28 Fishing activity was predominantly recorded in the eastern half of the study area, with vessels transiting to/from Shoreham. Vessels on transit through the study area typically intersected the eastern portion of the Scoping Boundary, while vessels engaged in fishing were generally located to the south-east of the existing Rampion 1. Fishing vessels less than 15m in length are not obliged to broadcast via AIS and as such the vessel traffic data presented likely does not represent the total fishing vessel activity.

5.10.29 A significant marine aggregate dredging route was noted within the north-west of the study area. The Scoping Boundary is sympathetic to this marine aggregate dredging activity, with the boundary parallel to this well-defined route. However, marine aggregate dredger tracks are still noted intersecting Rampion 2.

5.10.30 Passenger vessels were typically associated with the Solent and Newhaven. Some passenger vessel traffic was noted intersecting the south-west extent of the Scoping Boundary on passage to the Solent after exiting the westbound lane of the Dover Strait TSS.

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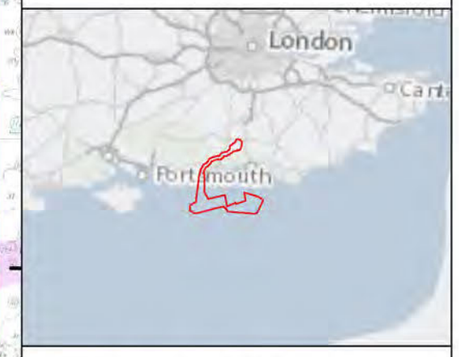
Key

- Scoping Boundary
- Study Area

Vessel Type

- Fishing
- Military
- Dredger
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil & Gas
- Wind Farm



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Rampion Extension Development

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Rampion 2 Offshore Wind Farm

Figure 5.10.3a 14 Days Summer 2019 Marine Traffic by Vessel Type

Scoping Report

System Identifier:				Version:
44285-GOBE-SC-OF-DR-16-0006				1.1
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
ANATEC	DS	WOOD	22/05/2020	FINAL

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Key

- Scoping Boundary
- Study Area

Vessel Type

- Fishing
- Military
- Dredger
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil & Gas
- Wind Farm

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Rampion Extension Development

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Rampion 2 Offshore Wind Farm

Figure 5.10.3b 14 Days Winter 2019 Marine Traffic by Vessel Type

Scoping Report

System Identifier:	Version:
44285-GOBE-SC-OF-DR-16-0007	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
ANATEC	DS	WOOD	22/05/2020	FINAL

Maritime incidents

5.10.31 An analysis of MAIB incident data from 2008 to 2017 indicated that a total of 134 incidents were recorded within the study area and a total of 18 within the Scoping Boundary. Within the MAIB dataset, the most common incident types recorded within the study area were Machinery Failure (34 percent) and Hazardous Incidents (21 percent). Vessels were typically of a UK flag (77 percent), with fishing (39 percent) and other commercial vessels (23 percent) the most frequently recorded vessel type. It is noted that *"other commercial vessels"* included angling vessels, sail training vessels and aggregate dredgers.

5.10.32 An analysis of RNLI incident data from 2008 to 2017 indicated that a total of 1,947 incidents were recorded within the study area and a total of 98 within the Scoping Boundary. Within the RNLI dataset, the most common casualty types reported within the study area involved recreational vessels (53 percent), a person in danger (28 percent) and fishing vessels (7 percent). The most frequent incident types reported were machinery failure (39 percent), person in danger (27 percent) and other (10%). It is noted the *"other"* incident type includes animal in trouble, fouled propeller and unknown.

5.10.33 It is noted that these incident levels reflect the Rampion 2 proximity to the shore.

Basis for scoping assessment

5.10.34 The shipping and navigation scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the offshore array element of the Scoping Boundary has an area of approximately 92nm^2 (315km^2). The area for the offshore export cables to connect the wind farm area to the shore is approximately 21nm^2 (76km^2);
- maximum number of 116 WTGs at the largest sea level dimensions:
  - maximum rotor diameter 275m;
  - maximum blade tip height 325m; and
  - minimum blade tip height.

5.10.35 The offshore elements will be located adjacent to the existing Rampion 1, off the southern coast of England in the English Channel. The nearest coastal ports are Littlehampton, Worthing, Shoreham-by-Sea, Brighton and Newhaven.

Embedded environmental measures

5.10.36 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on shipping and navigation (see **Table 5.10.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.10.37 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered

inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.10.4 Relevant shipping and navigation embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-41	The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (for example from anchor drag damage).	DCO requirements or DML conditions.
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins). The undertaker must ensure that a local notice to mariners is issued at least 14 days prior to the commencement of the authorised project or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant location.	DCO requirements or DML conditions.
C-47	Ongoing liaison with fishing fleets will be maintained during construction, maintenance and decommissioning operations via an appointed Fisheries Liaison Officer and Fishing Industry Representative.	DCO requirements or DML conditions.
C-48	Monitoring of vessel traffic will be undertaken for the duration of the construction period.	DCO requirements or DML conditions.
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2 The MPCP	DCO requirements or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	will also include relevant key emergency contact details	
C-56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	Electricity application procedures (Section 95 of Energy Act 2004)
C-83	Where scour protection is required, MGN 543 (or latest relevant available guidance) will be adhered to with respect to changes greater than 5% to the under-keel clearance in consultation with the MCA and Trinity House.	DML conditions
C-84	RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA. This will include a buoyed construction area around the Rampion 2 array.	DML conditions
C-85	RED will ensure that local notice to mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operations and maintenance works and supplemented with VHF radio broadcasts agreed with the MCA in accordance with the construction and monitoring programme approved under deemed marine licence condition.	DML conditions
C-86	A layout plan (including cables) will be agreed with the MMO following appropriate consultation with Trinity House and the MCA setting out proposed details of the authorised Proposed Development.	DML conditions
C-87	No part of the authorised Proposed Development may commence until the MMO,	DML conditions

ID	Environmental measure proposed	How the environmental measures will be secured
	in consultation with the MCA, has confirmed in writing that the undertaker has taken into account and, so far as is applicable to that stage of the Proposed Development, adequately addressed all MCA recommendations as appropriate to the authorised Proposed Development contained within MGN543 "Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response Issues" and its annexes.	
C-88	Marine coordination will be implemented to manage project vessels throughout construction and maintenance periods.	Secured in the description of the development
C-89	There will be a minimum blade tip clearance of at least 22m above Highest Astronomical Tide (HAT)[17]	Secured in the description of the development

Likely significant effects

5.10.38 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.10.39 The likely significant effects on shipping and navigation are summarised in **Table 5.10.5.** The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage including assessment of desktop vessel traffic data and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process.**

5.10.40 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects ‘scoped in’ as simple or detailed.

[17] It is noted that as per the requirements of MGN 543 the minimum blade tip clearance will also be at least 22m above Mean High Water Springs (MHWS).

Table 5.10.5 Likely significant shipping and navigation effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Displacement of vessels (Construction/ Decommissioning)	C- 46 C- 47 C- 48 C-84 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Construction activities associated with the installation of structures and cables may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels without measures to manage them including for vessels using IMO routeing measures	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop
Increased vessel to vessel collision risk between a third-party vessel and a project vessel (Construction/ Decommissioning)	C- 46 C- 47 C-56 C-84 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Vessels associated with construction activities may increase encounters and collision for other vessels already operating in the area without measures to manage them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop
Reduced access to local ports (Construction/ Decommissioning)	C-88	Potentially significant effect without secondary mitigation Construction activities associated with the installation of structures and cables may displace existing routes/activity restricting access to ports; without measures to ensure access is maintained	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop
Displacement of commercial vessels (Operation and Maintenance)	C- 46 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Presence of structures may displace existing routes/activity, increase grounding risk, increase encounters and collision risk with other third-party vessels without measures to manage them including for vessels using IMO routeing measures	**Scoped in – detailed assessment** assessed as part of the detailed assessment within the NRA (quantitative modelling)	Commercial vessels including marine aggregate dredgers	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Increased vessel to vessel collision risk between a third-party vessel and a project vessel (Operation and Maintenance)	C- 46 C-56 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Vessels associated with operation and maintenance activities may increase encounters and collision risk for other commercial vessels already operating in the area without measures to manage them	**Scoped in – detailed assessment** assessed as part of the detailed assessment within the NRA (quantitative modelling)	Commercial vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Displacement of recreational vessels (Operation and Maintenance)	C- 46 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment may displace existing recreational vessel activity, increase encounters and collision risk with other vessels without measures to manage them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	Recreational vessels (2.5 to 24m) including organised races, dive vessel charters and recreational sea fishing	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed RYA Coastal Atlas (2019)
Displacement of commercial fishing vessels (Operation and Maintenance)	C- 46 C- 47 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment will displace existing commercial fishing vessel activity, increase encounters and collision risk with other vessels without measures to manage them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	Commercial fishing vessels in transit	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Increased vessel to vessel collision risk between a third-party vessel and a project vessel (Operation and Maintenance)	C- 46 C- 47 C-56 C-85 C-87 C-88	Potentially significant effect without secondary mitigation Vessels associated with operation and maintenance activities will increase encounters and collision risk for other recreational and fishing vessels already operating in the area without measures to manage them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	Recreational vessels (2.5 to 24m) and commercial fishing vessels in transit	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed RYA Coastal Atlas (2019)
Vessel to structure allision risk (Operation and Maintenance)	C- 46 C-56 C-84 C-85 C-86 C-88 C-89	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment may increase allision risk for commercial vessels (both powered and drifting) without measures to mitigate the risk	**Scoped in – detailed assessment** assessed as part of the detailed assessment within the NRA (quantitative modelling)	Commercial vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Vessel to structure allision risk (Operation and Maintenance)	C- 46 C- 47 C-56 C-84 C-85 C-86 C-88 C-89	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment may increase allision risk (both powered and drifting) for recreational vessels and commercial fishing vessels in transit without measures to mitigate the risk	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	Recreational vessels (2.5 to 24m) and commercial fishing vessels in transit	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed RYA Coastal Atlas (2019)

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Reduced access to local ports (Operation and Maintenance)	None	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment may displace routes/activity and prevent use of existing Aids to Navigation without measure to mitigate them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Reduction of under keel clearance (Operation and Maintenance)	C-41 C-45 C-83	Potentially significant effect without secondary mitigation Presence of export and inter array cable protection in the offshore environment may reduce chartered water depths creating underwater allision risk without measures to mitigate them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Increased anchor interaction with subsea cables (Operation and Maintenance)	C-41 C-45	Potentially significant effect without secondary mitigation Presence of export and inter array cables in the offshore environment may increase the potential for interaction with subsea cables without measures to mitigate them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Interference with marine navigation, communications and position fixing equipment (Operation and Maintenance)	None	Potentially significant effect without secondary mitigation Presence of structures, export and inter array cables within the offshore environment may interfere with equipment used on board all vessels without measures to mitigate them	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	All vessels	Consultation including hazard workshop Vessel traffic surveys (summer and winter) to be completed
Reduction of emergency response provision including Search and Rescue (SAR) capability (Operation and Maintenance)	C-53 C-88	Potentially significant effect without secondary mitigation Presence of structures in the offshore environment including increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of incidents, increase consequences or reducing access for the responders	**Scoped in – simple assessment** assessed as part of the simple assessment within the NRA	UK emergency responders including marine pollution and SAR resources	Consultation including hazard workshop Department for Transport (DfT) UK civilian SAR helicopter taskings data

5.10.41 Impacts will be assessed as part of the base case and future case environment, with the latter assessment considering a general 10 percent increase in vessel traffic numbers within the study area in line with the future case environment considered in the NRA for other offshore wind farm developments.

Impacts scoped out of assessment

5.10.42 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed. No matters or aspects are being scoped out at this stage noting that compliance with assessment parameters set out in MGN 543 (MCA, 2016) are mandatory for any NRA which will be the technical assessment feeding into both the PEIR and ES.

Cumulative effects

5.10.43 Cumulative effects on shipping and navigation resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that will be screened in as part of the CEA screening exercise.

5.10.44 The following impacts give an indication of those that typically act cumulatively with impacts from Rampion 2 and other developments to contribute to potential cumulative effects on shipping and navigation receptors. Potential impacts identified are as follows.

- Construction activities associated with the presence of structures within the Proposed Development and other offshore developments may cause vessels to be cumulatively deviated leading to increased encounters and therefore may also lead to increased vessel to vessel collision risk for all vessels in all weather conditions.
- Presence of structures associated with the Proposed Development as well as other offshore developments may cause vessels to be cumulatively deviated leading to increased encounters and therefore may also lead to increased vessel to vessel collision risk for all vessels in all weather conditions.
- Presence of structures within the Proposed Development as well as other offshore developments may create cumulative powered and drifting allision risk for all vessels.

Transboundary effects

5.10.45 There is the potential for transboundary impacts upon shipping routes which transit to/from other EEA countries including the potential effects of shipping routes to/from transboundary ports. Transboundary issues could also arise from impacts upon international ports and international shipping routes.

5.10.46 The potential effects from the operation (including maintenance) phase on shipping and navigation receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

5.10.47 The output of this Scoping Report (namely the Scoping Opinion) will be used to inform the NRA.

5.10.48 The NRA will use a comprehensive analysis of baseline data and the outputs of consultation to undertake an FSA using the revised IMO FSA guidelines (IMO, 2018).

5.10.49 Baseline data will include the data outlined in this Scoping Report, but should also include that the results of a 28-day vessel traffic survey undertaken using AIS, visual observations and Radar noting the possible restrictions incurred by the ongoing COVID-19 pandemic may result in visual or radar observations not being possible for the summer survey. The vessel traffic survey approach and any amendments and limitations associated with COVID will be discussed with the MCA and Trinity House, and may require supplementation with additional consultation or validations further into the process. The vessel traffic survey data will be collected within the study area for shipping and navigation presented in this Scoping Report. This study area and dataset will ensure that all relevant sea users are accounted for, including recreational dive and angling charter vessels which are known to be prominent. As per the requirements of MGN 543 the vessel traffic survey data collection will be split into two 14-day periods (summer and winter) to account for seasonal variation.

5.10.50 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which as set out in **Section 4.3: Consultation and the evidence plan process.**

5.10.51 Throughout the NRA process consultation will be held with relevant statutory organisations as necessary. A key element of the consultation will be the Hazard Workshop, designed to gain insight from local users regarding the likely effect of Rampion 2 on their activities.

5.10.52 The assessment within the NRA will be in line with MGN 543 (MCA, 2016) (or the latest relevant guidance) and the MCA's methodology for undertaking risk assessment (MCA, 2013). The NRA will use assess a maximum development scenario (including an indicative array layout) to both quantify and qualify the risks to shipping and navigation. Using the outputs of the NRA, impacts will be taken forward to the PEIR and ES as required.

5.10.53 The PEIR and ES will determine whether each scoped in impact is significant or not significant using the assessment methodology outlined in this Scoping Report. Likely significant effects will be described and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA.**

5.11 Nature Conservation

Introduction

5.11.1 The nature conservation assessment will consider the potential likely significant effects on designated sites and the habitats and species of conservation interest that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions across the study area, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.11.2 Nature conservation interfaces with and draws upon the findings of several other aspects and as such, should be considered alongside these; namely:

- **Section 5.2: Coastal processes** - changes to coastal processes have the potential to directly or indirectly impact nature conservation receptors, therefore the information from this assessment will be used to inform the nature conservation assessment;
- **Section 5.4: Fish and shellfish ecology** - information on protected fish and shellfish receptors will be included within this section and therefore must be considered together;
- **Section 5.5: Benthic subtidal and intertidal ecology** - information on protected benthic subtidal and intertidal receptors will be included within this section and therefore must be considered together;
- **Section 5.7: Marine mammals** - information on protected marine mammal receptors will be included within this section and therefore must be considered together; and
- **Section 5.8: Offshore ornithology** - information on protected offshore ornithology receptors will be included within this section and therefore must be considered together.

Study area

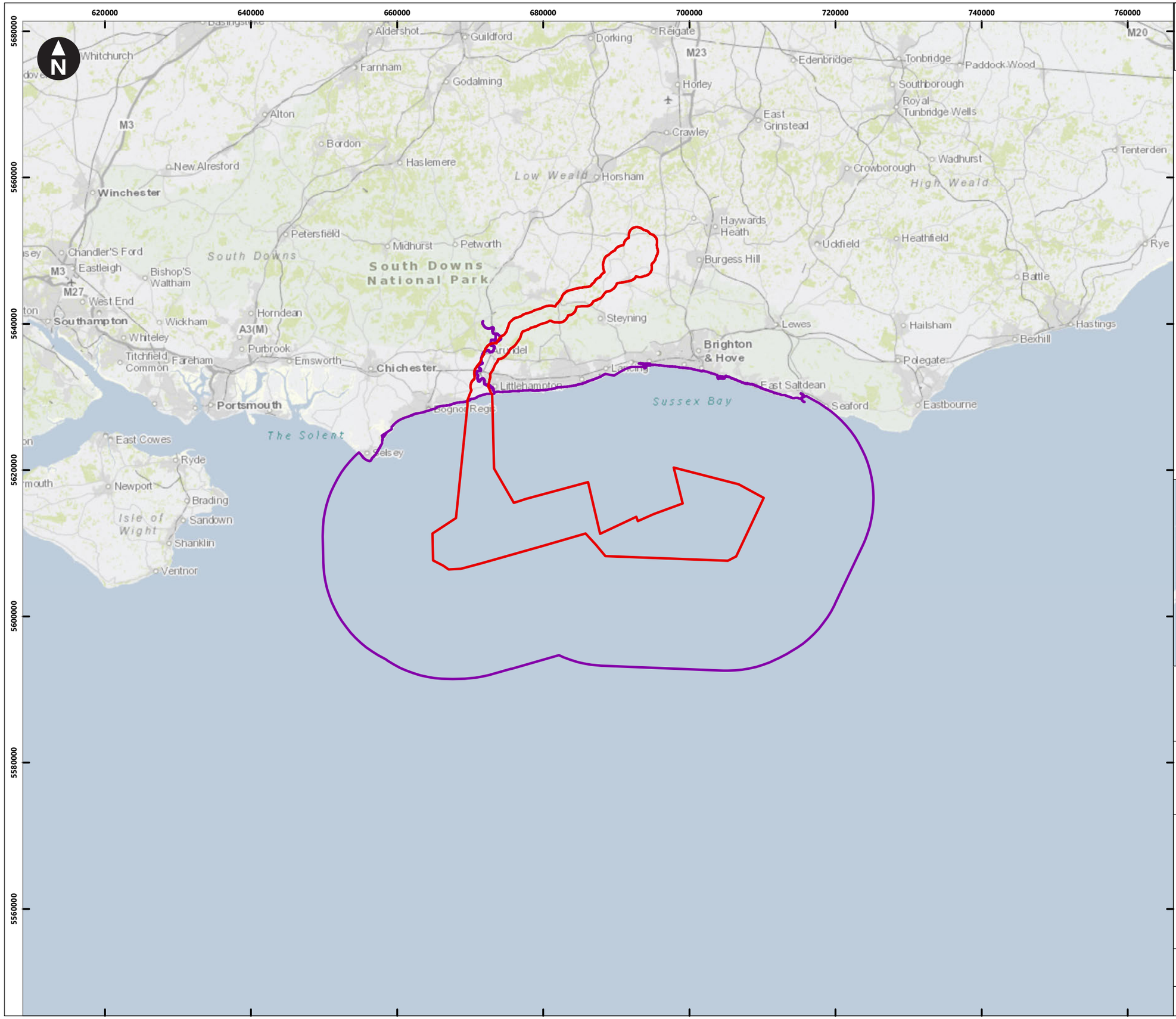
5.11.3 The study area for the nature conservation assessment is defined as the Scoping Boundary together with the maximum Zones of Influence (ZOIs) (see **Figure 5.11.1**) as defined by individual technical disciplines:

- **Section 5.4: Fish and shellfish ecology**;
- **Section 5.5: Benthic subtidal and intertidal ecology**;
- **Section 5.7: Marine mammals**; and
- **Section 5.8: Offshore ornithology**.

5.11.4 For this scoping assessment, marine and intertidal designated sites within the vicinity of the Scoping Boundary will be included within the baseline, these include offshore sites and those in the intertidal zone extending up to the Mean High-Water Spring (MHWS).

5.11.5 The study area proposed for the EIA will be reviewed and defined through reference to individual technical disciplines, to such matters as refinement of the offshore project components, the identification of additional impact pathways and in response to feedback from consultation through the Evidence Plan Process (EPP).

5.11.6 It should be noted that the Habitats Regulations Assessment (HRA) will consider Natura 2000 sites designated under the Habitats Directive and Birds Directive in a more detailed context and will therefore include consideration of sites further afield which have the potential for connectivity related issues, particularly with regards to mobile species such as birds and marine mammals.



Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.11.1 Study Area

Scoping Report

System Identifier:	Version:
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Assessment methodology

5.11.7 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. This has informed the approach that has been used in this nature conservation scoping assessment. Further details to address the specific needs of the nature conservation assessment are provided in the following paragraphs.

5.11.8 All designated sites (both existing and proposed) at European, national and local levels, which have features that could be impacted by development will be identified. It is anticipated that the current list of sites will be amended following consultation with relevant consultees and stakeholders, through the EPP. Further details on this are set out in **Section 4.3: Consultation and the evidence plan process**. For European Sites, the HRA screening process will build upon the ongoing ornithological, marine mammal and benthic surveys in order to add or remove sites as necessary.

5.11.9 The baseline information on designated features will be informed by the technical assessments provided in relevant aspects of the ES (e.g. physical processes, benthic ecology, fish and shellfish ecology, marine mammals and ornithology) as well as the HRA which will be undertaken for Rampion 2. It is proposed that the scope of these investigations will be finalised in conjunction with relevant stakeholders through the EPP.

5.11.10 The subsequent assessment of impacts upon designated sites during construction, operation and decommissioning will be informed by the assessment of the relevant features within the relevant aspects of the ES (coastal processes, benthic ecology, fish and shellfish ecology, marine mammals and ornithology).

5.11.11 Specific to the nature conservation assessment, the following guidance documents will be considered:

- National Planning Policy Framework (2019);
- Guidelines for Ecological Impact Assessment in Britain and Ireland, Marine and Coastal (Institute for Ecology and Environmental Management (IEEM, 2010));
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Judd, 2012);
- Marine Conservation Zones and Marine Licensing (MMO 2013); and
- National Policy Statement NPS EN-1 (Overarching National Policy Statement for Energy) and NPS EN-3 (National Policy Statement for Renewable Energy Infrastructure).

Baseline conditions

Data sources

5.11.12 A desk-based review of publicly available literature from statutory bodies such as Natural England (NE) and the Joint Nature Conservation Committee (JNCC) will be used to detail the extent, location, character and any associated conservation and management objectives of subtidal and intertidal designated sites.

5.11.13 Regional and site-specific studies will also be key sources of information to this chapter. For example, specific datasets on the presence of potential Annex I features such as biogenic and geogenic reef will be used to map and assess extent.

Baseline

5.11.14 There are several international, national and local designations (statutory and non-statutory) of relevance to Rampion 2 offshore, along the coastline and onshore. This section provides an overview of the designated sites relevant to the intertidal and offshore works.

The South Marine Plan

5.11.15 Rampion 2 falls within the South Marine Plan, which has been prepared for the purposes of Section 51 of the Marine and Coastal Access Act and has been adopted with the agreement of the Secretary of State for Environment, Food and Rural Affairs. The purpose of the South Marine Plan is to ensure that the right activities happen in the right place and in the right way within the marine environment. It provides a framework that will shape and inform decisions over how the areas' waters are developed, protected and improved.

Water Framework Directive (WFD)

5.11.16 The WFD (200/60/EC) establishes a framework for an integrated approach to the protection, improvement and sustainable use of Europe's water bodies, and requires all member states to achieve good ecological and chemical status of their water bodies (including coastal waters up to 1 nautical mile (nm) offshore) by 2015.

5.11.17 Under the WFD, the Environment Agency (EA) is responsible for monitoring water quality and reports the data against Environmental Quality Standards (EQS).

Sussex WFD coastal water body

5.11.18 The proposed Rampion 2 offshore cable corridor runs through the Sussex coastal water body (GB640704540003). 'Transitional waters' are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.

5.11.19 The proposed route of the offshore cable corridor does not pass through any designated bathing waters. There are bathing waters to the west (Middleton-on-sea) and south (Littlehampton) of the proposed offshore cable corridor landfall site. Current water quality classification is 'Excellent' for Middleton-on-sea and 'Good' for Littlehampton, based on samples taken from 2016 through to 2019 (Environment Agency, 2020).

Natura 2000 sites

5.11.20 The paragraphs that follow provide an overview of Natura 2000 sites designated under the Habitats Directive and Birds Directive. During the HRA Screening for

Rampion 2, a detailed review of Natura 2000 sites will be undertaken in consultation with key stakeholders.

Special Areas of Conservation (SACs)

5.11.21 SACs are sites designated under the Habitats Directive, because they make a significant contribution to conserving the habitat types and species identified in Annexes I and II of the Directive. SACs of relevance to the Proposed Development are detailed in **Table 5.11.1** and presented in **Figure 5.11.2**.

Table 5.11.1 SACs of relevance to the Proposed Development

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
South Wight Maritime SAC (Natural England, 2001)	Approximately 20km west of the Rampion 2 Scoping Boundary	This site is protected for three Annex I habitats; reefs, vegetated sea cliffs of the Atlantic and Baltic coasts and submerged or partially submerged sea caves. This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs.
Solent Maritime SAC (Natural England, 2014a)	Approximately 22km from the Rampion 2 Scoping Boundary	Annex I habitats that are the primary reason for selection of this site include estuaries, *Spartina* swards (*Spartinion maritimae*) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site include sandbanks which are slightly covered by sea water all the time, mudflats and sandflats not covered by seawater at low tide, coastal lagoons, annual vegetation of drift lines, perennial vegetation of stony banks, *Salicornia* and other annuals colonizing mud and sand and "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"").
Solent and Isle of Wight lagoons SAC (Natural England, 2014b)	Approximately 20km from the Rampion 2 Scoping Boundary.	Annex I habitats that are the primary reason for selection of this site include coastal lagoons.

Special Protection Areas (SPAs)

5.11.22 SPAs are designated under the European Union Directive on the Conservation of Wild Birds. Under the Directive, Member States of the European Union (EU) have a duty to safeguard the habitats of migratory birds and certain particularly threatened bird species. SPAs of relevance to the Proposed Development are detailed in **Table 5.11.2** and presented in **Figure 5.11.2.**

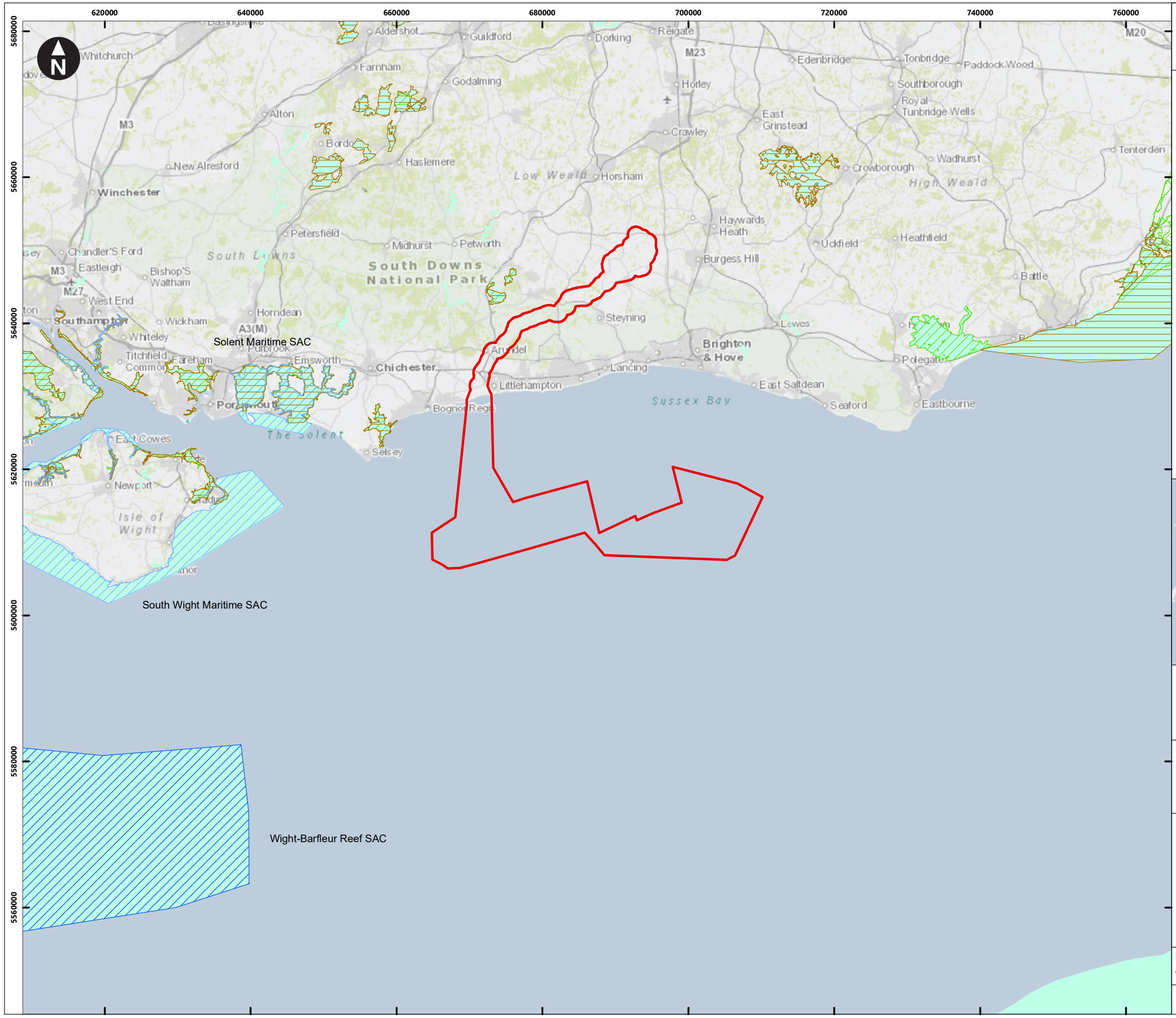
Table 5.11.2 SPAs of relevance to the Proposed Development

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Solent and Dorset Coast SPA (Natural England, 2016)	Approximately 1km from the Rampion 2 Scoping Boundary	The site has been designated to protect internationally important breeding populations of common tern (*Sterna hirundo*), Sanwich tern (*Sterna sandvicensis*) and little tern (*Sternula albifrons*).
Pagham Harbour SPA (Natural England, 2001)	Approximately 10km from the Rampion 2 Scoping Boundary	This site is designated as the estuarine basin is made up of an extensive central area of saltmarsh and intertidal mudflats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mudflats are rich in invertebrates and algae and provide important feeding areas for the many bird species that use the site.
Chichester and Langstone Harbours SPA (Natural England, 2004)	Approximately 23km from the Rampion 2 Scoping Boundary	Both Chichester and Langstone Harbours contain extensive intertidal mudflats and sandflats with areas of seagrass beds, saltmarsh, shallow coastal waters, coastal lagoons, coastal grazing marsh and shingle ridges and islands. These habitats support internationally and nationally important numbers of overwintering and breeding bird species, which are the primary qualifying features for this site.
Dungeness, Romney Marsh and Rye Bay potential SPA (Natural England, 2015)	Approximately 46km from the Rampion 2 Scoping Boundary	This site was designated to protect its important breeding and wintering waterbirds, birds of prey, passage warblers and breeding seabirds. It is also selected for the site's complex network of wetland types and habitats that support rich and diverse groups of bryophytes, vascular plants, invertebrates and vulnerable, endangered and critically endangered wetland species.

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Solent and Southampton Water SPA (Natural England, 2014c)	Approximately 28km from the Rampion 2 Scoping Boundary	This site has been designated to protect internationally important breeding and non-breeding birds and waterbird assemblage.
Portsmouth Harbour SPA (Natural England, 2014d)	Approximately 35km from the Rampion 2 Scoping Boundary	This site has been designated to protect internationally important breeding and non-breeding birds.

RAMSAR

5.11.23 Ramsar sites are wetlands of international importance that have been designated by the UK Government under the International Ramsar Convention (the Convention on Wetlands of International Importance), for containing representative, rare or unique wetland types or for their importance in conserving biological diversity. Ramsar sites of relevance to the Proposed Development include Arun Valley, Pagham Harbour, Pevensey Levels, Chichester and Langston Harbours, Portsmouth Harbour and Solent and Southampton Water. The sites are presented in **Figure 5.11.2**.



Key

- Scoping Boundary
- UK offshore Special Areas of Conservation (SACs)
- UK SACs with marine components
- UK Special Proected Areas (SPAs)
- England Ramsars
- Europe Natura 2000 sites

Kilometres

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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.11.2 International Designated Sites

Scoping Report

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Statutory National Designations

5.11.24 At a national level and within the vicinity of the Proposed Development, there are three types of designated site for nature conservation; these being Marine Conservation Zones (MCZ), Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR).

5.11.25 The Marine and Coastal Access Act 2009 created a relatively new type of Marine Protected Area (MPA) called an MCZ, which are of national importance. MCZs are intended to protect areas that are important to conserve the diversity of rare, threatened and representative marine habitats, species, geology and geomorphology in UK waters and they, together with other types of MPAs, deliver the Government's objective for an ecologically coherent network of MPAs. Features proposed to be designated for protection by MCZs comprise 'broad-scale habitats', and 'Features of Conservation Importance (FOCI). The MCZ's of relevance to the Proposed Development are presented in **Table 5.11.3** and **Figure 5.11.3**.

5.11.26 A SSSI is the land notified as an SSSI under the Wildlife and Countryside Act (1981), as amended. SSSI are the finest sites for wildlife and natural features in England, supporting many characteristic, rare and endangered species, habitats and natural features. The SSSI's of relevance to the Proposed Development are presented in **Table 5.11.3** and **Figure 5.11.3**.

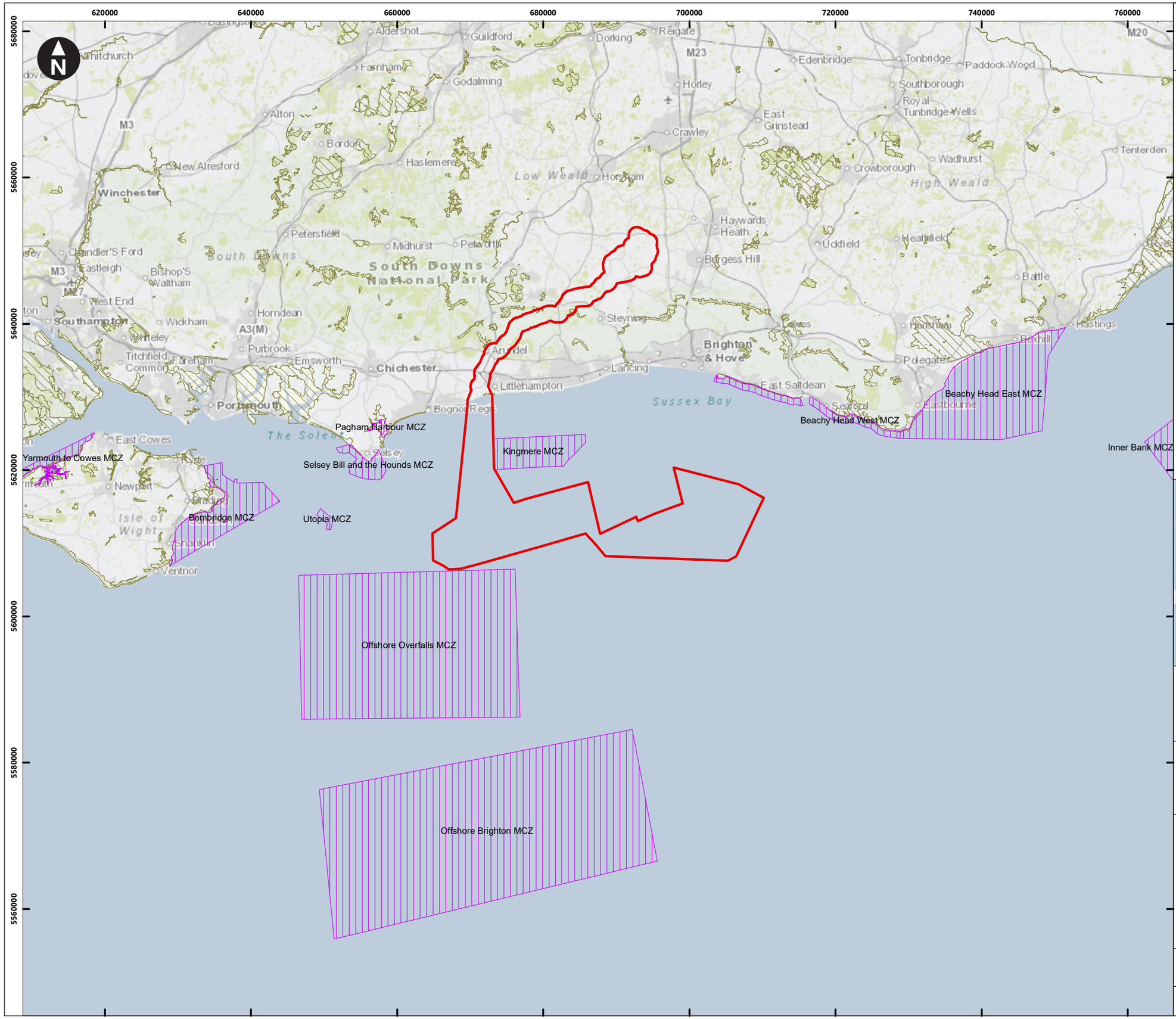
5.11.27 NNR's are a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities. They are places with wildlife or geological features that are of special interest locally. The NNR's of relevance to the Proposed Development are presented in **Table 5.11.3** and **Figure 5.11.3**.

5.11.28 A recent independent review led by former Fisheries Minister Richard Benyon, calls for the introduction of Highly Protected Marine Areas in English waters (Benyon, 2020). The review was commissioned on last year's world ocean day by then Environment Secretary Michael Gove as part of the Government's drive to protect our waters. HPMAs would allow marine ecosystems to recover to a mature state, by taking a 'whole site approach' to designation, thereby protecting all habitats and species in their boundaries. Whilst HPMA's are at a very early stage of discussion and no sites have been identified, it is important to follow any progress and development in this area with regards to the potential developments on Rampion 2.

Table 5.11.3 Statutory national designations of relevance to the Proposed Development

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Kingmere MCZ (Natural England, 2013a)	Lies east adjacent to the proposed Rampion 2 offshore cable corridor	Named after Kingmere Rocks, which is a rocky and boulder reef running through the middle of the site. There are also areas of chalk and different types of sediment. It is a place where black seabream come to breed in the spring. The features of this site are moderate energy infralittoral rock and thin mixed sediments, subtidal chalk and black seabream (*Spondyliosoma cantharus*).
Offshore Overfalls MCZ (Gov.uk, 2016a)	Lies adjacent to the proposed Rampion 2 array area	The site is designated for several marine habitats including; subtidal coarse sediment, subtidal mixed sediments, subtidal sand and English Channel outburst flood features
Selsey Bill and the Hounds MCZ (Gov.uk, 2019a)	Approximately 11km from the Rampion 2 Scoping Boundary	This site is designated for several marine features including: Bracklesham Bay geological feature, short-snouted seahorse (*Hippocampus hippocampus*), subtidal mixed sediments, subtidal sand, rock features and peat and clay exposures.
Pagham Harbour MCZ (Natural England, 2013b)	Approximately 10km from the Rampion 2 Scoping Boundary	This site is designated for several marine features including: Seagrass beds, defolin's lagoon snail (*Caecum armoricum*), and the Lagoon sand shrimp (*Gammarus insensibilis*).
Utopia MCZ (Gov.uk, 2016b)	Approximately 17km from the Rampion 2 Scoping Boundary	The protected features of this site include: circalittoral rock, subtidal coarse and mixed sediment, subtidal sands and fragile sponge and anthozoan communities on subtidal rocky habitats.
Beachy Head West MCZ (Natural England, 2013c)	Approximately 13km from the Rampion 2 Scoping Boundary	This site protects 10 different types of habitat and their associated species and offer specific protection to 2 species of conservation importance. These include intertidal coarse sediments, subtidal mixed, mud and sand, infralittoral muds and sands, infralittorial and circalittoral rock, chalk and their associated communities, native oyster (*Ostrea edulis*) and the short snouted seahorse (*Hippocampus hippocampus*).

Site	Location relative to Rampion 2 Scoping Boundary	Features or description
Beachy Head East MCZ (Gov.uk, 2019b)	Approximately 20km from the Rampion 2 Scoping Boundary	This site has been designated to protect features including littoral chalk communities, the short snouted seahorse (*Hippocampus hippocampus*), subtidal coarse sediment, subtidal sand, high energy circalittoral rock, moderate energy circalittoral rock, peat and clay exposures, ross worm reefs (*Saballeria spinulosa*) and subtidal chalk.
Bembridge MCZ (Gov.uk, 2019c)	Approximately 22km from the Rampion 2 Scoping Boundary	This site has been designated to protect features including sheltered muddy gravels, short-snouted seahorse (*Hippocampus hippocampus*), stalked jellyfish (*Calvadosia campanulata*), stalked jellyfish (*Haliclystus species*), subtidal coarse sediment, subtidal sand, maerl beds, native oyster (*Ostrea edulis*), peacock's tail (*Padina pavonica*), sea-pens and burrowing megafauna, seagrass beds, subtidal mixed sediments and subtidal mud.
Climping Beach Site of Specific Scientific Interest (SSSI)	Overlaps with the Rampion 2 offshore cable corridor landfall	This site is designated for aggregations of non-breeding birds including sanderling and *Calidris alba* as well as coastal vegetated shingle, fixed dune grassland and sand dune communities.
West Beach Local Nature Reserve (LNR)	Overlaps with the Rampion 2 offshore cable corridor landfall	The West Beach LNR is part of the Climping Beach SSSI. It includes sand dunes, vegetated shingle, sand flats and a small patch of saltmarsh. Sand lizards (*Lacerta agilis*), protected under the Wildlife and Countryside Act 1984, and four nationally scarce burrowing bees and wasps occur in the dunes. The vegetated shingle, though locally common, is internationally rare, and is used by a Red Data Book ant species. The sand flats host large numbers of migratory waders in the winter months.



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Key

- Scoping Boundary
- Marine Conservation Zones (MCZs)
- Sites of Special Scientific Interest (SSSIs)

Kilometres

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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.11.3 National Designated Sites

Scoping Report

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UK Biodiversity Action Plan (BAP)

5.11.29 The Convention of Biological Diversity was signed in Rio de Janeiro in 1992 (and hence is also referred to as the Rio Convention) and entered into force in 1993. It was the first treaty to provide a legal framework for biodiversity conservation and included calls for national strategies and action plans to 'conserve, protect and enhance biological diversity'.

5.11.30 The UK response was the UK BAP, launched in 1994. The UK plan includes the identification of several habitats and species, together with a series of local action plans. The following priority maritime species and habitats have been identified by the Sussex Biodiversity Partnership (East and West Sussex and Brighton and Hove councils) and the UK BAP:

- coastal saltmarsh;
- littoral and sublittoral chalk;
- biogenic reef;
- maritime cliffs and slopes;
- saline lagoons;
- brackish hydroid (*Clavopsella navis*);
- Ivell's sea anemone (*Edwardsia ivelli*);
- lagoon sand shrimp (*Gammarus insensibilis*);
- basking shark (*Cetorhinus maximus*);
- dolphin; and
- toothed whale.

Basis for scoping assessment

5.11.31 The nature conservation scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the array will consist of up to 116 WTGs, installed on monopile or jackets using percussive piling, or on suction caisson foundations which would require seabed clearance;
- there will be up to three offshore substations, installed on monopile of jacket type foundations using percussive piling;
- inter-array cables and export cables will be installed via either ploughing, jetting, trenching or post lay burial techniques;
- scour protection and cable protection may be required around the base of some or all foundations;
- inter-array and export cables will be buried, where possible, at a target burial depth of around 1m; and

- the Scoping Boundary will avoid internationally designated sites and all MCZs, including the Offshore Overfalls MCZ and the Kingmere MCZ;
- maintenance activities will be undertaken for both preventive and corrective maintenance requirements;
- the operational lifetime of Rampion 2 is assumed to be a minimum of 30 years; and
- the decommissioning of the wind farm is anticipated to involve the removal of all offshore infrastructure above the seabed. Electrical cables will be left in-situ. The decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment and impact.

Embedded environmental measures

5.11.32 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on nature conservation (see **Table 5.11.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.11.33 As there is a commitment to implementing these environmental measures, and to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

5.11.34 The Proposed Development will avoid internationally designated sites and all MCZs, including the Offshore Overfalls MCZ and the Kingmere MCZ.

Table 5.11.4 Relevant nature conservation embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C- 41	The inter-array cables will typically be buried at a target burial depth of 1m below the seabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	DCO requirements or DML conditions.
C-43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	DCO requirements or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
C-44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML conditions.
C-45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C-48	Monitoring of vessel traffic will be undertaken for the duration of the construction period.	DCO requirements or DML conditions
C-51	A Vessel Management Plan (VMP) will be developed pre-construction .	DCO requirements or DML conditions
C-52	A piling Marine Mammal Mitigation Protocol (MMMP), will be implemented during construction and will be developed in accordance with JNCC (2010) guidance. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.	DCO requirements or DML conditions
C-53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details	DCO requirements or DML conditions

Likely significant effects

5.11.35 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise, and the MMO 2012 review of post-consent monitoring, to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.11.36 The likely significant effects on nature conservation are summarised in **Table 5.11.5**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for

nature conservation effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

5.11.37 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.11.5 Likely significant nature conservation effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment	Receptor	Further data baseline requirements
Direct habitat disturbance to Climping Beach SSSI (Construction, Maintenance and Decommissioning)	C-43	Potential for significant effect to Climping Beach SSSI through temporary, direct habitat loss and disturbance, although minimal disturbance is expected using Horizontal Directional Drilling (HDD) techniques.	**Scoped in - detailed assessment.** The ecological features for which this site is designated will be assessed within the benthic and intertidal ecology chapter and the marine ornithology chapter. The impact assessment for these parameters will ultimately inform the assessment of this designated site.	Conservation features of the site include non-breeding birds, coastal vegetated shingle, fixed dune grassland and sand dune communities.	Baseline requirements will be covered by the individual aspect assessments.
Direct impact to other designated features (Construction, Maintenance and Decommissioning)	None	**No likely significant effect**	**Scoped out.** See rationale in **paragraph 5.11.38** below.	N/A	N/A
Temporary increase in suspended sediment and sediment deposition on designated features (Construction and Decommissioning)	None	Potential for significant effect through smothering of protected habitats and species.	**Scoped in - detailed assessment.** The ecological features of designated sites will be assessed within the benthic and intertidal ecology chapter and the fish and shellfish chapter. The impact assessment for these parameters will ultimately inform the assessment of designated sites.	Conservation features.	Baseline requirements will be covered by the individual aspect assessments.
Impacts to mobile features of designated sites (Construction, Operation and Decommissioning)	C-52; C-48; C-52	Potential for significant negative impact to protected marine mammals and marine ornithology.	**Scoped in - detailed assessment**. Mobile features of designated sites such as birds and marine mammals will be assessed within the marine ornithology and marine mammal chapter. The impact assessment for these parameters will ultimately inform the assessment of designated sites.	Conservation features.	Baseline requirements will be covered by the individual aspect assessments.
Long term effects to physical processes and seabed composition from infrastructure (Operation)	C-41; C-44; C-44	Potential for significant disturbance to physical processes and seabed composition.	**Scoped in - detailed assessment**. The impacts associated with long-term changes to physical processes and seabed composition will be assessed in the physical processes and benthic assessments. The impact assessment for these parameters will ultimately inform the assessment of designated sites.	Conservation features.	Baseline requirements will be covered by the individual aspect assessments.

5.11.1

5.11.38 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Impacts scoped out of assessment

5.11.39 Based on the baseline information on nature conservation currently available, direct impacts to nature conservation features that do not overlap with the Proposed Development are scoped out of further assessment, resulting from a conclusion of no likely significant effect. For direct impacts to occur there would need to be a physical overlap of the Proposed Development and the designated site. As illustrated in **Figure 5.11.3**, the offshore Scoping Boundary only overlaps with the Climping Beach SSSI, which has been scoped into the assessment.

Cumulative effects

5.11.40 Cumulative effects on nature conservation resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.11.41 The potential for cumulative effects on designated sites, habitats or species to occur will be assessed under the relevant aspect disciplines of the EIA.

Transboundary effects

5.11.42 As transboundary effects have the potential to affect Natura 2000 sites within other EEA states, it is necessary to consider the potential effects of the activity on these sites and follow the HRA process to screen the sites in or out of the HRA assessment which must also be undertaken as part of the application for development consent. Where there is the potential for significant effects on a Natura 2000 site within another EEA state, it is necessary to undertake consultation with the competent authorities of that state. It follows that this engagement should commence at the screening stage of the HRA process and be incorporated within the HRA process with reference to the HRA made within the transboundary assessments for these sites. The HRA screening for Rampion 2 incorporates all relevant Natura 2000 sites within other EEA states jurisdictions. The application for development consent for Rampion 2 will present a Report to Inform Appropriate Assessment that considers all relevant Natura 2000 sites (or the adopted 'National Sites' following the UK's exit from the European Union) for Rampion 2 alone and in-combination with relevant projects and plans.

5.11.43 The conservation / designated sites chapter of the ES will consider all relevant ecological receptors, including for example, offshore ornithology, marine mammals, and migratory fish species.

5.11.44 The potential effects from construction, operation (including maintenance) and decommissioning on nature conservation receptors are also considered in a screening matrix presented in **Appendix B**.

Proposed approach to PEIR and ES

5.11.45 The proposed approach to PEIR and ES with regards the study area of relevance, method of assessment and data to inform assessment have been identified in **paragraphs 5.11.3** *et seq*. The following paragraphs provide further context, including consultation and engagement, that will be undertaken to further inform the assessment.

5.11.46 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the EPP which as set out in **Section 4.3: Consultation and the evidence plan process**. Key consultees of relevance to the Nature Conservation Chapter include Natural England, the Marine Management Organisation, the Sussex Wildlife Trust, the RSPB and IFCA. Consultee responses will be addressed, and, where relevant, the scope of the assessment and current list of sites modified accordingly in the PEIR and ES chapter.

5.11.47 All designated sites at European, national and local levels, which have features that could be impacted by development will be identified. For European Sites, the HRA screening process will build upon the ongoing ornithological, marine mammal and benthic ecology surveys in order to add or remove sites as necessary.

5.11.48 The baseline information on designated features will be informed by the technical assessments provided in relevant aspects of the ES (e.g. marine physical processes, marine mammals, marine ornithology, benthic subtidal and intertidal ecology and fish and shellfish ecology) as well as the HRA which will be undertaken.

5.11.49 The subsequent assessment of potential effects upon designated sites during construction, operation and decommissioning will be informed by the assessment of the relevant features within the following PEIR / ES aspects: Marine physical processes, marine mammals, marine ornithology, benthic subtidal and intertidal ecology, fish and shellfish ecology and the Rampion 2 HRA.

5.11.50 The assessment will also include the consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.12 Civil and military aviation

Introduction

5.12.1 The civil and military aviation assessment will consider the potential likely significant effects the civil and military aviation receptors that may arise from the construction, operation and decommissioning of Rampion 2. These receptors include civil airports, aviation radar, meteorological radar, civil aviation agencies, potential offshore helicopter operators (including Search and Rescue (SAR) flight operations) and the Ministry of Defence (MoD) aviation operators. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions across the scoping boundary, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.12.2 Civil and military aviation interfaces with some other aspects and as such, should be considered alongside these; namely:

- **Section 5.3 Other marine users** (which considers Military Practice and Exercise Areas (PEXA)); and
- **Section 5.9: Shipping and navigation**.

Study area

Introduction

5.12.3 The study area for the civil and military assessment is defined as the area of the array Scoping Boundary together with the Zones of Influence (ZOIs). The study area for this civil and military aviation assessment is presented in **Figure 5.12.1**.

5.12.4 The civil and military aviation study area is dependent on the maximum operating ranges of each of the radar systems scoped into the assessment; this will vary from system to system, and even between different installations of the same system. The operational range of the radar system is dependent on the type of radar used, its function and its operational requirement: consequently, the study area can vary significantly. The study area is therefore defined in relation to the varying types of the radar systems relevant in this area including civil, military and national air traffic services facilities and, importantly, following relevant guidance as set out in the following paragraphs.

Civil aerodromes

5.12.5 Civil Aviation Publication (CAP) 764 states the distances from various types of airfields where consultation should take place. These distances include:

- airfield with a surveillance radar-30km;
- non radar licensed aerodrome with a runway of more than 1,100m-17km;
- non radar licensed aerodrome with a runway of less than 1,100m-5km;
- licensed aerodromes where the WTGs would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- unlicensed aerodromes with runways of more than 800m-4km;
- unlicensed aerodromes with runways of less than 800m-3km;
- gliding sites – 10km; and
- other aviation activity such as parachute sites and microlight sites within 3km[18].

5.12.6 CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are

[18] In such instances developers are referred to appropriate organisations.

intended to delimit the study area and as a prompt for further discussion between RED and aviation stakeholders.

5.12.7 As well as examining the technical impact of WTGs on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 to determine whether a proposed development will breach obstacle clearance criteria.

Ministry of Defence

5.12.8 It is necessary to take into account the aviation and air defence activities of the MoD. The types of issues that will be addressed include:

- MoD Airfields, both radar and non-radar equipped;
- MoD Air Defence Radars;
- MoD / UK Met Office Meteorological Radars; and
- MoD Danger Areas.

National Air Traffic Services Facilities

5.12.9 It is necessary to take into account the possible effects of WTGs upon the National Air Traffic Services (NATS) radar systems – a network of primary and secondary radars and navigation facilities around the country.

5.12.10 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

Key

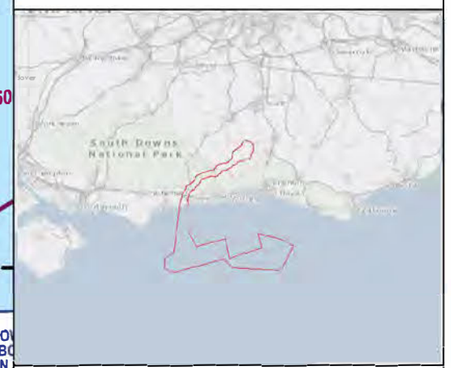
Scoping Boundary

Map provides Visual Flight Rules (VFR)

Defined by vertical limits in controlled airspaces, marked by red (IFR flights only) or blue (IFR and VFR flights permitted) outlines

For the full key of airspaces and other features see:

http://www.nats-uk.ead-it.com/aip/vfrcharts/downloads/HALF_LEGEND_A4.pdf



Kilometres
0 3 6 12 18 24
1:433,067

Rampion Extension Development

RWE WPAC Wind Power Aviation Consultants Ltd

Rampion 2 Offshore Wind Farm

Figure 5.12.1

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O3-0001				1.1
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WPAC	ST	WOOD	19/06/2020	FINAL

Assessment methodology

5.12.11 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this civil and military aviation section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the civil and military aviation assessment.

5.12.12 The assessment of potential impacts on civil and military aviation will be based on the maximum development scenario as identified from this design envelope (see **Section 2.2**). The key parameters will be the number of WTGs, the spatial extent of the WTGs (i.e. the size of the array) and the maximum blade tip height, see **paragraph 5.12.38**.

5.12.13 The ES chapter for civil and military aviation will be supported by desk-based studies that will identify and examine in greater detail civil and military aviation receptors. Studies will be undertaken in parallel with consultation and meetings with specific stakeholders in order to provide a detailed understanding of potential impacts.

5.12.14 This assessment will consider all radar systems within operational range of Rampion 2, as well as military areas of operation. For each identified receptor, the physical obstruction and/ or radar effect, and then subsequently the operational impacts will be considered with any other potential impacts. The operational impacts will be assessed by considering the orientation of approach and departure flight paths, physical safeguarding of flight, airspace characteristics and flight procedures as published in the UK Integrated Aeronautical Information Package (UKIAIP) (NATS, 2020) and the Military Aeronautical Information Publication (Mil AIP) (MoD, 2020).

5.12.15 This scoping assessment has been informed by initial radar modelling using Wind Power Aviation Consultants' 'RView' radar modelling system. RView uses a comprehensive systems database which incorporates the safeguarding criteria for a wide range of radar and radio navigation systems. RView models terrain using the latest Ordnance Survey (OS) Terrain 50 digital terrain model, which has a post spacing of 50m and has a root mean square (RMS) error of 4m. The results are verified using the Shuttle Radar Topography Mission (SRTM) dataset, a separate smoothed digital terrain model with data spacing of 3 arc seconds.

5.12.16 By using two separate and independently generated digital terrain models, anomalies are identified, and consistent results assured. Rview models the refractive effects of the atmosphere on radio waves and the First Fresnel Zone. A feature of RView is that as well as performing calculations in the manner believed to be most appropriate, it also allows comparison with results from simpler models. For example, RView can perform calculations using the true Earth Radius at the midpoint between the radar and the WTG or the simplified 4/3 Earth Radius model. If needed, Rview is also capable of modelling a range of atmospheric refractive conditions. RView models the trajectory of radar signals at different elevations enabling modelling of both volume surveillance and pencil beam radars as well as the effects of angular sterilisation as applied, for example, in Met Office radars.

5.12.17 The aviation industry and the provision of Air Navigation Services (ANS) (including radar services) are regulated through extensive legislation; however, the main mechanism for regulating the relationship between aviation and offshore wind is through the consenting system and the guidance outlined below. The following documents, as a minimum, have been and will be considered during the EIA process:

- Civil Aviation Publication (CAP) 670 Air Traffic Services Safety Requirements (CAA, 2019b);
- CAP 393 The Air Navigation Order 2016 and Regulation (CAA, 2019a);
- CAP 437 Standards for offshore helicopter landing areas (CAA, 2018);
- CAP 168 Licensing of Aerodromes, Edition (CAA, 2019);
- CAP 670 ATS Safety Requirements Version 3 (CAA, 2014);
- CAP 774 UK Flight Information Services, Ed 2.3 (CAA, 2015);
- CAP 738 Safeguarding of Aerodromes Version 2 (CAA, 2006);
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes Ed 1 (CAA, 2010);
- CAP 493 Manual of Air Traffic Services Part 1 Ed 6.1 (CAA, 2015);
- Military Aviation Authority Traffic Management (3000 series) Regulatory Articles;
- Military Aviation Authority Regulatory Article 2330 (Low Flying);
- UK Military Aeronautical Information Publication (MIL AIP);
- UK Aeronautical Information Publications (AIP); and
- CAA 1:250,000 and 1:500,000 VFR Charts.

5.12.18 Significance criteria for aviation impacts are typically difficult to establish; they are not strictly based on the sensitivity of the receptor or magnitude of change but on whether the industry regulations for safe obstacle avoidance or radar separation (from radar clutter) can be maintained in the presence of WTGs. Any anticipated impact upon aviation stakeholders which results in restricted operations will be considered to be of significance. Further details of the assessment of significance will be provided in the PEIR and ES and how this relates to an effect of significance in respect of the EIA Regulations 2017.

5.12.19 The determined effects have been informed by the results of the desktop assessment, professional knowledge and opinion and additional consultation with reference to the existing evidence base regarding the effects of WTGs on aviation receptors.

Baseline conditions

Data sources

5.12.20 **Table 5.12.1** presents the key guidance, regulations and data sources which have been collated and analysed to inform the baseline characterisation within this section.

Table 5.12.1 Key sources of civil and military aviation guidance, regulations and data

Source	Date	Summary	Coverage of study area
CAA Civil Aviation Publication (CAP) 168 (CAA, 2019)	March 2019	Licensing of Aerodromes sets out the standards required at UK licensed aerodromes relating to its management systems, operational procedures, physical characteristics, assessment and treatment of obstacles, and visual aids. Available online at: https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=6114	N/A
CAP 393: The Air Navigation Order 2016 and Regulations (CAA, 2019a);	March 2019	Sets out the provisions of the Air Navigation Order as amended together with regulations made under the Order. It is prepared for those concerned with day-to-day matters relating to air navigation that require an up-to-date version of the air navigation regulations and is edited by the Legal Advisers Department of the CAA. CAP 393 also includes application of lighting to WTGs in UK territorial waters.	N/A
CAP 764: Policy and Guidelines on Wind Turbines (CAA, 2016)	February 2016	Provides assistance to aviation stakeholders to help understand and address wind energy related issues, thereby ensuring greater consistency in the consideration of the potential impact of proposed wind farm developments.	N/A
CAP 670: Air Traffic Services Safety Requirements (CAA, 2019b)	August 2019	Sets out the safety regulatory framework and requirements associated with the provision of an air traffic service.	N/A
Military Aeronautical Information	2020	The main resource for information and flight procedures at all military aerodromes.	N/A

Source	Date	Summary	Coverage of study area
Publication (Mil AIP) (MOD, 2020)			
CAA, CAP 032: UK Integrated Aeronautical Information Package (UKIAIP) (CAA, 2020)	March 2020	The main resource for information and flight procedures at all licensed UK airports as well as airspace, en-route procedures, charts and other air navigation information.	N/A
Maritime and Coastguard Agency (MCA) Maritime Guidance Notes (MGN) 543: Safety of Navigation Offshore Renewable Energy Installations (OREIs) (MCA, 2016)	February 2016	Guidance on UK Navigational Practice, Safety and Emergency Response contains information for operators and developers in formulating their emergency response plans and site safety management.	N/A

Aviation baseline

5.12.21 The Proposed Development is located in an area that is relatively uncomplicated in aviation terms. **Figure 5.12.1** shows the aviation features including the classification and designations of the airspace and the locations of the local aviation facilities. The Scoping Boundary extends along the coast at least 12km offshore to a westerly point that is just to the east of the boundary of military danger area D037 shown with a purple hashed boundary. D037 forms part of a complex of danger and exercise areas known collectively as 'The Portsmouth Danger Areas'.

5.12.22 The majority of the area is located under Class A controlled airspace designated as part of the London Terminal Area (LTMA) and the Worthing Control Area (CTA) with a base of Flight Level (FL) 65 increasing to FL85. This equates to an altitude of approximately 6500 to 8500ft. Air traffic control services in this airspace are provided by NATS En Route Ltd (NERL) from the Terminal Control (TC) facility located within the London Area Control Centre at Swanwick, near Southampton.

Between sea level and the base of controlled airspace, the airspace is unregulated 'Class G' airspace available to any aircraft flying under the visual flight rules (VFR). The scoping boundary is some distance from any large airports and the closest aerodrome is the small licensed aerodrome at Shoreham, shown in **Figure 5.12.1** with a small blue shaded circle marking the Aerodrome Traffic Zone. To the east of the existing Rampion 1, the Scoping Boundary straddles the boundary of the LTMA and the Worthing CTA. The closest large airport is Gatwick, over 52km to the north. The next closest is Southampton Airport, over 65km to the north-west.

Civil aviation baseline

5.12.23 The baseline for the aviation scoping assessment is based upon the criteria set out in **paragraph 5.12.5**. The current baseline is informed by an initial high-level desk-based assessment which will be re-examined in greater detail during the EIA and developed, as relevant, through consultation with relevant stakeholders. The following sections provide an initial description of the baseline for each relevant civil aviation receptor group/facility.

Licensed airfield with a surveillance radar

5.12.24 There are no licensed airfields with a surveillance radar within 30km of any part of the array. The closest is Gatwick Airport over 50km to the north. ATC radar services are not provided from Gatwick but from the London Area Control Centre utilising a number of radars including the Raytheon ATCR33 located adjacent to Gatwick at Pease Pottage. This issue is addressed under the NERL section of this Scoping Report (see **paragraph 5.12.36** *et seq*.). There is no requirement to consult with Gatwick directly as NERL will be managing any wind farm induced effects as explained below.

5.12.25 The next closest radar equipped airfield is at Southampton, over 61km to the north-west. Southampton Airport do not provide ATC services in the area of Rampion 2.

5.12.26 Farnborough Airport is located 68km to the north of Rampion 2. It holds the responsibility for the provision of the Lower Airspace Radar Service (LARS) for aircraft operating below controlled airspace in this area.

Non radar licensed aerodrome with a runway of more than 1,100m

5.12.27 There are no non radar licensed aerodromes with a runway of more than 1,100m within or close to the designated 17km consultation distance.

Non radar licensed aerodrome with a runway of less than 1,100m

5.12.28 Consultation distance for non-radar licensed aerodrome with a runway of less than 1,100m is 5km.

Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP)

5.12.29 Shoreham Airport is a small non-radar licensed aerodrome with a runway of less than 1,100 metres, located 17km to the north of Rampion 2, however, it has

published an Instrument Flight Procedure designated RNAV (GNSS) Runway 02. The procedure commences approximately 2.5km to the north of the northerly boundary of the array of Rampion 2. At this point aircraft are required to be at a minimum altitude of 2,200ft and commencing a descent towards the runway down to 1,500ft.

Other civil aviation activities

5.12.30 No light aircraft landing strips, gliding sites, microlight sites or parachute sites which may be directly impacts by Rampion 2 have been identified.

Military aviation baseline

MoD airfields, both radar and non-radar equipped

5.12.31 Examination of the area and initial radar modelling show that Rampion 2 is a sufficient distance from any military airfields to avoid any potential for impacts to arise and on the basis of a lack of a potential impact pathway therefore, it is evident that none will be affected. The closest military airfield equipped with ATC radar facilities is RAF Odiham, over 66km to the north.

MoD air defence radars

5.12.32 The MOD safeguard a network of long range high powered air defence radars used to provide the UK with airspace surveillance and security and to fulfil national and international obligations. The MoD claim that the performance of the current generation of air defence radars are adversely affected by WTGs.

MoD danger areas

5.12.33 Immediately to the west of Rampion 2 are the Portsmouth Danger Areas, the closest of which to the proposed development is D037 which is activated by Notices To Airmen (NOTAM) up to a maximum of 55,000ft. These danger areas are mainly utilised for ships operating out of Portsmouth and are used for radar calibration and tracking, helicopter training, gunnery against airborne towed targets etc.

5.12.34 Radar surveillance is either provided by the ship itself, or further to the west by the remote radar head at Portland, with the control facility located in Plymouth.

Meteorological radar

5.12.35 The closest Met Office radar systems are located at Thurnham in Kent and West Dean in Wiltshire. Both are 85km from Rampion 2.

NATS En Route Ltd (NERL)

5.12.36 NERL operate a network of radars and other sensors, located around the UK which are fed into a multi radar tracking system used at the London Area Control Centre at Swanwick. Initial radar modelling shows that part of the Proposed Development will be in radar line of sight (RLOS) of the radar at Pease Pottage,

near Gatwick. The radar is an essential part of the surveillance network and is the only radar with good low level coverage over the English Channel in this area.

5.12.37 NERL were consulted in 2018 regarding Rampion 2 and advised that they would object on the grounds of unacceptable impact on the performance of the radar. Consultation with NERL was subsequently held to identify a suitable technical mitigation scheme. It is acknowledged that further consultation will be required in order to confirm updated details of Rampion 2 and to enable a suitable mitigation to be agreed, following detailed assessment in the EIA.

Basis for scoping assessment

5.12.38 The civil and military scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- maximum number of WTGs: 116;
- maximum rotor diameter: 275m;
- maximum blade tip height: 325m; and
- extent of array area (see **Figure 5.12.1**).

Embedded environmental measures

5.12.39 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on civil and military aviation (see **Table 5.12.2**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.12.40 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.12.2 Relevant civil and military aviation embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-108	Development of Emergency Response and Cooperation Plan (ERCOP)	DCO requirements or DML conditions.
C-109	Notification to aviation stakeholders of the location and height of all wind energy development and associated construction activities (all structures over 150 ft).	DCO requirements or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
C-110	RED will agree a lighting scheme for the aviation lighting of structures (turbines and offshore support platforms) above 60m in height with the relevant authorities.	DCO requirements or DML conditions.

Likely significant effects

5.12.41 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.12.42 The likely significant effects on civil and military aviation are summarised in **Table 5.12.3**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for civil and military aviation effects, the identification of potentially impacted receptors, and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

5.12.43 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.12.3 Likely significant civil and military aviation effects

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Installation of the export cables offshore affecting aviation receptors. (Construction, Operation and Decommissioning)	None	There is no potential source/receptor pathway for an impact to arise on any aviation interest, facilities or operations. No likely significant effect identified.	**Scoped out.** See rationale in **paragraph 5.12.46** below**.**	No aviation receptors identified.	N/A
Construction and Decommissioning of the WTGs leading to impacts on civil and military radar systems. (Construction and Decommissioning))	None	During construction (prior to commissioning) and decommissioning phases the WTG rotors will be static and therefore there should be no interference with radar systems (specifically in terms of data display). There is therefore no impact pathway during construction.	**Scoped out.** See rationale in **paragraph 5.12.47** below**.**	No aviation receptors will be affected	N/A
Physical presence and operation of the WTGs leading to impacts on Licensed Airfields with surveillance radar.	None	There are no licensed airfields with a surveillance radar within 30km of any part of the array and therefore no impact pathway for an effect to arise.	**Scoped out.** See rationale in **paragraph 5.12.48** below**.**	No Licensed Airfield surveillance radars will be affected	N/A

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(Operation)					
Physical presence and operation of the WTGs leading to impacts on Non radar licensed aerodromes. (Operation)	None	There are no non radar licensed aerodromes within the designated consultation distances (17km for facilities with runways >1100m;5km for those <1100m). There is therefore no impact pathway for assessment.	**Scoped out.** See rationale in **paragraph 5.12.50** below**.**	No non radar licensed aerodromes will be affected	N/A
Physical presence and operation of the WTGs leading to impacts on Licensed aerodromes where WTGS would be within airspace with published Instrument Flight Procedures. (Operation)	None	The minimum obstacle clearance within the IFP zone from Shoreham airport is not impeded by the maximum tip height of the WTGs proposed for Rampion 2 and therefore there is no impact pathway for an effect to occur.	**Scoped out.** See rationale in **paragraph 5.12.52** below**.**	No licensed aerodromes with IFP zones will be affected.	No further baseline requirements identified; however, consultation will be undertaken with Shoreham Airport to confirm.
Physical presence and operation of the WTGs leading to impacts on other civil aviation activities.	None	Due to separation distance of the scoping boundary from any of these receptors, there can be no effects on light aircraft landing strips, gliding sites,	**Scoped out.** See rationale in **paragraph 5.12.53** below**.**	No light aircraft landing strips, gliding sites, microlight	N/A

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(Operation)		microlight sites or parachute sites.		sites or parachute sites will be affected by Rampion 2 development.	
Physical presence and operation of the WTGs leading to impacts on SAR flight operations. (Operation)	C-108; C-109; C-110.	The presence of the WTG may present a physical obstruction and affect SAR helicopter flight operations due to the change in operating environment should airborne SAR operation be required within or close to the array area. With the application of the CAA regulated mitigation ERCOP (C-1) and aviation stakeholder notifications (C-2), there is no likely significant effect anticipated.	**Scoped out.** See rationale in **paragraph 5.12.54** below**.**	SAR Flight Operations	N/A
Physical presence and operation of the WTGs leading to impacts on MoD facilities (airfields, Air Defence Radars	None	Due to separation distance of the scoping boundary from any of these receptors, there can be no effects on MoD airfields,	**Scoped out.** See rationale in **paragraph 5.12.55** below**.**	MoD facilities (airfields, Air Defence Radars	Baseline requirements identified; however, consultation will

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
(ADRs) and danger areas). (Operation)		ADRs or impingement on danger areas.		(ADRs) and danger areas	be undertaken with the MoD.
Physical presence and operation of the WTGs leading to impacts on Meteorological radar. (Operation)	None	Due to separation distance of the scoping boundary from the two closest meteorological radar system installations, there can be no effect from the proposed Rampion 2.	**Scoped out.** See rationale in **paragraph 5.12.58** below**.**	Meteorological radar systems	N/A
Physical presence and operation of the WTGs leading to impacts on the NATS En Route Ltd (NERL) radar at Pease Pottage. (Operation)	None	WTGs in coverage areas of NATS PSR systems could shield the radar from genuine targets of interest in clutter and a degree of 'shadowing' could be created behind detectable WTG. Any of these potential effects could impact on the NATS provision of ATS to aircraft. Whilst mitigation solutions may be agreed, impacts on the performance of this system mean that there is potential for a likely significant effect.	**Scoped in, detailed assessment.** The assessment will consider all radar systems within operational range of Rampion 2, as well as military areas of operation. For each identified receptor, the radar effect, and then subsequently the	NERL radar at Pease Pottage.	Consultation with NERL to discuss the potential for a suitable technical mitigation scheme.

Activity and impact	Embedded measures	Likely significance of effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
			operational impacts will be considered with any other potential impacts. This will be supported by further radar modelling.		
Physical presence and operation of the WTGs, together with construction and decommissioning activities affecting civil and military flight operations (Operation)	C-110	There is expected to be a requirement for Aviation Obstruction Lighting on the construction and decommissioning infrastructure and all or individual WTG based on CAA regulations. The fitting of appropriate lighting would ensure visibility of the WTG and infrastructure to aviation stakeholders and therefore there is no likely significant effect anticipated.	**Scoped out.** See rationale in **paragraph 5.12.59** below**.**	No aviation receptors identified.	N/A

Rationale for Impacts scoped out of assessment

5.12.44 With the exception of the potential for effects on the NERL PSR radar system at Pease Pottage, all other radar systems for civilian or military airfields, aerodromes or danger areas (and including meteorological radars), are well beyond the distance within which impacts could arise. It follows, therefore, that as there is the absence of a potential impact pathway that could lead to a significant effect on any of these receptors, all are proposed to be scoped out as detailed in **Table 5.12.3.** Where there is a requirement to undertake further consultation with stakeholders and authorities, for example the MoD and Shoreham Airport, these will be progressed to inform the PEIR and ES.

5.12.45 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.

5.12.46 **Installation of the export cables offshore affecting aviation receptors:** As all of the offshore cable corridor infrastructure will be below sea level, there is no potential source/receptor pathway for an impact to arise on aviation interests for any stage of Rampion 2. All offshore cable aspects are therefore proposed to be scoped out from consideration within the ES.

5.12.47 **Construction and Decommissioning of the WTGs leading to impacts on civil and military radar systems:** During construction (prior to commissioning) and during the decommissioning phases of Rampion 2, there will be no interference of any civil or military ATC or Air Defence radar systems as the WTG rotors will remain static and will not, therefore create clutter or affect automated tracking systems. On this basis there is no impact pathway identified during construction and hence this impact is proposed to be scoped out from the EIA.

5.12.48 **Physical presence and operation of the WTGs leading to impacts on Licensed Airfields with surveillance radar:** The next closest radar equipped airfield is at Southampton, over 61km to the north-west. Southampton Airport do not provide ATC services in the area of Rampion 2. Initial radar line of sight modelling also shows that there is no possibility of the radar being affected by Rampion 2 and on this basis will be scoped out of the EIA.

5.12.49 Farnborough Airport is located 68km to the north of Rampion 2. Initial radar modelling shows that there is no possibility of the radar being affected and on this basis will be scoped out of the EIA.

5.12.50 **Physical presence and operation of the WTGs leading to impacts on Non radar licensed aerodromes:** There are no non radar licensed aerodromes with a runway of more than 1,100m within or close to the designated 17km consultation distance. On this basis assessment of these facilities will be scoped out of the EIA.

5.12.51 Consultation distance for non-radar licensed aerodromes with a runway of less than 1,100m is 5km. As the scoping boundary is at least 12km offshore, there will be no non-radar licensed aerodromes requiring consultation and this issue will therefore be scoped out of the EIA.

5.12.52 **Physical presence and operation of the WTGs leading to impacts on Licensed aerodromes where WTGS would be within airspace with published Instrument Flight Procedures:** The maximum height of the turbine tip under consideration is 325m or 1,061ft AOD. The minimum obstacle clearance (MOC) for this phase of the procedure is 1,000ft, therefore with a 1,061ft turbine tip height there is still sufficient clearance, however, RED will consult with Shoreham Airport in order to confirm their position and if necessary to arrange for a licensed procedure design company to confirm the procedure will remain valid, or to redesign the procedure if required taking into account the final size and location of the turbines. This matter will be addressed in detail in the ES.

5.12.53 **Physical presence and operation of the WTGs leading to impacts on other civil aviation activities:** Given the location of the WTGs at least 12km offshore, there will be no effects on light aircraft landing strips, gliding sites, microlight sites or parachute sites. Assessment of potential impacts on these facilities will therefore be scoped out of the EIA. Search and Rescue (SAR) flight operations could be affected by the presence of Rampion 2 as a result of the physical presence of Rampion 2, should SAR operations be required in proximity to or within the array area. On the basis that operational flexibility is inherent in the flight operations of SAR activities and that mitigation measures in the form of notifications and an Emergency Response and Cooperation Plan (ERCOP) will be applied and secured for Rampion 2, this issue will be scoped out of the EIA.

5.12.54 **Physical presence and operation of the WTGs leading to impacts on SAR flight operations:** The potential for likely significant effects to arise on Search and Rescue (SAR) flight operations is also proposed to be scoped out. This assertion is made on the basis that whilst the presence of the WTG structures at Rampion 2 may present a physical obstruction and affect SAR helicopter flight operations when such activities are required to be undertaken in proximity to Rampion 2, the application of secured mitigation measures as detailed above will ensure appropriate lighting, marking and notification, in line with CAA regulations, to ensure no significant effect on SAR flight operations will arise. The Proposed Development will be appropriately marked on aeronautical maps, charts and relevant associated documentation. The application of an agreed ERCOP will also be in place throughout all phases of Rampion 2. These measures will be secured under the deemed Marine Licence (dML) provisions for the Rampion 2 application for development consent and can, therefore, be relied upon.

5.12.55 **Physical presence and operation of the WTGs leading to impacts on MoD facilities (airfields, ADRs and danger areas):** There are no air defence radars within a relevant distance of Rampion 2. In addition, radar modelling at the closest facility, located at Trimingham in Norfolk, has shown that there would be no effects on the facility. This issue is therefore scoped out of the EIA, although as above this will be confirmed with the MOD through consultation as part of the scoping process.

5.12.56 There is no possibility of Rampion 2 affecting RAF Odiham (over 66km to the north) or any other military ATC radar as there is no radar line of sight from any of these facilities. This issue is therefore scoped out of the EIA, although it should be noted that this will be confirmed by the MOD Defence Infrastructure Organisation (DIO) during scoping consultation.

5.12.57 Radar modelling shows that Rampion 2 will not affect the Portland radar, which is 126km to the west. Radar surveillance is therefore scoped out of the EIA, although again this will be confirmed by the MoD when they are consulted during scoping. It is also relevant to highlight that it is the MoD's responsibility to ensure that all activity within the danger area is contained within it and that a buffer is included within the danger area itself to ensure safety.

5.12.58 **Physical presence and operation of the WTGs leading to impacts on Meteorological radar (Operation):** The closest Met Office radar systems are located at Thurnham in Kent and West Dean in Wiltshire. Both are 85km from Rampion 2 and well in excess of the 20km safeguarded zone around each radar. Met Office radars will therefore be unaffected and thus scoped out of the EIA.

5.12.59 **Physical presence and operation of the WTGs, together with construction and decommissioning activities affecting civil and military flight operations:** The requirement for aviation lighting, which will be developed in discussion and agreement with the MCA for marine vessel navigation to ensure suitable differentiation between aviation and maritime lighting is achieved, will be put in place and secured under the dML. As this has been committed to by RED and will be secured under the dML provisions, this issue is proposed to be scoped out from the EIA.

Cumulative effects

5.12.60 Cumulative effects on civil and military aviation resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.12.61 The potential for cumulative impacts in the context of civil and military aviation is created by the radar detection of Rampion 2 existence to those radar systems that will also detect other wind farm developments (such as the existing Rampion 1 project) in the study area. The potential for cumulative effects on the NERL PSR radar system will be scoped into the cumulative impact assessment.

Transboundary effects

5.12.62 Due to the localised nature of the potential impacts, relating solely to the Pease Pottage radar, transboundary effects are considered unlikely to occur and therefore it is proposed that civilian and military aviation is scoped out from further consideration within the EIA.

5.12.63 A Transboundary Screening Matrix for Rampion 2 is presented in **Appendix B**.

Proposed approach to PEIR and ES

5.12.64 The proposed approach to PEIR and ES with regards the study area of relevance, method of assessment and data to inform assessment have been identified in **paragraphs 5.12.3** *et seq***.** The following paragraphs provide further context including details about consultation and engagement that will be undertaken to further inform the assessment.

5.12.65 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of Rampion 2 consultation activities, which are set out in **Section 4.3: Consultation and the evidence plan process**. Key consultees of relevance to the Civilian and Military Aviation assessment include the MoD Defence Infrastructure Organisation (DIO), NERL and Shoreham Airport, though Rampion 2 will ensure effective consultation is undertaken with all relevant stakeholders. Consultee responses will be addressed, and the scope of the assessment modified accordingly in the PEIR and ES chapter.

5.12.66 The aviation study area (**Figure 5.12.1**) has been informed by a range of guidance and documents listed in the relevant parts of this section as well as through reference to the EIA undertaken for the existing Rampion 1 project. This study area will be reviewed and potentially amended in response to such matters as refinement of the offshore components and in response to feedback from consultation where appropriate. Additionally, information from site specific radar modelling, where required, will also inform the final study area.

5.12.67 The baseline will be established through the compilation of both desk-based studies and consultation. The key data sources to be utilised to inform the baseline and assessment are listed (**Table 5.12.1**).

5.12.68 The maximum development scenario on which the assessments will be based, will be defined in accordance with the design envelope approach (see **Section 2.2**); the spatial footprint, the number of WTGs and the maximum tip height of the WTGs will be key considerations in defining the maximum design scenario for aviation receptors. Following this, the likely significant effects on receptors from the maximum design scenario will be described and assessed.

5.12.69 The assessment will also include the consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

5.13 Seascape, landscape and visual

Introduction

5.13.1 The seascape, landscape and visual impact assessment (SLVIA) will consider the potential likely significant effects on seascape, landscape and visual receptors that may arise from the construction, operation, and decommissioning of the offshore elements of Rampion 2. This section describes the methodology to be used and how these likely significant effects will be assessed for the purpose of an EIA. The full methodology for the SLVIA is contained in **Appendix C**.

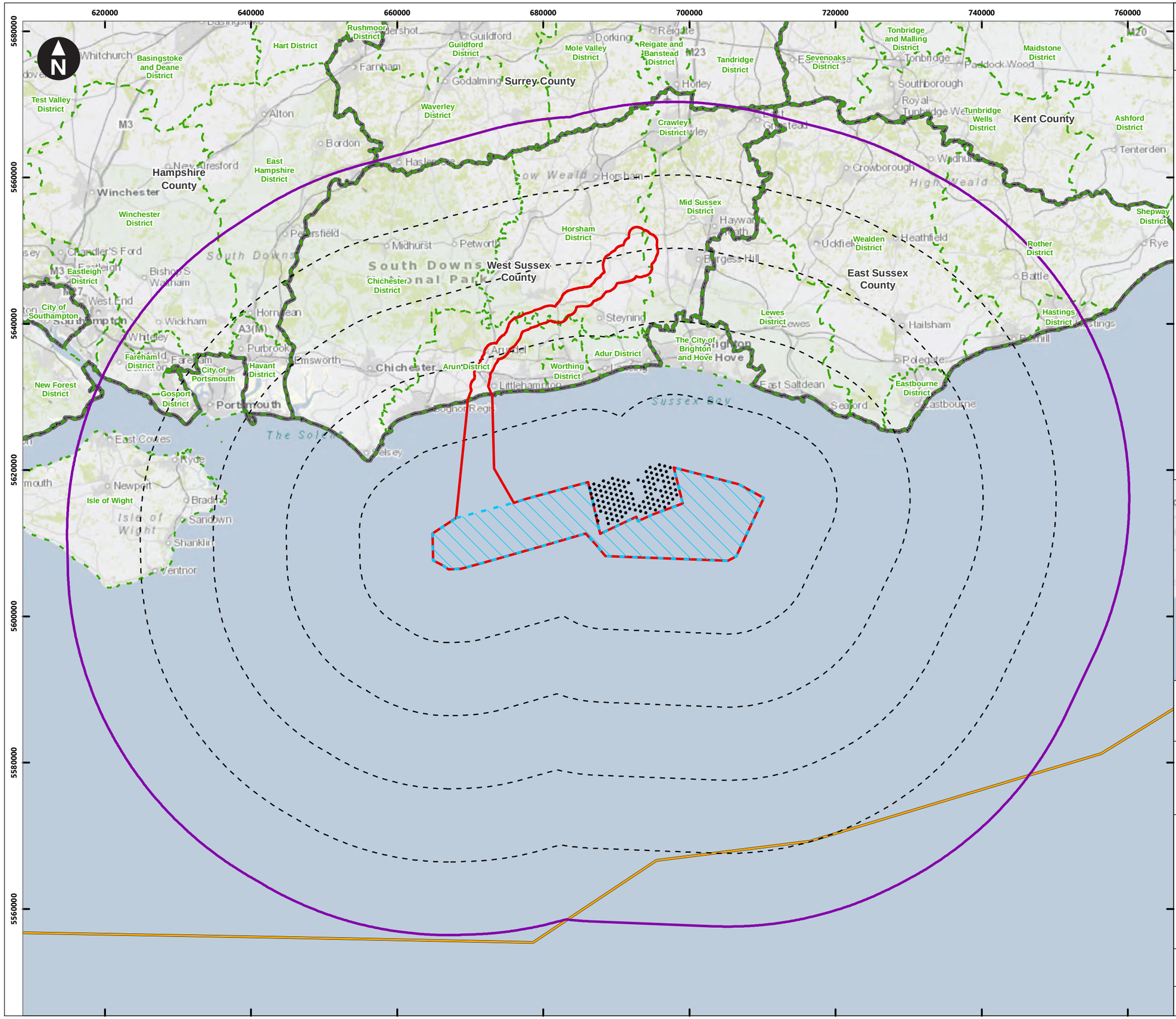
5.13.2 Seascape, landscape and visual interfaces with other aspects and as such, should be considered alongside these; namely: **Section 6.2: Landscape and visual impact** (onshore), for interactions with onshore landscape features and **Section 5.14: Archaeology and cultural heritage** for potential effect to features of historical importance.

5.13.3 The assessment of potential effects on seascape, landscape and visual receptors will be made with reference to relevant National Policy Statements (NPS). The relevant NPSs to this assessment are:

- Overarching National Policy Statement for Energy (NPS EN-1 July 2011);
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3 July 2011); and
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5 July 2011).

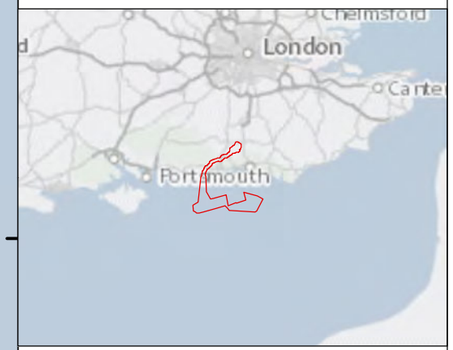
Study area

5.13.4 The SLVIA study area will cover a radius of 50km from the 'array area' of the Scoping Boundary, as illustrated in **Figure 5.13.1**. Broadly, the SLVIA study area is defined by a northern terrestrial area, including the counties of East Sussex, West Sussex, Isle of Wight, Hampshire, Surrey and Kent; as well as the City of Brighton and Hove; and a southern offshore area defined by waters of the English Channel.



Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- County Boundary
- District Boundary
- Maritime Boundary (UK and France)



Kilometres
0 2.5 5 10 15 20
1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.1 SLVIA Study Area

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-10-0001	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
OPEN	JM	WOOD	27/05/2020	FINAL

5.13.6 The SLVIA study area is defined as the outer limit of the area where significant effects could occur, using professional judgement.

5.13.7 Institute of Environmental Management and Assessment Guidance (IEMA, 2015 and 2017) recommends a proportionate ES focused on the significant effects and a proportionate ES aspect chapter. An overly large SLVIA study area may be considered disproportionate if it makes the understanding of the key impacts of the offshore elements of Rampion 2 more difficult.

5.13.8 This is supported by Landscape and Visual Impact Assessment (LVIA) Guidance produced by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (para 3.16). This guidance recommends that *'The level of detail provided should be that which is reasonably required to assess the likely significant effects'.* Para 5.2 and p70 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner'.*

5.13.9 Other wind farm specific guidance, such as Scottish Natural Heritage's (SNH) Visual Representation of Wind Farms Guidance (SNH, 2017) recommends that Zone of Theoretical Visibility (ZTV) distances are used for defining study area based on WTG height. This guidance recommends a 45km radius for WTG greater than 150m to blade tip (para 48, p12), however it doesn't go beyond turbines above 150m in height. The height of current offshore WTG models has now exceeded the heights covered in this guidance. The SNH guidance recognises that greater distances may need to be considered for larger WTGs used offshore, as is the case for the SLVIA study area for Rampion 2.

5.13.10 A 50km radius study area is consistent with agreed study areas for other offshore wind farms, such as East Anglia ONE North and East Anglia TWO (up to 300m blade tip height) and had therefore been adopted for the purposes of the proposed Rampion 2 assessment.

5.13.11 Beyond the Scoping Boundary, the SLVIA will generally focus on locations from where it may be possible to see the offshore elements of Rampion 2, as defined by the Blade Tip ZTV (**Figure 5.13.2**).

Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- Representative Viewpoint
- Illustrative Viewpoint

Blade Tip Zone of Theoretical Visibility

- Higher Theoretical Visibility
- Lower Theoretical Visibility

Kilometres
0 2.5 5 10 15 20
1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.2 Blade Tip ZTV (Rampion 2)

Scoping Report

Viewpoints

1 - Beachy Head cliff top
2 - Birling Gap cliff top (top of steps leading down to beach)
3 - Seven Sisters Country Park cliff top
4 - Seaford Head
5 - Newhaven Coastguard cliff top
6 - Peacehaven cliff top
7 - Beacon Hill, Rottingdean
8 - Brighton sea front promenade (adjacent to pier).
9 - Shoreham/A259 coastal road
10 - Worthing sea front promenade
11 - Littlehampton sea front promenade
12 - Bognor Regis sea front promenade
13 - Pagham Beach
14 - Selsey sea front promenade
15 - Willingdon Hill
16 - Firle Beacon
17 - Devil's Dyke
18 - Cissbury Ring
19 - Highdown Hill
20 - Springhead Hill
21 - Bignor Hill
22 - Eastoke Point (Chichester Harbour AONB)
23 - Portsmouth (Southsea Castle)
24 - Bembridge, Isle of Wight
25 - Bramber Castle
26 - Low Weald

Blade Tip:	325m	Observer height:	2m
DTM:	OS T50	Surface features:	Excluded
DTM resolution:	50m	Earth curvature:	Included

System Identifier:	Version:
42285-GOBE-SC-OF-DR-10-0002	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
OPEN	JM	WOOD	27/05/2020	FINAL

5.13.13 The ZTVs shown in **Figure 5.13.2** (and **Figures 5.13.5a-b**) are based on WTGs of 325m to tip (above LAT) in a grid weighted towards the coastward perimeters of the array area and represents the Maximum Development Scenario (MDS) for the SLVIA considered in the scoping assessment. The ZTV illustrates where there would be no visibility of these WTGs, as well as areas where there will be lower or higher numbers of WTGs theoretically visible.

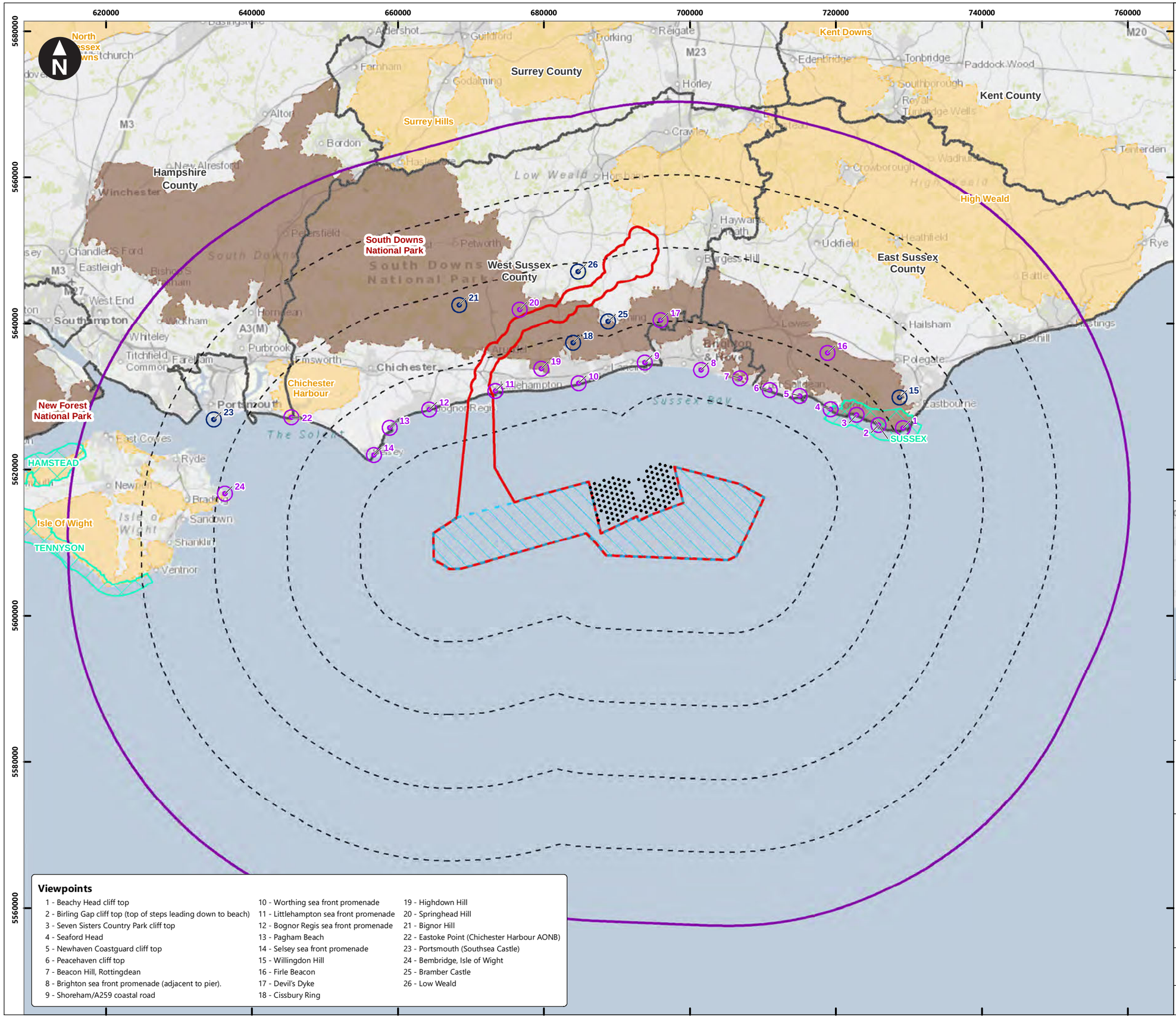
5.13.14 Consideration of the blade tip ZTV (**Figure 5.13.2**) indicates that theoretical visibility of Rampion 2 mainly occurs within 50km and that beyond this distance, the geographic extent of visibility will become very restricted. At distances over 50km, the lateral (or horizontal) spread of Rampion 2 will also occupy a small portion of available views and the apparent height (or 'vertical angle') of the WTGs would also appear very small, therefore significant visual effects are unlikely to arise at greater than this distance, even if the WTGs are visible.

5.13.15 The influence of earth curvature begins to limit the apparent height and visual influence of the WTGs visible at long distances (such as over 50km), as the lower parts of the turbines would be partially hidden behind the apparent horizon, leaving only the upper parts visible above the skyline.

5.13.16 The variation of weather conditions influencing visibility off the English coast has also informed the SLVIA study area. Based on initial review of Met Office visibility data presented in the MMO Seascape Assessment for the South Marine Plan Areas (MMO, 2014) (Figure 16, p26) *'visibility beyond 50km is very unlikely'.*

5.13.17 This is supported by the visibility analysis in the Offshore Energy Strategic Environmental Assessment (White Consultants, March 2020), which considered Met Office visibility data for eight coastal stations. Averaging all coastal stations, the visual range recorded was just under 24km around 50% of the time, just under 30km 33% of the time, around 34km for 20% of the time, and 40km 10% of the time.

5.13.18 In considering the SLVIA study area, the sensitivity of the receiving seascape, landscape and visual receptors has also been reviewed, taking particular account of the landscape designations shown in **Figure 5.13.3**, and other principal visual receptors. It is clear that the principal issues for the SLVIA are the location of Rampion 2 off the Sussex coast and therefore its exposure to and visibility from settlements along the coast; the South Downs National Park (SDNP) and the Sussex Heritage Coast, which are primarily within 13-30km of Rampion 2.



Viewpoints

1 - Beachy Head cliff top
2 - Birling Gap cliff top (top of steps leading down to beach)
3 - Seven Sisters Country Park cliff top
4 - Seaford Head
5 - Newhaven Coastguard cliff top
6 - Peacehaven cliff top
7 - Beacon Hill, Rottingdean
8 - Brighton sea front promenade (adjacent to pier).
9 - Shoreham/A259 coastal road
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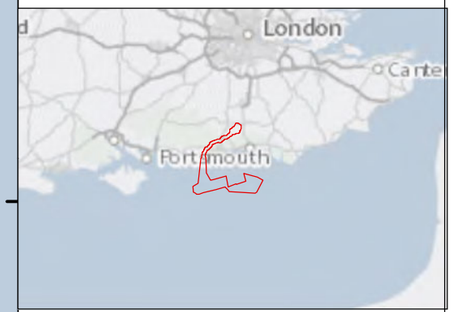
11 - Littlehampton sea front promenade
12 - Bognor Regis sea front promenade
13 - Pagham Beach
14 - Selsey sea front promenade
15 - Willingdon Hill
16 - Firle Beacon
17 - Devil's Dyke
18 - Cissbury Ring
19 - Highdown Hill
20 - Springhead Hill
21 - Bignor Hill
22 - Eastoke Point (Chichester Harbour AONB)
23 - Portsmouth (Southsea Castle)
24 - Bembridge, Isle of Wight
25 - Bramber Castle
26 - Low Weald

Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- Representative Viewpoint
- Illustrative Viewpoint
- County Boundary
- Heritage Coasts
- Area of Outstanding Natural Beauty
- National Park



Kilometres
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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.3 Landscape Planning Designations and Defined Areas

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-10-0003				1.2
Company: OPEN	Drawn By: JM	Chk/Aprvd: WOOD	Drawn Date: 27/05/2020	Status: FINAL

5.13.20 Potential cumulative effect interactions with other offshore wind farms have also influenced the definition of the SLVIA study area. Other offshore windfarms within the SLVIA study area are shown in **Figure 5.13.1 and include only the existing Rampion 1 project**.

5.13.21 The study area will be reviewed and amended in response to such matters as refinement of the offshore elements of Rampion 2, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation. Feedback from consultees is requested specifically on the SLVIA study area.

Assessment methodology

Introduction

5.13.22 The project-wide approach to the assessment methodology is set out in **Chapter 4**. Whilst this has informed the approach that will be used in the SLVIA, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the SLVIA.

5.13.23 The SLVIA is an objective evaluation that is informed by experienced professional judgement based on the application of a methodology. The methodology proposed for the SLVIA is as set out in the example methodology provided in **Appendix C: SLVIA Methodology**. The key guidance and an overview of the SLVIA approach are summarised as follows.

Other technical guidance

5.13.24 The SLVIA will be undertaken in accordance with the methods outlined in the following best practice guidance documents.

- Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition.
- MMO (2019). An Approach to Seascape Sensitivity Assessment.
- Natural England and the Department for Environment, Food and Rural Affairs (2014). Landscape and Seascape Character Assessments.
- Natural England (2012). An Approach to Seascape Character Assessment.
- Natural England (2014). An Approach to Landscape Character Assessment.
- Natural England (2019). An Approach to Landscape Sensitivity Assessment.
- Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope.
- Scottish Natural Heritage (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments.
- Scottish Natural Heritage (2017). Visual Representation of Windfarms: Version 2.2.

- Landscape Institute (2019). Visual Representation of Development Proposals (Technical Guidance Note 06/19).

Approach

5.13.25 The objective of the SLVIA will be to predict the significant effects on the seascape, landscape and visual resource. In accordance with the EIA Regulations 2017, the seascape, landscape and visual effects will be assessed to be either significant or not significant.

5.13.26 The SLVIA will assess the effects of changes resulting from Rampion 2 on seascape / landscape as a resource, the views available to people and their visual amenity. The SLVIA is undertaken using the following steps.

- The features of Rampion 2 that may result in seascape, landscape and visual effects are described. The overall scope of the assessment will be defined, including the study area and range of possible seascape, landscape and visual effects.
- The seascape / landscape baseline will be established using seascape / landscape character assessment and the ZTV of Rampion 2, to identify seascape and landscape receptors that may be affected and their key characteristics and value.
- The visual baseline will be established by identifying the extent of possible visibility (ZTV), identifying the people who may be affected and identifying visual receptors and selecting viewpoints.
- A preliminary assessment will be undertaken of landscape and visual receptors using ZTV analysis, to identify which landscape and visual receptors are unlikely to be significantly affected and those that are more likely to be significantly affected by Rampion 2, which require to be assessed in full.
- Interactions are identified between Rampion 2 and seascape, landscape and visual receptors, to predict likely significant effects arising and measures are proposed to mitigate effects.
- An assessment of the susceptibility of seascape, landscape and visual receptors to specific change and the value attached to landscape receptors and views will be undertaken, combining these judgements to assess the sensitivity of the landscape and visual receptors to Rampion 2.
- An assessment of the size / scale of seascape/landscape impact, the degree to which seascape/landscape elements are altered and the extent to which the impacts change the key characteristics of the landscape will be undertaken, combining these judgements to assess the magnitude of change on each seascape / landscape receptor.
- An assessment of the size / scale of visual impact, the extent to which the change would affect views, whether this is unique or representative of a wider area, and the position of Rampion 2 in relation to the principal orientation of the view and activity of the receptor. These judgements are combined to assess the magnitude of change on the visual receptor.

- The assessments of sensitivity to change and magnitude of change will be combined to assess the significance of seascape, landscape and visual effects.

5.13.27 The significance of effects will be assessed through a combination of two considerations – the sensitivity of the seascape / landscape or visual receptor / view to Rampion 2 and the magnitude of change that will result from Rampion 2. In accordance with the Landscape Institute's GLVIA3, the SLVIA methodology requires the application of professional judgement, but generally, the higher the sensitivity and the higher the magnitude of change the more likely that a significant effect will arise.

5.13.28 The objective of the cumulative SLVIA will be to describe, visually represent and assess the ways in which Rampion 2 will have additional effects when considered together with other existing, consented or application stage developments and to identify related significant cumulative effects arising. The guiding principle in preparing the cumulative SLVIA will be to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process.

Baseline conditions

Data sources

5.13.29 Data sources used to collate the information for the SLVIA are set out in **Table 5.13.1**.

Table 5.13.1 Key sources of seascape, landscape and visual data

Source	Date	Summary	Coverage of study area
Campaign to Protect Rural England (CPRE)	2016	Interactive maps of the UK's light pollution and dark skies as part of a national mapping project (LUC/CPRE, 2016). Open Source data used to understand and illustrate baseline lighting levels. (available online: https://www.nightblight.cpre.org.uk/)	Full coverage of the study area.
East Sussex County Council	2016	Landscape Character Areas (LCAs) (East Sussex). East Sussex Landscape Character Assessment (2016) (available online: https://www.eastsussex.gov.uk/environment/landscape/) Local Development Plans covering Eastbourne, Hastings Borough and Lewes, Rother and Wealdon Districts.	East Sussex
English Heritage	2020	Any specific visitor attractions / tourist destinations (available online: https://www.english-	Full coverage

Source	Date	Summary	Coverage of study area
		heritage.org.uk/visit/places/#?page=1&place=&map=false&fe=false)	of the study area
E.ON UK (Rampion Wind Farm Ltd)/RSK Environmental	2012	Rampion Wind Farm Environmental Statement (ES). ES Section 12 Seascape, Landscape ad Visual Impact Assessment (Document 6.1.12).	Partial coverage of the study area
Google Earth Pro	2020	Aerial photography	Full coverage of the study area
Hampshire County Council	2010	Landscape Character Areas (LCAs) (Hampshire). Hampshire Integrated Landscape Assessment (Available online: https://www.hants.gov.uk/landplanningandenvironment/environment/)	Hampshire
Historic England	2020	Registered Parks and Gardens and UNESCO World Heritage Sites (available online: https://historicengland.org.uk/listing/what-is-designation/registered-parks-and-gardens/	Full coverage of the study area
Isle of Wight Council	2015	Landscape Character Areas (LCAs) (East Isle of Wight). East Wight Landscape Character Assessment (available online: https://www.iow.gov.uk/azservices/documents/2782-EWLCA-Final-Version-May-2015-Web-version.pdf)	Isle of Wight
Kent County Council	2004	Landscape Character Areas (LCAs) (Kent). Landscape Assessment of Kent (available online: https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/countryside-policies-and-reports/kents-landscape-assessment)	Kent
Long Distance Walkers Association	2020	Overview map for Long Distance Paths and Walks (available online: https://www.ldwa.org.uk/ldp/public/ldp_overview_map.php)	Full coverage of the study area

Source	Date	Summary	Coverage of study area
Met Office	2009-2019	Visibility Data. Visibility bands every 1km up to 30km, then every 5km up to 50km, then every 10km up to 70km, and >70km	Weather station at Thorney Island.
MMO	2014	Marine Character Areas. MMO, June 2014 Seascape assessment for the South Marine Plan Areas: Technical Report (MMO 1037). Available online: https://www.gov.uk/government/publications/the-south-marine-plans-documents)	South Inshore and Offshore Marine Plan Areas
National Trust	2020	Any specific visitor attractions / tourist destinations (available online: https://www.nationaltrust.org.uk/days-out)	Full coverage of the study area
Natural England	2018	National Character Areas (NCAs) (available online: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-south-east-england-and-london	Full coverage of the study area
Natural England	2019	5.13.1 GIS datasets for: • National Parks (https://data.gov.uk/dataset/334e1b27-e193-4ef5-b14e-696b58bb7e95/national-parks-england). • Areas of Outstanding Natural Beauty (AONB) (https://data.gov.uk/dataset/8e3ae3b9-a827-47f1-b025-f08527a4e84e/areas-of-outstanding-natural-beauty-england) • County Parks (https://data.gov.uk/dataset/e729abb9-aa6c-42c5-baec-b6673e2b3a62/country-parks-england). • Open Access Land (https://data.gov.uk/dataset/05fa192a-06ba-4b2b-b98c-5b6bec5ff638/crow-act-2000-access-layer). • Heritage Coasts (https://data.gov.uk/dataset/79b3515f-b00e-419a-9c7e-1d3163555886/heritage-coasts)	Full coverage of the study area

Source	Date	Summary	Coverage of study area
Oceanwise		Marine and coastal mapping data, ferry routes.	Coverage of seascape sections of the study area
OPEN internal dataset	2020	Public Rights of Way	Full coverage of the study area
Ordnance Survey	2019	1:50,000 scale mapping	Full coverage of the study area
Ordnance Survey	2019	1:25,000 scale mapping	Coverage of coastal sections of the study area
Ordnance Survey Open Data	2019	OS County Region, Local Unitary Authority, Railways, Road and Settlements	Full coverage of the study area
Ordnance Survey	2019	OS Terrain 50 Digital Terrain Model (DTM)	Full coverage of the study area
Ordnance Survey	2019	OS Terrain 5 Digital Terrain Model (DTM)	Coverage of coastal sections of the study area
Royal Yachting Association (RYA)	2013	Cruising routes for recreational yachting	Coverage of seascape sections of the study area

Source	Date	Summary	Coverage of study area
SDNP Authority	2011	Landscape Character Areas (SDNP). South Downs Integrated Landscape Character Assessment (updated 2011) (available online: https://www.southdowns.gov.uk/planning-policy/landscape-character-assessments/south-downs-integrated-landscape-character-assessment/)	SDNP
SDNP Authority	2018	South Downs National Park, Dark Skies Technical Advice Note (April 2018) including Sky Quality Map and Dark Sky Zones	SDNP
Surrey County Council	2015	Landscape Character Areas (LCAs) (Surrey). Surrey Landscape Character Assessment (2015). (Available online: https://www.surreycc.gov.uk/land-planning-and-development/countryside/strategies-action-plans-and-guidance/landscape-character-assessment)	Surrey
Sustrans	2020	National Cycle Network (GIS dataset) (available online: https://www.sustrans.org.uk/)	Full coverage of the study area
West Sussex County Council	2003	Landscape character assessment of West Sussex (available online: https://www.westsussex.gov.uk/land-waste-and-housing/landscape-and-environment/landscape-character-assessment-of-west-sussex/https://historicengland.org.uk/listing/the-list/).	West Sussex
West Sussex County Council	2019	Local distinctiveness study of West Sussex (available online: https://www.westsussex.gov.uk/land-waste-and-housing/landscape-and-environment/local-distinctiveness-study-of-west-sussex/)	West Sussex
West Sussex County Council	2020	Public Rights of Way iMap (available online: https://www.westsussex.gov.uk/land-waste-and-housing/public-paths-and-the-countryside/public-rights-of-way/public-rights-of-way-imap/).	West Sussex

Seascape baseline

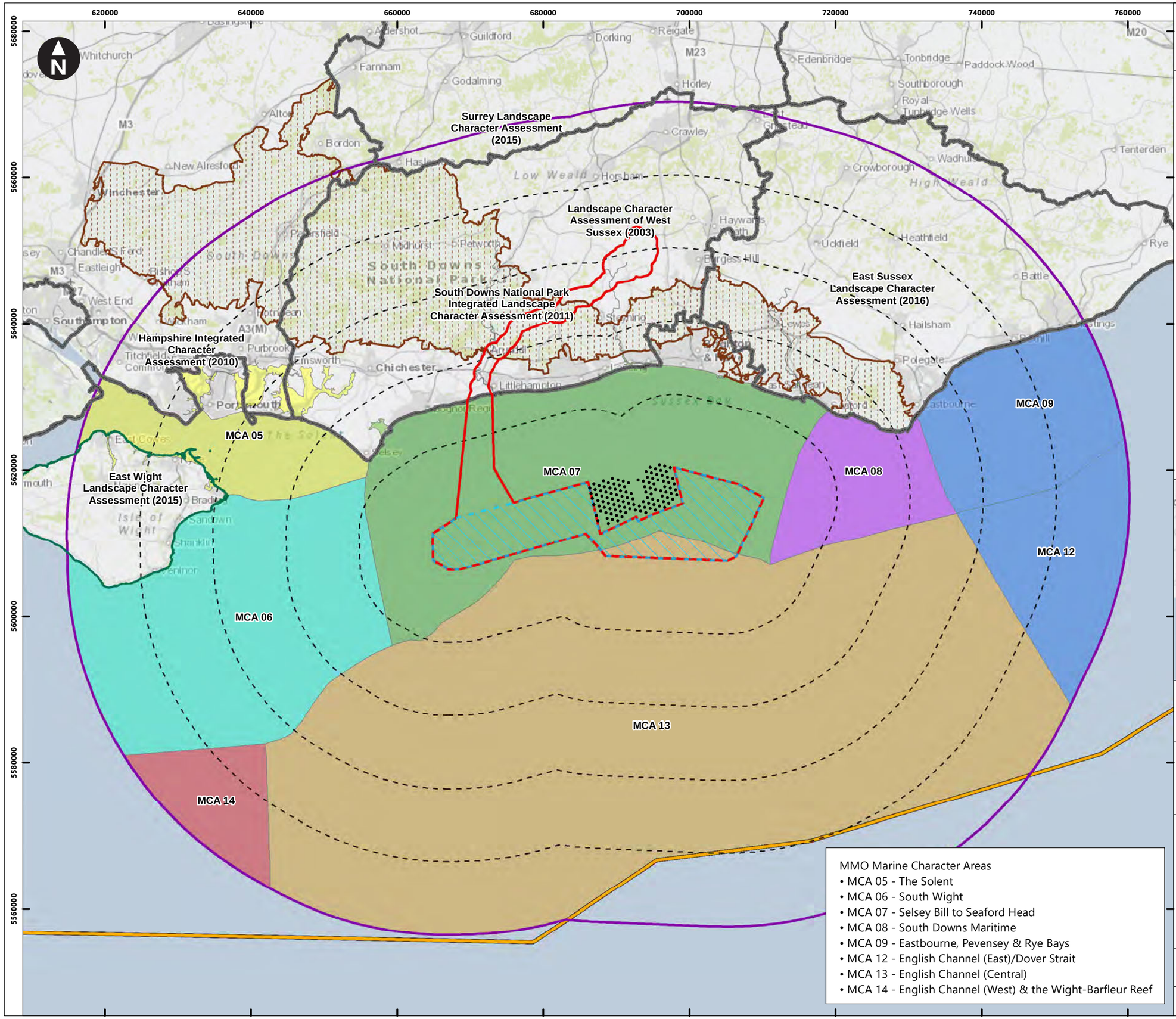
5.13.30 The SLVIA will seek to take account for the definition of 'seascape', as set out in the UK Marine Policy Statement (UK Government, 2011) which states that

'…references to seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other'.

5.13.31 The majority of the southern half of the SLVIA study area consists of sea. In England, seascape character *'principally applies to coastal and marine areas seaward of the low-water mark'* and landscape character '*principally applies to terrestrial areas lying to the landward side of the high-water mark'* (Natural England, 2012, p7, Box 1). Although these definitions are clear in the guidance, the importance of the interaction of sea, coastline and land as perceived by people is also highlighted in subsequent definitions of seascape in the guidance (Natural England, 2012), indicating a subtler transition between seascape and landscape than defined in the guidance.

5.13.32 In order to address this and avoid under-valuing the inter-tidal area between the mean low and high-water mark, the SLVIA will assess 'offshore' seascape effects on Marine Character Areas (MCAs) where they are seaward of the mean high water mark (MWHS); and the effect on terrestrial landscape character will be assessed on landscape character areas (LCAs) lying to the landward side of the mean low-water mark (MWLS). This approach means that the 'foreshore', which includes beaches, inter-tidal areas and coastlines between MWHS and MLWS, will be considered in both the landscape and seascape character assessments. This ensures adequate consideration has been given to assessing the relationship between terrestrial and marine areas and interactions across the land/sea interface. This is consistent with the published MMO Seascape Assessment (MMO, 2014) which extends to the mean high water mark; and published landscape character assessments (such as East and West Sussex LCAs), which extend to the lower water mark (i.e. the published seascape and landscape character assessments both consider the foreshore as part of seascape character and as part of landscape character).

5.13.33 Seascape Assessment for the South Marine Plan Areas (MMO, June 2014) covers the majority of the seascape of the SLVIA study area, including the South Inshore (area 6) and South Offshore (area 7) marine plan areas within UK Waters (**Figure 5.13.4**). The southern edge of the SLVIA study area includes a portion of French territorial waters.



Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- National Park
- County Boundary
- Isle of Wight District Boundary
- Maritime Boundary (UK and France)

Kilometres
0 2.5 5 10 15 20
1:500,000

MMO Marine Character Areas
- MCA 05 - The Solent
- MCA 06 - South Wight
- MCA 07 - Selsey Bill to Seaford Head
- MCA 08 - South Downs Maritime
- MCA 09 - Eastbourne, Pevensey & Rye Bays
- MCA 12 - English Channel (East)/Dover Strait
- MCA 13 - English Channel (Central)
- MCA 14 - English Channel (West) & the Wight-Barfleur Reef

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.4 Seascape/Landscape Character

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-10-0004				1.2
Company: OPEN	Drawn By: JM	Chk/Aprvd: WOOD	Drawn Date: 27/05/2020	Status: FINAL

5.13.35 The MMO Seascape Assessment for the South Marine Plan Areas will provide evidence to characterise the Inshore and Offshore areas of the SLVIA study area. The Marine Character Areas (MCAs) identified within this Seascape Assessment (**Figure 5.13.4**) will provide the baseline seascape characterisation and mapping for the SLVIA, against which the seascape effects of Rampion 2 will be assessed.

5.13.36 Changes to the baseline conditions which have occurred since publication of the MMO Seascape Assessment (MMO, 2014) will be considered and reported in the SLVIA. In particular, Rampion Wind Farm became operational in November 2017, and introduced a large-scale operational wind farm influence to the baseline seascape, landscape and visual environment.

5.13.37 The existing Rampion 1 project is located within MCA7 Selsey Bill to Seaford Head. The northern portion of Rampion 2 is also located primarily within MCA7 and its southern portion is located partially within MCA13 English Channel (Central).

5.13.38 MCA7 is an extensive bay with boundaries formed in the west by the low-lying headland of Selsey Bill and to the east by the distinctive chalk cliffs of Seaford Head, where the South Downs National Park boundary meets the coast. It includes expansive urban development along its coastline and the existing Rampion 1 project in the seascape setting to the south.

5.13.39 The MMO Seascape Assessment describes the overall character of MCA7 as follows: '*This expansive bay framed by the headlands is locally known as the Bay of Sussex. The coastline contains a number of towns including Selsey, Bognor Regis and Littlehampton to the west, Worthing and Brighton in the centre and Newhaven and Seaford to the east. The South Downs National Park is located inland to the north of the major settlements forming a prominent ridge and extends to the coastline at places in the east of the MCA, between Brighton and Rottingdean, Saltdean and Peacehaven and Newhaven and Seaford providing important visual connections to and from the sea. Shingle beaches offset the major coastal resorts in the west of the MCA and vertical chalk cliffs characterise the east, where there are views to the prominent white cliffs of Beachy Head (South Downs National Park) in MCA 8. Tidal currents are fast in the waters around the points of Selsey and Beachy Head, whilst the bay is more sheltered. Views seaward are frequently to an unbroken horizon with the main shipping traffic being located at a greater distance into the channel. Small recreational craft and fishing boats are the main sea users with cross channel ferries between Newhaven – Dieppe and freight from small ports at Shoreham, Newhaven and Littlehampton.*

5.13.40 *MCA13 covers the central English Channel. Its overall character is described as having 'a rich geomorphological history which has been used as the basis of our understanding of the English Channel. It is also a busy shipping channel which supports heavy sea traffic as well as the passenger ferry between Newhaven and Dieppe. The seabed contains wrecks which reflect battle history from the World Wars*'.

5.13.41 The SLVIA will present a baseline description of relevant SCAs from the MMO seascape character assessment that may experience significant effects as a result of Rampion 2.

Landscape baseline

Landscape character

5.13.42 There is a hierarchy of published Landscape Character Assessments (LCAs) that describe the baseline landscape character of the landscape in the SLVIA study area, at the National, County and District level.

5.13.43 The English Landscape is classified at the national level by National Character Areas (NCAs). The 159 NCAs, which cover the country, were originally identified by the Countryside Agency. This mapping and the associated descriptions have been revised and developed by Natural England into National Character Area profiles, which provide a recognised, national, spatial framework. The NCAs will be used in providing a high-level description of the landscape and its context.

5.13.44 At the National level, the SLVIA study area is characterised by a number of NCAs, including the Low Weald (121) and High Weald (122), Pevensey Levels (124), Isle of Wight (127) and South Hampshire Lowlands (128). The South Downs (125) and South Coast Plain (126) that make up the main coastal associated landscapes of the SLVIA study area and are located approximately 13.2km and 13.3km from Rampion 2, at their closest point.

5.13.45 The South Downs NCA (125) comprises chalk land stretching from the Hampshire Downs in the west to the coastal cliffs of Beachy Head in East Sussex. The majority of the area falls within the South Downs National Park (SDNP), a recognition of its scenic quality and importance for recreation, however the coastal areas of the NCA are urban, comprising the coastal conurbation of Brighton and Hove in the east. The operational Rampion Wind Farm forms part of the seascape setting of the NCA, within Sussex Bay. The South Downs NCA is a diverse and complex landscape with considerable variation representing physical, historical and economic influences; much of it has been formed and maintained by human activity, while dramatic white chalk cliffs and downlands create a sense of openness.

5.13.46 The South Coast Plain NCA (126) is a flat, coastal landscape with an intricately indented shoreline lying between the dip slope of the South Downs and South Hampshire Lowlands and the waters of the English Channel, Solent and part of Southampton Water. The coastline includes several major inlets, which have distinctive local landscapes and intertidal habitats. Chichester Harbour AONB lies within the NCA and the foothills of the South Downs, along the northern boundary, fall within the SDNP. The Manhood Peninsula is one of few undeveloped stretches of coastline within the NCA. Elsewhere, there is significant urban development, with settlements along the coast dominated by conurbation, trunk roads, suburban villages and an extensive string of seaside towns. The existing Rampion 1 project forms part of the seascape setting of the South Coast Plain.

5.13.47 The landscape of the onshore parts of the study area will be described and assessed in relation to the published County Council and National Park Landscape Character Assessments within the SLVIA study area, as follows.

- Landscape Character Assessment of West Sussex (2003), including A Strategy for the West Sussex Landscape (2005) and Local Distinctiveness Guidance (2013).

- East Sussex Landscape Character Assessment (2016).
- South Downs National Park Integrated Landscape Character Assessment (2011).
- Hampshire Integrated Character Assessment (2010).
- East Wight Landscape Character Assessment (2015).
- Landscape Assessment of Kent (2004).
- Surrey Landscape Character Assessment (2015).

5.13.48 The character of the associated coastal landscapes is defined at the County Level by the Landscape Character Assessment of West Sussex (2003), the East Sussex Landscape Character Assessment (2016) and the South Downs Integrated Landscape Character Assessment (2011) (**Figure 5.13.4**).

5.13.49 These provide a county-wide, consistent LCA framework as a background for more detailed assessments (such as at the district level). They are considered to be of an appropriate scale to allow assessment of the effects of Rampion 2 over the relatively wide SLVIA study area, at a sufficient level of detail.

5.13.50 The West Sussex Landscape Character Assessment identifies 42 landscape character areas, covering the landward extents of the SLVIA study area, to the west of Brighton. The immediate coastal edge is defined as the South Coast Shoreline (SC1), backed primarily by built-up urban areas between Shoreham-by-Sea, Worthing, Bognor Regis and Selsey, and the Chichester to Yapton Coastal Plan (SC9) and Manhood Peninsula (SC2) in the west.

5.13.51 The East Sussex LCA identifies 40 landscape character areas, covering the landward extents of the SLVIA study area, to the east of Brighton. The coastal landscapes within the SDNP are defined as downlands of Falmer Telscombe (18), Lewes (20), Firle Bishopstone (21) and Wilmington (23) interspersed by the Lower Ouse (19) and Cuckmere Valleys (22) and the coastal urban areas of Peavehaven, Newhaven, Seaford and Eastbourne. Terrestrial areas to the north of the SDNP are defined by the Low Weild (14 and 15) and Pevensey Levels (25).

5.13.52 The South Downs Integrated Landscape Character Assessment (2011) will be used as the basis for the landscape characterisation and assessment of land within the SDNP, given its purpose as a comprehensive, integrated assessment of the character of the SDNP. It defines a broad geographic division between the Open Downland (A) to the east of the SDNP and the Wooded Estate Downland (B) and Download Mosaic (D) to the west, divided by several Major River Floodplains (F) and Chalk Valley Systems (E).

Landscape designations and defined areas

5.13.53 The offshore areas of the Scoping Boundary are located beyond the boundaries of any areas subject to international, national or regional landscape designation intended to protect landscape quality, as shown in **Figure 5.13.3**.

5.13.54 Certain landscapes found within the study area have been designated or defined due to their scenic qualities or historic landscape qualities as shown on **Figure**

5.13.3. These include two National Parks and four Areas of Outstanding Natural Beauty:

- South Downs National Park (SDNP).
- New Forest National Park (NFNP) (edges of NFNP just within SLVIA study area).
- Chichester Harbour AONB.
- Isle of Wight AONB.
- High Weald AONB.
- Surrey Hills AONB (edges just within SLVIA study area).

5.13.55 The SDNP is of particular relevance due to its association with the closest coastal landscapes, located at a distance of 13.5km from the array area of the Scoping Boundary at its closest point. The following data sources will inform the understanding of the baseline characteristics and qualities of the SDNP.

- South Downs National Park Integrated Landscape Character Assessment (2011).
- South Downs National Park Special Qualities (2011).
- South Downs Local Plan, South Downs National Park Authority (2019).

5.13.56 Within the SDNP, land between Eastbourne, along the chalk cliffs of Beachy Head and the Seven Sisters, past Cuckmere Haven to Splash Point at Seaford is also defined as the Sussex Heritage Coast, which also extends to cover the nearshore waters off the white chalk cliffs of Beachy Head and Seven Sisters. The Sussex Heritage Coast is located approximately 13.5km from the array area of the Scoping Boundary at its closest point. There are no statutory requirements or powers associated with the Heritage Coast definition, however the Sussex Heritage Coast Group has published the Sussex Heritage Coast Strategy and Action Plan (2016-20). This data source will inform the understanding of the baseline characteristics and qualities of the Sussex Heritage Coast, which includes objectives that are consistent with the conservation of natural beauty and protection of heritage features, and the SLVIA will assess the effects on the Sussex Heritage Coast as components of the SDNP.

5.13.57 Chichester Harbour AONB is located approximately 21.4km from the array area of the Scoping Boundary and Isle of Wight AONB is located 29.0km to the west of the array area. Relevant AONB management plans (Chichester Harbour Management Plan (2019-2024) and Isle of Wight AONB Management Plan (2019 - 2024) will inform the understanding of the baseline characteristics and qualities of these AONBs.

5.13.58 The SLVIA study area includes a number of Registered Parks and Gardens (RPGs), which are identified and described in the Register of Parks and Gardens of Special Historic Interest in England (Historic England). RPGs located within or on the edge of coastal settlements such as Brighton, and those with public access will be considered in the SLVIA, particularly those which afford views to the sea towards the England Channel.

5.13.59 The value of the landscape assessed in the SLVIA will also be informed by local landscape designations identified in local development plan documents.

5.13.60 **Table 5.13.2** sets out the principal designated landscape and defined areas of relevance to the SLVIA.

Table 5.13.2 Landscape designations and defined areas with relevance to the SLVIA

Designation / Defined Area	Closest distance to Rampion 2 (km)	Description
Designations		
South Downs National Park (SDNP)	13.5km	In essence the landscape of the SDNP comprises a chalk ridge stretching from Beachy Head in the east to Winchester in the west with a dramatic northern escarpment and gentler dipslope towards the coast. Within this simple landform structure there is significant diversity and including the Greensand shelf at the foot of the downland scarps and the clay hinterland of the Low Weald, creating a very varied and complex landscape character. It includes areas of mixed farming with extensive swathes of seminatural species-rich chalk grassland which accentuates the undulating landform of the Downs, river valleys, frequent small woodlands and areas of heathlands. There is an associative relationship between parts of the SDNP and the marine environment, particularly between Eastbourne and Seaford, where the SDNP extends to the White Cliffs along this section of the coast, with the SDNP boundary being open at its seaward limit to encompass an associative (but not formally defined) extent of seascape. The operational Rampion Wind Farm forms part of this associative seascape setting of the SDNP, within Sussex Bay. To the west of Seaford Head, the SDNP boundary is formed by a continuous inland urban edge of the coastal conurbations between Seaford, Brighton and Worthing. The statutory purposes of National Parks is to *'conserve and enhance their natural beauty, wildlife and cultural heritage and to promote opportunities for the understanding and enjoyment of their special qualities by the public.'* The special qualities identified

Designation / Defined Area	Closest distance to Rampion 2 (km)	Description
		by the South Downs National Park Authority (SDNPA) as a result of stakeholder engagement since designation are set out in the SDNP Special Qualities document: 1. Diverse, inspirational landscape and breathtaking views. 2. A rich variety of wildlife and habitats including rare and internationally important species. 3. Tranquil and unspoilt places. 4. An environment shaped by centuries of farming and embracing new enterprise. 5. Great opportunities for recreational activities and learning experiences. 6. Well-conserved historical features and a rich cultural heritage. 7. Distinctive towns and villages, and communities with real pride in their area.
Chichester Harbour AONB	21.4km	Chichester Harbour AONB has a unique combination of land and sea, including expanses of open waters, narrow inlets and creeks. Unusually for an AONB, the landform is predominantly flat. This accentuates the relationship with the sea and how the landscape is altered with the tides. The historic environment and heritage assessment of the area lend to this AONBs special qualities. Other qualities include its harbourside settlements and the abundance of flora and fauna. The 10 special qualities of the Chichester Harbour AONB are set out in the Chichester Harbour AONB Management Plan (2019-2024).
Isle of Wight AONB	29.0km	The Isle of Wight AONB approximately half of the Isle of Wight. Unusually, this AONB does not form a continuous mass and is made up of five distinct areas across the island. This creates a strong interrelationship between the AONB and the non-designated areas. The character of this AONB is shaped by contrasting elements; sea cliffs and sweeping beaches to quiet ancient woodland; worked farmland to intricate inlets of streams. Long distance views are offered from the coastal heath and downland, and at night, the dark skies of the area allow for views of the night sky. Settlements within the AONB comprise isolated houses, hamlets and rural villages and harbour towns. The AONB remains

Designation / Defined Area	Closest distance to Rampion 2 (km)	Description
		a lightly populated, undeveloped area, popular for outdoor recreation and tourism, valued for its tranquillity, the quality of the environment and culture. The special qualities of the Isle of Wight AONB are set out in the Isle of Wight AONB Management Plan (2019-2024).
Other Defined Areas		
Sussex Heritage Coast	13.5km	Heritage Coasts were established to protect and conserve the best stretches of undeveloped coast in England, however there are no statutory requirements or powers associated with the Heritage Coast definition. The land section of the Sussex Heritage Coast sits entirely within the SDNP, stretching between Eastbourne, along the chalk cliffs of Beachy Head and the Seven Sisters, past Cuckmere Haven to Splash Point at Seaford. The inland boundary is the A259 road and the offshore boundary extends up to 1.5km off the coast covering the nearshore waters off the white chalk cliffs off Beachy Head and Seaford Head. The operational Rampion Wind Farm is located beyond the offshore boundary of the Sussex Heritage Coast, but forms part of the associative seascape setting. The Sussex Heritage Coast Group published the Sussex Heritage Coast Strategy and Action Plan (2016-20), which includes 14 principles which aim to support the national purposes of Heritage Coasts. These principles cover a range of management objectives, but include two that relate specifically to landscape: Key Principle 2: *'Support measures that will conserve and enhance the unique coastal landscape and retain its open character and uninterrupted views'*. Key Principle 5: *'Define the special qualities of the Sussex Heritage Coast'*.
Registered Parks and Gardens	Including the following closest RPGs: Kemp Town Enclosures (Brighton) (13.8km)	RPGs located within or on the edge of coastal settlements such as Brighton, and those with public access will be considered in the SLVIA, particularly those which afford views to the sea towards the England Channel.

Designation / Defined Area	Closest distance to Rampion 2 (km)	Description
	The Royal Pavilion (Brighton) (14.1km) Queens Park (Brighton) (14.5km)	

Visual baseline

5.13.61 The context of the SLVIA study area includes a number of key visual elements and vertical infrastructure components, which include:

- the existing Rampion 1 project, comprising 116 WTGs of 140m blade tip height, between 13 and 20km off the Sussex coast;
- the general built form within the extensive, coastal, urban environment which predominates between Seaford and Bognor Regis;
- landmark man-made features including high rise buildings and seafront piers at Brighton, Worthing and Bognor and Shoreham Power Station chimney;
- the Brighton i360 tower (162m) at Brighton sea front, the tallest structure in Sussex;
- the massing of beach groynes along the coastline and lighthouses at Beachy Head; concentrations of sea faring activity at Newhaven, Brighton, Shoreham and Littlehampton; and
- large scale cliff landforms, most notably between Seaford and Beachy Head; and the large scale landform massing of the South Downs.

5.13.62 An extensive shingle beach extends along the majority of the coastline between Brighton and Selsey.

5.13.63 An understanding of the baseline visual resource is provided in the MMO Seascape Assessment for the South Marine Plan Areas (MMO, 2014), Section 3. It is described in terms of land with sea views; and visibility of the sea.

5.13.64 Figure 25 of MMO, 2014 shows land with sea views, which broadly indicates that elevated land forming the eastern part of Sussex Bay has generally higher visibility of the sea than the lower coastal plain forming the western parts of the bay. Visibility of the sea is also primarily from land within 10km of the coastline, forming a band of visibility across the coastal edge, South Downs and coastal plain. At the broad scale, it indicates that beyond 20km inland from the coast, there is almost no visibility of the sea; and between 10-20km visibility of the sea is very limited. Although this does not equate to visibility of Rampion 2, which is discussed in relation to the ZTV below, it does provide some definition to ‘seascape’ where the

sea may form part of the baseline characteristics in *'landscapes with views of the coast or seas'* (MMO, 2014).

5.13.65 The MMO, 2014 finds that *'At a strategic scale, the most extensive views of the South Inshore and South Offshore marine plan areas are generally found within* 5km of the HWM. *A notable exception to this is the South Downs where there are extensive sea views experienced further inland at these higher elevations. Due to its elevated topography and position, the west of the Isle of Wight also provides viewers with extensive views of the sea'.*

5.13.66 At a more local level, the MCA descriptions highlight where viewers on land may expect to have the most extensive views of each MCA. Extensive views of MCA7 (Selsey Bill to Seaford Head) can be obtained from areas up to 10km inland, from the western edge of Eastbourne to Walderton (within the South Downs National Park and including sections of the South Downs Way). Some views of the MCA can also be obtained from the coastline between Selsey Bill to Hove, Seaford; from parts of the Seven Sisters Country Park; and from East Wittering to Beachy Head on the mainland. Some views are afforded from the edge of Shanklin and Bembridge Downs within the Isle of Wight AONB.

5.13.67 At a strategic scale, in terms of visibility of the sea from land, it is *'particularly noticeable the extent to which the Solent and adjacent waters (between Selsey Bill and Seaford Head) can be seen from numerous locations on land. This is likely to be a result of the extent to which views of the sea extend inland to elevated areas around the South Downs. There are opportunities to view this area of sea from both directions (from the Isle of Wight as well as Hampshire and West Sussex). The coastline behind the Solent is generally low-lying and there is high visibility of this area of sea by viewers close to the coast as well'.*

5.13.68 MMO 2014 includes viewshed analysis for MCA7, to examine which locations on land can see these them. Figure 28 of MMO 2014 shows the locations of the most and least visible areas of sea within MCA7 and provides an understanding that the most extensive views are of the areas of MCA7 within 15km of the coast, reducing to more moderate levels to the outer edges of MCA7 with distance offshore.

5.13.69 Whilst visibility mapping can model the theoretical visibility of the sea or Rampion 2 from any point, it is important to note that atmospheric conditions will affect visibility. The Met Office defines visibility as '*the greatest distance at which an object can be seen and recognised in daylight, or at night could be seen if the general illumination were raised to a daylight level'* (Met Office, 2000).

5.13.70 Met office visibility data will be used to inform the assessment of the likelihood of effects in the SLVIA, based primarily on data from Thorney Island, which is the station that is closest to Rampion 2, within the study area, close to the coast and almost at sea level (MMO, 2014, Figure 15).

5.13.71 This data has been analysed in MMO, 2014, which shows a 10 year average of the frequency of observations at measured distances from the station (Figure 16, p26) and buffers around the coast were generated to be coincident with these measured distances (Figure 17, p27). A summary of these results is as follows:

- '*Locations within 10-20km of the coastline are not likely to be visible for at least 25% of the time.*

- *Locations within 20-30km of the coastline are not likely to be visible for at least 59% of the time.*
- *Locations within 30-50km of the coastline are not likely to be visible for at least 93% of the time.*
- *Visibility beyond 50km is very unlikely'.*

5.13.72 The likelihood of the seascape, landscape and visual effects arising will be described in the SLVIA relation to the Met Office definitions for the different ranges of visibility from 'very poor' to 'excellent' (Met Office, 2000), however likelihood will not be considered as a factor of significance, which will be assessed based on excellent visibility as a worst case. Due to its distance between approximately 13-25km from the coast, Rampion 2 will be visible in good, very good or excellent visibility (over 10km), but is unlikely to be visible in periods of very poor, poor or moderate visibility (less than 10km).

5.13.73 The Campaign to Protect Rural England (CPRE) has produced interactive maps of the UK's light pollution and dark skies as part of a national mapping project (LUC / CPRE, 2016). The Open Source data can be used to understand and illustrate baseline lighting levels. It identifies that the majority of the coastal margin between Bognor Regis and Seaford falls within the 'brightest' to 'brighter' light influence category (the greatest light influenced end of the spectrum). The relatively less light influenced, darker coastal areas coincide with the headlands of Selsey Bill and Beachy Head. The seascape of Sussex Bay includes visible fixed marine navigational lighting on the existing Rampion 1 WTGs, as well as lit vessels and cardinal buoys that are visible in the sea at night. The South Downs uplands, within the eastern and western extents of the study area, also demonstrate more association with darker skies.

5.13.74 In May 2016 the SDNP became the world's newest International Dark Sky Reserve (IDSR). Draft policies for the SDNP's Local Plan include specific lighting requirements that developers will need to meet. Dark skies are a special quality of the SDNP that are perceived by people within the SDNP at night. Using sky quality measurements, the SDNP has been categorised into a number of dark zones, shown in Figure 2 of the SDNP Dark Skies Technical Advice Note (April 2018). The zones reflect the quality of the sky overhead, the IDSR designation and the general level of lighting. The IDSR takes in the entire SDNP boundary (located 13.5km from the proposed development at its closest point) but is largely defined by a core and buffer zone, where the darkest skies and IDSR quality can be found. The conditions in the core zone are generally the best within the SDNP, however the core zone is located some 22km from the proposed development at its closest point. Surrounding the core is a buffer zone, determined at 2km reflecting a transition from dark to brighter skies. Other areas of the SDNP are consistently brighter than the core and buffer areas but have skies of sufficient IDSR quality they remain of value to protect and distinguish from other areas of the SDNP that are brighter, e.g. urban areas. Categorising the landscape according to general darkness, allows the SDNPA to take a weighted zoning approach to policies to ensure that lighting is appropriate to the environment within the IDSR. Policies are largely concerned with lighting of developments within the IDSR, however reference is also made to the consideration of the potential effects of large scale developments outside the SDNP on dark skies within the IDSR.

Zone of Theoretical Visibility (ZTV)

5.13.75 The evaluation undertaken in MMO 2014 is of the baseline visual resource that the sea provides, therefore it evaluates views of the sea surface rather than a development scenario (such as offshore WTGs).

5.13.76 Visual effects will only occur where the introduction of Rampion 2 changes or influences the visual amenity and views experienced by people in the area. The areas where the visual baseline may be altered is defined by the ZTV shown in **Figure 5.13.2**. The ZTV shows the main area in which Rampion 2 will theoretically be visible, highlighting the different areas where people who may experience views and assisting in the identification of viewpoints where they may be affected. The ZTV shown in **Figure 5.13.2** is based on a wind farm layout representing the maximum visibility scenario for the SLVIA as described in the later 'Basis for scoping assessment' section.

5.13.77 The ZTV illustrates the 'bare ground' situation based on an Ordnance Survey (OS) terrain model and does not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility. By using a bare ground elevation model, the results will be an over-representation of maximum visibility, as many could, in reality, be blocked by surface features not included in the model. Although views from the shoreline are often unimpeded by visual barriers such as buildings, trees, hedges and other tall vegetation, moving further inland introduces the possibility of views being disrupted by one or more of the above features.

5.13.78 The landward, topographical influences define the extent of the ZTV. A distinct coastal plateau with a nominal elevation of between 0 and 10m AOD extends to the west of Brighton, widening its inland extents towards Chichester in the west. Behind this 'plateau' the land rises into the dip slopes of the South Downs, forming a distinctive coastal backdrop and a physical divide between coastal and inland areas. The elevation of the landform 'spine' of the Downs, which runs east to west across the study area varies between approximately 20m and 250m AOD and contributes to notable coastal cliffs east of Brighton, culminating in the dramatic chalk cliffs around Beachy Head. The northern face of the Downs drops more abruptly inland as a scarp slope feature relating to the lower lying Weald landscape beyond. Several valleys, notably associated with the Rivers Arun, Adur, Ouse and Cuckmere, cut through the scarp and dip slope landform, creating a limited visual and physical association between the landscapes to the north and south of the Downs.

5.13.79 The ZTV shows the main areas of higher theoretical visibility of Rampion 2 will be from the immediate coastal edges and hinterland of Sussex Bay between Selsey Bill and Beachy Head, including the coastal plateau to the west of Brighton, the white cliffs of the Sussex Heritage Coast between Brighton and Eastbourne, the southern dip slopes of the South Downs and the elevated landform 'spine' of the Downs which runs east to west across the study area. This main area with higher visibility of Rampion 2 is generally within a range of 13-20km; but also extends to 25km to the north-east into Lewes and Eastbourne districts; and to around 30km to the north-west into Chichester district.

5.13.80 Visibility from streets, open spaces and low storey buildings within coastal, urban areas will typically be contained within the urban environment by surrounding built

form, with most visibility of Rampion 2 at the sea-front. Views across the coastal 'plateau' (which broadly comprises the area between the coastline and boundary of the South Downs National Park) are partially filtered by vegetation, built form and infrastructure. Within the seaward facing South Downs dip slope, the rolling topography creates subtle containment within valley landforms.

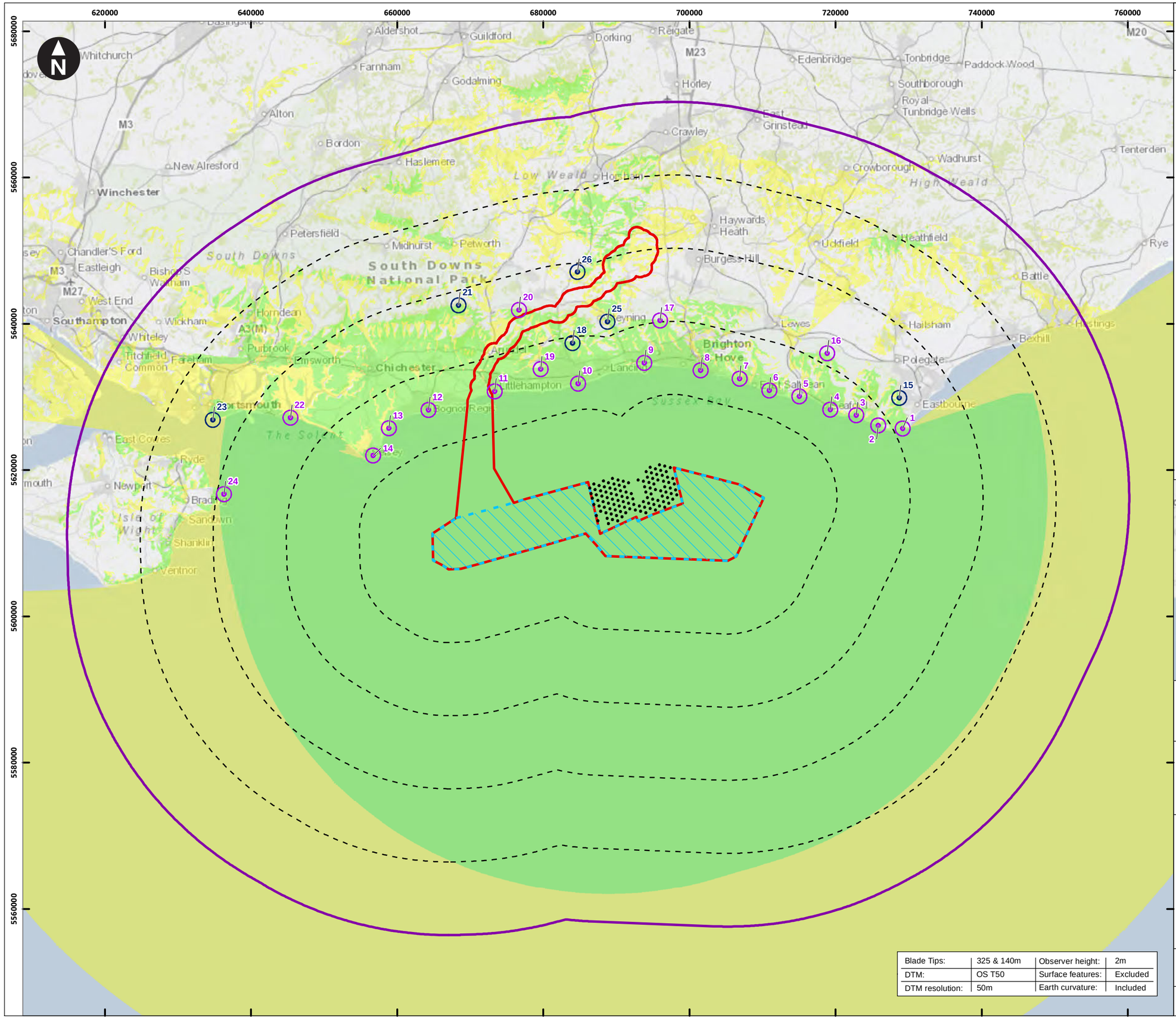
5.13.81 The landscape to the north of the South Downs is largely screened from the sea by the intervening landform and generally affords either no visibility, or has lower theoretical visibility of Rampion 2, at long distances of over 25km. Due to the height of the Rampion 2 WTGs there are, however, several visibility splays to Rampion 2 through the landform of the South Downs from across the landscape of the Low Weald to the north of the South Downs, including areas of East Sussex extending to the edges of the High Weald up to 35-45km from Rampion 2; and areas of West Sussex extending north to the edges of Surrey and the Surrey Hills between 30-50km from Rampion 2.

5.13.82 Due to the potential height of the Rampion 2 WTGs, and the western extent of the Scoping Boundary, there will also be long distance visibility from the coastal areas of Hampshire beyond Selsey Bill, around Hayling Island and the City of Portsmouth, at distances of 25-40km. Theoretical visibility of Rampion 2 also extends along the eastern Solent, between the Hampshire Coast and the Isle of Wight; and there will be long distance views from the eastern coast of the Isle of Wight at distances between 30-40km and the higher ground of the eastern Isle of Wight.

5.13.83 Visibility to the east is restricted by the headland at Beachy Head, such that there is likely to be no visibility of Rampion 2 for the majority of the coastal landscape between Eastbourne and Hasting, and inland across the Pevensey Levels.

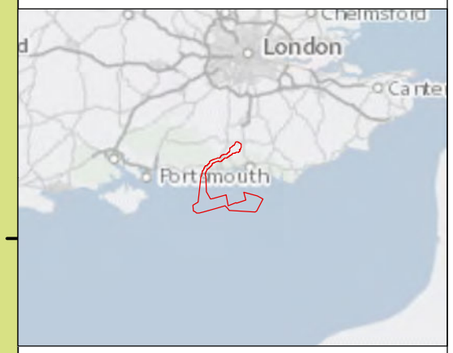
5.13.84 The ZTV in **Figure 5.13.5a** shows areas where Rampion 2 and the existing Rampion 1 project will be visible in combination (green areas on ZTV); and where they will be visible alone (i.e. without the other). Rampion 2 will often be viewed in combination with the operational Rampion Offshore Wind Farm (green areas on **Figure 5.13.5a**), in particular from the main areas of higher theoretical visibility (i.e. from the immediate coastal edges and hinterland of Sussex Bay between Selsey Bill and Beachy Head; the coastal plateau; the white cliffs of the Sussex Heritage Coast and slopes of the South Downs). In views from these areas, Rampion 2 will result in visual effects arising from the appearance of Rampion 2 when viewed in-combination with Rampion Wind Farm. The apparent height of the larger Rampion 2 WTGs (325m) relative to the smaller operational WTGs (140m) is likely to be central to the potential for cumulative visual effects arising from these areas.

5.13.85 Rampion 2 will also be viewed from areas where the existing Rampion 1 project is not visible, as shown in yellow above and also in **Figure 5.13.5b**, where it will extend the geographic extent of visibility to new areas that are not currently subject to views of Rampion 1. These include areas of the Low Weald and High Weald to the north of the South Downs; the edges of the Surrey Hills; and coastal areas of Hampshire and the Solent.



Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- Representative Viewpoint
- Illustrative Viewpoint
- Rampion 2 Theoretical Visibility
- Rampion 1 Theoretical Visibility
- Combined Theoretical Visibility



Kilometres
0 2.5 5 10 15 20
1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

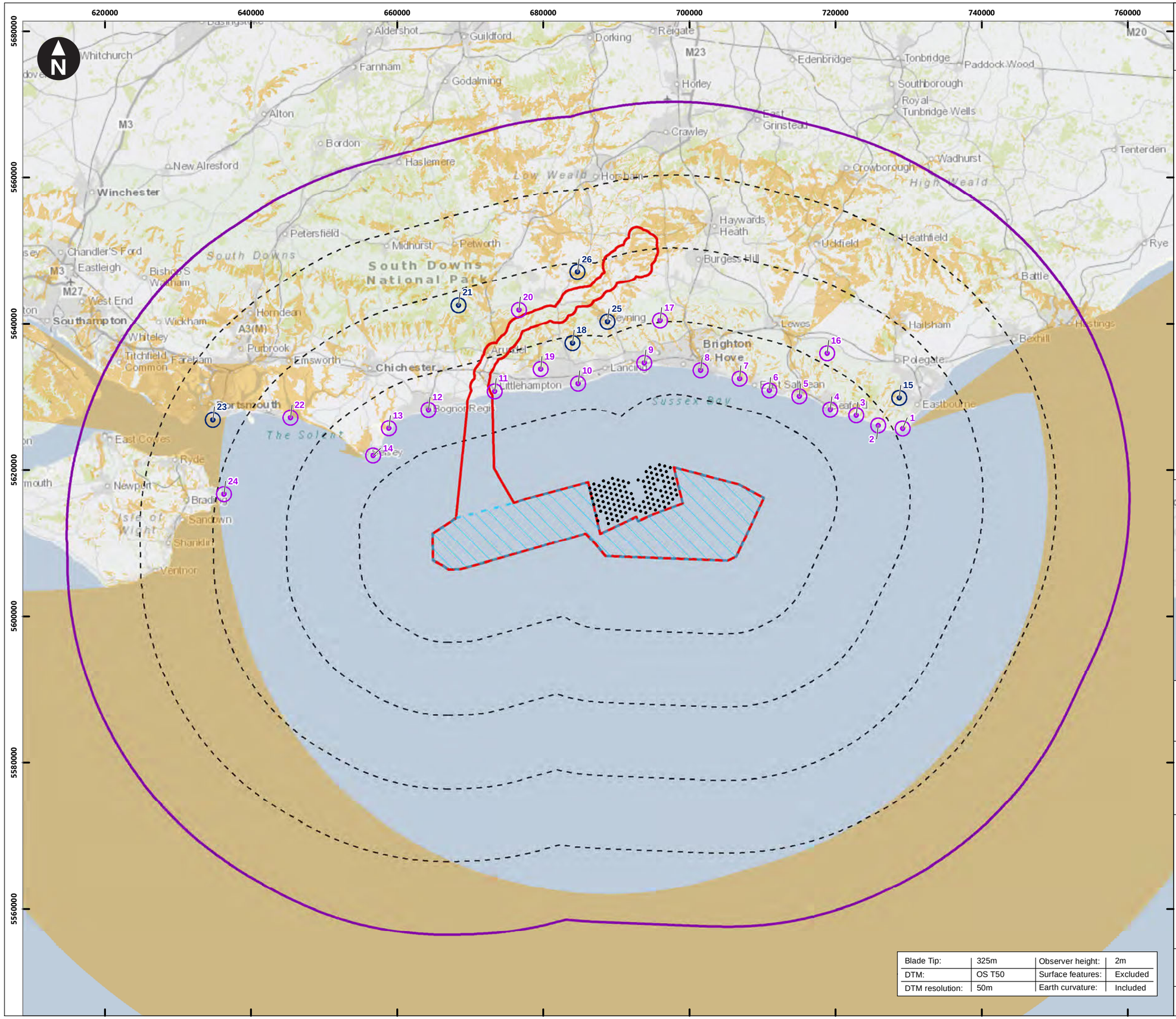
Figure 5.13.5a Combined Blade Tip ZTV (Rampion Wind Farm)

Scoping Report

Blade Tips:	325 & 140m	Observer height:	2m
DTM:	OS T50	Surface features:	Excluded
DTM resolution:	50m	Earth curvature:	Included

System Identifier:	Version:
42285-GOBE-SC-OF-DR-10-0005	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
OPEN	JM	WOOD	27/05/2020	FINAL



Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- Representative Viewpoint
- Illustrative Viewpoint
- Rampion 2 Project Alone Theoretical Visibility

Kilometres
0 2.5 5 10 15 20
1:500,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.5b Project Alone Blade Tip ZTV (Rampion 2)

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-10-0006	1.2

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
OPEN	JM	WOOD	27/05/2020	FINAL

Visual Receptors

5.13.86 The principal visual receptors that are likely to be most sensitive to visual effects arising from Rampion 2 will be identified in the SLVIA. The principal visual receptors in the SLVIA study area are likely to be focused along the closest sections of the Sussex coastline, including people within settlements, driving on roads, visitors to tourist facilities or historic environment assets, and people engaged in recreational activity such as on walking and cycle routes. The SLVIA will undertake an initial baseline assessment of the principal visual receptors within the ZTV, in order to identify those that may experience significant effects as a result of Rampion 2.

5.13.87 A simple assessment will be undertaken in the SLVIA for those visual receptors which may experience significant visual effects as a result of Rampion 2, with a detailed assessment focus on particular visual receptors, such as where the sea is a strong influence in the baseline view along the Sussex coastline, or where Rampion 2 may result in significant visual effects that are material to the consenting process.

5.13.88 Principal visual receptors are initially identified as including the following:

- Coastal settlements. The larger settlements within the extent of ZTV are generally coincident with the coastline, where the main focus of views is typically 'land to sea' or 'land to land'. Some of the seafront views however also include an element of 'coast across sea to land' views such as those from Seaford towards Newhaven and those from Selsey Bill towards Worthing. The principal coastal settlements with capacity for views of Rampion 2 are (with approximate distance to the array area of the Scoping Boundary): Hove (14.0km), Worthing (14.5km), Newhaven (13.5km), Shoreham (14.6km), Brighton (13.9km), Rottingdean (13.7km), Saltdean and Peacehaven (13.7km), Seaford (15.3km), Littlehampton (14.5km), Bognor Regis (15.4km) and Selsey Bill (13.9km). There may also be longer distance visibility from coastal settlements beyond the headland of Selsey Bill, 30-40km from Rampion 2, such as South Hayling, Portsmouth and Gosport in Hampshire; and settlements on the eastern coast of the Isle of Wight, such as Bembridge, Sandown and Shanklin.
- Long distance paths. The principal long distance routes with potential for views of Rampion 2 are: The South Downs Way, National Trail through the heart of the SDNP between Winchester and Eastbourne; The Monarchs Way, passing through the elevated areas of the SDNP; The Sussex Border Path skirting around the northern edge of Brighton and Hove; Vanguard Way which is within the ZTV along its cliff top extents between Cuckmere and Newhaven.
- Long distance cycle routes. Sustrans National Cycle Route 2 (NCR2) Dover to Havant passes between Worthing and Eastbourne and includes part of the 'Downs and Wealds Cycle Route' within its route between Brighton and Eastbourne. The route includes notable seaward views between Worthing and Seaford. Parts of several other NCRs extend inland from the coast, including NCR223, NCR82, NCR90 and NCR21.
- Public Rights of Way. A more general concentration of Public Rights of Way is also notable within the extents of the SDNP and the coast, associated with its

open landscape and focus as a centre for outdoor recreation. Sea front promenades, typically associated with the main settlements, provide further linear route vantage points.

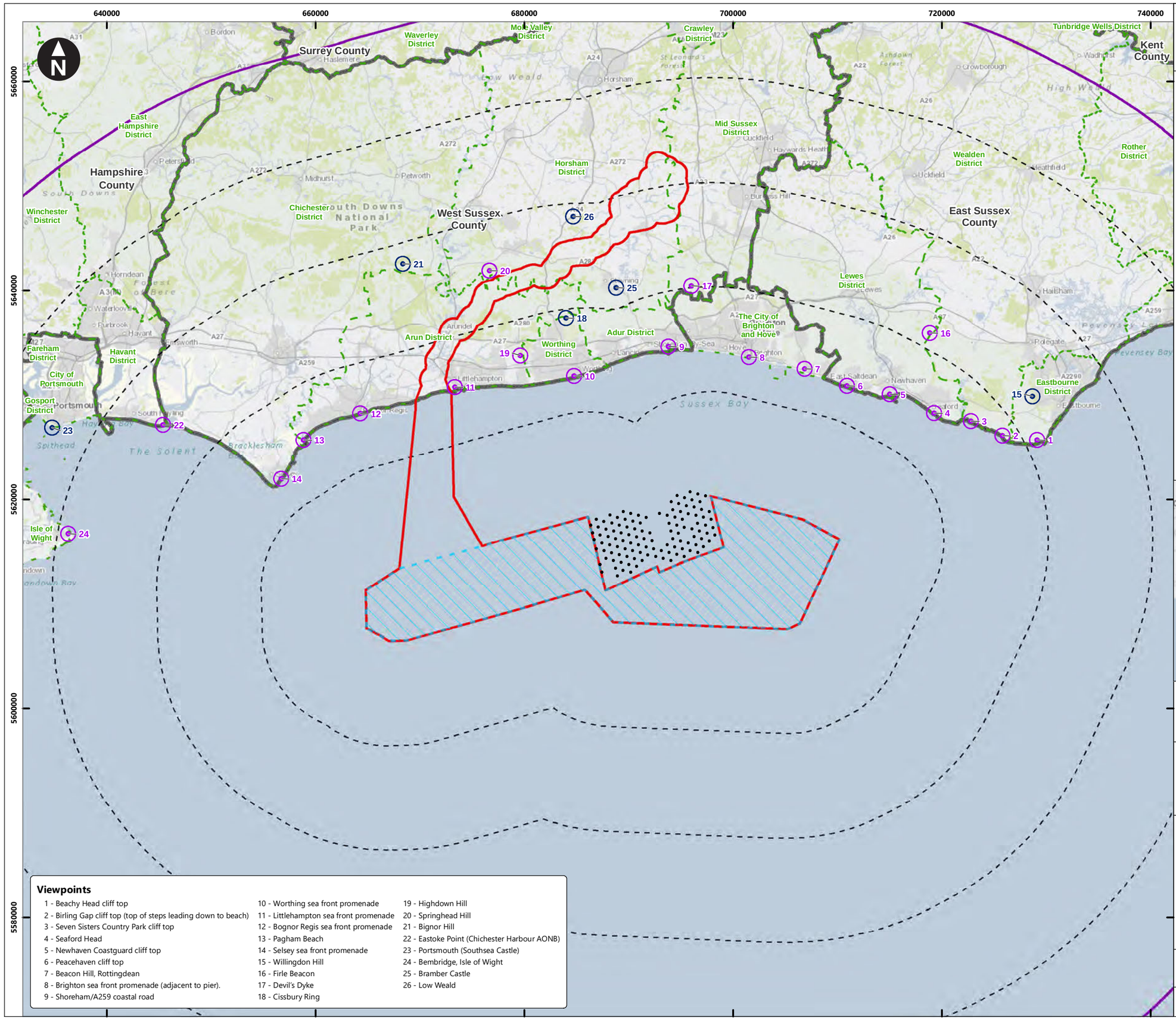
- Main road routes. The principal highway route with capacity for sea views is the A259 running between Chichester and Eastbourne, connecting the various coastal towns and coincident with the coastline between Worthing and Newhaven. The A27 is set inland from the coast and has only limited scope for views where it reaches its highest point north of Brighton.
- Rail routes. The only notable rail route with potential for views of the proposals is the Lewes to Seaford line terminating at Seaford, where the line runs parallel to the coast east of Newhaven.
- Tourist and visitor locations. Concentrations of recreational and visitor locations associated with the main coastal resort towns, with their sea front promenades, piers and shingle beaches, including: Brighton and Hove (13.9km), Worthing (14.5km), Bognor Regis (15.4km), Littlehampton (14.5km) and Seaford (15.3km). Other notable beach locations (within general accessibility along the majority of the coastline) offering beach and inshore sea based recreational opportunities include: Selsey Bill, Pagham, Middleton, South Lancing, Shoreham and Birling Gap. The cliffs east of Seaford and coincident with the extents of Heritage Coast, act as a key visitor focus along the coastline, including locations at Seven Sisters Country Park, Birling Gap, Cuckmere Haven and Beachy Head. The eastern coast of the Isle of Wight is a popular recreational and visitor location
- Recreational boating. Offshore recreational boating activity is concentrated on the harbour areas of Brighton, Littlehampton, Shoreham, Newhaven and Eastbourne, with main Royal Yachting Association routes extending from these points both along the coastline and out across the English Channel. The main ‘heavy use’ recreational boat routes run out of Brighton in a westward direction, to the north of the array area. Several ‘medium use’ routes run through the array area. The main recreational boat racing and sailing areas coincide with areas to the east of Selsey Bill and east of Beachy Head. Beyond Selsey Bill to the west, the Solent is known internationally as a location for sailing with Portsmouth hosting many of the world's long-distance sailing races. Cowes on the Isle of Wight attracts the world's leading racing yachtsmen and the Solent is busy with leisure boats all year round.
- South Downs IDSR. People visiting the South Downs IDSR at night to view the night sky, including from Dark Sky Discovery sites, which allow good access to dark skies and are usually centred on rural car parks.

Viewpoints

5.13.89 Viewpoints have been compiled based on the viewpoints selected for the existing Rampion 1 project (E-ON UK, 2012), the landscape and visual receptors described above and the ZTV for Rampion 2 (**Figure 5.13.2** and **Figure 5.13.5a-b**).

5.13.90 Representative and illustrative viewpoints proposed for the visual assessment are identified in **Table 5.13.3** and mapped in **Figure 5.13.6**.

- **Representative viewpoints** – are selected to represent the experience of different types of visual receptor within an area where larger numbers of viewpoints cannot all be included. A combination of baseline panorama, cumulative wireline and full photomontage visualisations will be produced. Detailed assessment of the visual effects from these viewpoints will be undertaken in the SLVIA that may experience significant visual effects, while others may be scoped out during the simple assessment, if no potential for significant effects is identified.
- **Illustrative viewpoints** – are chosen specifically to demonstrate a particular effect or specific issue (including restricted visibility). A baseline panorama and wireline visualisation (90 degrees field of view) will be produced, but a written assessment of the visual effects from these viewpoints is not included in the SLVIA.



Key

- Scoping Boundary
- Array Area
- 10km Radii
- 50km Study Area
- Rampion 1 Operational Turbine
- Representative Viewpoint
- Illustrative Viewpoint
- County Boundary
- District Boundary

Kilometres
0 2.5 5 10 15 20
1:350,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.13.6 Viewpoint Locations

Scoping Report

System Identifier:	Version:
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Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
OPEN	JM	WOOD	27/05/2020	FINAL

5.13.91 The SLVIA proposes to focus on viewpoints from which there may be material issues that have the potential to yield significant effects, and where there is evidence, has scoped out viewpoints that are unlikely to be material to the consenting of Rampion 2. In doing so, the viewpoint assessment undertaken for the existing Rampion 1 project in the Rampion Wind Farm ES (E-ON UK, 2012) has informed the definition of the viewpoints for Rampion 2, along with the principal issues identified by the Examining Authority set out in its Recommendation Report (PINS, 2014).

5.13.92 The existing Rampion 1 project ES (E-ON UK, 2012) included 31 viewpoints. Some viewpoints have been scoped out in line with the proportionate assessment approach; particularly those from where Rampion 2 is likely to have a small magnitude of change and a not significant effect. It is also considered that there is also now familiarity with the visual effects of Rampion 1, such that people will be better able to visualise the effects of Rampion 2 based on fewer viewpoints. Other viewpoints are proposed as 'illustrative' viewpoints - to show the appearance of the offshore elements of Rampion 2 from certain locations, without the need for detailed impact assessment, where viewpoints where sited in relatively close proximity to one another.

5.13.93 Due to the taller WTGs proposed for Rampion 2 and the larger geographic extent of their ZTV, additional viewpoints located at longer distances have been included, particularly in areas where Rampion 2 WTGs may be viewed in their own right, without the Rampion Wind Farm (**Figure 5.13.5b**) where Rampion 2 adds to the geographic extent of visibility, including for example the coastal areas of Hampshire beyond Selsey Bill, around Hayling Island and the City of Portsmouth, the eastern Solent, and the Isle of Wight.

5.13.94 The viewpoints considered for inclusion in the SLVIA are listed in **Table 5.13.3** as follows. Viewpoint identification numbers have been retained from the Rampion Wind Farm ES (E-ON UK, 2012) for ease of reference to the Rampion Wind Farm SLVIA. Additional viewpoints have been added sequentially. The viewpoints which are proposed to be included or excluded from the Rampion 2 SLVIA and rationale, is described in **Table 5.13.3**. Comments are sought from consultees on these proposed viewpoint locations so that they may be agreed for the SLVIA.

Table 5.13.3 Viewpoints included in the SLVIA

ID (Rampion 1 ES)	ID (Rampion 2 Scoping Report)	Viewpoint Name	Easting	Northing	Minimum distance to Scoping Boundary (array area) (km)	Rationale / comments	Include or exclude from Rampion 2 SLVIA? Representative or Illustrative viewpoint?
Viewpoints from Rampion 1 ES							
1	**1**	Beachy Head cliff top	558707	95526	21.2	Located in SDNP and Sussex Heritage Coast. Coastal viewpoint (highest point of chalk sea cliffs within study area). Popular visitor destination, with visitor centre. South Downs Way.	**Include** *Representative*
2	**2**	Birling Gap cliff top (top of steps leading down to beach)	555382	95992	18.5	Located in SDNP and Sussex Heritage Coast. Cliff top visitor facilities and car park providing access to the beach. Within South Downs IDSR – Dark Sky Discovery site.	**Include** *Representative*
3		Birling Gap beach (bottom of steps leading down to beach)	555375	95989	18.5	Located in SDNP and Sussex Heritage Coast. Accessible beach access with prominent white cliff backdrop.	**Exclude** Viewpoint 2 is located close by and shows worst-case.
4	**3**	Seven Sisters Country Park cliff top	552394	97409	17.0	Located in SDNP and Sussex Heritage Coast. South Downs Way, Country Park and white cliff viewpoint.	**Include** *Representative*
5		Seven Sisters Country Park Cuckmere Haven	552224	99149	18.0	Located in SDNP and Sussex Heritage Coast. South Downs Way, Country Park.	**Exclude** Limited visibility due to intervening coastal landforms. Viewpoint 3 is located close by and shows worst case effect on Seven Sisters Country Park.
6	**4**	Seaford Head	548874	98236	15.1	Located in SDNP and Sussex Heritage Coast. Closest terrestrial point of Sussex Heritage Coast.	**Include** *Representative*
7		Seaford sea front promenade (adjacent to Martello Tower)	548453	98476	15.1	Main seafront pedestrian walkway, recreational beach area, seafront road and sea orientating property frontages.	**Exclude** Viewpoint 4 is located to represent Seaford sea front and cliffs.
8	**5**	Newhaven Coastguard cliff top	544637	100080	14.5	Area of publicly accessible open land coincident with local highpoint, including the vantage point of Newhaven Fort.	**Include** *Representative* Potential to move to community telescope.
9	**6**	Peacehaven cliff top	540545	100955	13.5	Cliff top seafront walk adjacent to sea orientating property frontages.	**Include** *Representative*

ID (Rampion 1 ES)	ID (Rampion 2 Scoping Report)	Viewpoint Name	Easting	Northing	Minimum distance to Scoping Boundary (array area) (km)	Rationale / comments	Include or exclude from Rampion 2 SLVIA? Representative or Illustrative viewpoint?
10	**7**	Beacon Hill, Rottingdean	536502	102633	14.0	Located in SDNP. Landmark windmill and highpoint viewpoint coincident with Public Rights of Way. Closest part of the SDNP.	**Include** *Representative* Potential to move to community telescope.
11		Brighton parade	532556	103606	13.9	Marine Parade (A259) highway approaches to Brighton, elevated promenade vantage point and extensive residential and hotel seaward orientating frontages.	**Exclude** Effects covered by nearby Viewpoint 8 at Brighton Sea Front.
12	**8**	Brighton sea front promenade (adjacent to pier).	531202	103830	13.8	Prominent tourist focus on the main seafront pedestrian walkway, recreational beach area, seafront road and sea orientating property frontages. NCR 90.	**Include** *Representative*
13	**9**	Shoreham/A259 coastal road	523504	104954	14.9	Harbour area is a notable feature along the coastal road which includes views from the road and from sea orientating property frontages.	**Include** *Representative* Potential to move to community telescope.
14	**10**	Worthing sea front promenade	514433	102255	13.6	Main seafront pedestrian walkway, recreational beach area, sea front road and sea orientating property frontages.	**Include** *Representative*
15	**11**	Littlehampton sea front promenade	502993	101335	15.3	Main seafront pedestrian walkway and recreational beach area.	**Include** *Representative*
16	**12**	Bognor Regis sea front promenade	493904	98931	15.3	Main seafront pedestrian walkway, recreational beach area, sea front road and sea orientating property frontages.	**Include** *Representative*
17	**13**	Pagham Beach	488446	96483	15.3	Coastal viewpoint, wildlife appreciation area and recreational beach area.	**Include** *Representative*
18	**14**	Selsey sea front promenade	486241	92791	13.4	Main seafront pedestrian walkway, recreational beach area and sea orientating property frontages.	**Include** *Representative*

ID (Rampion 1 ES)	ID (Rampion 2 Scoping Report)	Viewpoint Name	Easting	Northing	Minimum distance to Scoping Boundary (array area) (km)	Rationale / comments	Include or exclude from Rampion 2 SLVIA? Representative or Illustrative viewpoint?
19	**15**	Willingdon Hill	558305	99687	21.5	Located in SDNP on South Downs Way, within Eastbourne Borough. Illustrative of first main area of visibility from South Downs Way entering SDNP from the east.	**Include** *Illustrative*
20	**16**	Firle Beacon	548554	105917	23.6	Located in SDNP on South Downs Way, highpoint with open views across SDNP out to the sea.	**Include** *Representative*
21		Saxon Down	544360	110372	17.9	Located in SDNP. Uncategorised path linking to local Public Right of Way network accessible from Lewes, coincident with a localised highpoint.	**Exclude** Other viewpoints in SDNP closer and representative
22		Hollingbury Golf Course (Brighton)	532064	107803	23.4	Located in SDNP. Public Right of Way with view over Brighton and sea view beyond.	**Exclude** Viewpoint 8 provides worst-case views from Brighton. Other viewpoints on South Downs Way in SDNP.
23		Ditchling Beacon ridge	534860	112825	20.2	Located in SDNP on South Downs Way.	**Exclude** Viewpoint 17 located nearby at closer proximity provide worst-case view from South Downs Way.
24	**17**	Devil's Dyke	525774	110732	21.1	Located in SDNP. South Downs Way and intersection of multiple Public Rights of Way. Within South Downs IDSR – Dark Sky Discovery site.	**Include** *Representative*
25		Upper Beeding	520186	110374	19.1	Located in SDNP. Inland area below the main elevational influence of the South Downs (restricted byway Public Right of Way)	**Exclude** Limited visibility of the offshore elements of Rampion 2. Replace with nearby viewpoint at Bramber Castle, which has view along the Adur Valley through the South Downs.
26	**18**	Cissbury Ring	513740	107799	16.6	Located in SDNP. National Trust landscape, notable local landmark hilltop and Public Right of Way access.	**Include** *Illustrative*

ID (Rampion 1 ES)	ID (Rampion 2 Scoping Report)	Viewpoint Name	Easting	Northing	Minimum distance to Scoping Boundary (array area) (km)	Rationale / comments	Include or exclude from Rampion 2 SLVIA? Representative or Illustrative viewpoint?
							Moved to summit of Cissbury Ring.
27	**19**	Highdown Hill	509309	104284	25.2	Located in SDNP. National Trust landscape and Public Right of Way access. Closest part of SDNP to the west of Rampion 1.	**Include** *Representative*
28	**20**	Springhead Hill	506460	112438	28.1	Located in SDNP. South Downs Way.	**Include** *Representative*
29	**21**	Bignor Hill	498181	113190	21.2	Located in SDNP. South Downs Way highpoint.	**Include** *Illustrative*
30		Newhaven to Dieppe Ferry – looking away from land	547078	93979	10.7	Sea views from main ferry route.	**Exclude (wireline only)** Sea-based view from Newhaven-Dieppe Ferry.
31		Newhaven to Dieppe Ferry – looking towards land	555018	78773	17.1	Sea views from main ferry route.	**Exclude (wireline only)** Sea-based view from Newhaven-Dieppe Ferry.
Additional viewpoints							
NA	**22**	Eastoke Point (Chichester Harbour AONB)	475020	98101	25.0	Coastal edge of Chichester Harbour AONB. Sandy Point Nature Reserve.	**Include** *Representative*
NA	**23**	Portsmouth (Southsea Castle)	464373	97969	33.8	Portsmouth, Southsea Castle.	**Include** *Illustrative*
NA	**24**	Bembridge, Isle of Wight	465766	87792	29.0	Bembridge, closest point of Isle of Wight, within Isle of Wight AONB.	**Include** *Representative*
NA	**25**	Bramber Castle	518576	110649	21.9	Bramber Castle, English Heritage site, located just to north of SDNP has aligned view along the Adur Valley through the South Downs. Closest edge of the 'Low Weald'.	**Include** *Illustrative* Replaces viewpoint at Upper Beeding, which has very limited visibility of the offshore elements of Rampion 2.

ID (Rampion 1 ES)	ID (Rampion 2 Scoping Report)	Viewpoint Name	Easting	Northing	Minimum distance to Scoping Boundary (array area) (km)	Rationale / comments	Include or exclude from Rampion 2 SLVIA? Representative or Illustrative viewpoint?
NA	**26**	Low Weald	514564	117506	28.8 (from indicative location near Ashington)	Worst-case view from Low Weald looking across the South Downs. Potential for turbines to be visible over the South Downs skyline.	**Include** *Illustrative* Location to be selected/micro-sited.

5.13.95 The detailed assessment of visual effects from representative viewpoints will focus on those viewpoints where the combination of their sensitivity and potential magnitude of change resulting from the offshore elements of Rampion 2 may give rise to significant effects.

5.13.96 In preparing photomontages for the SLVIA, the photographs for all viewpoints will, where possible, be taken in good visibility conditions during summer, seeking to represent a maximum visibility scenario when the offshore elements of Rampion 2 may be most visible. Further photomontages will also be produced from up to five key viewpoints to be agreed with stakeholders, showing the existing night-time view alongside a representation of the appearance of visible aviation and marine navigation lighting.

Basis for scoping assessment

5.13.97 The seascape, landscape and visual scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- Scoping Boundary - the offshore elements of Rampion 2 are situated to the east and west of the existing Rampion Wind Farm within the array area of the Scoping Boundary (**Figure 5.13.1)**, approximately 13km to 25km offshore, occupying an irregular elongated area approximately 46km in length (west to east) and approximately 7-13km in width (north to south).
- Offshore cable corridor – the area that will contain the offshore export cables between the array area and landfall.
- WTGs - WTGs will comprise a tower (potentially assembled in sections), a nacelle (housing a gearbox, generator, and transformer), a rotor, and turbine blades.
- WTGs are expected to range from 10MW to 16MW, with an indicative number of WTGs up to 116 (10MW WTGs) (generating capacity of up to 1,200 MW) (**Table 5.13.4**, C-36).
- Maximum WTG height of 325m blade tip and 275m rotor diameter (16MW) (above LAT (**Table 5.13.4**, C-37).
- The realistic Maximum Development Scenario (MDS) layout considered as the basis for the SLVIA scoping assessment is based on minimum 75 (16MW) WTGs of 325m to tip located in a grid weighted towards the coastward perimeters of the array area. Although this layout has a lower overall number of WTGs, it considered to be a suitable basis for the scoping assessment because the tallest WTGs have potential to be most visible in coastal views, with largest geographic extent of visibility and greater scale contrast with the existing Rampion 1 project, representing the Maximum Development Scenario (MDS) for seascape, landscape and visual effects. It is proposed that the MDS will be illustrated for all viewpoints and that alternative scenarios will also be shown in wirelines for agreed key viewpoints in order to illustrate these.
- The Maximum Development Scenario (MDS) will be tested and evidenced further in the SLVIA, with further consideration of alternative project design envelopes, including the 10MW layout which has the maximum number of

(lower height) WTGs (116 x 190m blade tip). The SLVIA will assess the project envelope which has the maximum effect on seascape, landscape and visual receptors.

- Jack-up vessels and/or dynamic positioning heavy lift vessels will be visible during the construction and decommissioning phases for the installation of foundations substructures and WTGs, along with windfarm service vessels and accommodation vessels.
- Foundation substructures - the Maximum Development Scenario (MDS) for the SLVIA scoping assessment assumes that the WTG substructure design will be a 4-legged jacket foundation substructure (**Table 5.13.4**, C-38).
- Offshore electrical platforms (substations) - up to three offshore electrical substations with locations, design and visual to be confirmed through the detailed design process (**Table 5.13.4**, C-40). The scoping assessment assumes that these would be located along the shoreward perimeter of the array area, where they will in theory be most visible from coastal viewpoints.
- Aviation and marine navigation lighting – WTGs and offshore electrical platforms will be lit in accordance with the International Association of Lighthouse Authorities (IALA) standards and Civil Aviation Authority (CAA) requirements. Specific requirements for aviation and navigational lighting will be agreed with relevant stakeholders during the project design and post-consent, however the scoping assessment assumes that red, medium intensity aviation warning lights (2000 candela (cd)) will be located on either side of the nacelle of significant peripheral WTGs and/or the tallest part of the offshore electrical platforms. The scoping assessment assumes that marine navigational lights will be fitted at the platform level on significant peripheral structures, synchronised to display IALA ‘special mark’ characteristic, flashing yellow, with a range not less than five nautical miles.

Embedded environmental measures

5.13.98 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on seascape, landscape and visual receptors (see **Table 5.13.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.13.99 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.13.4 Relevant seascape, landscape and visual embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C–36	The number of turbines will not exceed that of the existing Rampion 1 project.	DCO requirements or DML conditions.
C-37	Maximum blade tip height of 325m and rotor diameter of 275m.	DCO requirements or DML conditions
C–38	The selection of the foundation type will primarily be based upon the site conditions combined with the turbine that is selection. The following types are being considered: monopile and jacket.	DCO requirements or DML conditions
C–40	There will be up to three offshore substations installed to serve the development. The exact locations, design and visual appearance will be subject to a structural study and electrical design, which is expected to be completed post consent. The offshore substations will be installed on jacket, monopile foundations, similar to those described for the turbines themselves.	DCO requirements or DML conditions.

Likely significant effects

5.13.100 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience, expertise to identify those effect-receptor pathways that may potentially lead to a significant effect. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant effect with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.13.101 The likely significant effects on seascape, landscape and visual receptors are summarised in . The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for seascape, landscape and visual effects (which includes the existing Rampion 1 project ES) and professional judgement. The approach to this assessment is set out in **Chapter 4 The EIA Process**.

5.13.102 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between

the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base. Embedded environmental measures which address these likely significant seascape, landscape and visual effects are described in **Table 5.13.4**.

5.13.103 The SLVIA will focus on the assessment of the effects of the offshore elements of Rampion 2 - where viewed in-combination with the existing Rampion 1 project (**Figure 5.13.5a**), or where its WTGs are viewed in their own right without the Rampion 1 project (**Figure 5.13.5b**). The apparent height of the larger Rampion 2 WTGs (325m) relative to the smaller operational WTGs (140m) is likely to be central to the potential for landscape and visual effects arising.

5.13.104 The SLVIA will consider the effects of Rampion 2 simultaneously with a baseline of operational offshore wind farms. The SLVIA will focus on the effects resulting from Rampion 2 in conjunction with the existing Rampion 1 project (**Figure 5.13.1**), which will form part of the baseline for the seascape, landscape and visual effects assessments; as well as its potential cumulative effects with other relevant energy generation and grid connection projects (as described under Cumulative effects).

5.13.105 A summary of the likely significant seascape, landscape and visual effects scoped in to the SLVIA is set out in **Table 5.13.5**.

5.13.106 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Table 5.13.5 Significant seascape, landscape and visual effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Effects (daytime) of the construction of the offshore elements of Rampion 2 on seascape character (Construction and Decommissioning)	C-36 C-37 C-38 C-40	Potential for significant effect. Short-term, temporary effects on perceived seascape character, arising as a result of the construction and decommissioning activities (including laying new offshore export cables to shore) and structures located within the Scoping Boundary, which may alter the seascape character of the area within the Scoping Boundary itself and the perceived character of the wider seascape through visibility of these changes.	**Scoped in - simple assessment**	**Scoped in** Marine Character Areas (MCAs): MCA05, MCA06, MCA07, MCA08, MCA13. **Scoped out** Marine Character Areas (MCAs): MCA09, MCA12, MCA14.	The MCAs will be mapped and the MMO baseline seascape characterisation will be used to inform the baseline descriptions and assessment of sensitivity of these seascape receptors.
Effects (daytime) of the construction of the offshore elements of Rampion 2 on landscape character (Construction and Decommissioning)	C-36 C-37 C-38 C-40	Potential for significant effect. Short-term, temporary effects on perceived landscape character, arising as a result of the construction decommissioning activities and structures, including laying new offshore export cables to shore, which will be visible from the coast (during good to excellent visibility conditions) and may therefore affect the perceived character of the landscape.	**Scoped in - simple assessment**	**Scoped in** Landscape Character Areas (LCAs): within East Sussex, West Sussex, Hampshire and Isle of Wight. Landscape Designations and Defined Areas: South Downs National Park (SDNP), High Weald AONB, Chichester Harbour AONB, Isle of Wight AONB, Sussex Heritage Coast. **Scoped out** Landscape Character Areas (LCAs): within Surrey and Kent. Landscape Designations and Defined Areas: New Forest National Park (NFNP), Surrey Hills AONB, Hamstead Heritage Coast, Tennyson Heritage Coast.	Landscape receptors will be mapped with the ZTV and described using published landscape character assessments, reference to special qualities and citations, further desk studies and field work.
Effects (daytime) of the construction of the offshore elements of Rampion 2 on visual receptors / viewpoints (Construction and Decommissioning)	C-36 C-37 C-38 C-40	Potential for significant effect. Short-term, temporary effects on views and visual amenity experienced by people from principal visual receptors and representative viewpoints, arising as a result of the construction decommissioning activities and structures, including laying new offshore export cables to shore, which will be visible from the coast (during good to excellent visibility conditions)	**Scoped in - simple assessment**	**Scoped in** Principal visual receptors (coastal settlements, long distance paths/cycle routes, boating routes, main road/rail routes) within ZTV. Included representative viewpoints Table 5.13.3. **Scoped out** Visual receptors outside ZTV. Excluded viewpoints Table 5.1.3.	Visual receptors and representative viewpoints (locations to be agreed with stakeholders) will be mapped with the ZTV and described following further desk studies and field work. Daytime panoramic viewpoint photography will be taken from agreed viewpoint locations. Visual representations will be prepared to illustrate the Maximum Development Scenario (MDS) for the SLVIA. These

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
					will include baseline panoramas, cumulative wirelines and photomontages showing the offshore elements of Rampion 2 in its baseline context. These will be used to inform the assessment of the effects during construction and decommissioning.
Effects (daytime) of the operation and maintenance of the offshore elements of Rampion 2 on seascape character (Operation)	C-36 C-37 C-38 C-40	Potential for significant effect. Long-term, reversible effects on perceived seascape character (MCAs), arising as a result of the operational WTGS, substations and maintenance activities located within the array area, which may alter the seascape character of the array area itself and the perceived character of the wider seascape.	**Scoped in - both simple and detailed assessment**	**Scoped in** Marine Character Areas (MCAs): MCA05, MCA06, MCA07, MCA08, MCA13. **Scoped out** Marine Character Areas (MCAs): MCA09, MCA12, MCA14.	The MCAs will be mapped and the MMO baseline seascape characterisation will be used to inform the baseline descriptions and assessment of sensitivity of these seascape receptors. The influence of the operational Rampion Wind Farm and recent changes to seascape character will be taken into account. The ZTV (**Figures 5.13.2 and 5.13.6a-b**) will inform the likely visibility of the offshore elements of Rampion 2 from the MCAs. Site visits and visual representations prepared from coastal locations will be used to inform the assessment of the effects.
Effects (daytime) of the operation and maintenance of the offshore elements of Rampion 2 on landscape character (Operation)	C-36 C-37 C-38 C-40	Potential for significant effect. Long-term, reversible effects on perceived landscape character (LCAs and Designations), arising as a result of the operational WTGs, substations and maintenance activities, which will be visible from the coast (during good to excellent visibility conditions) and may therefore affect the perceived character of the landscape.	**Scoped in - both simple and detailed assessment**	**Scoped in** Landscape Character Areas (LCAs): within East Sussex, West Sussex, Hampshire and Isle of Wight. Landscape Designations and Defined Areas: South Downs National Park (SDNP), High Weald AONB, Chichester Harbour AONB, Isle of Wight AONB, Sussex Heritage Coast. **Scoped out** Landscape Character Areas (LCAs): within Surrey and Kent. Landscape Designations and Defined Areas: New Forest National Park (NFNP), Surrey Hills AONB, Hamstead Heritage Coast, Tennyson Heritage Coast.	Landscape receptors will be mapped with the ZTV and described using published landscape character assessments, special qualities reports, further desk studies and field work. The influence of the existing Rampion 1 project and recent changes to landscape character will be taken into account. The ZTV (**Figures 5.13.2 and 5.13.6a-b**) will inform the likely visibility of the offshore elements of Rampion 2 from landscape receptors. Site visits and visual representations will be used to inform the assessment of effects.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Effects (daytime) of the construction, operation and maintenance, and decommissioning of the offshore elements of Rampion 2 on Special Qualities of the South Downs National Park (SDNP)	C-36 C-37 C-38 C-40	Potential for significant effect. Long-term, reversible effects on perception of defined special qualities of SDNP, arising as a result of the construction decommissioning activities and structures, operational WTGs, substations and maintenance activities, visible from the SDNP (during good to excellent visibility conditions).	**Scoped in - detailed assessment**	**Scoped in** SDNP special qualities: 1. Diverse, inspirational landscape and breath-taking views. 3. Tranquil and unspoilt places. 7. Distinctive towns and villages, and communities with real pride in their area. **Scoped out** SDNP special qualities: 2. A rich variety of wildlife and habitats including rare and internationally important species. 4. An environment shaped by centuries of farming and embracing new enterprise. 5. Great opportunities for recreational activities and learning experiences. 6. Well-conserved historical features and a rich cultural heritage.	The special qualities identified by the SDNPA as a result of stakeholder engagement since designation are set out in the SDNP Special Qualities document.
Effects (daytime) of the operation and maintenance of the offshore elements of Rampion 2 on visual receptors / viewpoints (Operation)	C-36 C-37 C-38 C-40	Potential for significant effect. Long-term, reversible effects on views and visual amenity experienced by people as principal visual receptors and representative viewpoints, arising as a result of the operational wind turbines, substations and maintenance activities.	**Scoped in - both simple and detailed assessment**	**Scoped in** Principal visual receptors (coastal settlements, long distance paths/cycle routes, boating routes, main road/rail routes) within ZTV. Included representative viewpoints Table 5.13.3. **Scoped out** Visual receptors outside ZTV. Excluded viewpoints Table 5.13.3.	Visual receptors and representative viewpoints (to be agreed with stakeholders) will be mapped with the ZTV (**Figures 5.13.2 and 5.13.6a-b**) and described following desk-based studies and field work. Daytime viewpoint photography will be taken from agreed locations. Visual representations will be prepared to illustrate the Maximum Development Scenario (MDS) for the SLVIA. These will include baseline panoramas, cumulative wirelines and photomontages illustrating the offshore elements of Rampion 2 in its baseline context.
Effects (night-time) of the operation and maintenance of Rampion 2 lighting on visual receptors / viewpoints and the	C-36 C-37 C-38 C-40	Potential for significant effect. Long-term, reversible effects on views and visual amenity experienced by people from principal visual receptors and representative viewpoints, including from within the South Downs IDSR, arising as a result of the marine navigation and	**Scoped in – both simple and detailed assessment**	**Scoped in** Specific representative viewpoints Table 5.13.3. Receptors within the South Downs IDSR including Dark Sky Discovery sites.	Figures showing the baseline light pollution, South Downs IDSR Sky Quality Map and Dark Sky Zones, ZTVs of the aviation lighting (turbine hub) will be used to inform the assessment of aviation and marine navigation lighting. Night-time

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
dark night skies quality of the SDNP during operation (Operation)		aviation lights. Potential for significant effect on perception of dark night skies quality of the SDNP arising from the offshore elements of Rampion 2 outside the SDNP on the dark night skies experienced within the South Downs IDSR.		SDNP special quality 3. 'Tranquil and unspoilt places', including dark night skies quality.	photographs and visual representations will be prepared to illustrate the effects of the marine navigation and aviation lighting from key viewpoints, to be agreed with stakeholders, including from within the South Downs IDSR.
Cumulative seascape, landscape and visual effects of the offshore elements of Rampion 2 with other operational, consented and application stage offshore wind farm projects (with the exception of Rampion Wind Farm)	C-36 C-37 C-38 C-40	No likely significant effects.	**Scoped out (paragraph 5.13.107)**	MCAs, LCAs, landscape designations, visual receptors and viewpoints.	None
Seascape, landscape and visual effects of the offshore elements of Rampion 2 outside the 50km radius SLVIA study area	C-36 C-37 C-38 C-40	No likely significant effects.	**Scoped out (paragraph 5.13.107)**	MCAs, LCAs, landscape designations and defined areas, visual receptors and viewpoints.	None

Impacts scoped out of the assessment

5.13.107 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice and each scoped out receptor is considered in turn below.

5.13.108 Seascape effects on MCAs with limited visibility of the offshore elements of Rampion 2 during operation, specifically

- MCA9 Eastbourne Pevensey and Rye Bays;
- MCA12 English Channel East (Dover Strait); and
- MCA14 English Channel West.

5.13.109 These MCAs are likely to experience low levels of change, due to having limited visibility of the offshore elements of Rampion 2 and/or being located at long distance, such that they have no potential to be significantly affected by the offshore elements of Rampion 2.

5.13.110 Seascape, landscape and visual effects of the offshore elements of Rampion 2 on certain Special Qualities of SDNP during operation. The following special qualities identified by the SDNPA will be scoped out of the SLVIA as having no potential for significant seascape, landscape and visual effects:

- *2. A rich variety of wildlife and habitats including rare and internationally important species.*
- *4. An environment shaped by centuries of farming and embracing new enterprise.*
- *5. Great opportunities for recreational activities and learning experiences.*

5.13.111 The following special qualities will be assessed in the Archaeology and Cultural Heritage aspect assessment (but scoped out of the SLVIA):

- *6. Well-conserved historical features and a rich cultural heritage*.

5.13.112 Seascape, landscape and visual effects of the offshore elements of Rampion 2 on the New Forest National Park (NFNP). The NFNP is located 49.0km from the array area at its closest point, with a small land area in the SLVIA study area. There is limited/no visibility of the offshore elements of Rampion 2 from within the boundary of the NFNP, such that it has no potential to be significantly affected by the offshore elements of Rampion 2.

5.13.113 Seascape, landscape and visual effects of the offshore elements of Rampion 2 on Surrey Hills AONB (Operation). The Surrey Hills AONB is located 47.1km from the array area at its closest point, with the majority of its land area outside the SLVIA study area. There is limited/no visibility of the offshore elements of Rampion 2 from within the boundary of the AONB, such that it has no potential to be significantly affected by the offshore elements of Rampion 2.

5.13.114 Seascape, landscape and visual effects of the offshore elements of Rampion 2 on Hamstead Heritage Coast. Hamstead Heritage Coast is located 48.7km from the array area at its closest point, with a small land area in the SLVIA study area. Due to its position on the western side of the Isle of Wight, there is limited/no visibility of the offshore elements of Rampion 2 from within the boundary of the Hamstead Heritage Coast, such that it has no potential to be significantly affected by the offshore elements of Rampion 2.

5.13.115 Landscape and visual effects of the offshore elements of Rampion 2 on Tennyson Heritage Coast (Operation). Tennyson Heritage Coast is located 38.7km from the array area at its closest point. Due to its position on the southern and western side of the Isle of Wight, there is limited/no visibility of the offshore elements of Rampion 2 from within the boundary of the Tennyson Heritage Coast, such that it has no potential to be significantly affected by the offshore elements of Rampion 2.

5.13.116 Seascape, landscape and visual effects of the offshore elements of Rampion 2 on receptors in Surrey (Operation). Landscape and visual receptors in the county of Surrey are likely to experience no change, or negligible change, due to it affording no visibility, or very limited visibility at long range (46km and over) of the offshore elements of Rampion 2, such that receptors in Surrey have no potential to be significantly affected, by the offshore elements of Rampion 2.

5.13.117 Cumulative seascape, landscape and visual effects of the offshore elements of Rampion 2 with other operational, consented and application stage offshore wind farm projects (with the exception of Rampion Wind Farm). There are no operational, consented or application stage offshore wind farms within UK waters within approximately 140km of the array area. The closest offshore wind farms within French waters are located at approximately 70km distant. There is no potential for seascape, landscape and visual receptors to experience significant cumulative effects at such distance. Cumulative effects with all other offshore wind farm projects, with the exception of Rampion Wind Farm, are therefore scoped out of the SLVIA. The SLVIA will focus on the cumulative effects resulting from the offshore elements of Rampion 2 in conjunction with the operational Rampion Wind Farm.

5.13.118 Seascape, landscape and visual effects of the offshore elements of Rampion 2 outside the 50km radius SLVIA study area. As justified in full in ‘Study area’, the 50km radius SLVIA study area is defined to extend far enough to include all areas and receptors within which significant effects could occur, forming an outer limit to where significant effects could occur.

Cumulative effects

5.13.119 It is likely that there will be cumulative effects which require assessing due to the spatial scope of the offshore elements of Rampion 2 and associated assessment. Cumulative effects on seascape, landscape and visual receptors resulting from the effects of the offshore elements of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.13.120 The impacts from the offshore elements of Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects. In the absence of a development list, such impacts from the offshore elements of Rampion 2 that have the potential to contribute to cumulative seascape, landscape and visual effects include during operation, effects on seascape, landscape and visual amenity due to inter-visibility of other planned projects with the offshore elements of Rampion 2. Cumulative effects during construction are considered less likely to be significant, due to the temporary nature of the activity.

5.13.121 A comprehensive list of national and international plans, projects and regulated activities that have the potential to contribute to cumulative impacts of the offshore elements of Rampion 2 will be compiled as part of the PEIR. The SLVIA will then undertake a process of scoping out plans, projects and activities from this list, based on expert judgement, assessment rationale and guidance relevant to seascape, landscape and visual impacts.

5.13.122 As of May 2020, there are no Tier 1 (under-construction / consented), Tier 2 (application stage) or Tier 3 (scoping) offshore wind farms (as defined fully in **Appendix C**) within the 50km radius SLVIA study area (**Figure 5.13.11**), nor within UK waters within approximately 140km of the array area. The closest Tier 2 project is Thanet Extension, located some 143km distant. The closest offshore wind farms within French waters are located approximately 70km to the south.

5.13.123 For this reason, the potential effects of the offshore elements of Rampion 2 with other Tier 1, 2 and 3 offshore wind farms are scoped out of the assessment. It is considered that there is no potential for the offshore elements of Rampion 2 to have cumulative effects with other Tier 1, 2 and 3 offshore wind farms, beyond those arising with the existing Rampion 1 project. The SLVIA will focus on the cumulative effects of the offshore elements of Rampion 2 with other planned energy generation and grid connection projects scoped in from the list of developments for assessment at PEIR. Cumulative effects with all other offshore wind farm projects, with the exception of Rampion Wind Farm, are therefore proposed to be scoped out of the SLVIA, although this will be monitored during the Rampion 2 programme for any development brought forward under Round 4 that might be relevant during preparation of the PEIR.

Transboundary effects

5.13.124 The potential effects from construction, operation (including maintenance) and decommissioning on seascape, landscape and visual receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

SLVIA contents

5.13.125 The SLVIA chapter of the PEIR and ES will provide a summary of the significance of changes resulting from the construction and operation of the offshore elements of Rampion 2 to seascape, landscape and visual receptors. Full technical assessments of the seascape, landscape and visual impacts will be contained

within technical appendices. The SLVIA will be supported by plan figures and visual representations (photomontages).

Desk-based and site survey work

5.13.126 The SLVIA undertaken as part of the PEIR and ES will be informed by desk-based studies and field survey work undertaken within the SLVIA study area. The landscape, seascape and visual baseline will be informed by desk-based review of landscape and seascape character assessments, and the ZTV, to identify receptors that may be affected by the offshore elements of Rampion 2 and produce written descriptions of their key characteristics and value.

5.13.127 A preliminary desk-based assessment will be undertaken of seascape, landscape and visual receptors using ZTV analysis, to identify which landscape and visual receptors are unlikely to be significantly affected, which will be subject to a simple assessment, and those that are more likely to be significantly affected by the offshore elements of Rampion 2, which require a detailed assessment.

5.13.128 Interactions will be identified between the offshore elements of Rampion 2 and seascape, landscape and visual receptors, to predict potentially significant effects arising and measures may be proposed to mitigate effects.

5.13.129 For those receptors where a detailed assessment is required, primary data acquisition will be undertaken through a series of surveys. These surveys will include field survey verification of the ZTV from terrestrial landscape character areas (LCAs), micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from all representative viewpoints (as listed in **Table 5.13.3**). These viewpoint photography and visual assessment surveys are planned to be undertaken during Summer 2020. There is some risk of delay in being able to take viewpoint photographs due to the ongoing Covid-19 public health situation, however it is anticipated that site visits to the study area will be possible to undertake later in summer 2020, when Covid-19 restrictions are expected to have eased. **Section 4.2** of the Scoping Report sets out plans to progress Rampion 2 with the Covid-19 restrictions in place. Further visual assessment surveys are then likely to be undertaken prior to the PEIR submission, expected to be in September-October 2020, using the photomontage visualisations to undertake field survey assessment of visual effects from each representative viewpoint. Sea-based offshore surveys are not proposed to be undertaken as part of the SLVIA. Illustrative wirelines (without baseline photography) will be prepared for offshore viewpoints.

5.13.130 Detailed assessment methods will be based on quantifying impacts through modelling to enable prediction of seascape, landscape and visual effects. Assessment of the sensitivity of seascape, landscape and visual receptors will be undertaken, together with an assessment of the magnitude of change arising as a result of the offshore elements of Rampion 2. Judgements on sensitivity and magnitude will be combined to arrive at an overall assessment as to whether the offshore elements of Rampion 2 will have an effect that is significant or not significant on each seascape, landscape and visual receptor.

5.13.131 The SLVIA undertaken as part of the PEIR and ES will prepare the necessary information to assess the night-time visual effects of the proposed lighting of the offshore elements of Rampion 2.

Study area refinements for PEIR / ES

5.13.132 The 50km radius SLVIA study area (**Figure 5.13.1**) may be further refined for the PEIR or ES if the array area changes from that shown in the Scoping Boundary. The ZTV (**Figure 5.13.2**) of Rampion 2 may also be further refined to address any ongoing design changes, or changes in the design envelope, for example in response to embedded environmental measures that may influence the Maximum Development Scenario (MDS) for the SLVIA.

Stakeholder engagement

5.13.133 Consultation will be a key feature of the SLVIA process for Rampion 2, from the pre-application to examination stage with relevant statutory and non-statutory organisations, the public and Interested Parties (IPs).

5.13.134 RED is seeking early engagement with consultees to gain input and local knowledge on the key seascape, landscape and visual constraints / sensitivities and discuss potential future environmental measures, as appropriate. RED considers it important to engage early to ensure all seascape, landscape and visual aspect matters are considered appropriately and proportionately with the relevant statutory consultees. RED is progressing early informal input from key stakeholders relevant to SLVIA. Communications will not form part of the formal EPP but seek to introduce the Rampion 2 and gain high level insight on issues that key stakeholders would like to see included at scoping through early engagement.

5.13.135 Formal pre-application consultations with regards to SLVIA will be undertaken primarily through specialist consultation via an Expert Topic Group (ETG) as part of the EPP, along with wider consultation through this Scoping Report and the PEIR. Numerous ETG meetings and site visits will be organised with representatives from Natural England, the joint County Councils (East and West Sussex), Isle of Wight Council, Brighton and Hove City Council, relevant coastal District Councils (Worthing, Lewes, Eastbourne, Arun and Adur), South Downs National Park Authority, Sussex Heritage Coast Group (which includes National Trust, SDNP Authority, East Sussex County Council, Sussex Wildlife Trust and Lewes and Eastbourne Council).

5.13.136 Feedback received through this consultation process will be considered in preparing the PEIR and ES where appropriate to be submitted with the DCO Application.

5.13.137 In line with the consultation strategy, public consultation with be conducted primarily through a series of Public Information Days (PIDs) and public meetings. Details of the proposed consultation phases are set out in **Section 4.3**: **Consultation and the evidence plan process** of this Scoping Report.

5.13.138 All consultation feedback pertaining to the SLVIA will be presented in a Consultation Report, to be provided as part of the DCO Application, and will be summarised in the SLVIA chapter together with information on how feedback has been addressed in the PEIR and ES.

5.14 Marine archaeology

Introduction

5.14.1 The marine archaeology assessment will consider the potential likely significant effects on intertidal and underwater cultural heritage up to the Mean High Water Springs (MHWS) mark that may arise from the construction, operation and decommissioning of the Proposed Development. This section describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.14.2 Marine archaeology interfaces with several other aspects and as such, should be considered alongside these; namely:

- **Section 5.2: Coastal processes**;
- **Section 5.13: Landscape, seascape and visual**; and
- **Section 6.9: Historic environment** (onshore).

5.14.3 These aspects are interface with marine archaeology as they can inform the understanding and context of the baseline environment and potential impact on the Marine Archaeology resource. For example, input from Coastal Processes can establish the level of scour effects on marine archaeological receptors.

Study area

5.14.4 The study area for the marine archaeology assessment is defined as the Scoping Boundary area up to MHWS, together with a 2km buffer zone to accommodate the potential imprecision of historic marine positioning and in line with the existing Rampion 1 project marine archaeology study area (**Figure 5.14.1**).

5.14.5 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

660000
680000
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5620000
N
Midhurst
Petworth
South Downs National Park
A272
A24
A283
A23
Haywards Heath
Burgess Hill
Uckfield
A26
Steyning
Lewes
A27
Arundel
A280
Brighton & Hove
Shoreham-By-Sea
Hove
Brighton
Lancing
Worthing
A259
Littlehampton
East Saltdean
Newhaven
Bognor Regis
Sussex Bay
London
Portsmouth

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Data derived from RWE data © RWE 2020

Key

- Scoping Boundary
- Study area

Kilometres
0 1 2 4 6 8
1:200,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.14.1 Study area

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O1-0001				1.1
Company: MA Ltd	Drawn By: RLF	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL

Assessment methodology

Introduction

5.14.6 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this marine archaeology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the marine archaeology assessment.

Desk-based assessment

5.14.7 A full desk-based assessment will be carried out to establish the marine archaeological potential of the Rampion 2 development area and wider marine archaeology study area. Within this, an assessment of the importance of marine archaeology receptors, both known and currently unknown, will be undertaken to ensure appropriate protection of each. It will consider all aspects of the maximum design scenario to determine likely effects on all marine archaeological receptors.

5.14.8 This will be achieved through the characterisation of the known cultural heritage resource to determine the likely importance of any unknown receptors that may be encountered, primarily during the construction phase for Rampion 2. Further, likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4 Assessment of cumulative effects**.

5.14.9 As a result of the ongoing COVID-19 public health measures, there has been a delay in receiving National Records of the Historic Environment (NRHE) data and therefore, this data is not included in this Scoping Report. However, the data will be available for review for the PEIR. To ensure that the marine archaeology study area is sufficiently characterised for the purposes of this Scoping Report data was collated from the United Kingdom Hydrographic Office (UKHO), the West Sussex County Council Historic Environment Record (WSCC HER) and the East Sussex County Council Historic Environment Record (ESCC HER), as well as various regional studies (listed in **Table 5.14.4**).

Site specific surveys

5.14.10 Geophysical surveys are due to commence in June/July 2020 and will provide 100 percent coverage of the seabed within the Rampion 2 development areas. This, supported by a comprehensive programme of geotechnical survey data review and assessment, will inform the final design plan of Rampion 2. Commitments relating to the geotechnical survey and assessment will be documented and agreed with Historic England through the development of an archaeological Written Scheme of Investigation (WSI). This will also include a specific Protocol for Archaeological Discoveries (PAD) which together will form the basis of tertiary mitigation and the implementation of best practice.

Guidance

5.14.11 Current standard/best practice guidance considered for the basis of this assessment include:

- *Historic Environment Guidance for the Offshore Renewable Energy Sector* (COWRIE, 2007);
- *Marine Geophysical Data Acquisition, Processing and Interpretation* (Historic England, 2013);
- *Model Clauses for Written Schemes of Investigation* (The Crown Estate, 2010);
- *Protocol for Archaeological Discoveries: Offshore Renewables Project* (The Crown Estate, 2014); and
- *Offshore Geotechnical Investigation and Historic Environment Analysis: Guidance for the Offshore Renewable Energy Sector* (COWRIE, 2011).

5.14.12 Further, the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy and Climate Change, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3) (Department for Energy and Climate Change, 2011b) contain planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to marine archaeology. NPS EN-1 and NPS EN-3 include guidance on matters that are to be considered in the assessment, as well as highlighting several factors relating to mitigation and the determination of an application. The assessment of the marine archaeological resource, together with the embedded environmental measures adopted for Rampion 2, will consider all the relevant NPS EN-1 and EN-3 provisions.

Assessing effect and determining significance

5.14.13 The following paragraphs outline the method that will be used to assess the significance of effect on marine archaeology receptors up to MHWS. The criteria for determining this significance is based on both the sensitivity level of those receptors and the magnitude of change as a result of potential impacts, as well as professional judgement based on the guidance set out by the Department for Culture, Media and Sport (2013).

5.14.14 The criteria for establishing the level of receptor sensitivity are outlined in **Table 5.14.1**.

5.14.15 The criteria for establishing the magnitude of impact are outlined **Table 5.14.2**.

Table 5.14.1 Criteria for establishing receptor sensitivity

Sensitivity	Criteria	Receptor type
Very high / high	Very high / high importance and rarity of an international / national scale. Unique with regards to period, rarity, level of documentation, group value, condition, vulnerability, diversity, and / or archaeological potential.	Designated heritage assets, protected wreck sites, palaeoenvironmental features or deposits with evidence of *in situ* finds.

Sensitivity	Criteria	Receptor type
	It is possible that low to moderate impacts on these receptors or their settings could lead to significant effects.	
Medium	High or medium importance and rarity of a regional scale with limited potential for substitution. Regionally rare with regards to period, rarity, level of documentation, group value, condition, vulnerability, diversity, and / or archaeological potential.	Non-designated live wreck sites, geophysical anomalies of high potential, recorded wrecks not confirmed by survey, palaeoenvironmental features or deposits.
Low	Low importance and rarity, local scale. Low or no recognised value with regards to period, rarity, level of documentation, group value, condition, vulnerability, diversity, and / or archaeological potential.	Fouls and obstructions, geophysical anomalies of low potential.
Negligible	Very low to no archaeological importance and rarity, local scale. The nature of the receptor is in very poor condition and survival and is therefore not considered a receptor.	Dead wrecks, dead fouls or obstructions, geophysical anomalies of negligible potential such as cables.

Table 5.14.2 Criteria for establishing magnitude of change

Magnitude of impact	Criteria (Adverse)	Criteria (Beneficial)
Major	Substantial or irreversible change of archaeological sites, materials or context of archaeological materials or features resulting in significant alteration of archaeological site, feature, or materials, inhibiting interpretation of characteristics, sub-features, or components.	Large-scale enhanced understanding of the archaeological resource inversely proportional to the scale of adverse effect, e.g. benefit through large area geophysical/geotechnical survey data released to public domain.
Moderate	Moderate changes to archaeological sites, materials or context of archaeological materials or features	Benefit to, or addition of, key characteristics, features or elements e.g. site-specific survey and

Magnitude of impact	Criteria (Adverse)	Criteria (Beneficial)
	resulting in clear alteration, inhibiting interpretation of several key characteristics, sub-features, or components.	investigation leading to an enhancement of disseminated knowledge; for example, diver/ROV ground-truthing of anomalies, published results.
Minor	Minor changes to archaeological sites, material or contexts of archaeological materials or features resulting in clear alteration, inhibiting interpretation of several key characteristics, sub-features or components.	Minor benefit to, or addition of, one or more key characteristics, features or elements through enhanced knowledge and understanding of receptors not disseminated or made publicly available.
Negligible	Changes that are indistinguishable from natural variation, do not change archaeological sites or materials, and do not affect key characteristics, sub-features, or components or their environment or context.	N/A

5.14.16 The significance of the effect on marine archaeology will be determined by correlating the sensitivity of the receptor and the magnitude of the impact as illustrated in **Table 5.14.3**. For the purpose of the EIA, any effects with a significance level of minor or less will be considered as not significant in terms of the EIA Regulations (2017).

Table 5.14.3 Significance assessment matrix

Receptor sensitivity	Magnitude of Change			
	Major	**Moderate**	**Minor**	**Negligible**
Very High / High	**Significant**	**Significant**	Potentially Significant	Not Significant
Medium	**Significant**	Potentially Significant	Not Significant	Not Significant
Low	Potentially Significant	Not Significant	Not Significant	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Not Significant

Baseline conditions

Data sources

5.14.17 The data sources used to collate the information for this Scoping Report are detailed in **Table 5.14.4** below.

Table 5.14.4 Key sources of marine archaeology data

Source	Date	Summary	Coverage of study area
United Kingdom Hydrographic Office (UKHO) via Emapsite	22/04/2020	Database of known wrecks and obstructions held and maintained by the UKHO.	Full coverage of the study area
West Sussex County Council Historic Environment Record (WSCC HER)	23/04/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and historic landscape character studies.	Partial coverage of the study area (approximately 2/3rd falls within West Sussex County Council jurisdiction)

Source	Date	Summary	Coverage of study area
East Sussex County Council (ESCC) HER	06/05/2020	County maintained database of all known archaeological monuments and events, including designated and non-designated archaeological sites, designated and non-designated buildings and standing structures, conservation areas, sites with known palaeoenvironmental significance and historic landscape character studies.	Partial coverage of the study area (approximately 1/3rd falls within East Sussex County Council jurisdiction)
Submerged Palaeo-Arun River Project (Gupta *et al.* 2004; 2008)		A reconstruction of the prehistoric landscapes connected to the River Arun with an evaluation of the archaeological resource potential.	Partial coverage of the study area
The South Coast Regional Environmental Characterisation (James *et al.* 2010)		A regional marine assessment, focusing on evaluating the geological, biological and archaeological resource.	Broadscale data with regional coverage
South East Rapid Coastal Zone Assessment (Wessex Archaeology, 2011; 2013)		A regional assessment undertaken to enhance the knowledge of the coastal historic environment in order to inform Shoreline Management Plans.	Broadscale data with regional coverage
Rampion Offshore Wind Farm Environmental Statement (RSK Environment Ltd, 2012)		The Environmental Statement for Rampion Offshore Wind Farm. Chapter 13 - marine archaeology provides a review of the archaeological potential of the area directly adjacent to Rampion 2.	Partial coverage of the study area

Baseline

5.14.18 The marine archaeological resource can be characterised into the following three main categories of sites and features:

- Submerged prehistoric landscapes as a result of fluctuations in past sea-level. Such landscapes may contain significant evidence of prehistoric human occupation and/or environmental change.
- Archaeological remains of vessels deposited after a wrecking event at sea or abandoned in an intertidal context.
- Remains of aircraft crash sites, either coherent assemblages or scattered material, typically the result of Second World War (WW2) military conflict, but also numerous passenger casualties. But also includes aircraft, airships and other dirigibles dating to the First World War (WW1), however these rarely survive the archaeological record.

5.14.19 Structural remains including defensive structures, lighthouses or sites lost to the sea as a result of coastal erosion may be found within the intertidal zone (between Mean Low Water Spings (MLWS) and MHWS) (see **Table 5.14.5** for summary and **Figure 5.14.2**).

Table 5.14.5 Summary of WSCC HER intertidal sites

Period	Number recorded	Types
Prehistoric	4	Palaeolithic hand axe, Bronze Age hoard, Neolithic/Bronze Age pottery, worked stone
Roman	3	Coins, pottery, samian ware
Medieval	3	Deserted medieval villages
Post-medieval	1	Pepper pot lighthouse (demolished)
WW2	1	Anti-aircraft artillery
Unknown date	6	Intertidal wreck, coastal defences, brick, post, church, well

5.14.20 The wrecks and obstructions within the marine zone of the study area can be summarised as follows:

- there are 324 wrecks and obstructions recorded within the study area (see **Table 5.14.6** for summary and **Figure 5.14.3**);
- there are seven known WW2 military aircraft crash sites within in the study area, however their locations are general. If these sites are identified during the project, they will be automatically designated under the Protection of Military Remains Act 1986 (see **Table 5.14.6** for summary and **Figure 5.14.3**);
- three finds of stray wreck material have been dredged up within the study area (see **Table 5.14.6** for summary and **Figure 5.14.3**); and
- there are no wreck sites designated under the Protection of Wrecks Act 1973.

5.14.21 Whilst there is potential to encounter watercraft from the Mesolithic period (*c.* 10,000 BC) onwards within the study area, the known wrecks and obstructions range from the last 700 years.

5.14.22 If any further unknown military aircraft crash sites are identified during the lifecycle of Rampion 2, they will automatically be designated under the Protection of Military Remains Act 1986.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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Data derived from West Sussex County Council. Licence number 2020-067

Key

- Scoping Boundary
- Study area
- Prehistoric
- Roman
- Medieval
- Post-Medieval
- WW2
- Unknown

Kilometres
0 0.1250.25 0.5 0.75 1
1:30,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.14.2 Coastal sites

Scoping Report

System Identifier:				Version:
42285-GOBE-SC-OF-DR-O1-0002				1.1
Company: MA Ltd	Drawn By: RLF	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL

660000
680000
700000
5640000
5620000
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N
A26
A283
Steyning
Lewes
A27
A23
A280
Arundel
Brighton & Hove
A27
Shoreham-By-Sea
Hove
Brighton
Lancing
A259
Worthing
Littlehampton
East Saltdean
Newhaven
Sussex Bay
Bognor Regis
Selsey
ham
Chelmsford
London
Canterbury
Portsmouth

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Key

- Scoping Boundary
- Study area
- WW2 aircraft sites
- Medieval
- Post-Medieval
- 20th Century
- WW1
- WW2
- Unknown
- Foul/obstruction
- Foul/obstruction

Kilometres
0 1 2 4 6 8
1:200,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.14.3 Wrecks and obstructions

Scoping Report

System Identifier:	Version:
42285-GOBE-SC-OF-DR-O1-0003	1.1

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
MA Ltd	RLF	WOOD	21/05/2020	FINAL

Table 5.14.6 Summary of wrecks and obstructions recorded within the study area

Period	Number recorded	Types
Medieval	1	Cargo vessel
Post-medieval	57	Steam ship, sailing vessel, destroyer, schooner, cargo vessel, brig, sloop, cutter, yawl, ketch, galliot, barque, barge, lugger, yacht, fishing vessel, full rigged merchantman
20th century (1900-1913 / 1919-1938 / 1946-2000)	35	Steam ship, sailing vessel, brigantine, schooner, ketch, cutter, trawler, cargo vessel, barge, destroyer, tank landing, craft motor vessel, wooden vessel, fishing vessel, carrier
WW1	64	Trawler, steam ship, destroyer, cargo vessel, drifter, armed cargo vessel, collier, transport vessel, smack, trawler, boilers, lightship
WW2	27	Trawler, steam ship, aircraft, barge, cargo vessel, trawler
Unknown date	84	Trawler, steam ship, non-sub contact, cargo vessel, landing craft, freighter, barge, boiler/engine/generator, aircraft, lost cargo, barge
Foul / obstructions	63	Fisherman's fasteners, stones, masonry, rubble, unidentified
Stray finds	3	Copper alloy fitting, gas ribbon burner, ship's telephone

5.14.23 The potential for the prehistoric submerged landscapes within the study area is high. Past fluctuations in sea-level and temperature resulted in repeat (re)colonisation and abandonment of these landscapes. These periods of (re)colonisation are associated with the retreat of ice-sheets following the last three glacial maximums:

- Devensian: Upper Palaeolithic *c.* 100,000 to 200,000 Before Present (BP);
- Wolstonian: Lower Palaeolithic *c.* 250,000 to 150,000 BP; and
- Anglian: Lower Palaeolithic *c.* 350,000 to 280,000 BP.

5.14.24 Southern England avoided glaciation in the Last Glacial Maximum (LGM) (Farr *et al.* 2017), so there are no adverse effects of ice scouring in this region on earlier Palaeolithic deposits. Therefore, prehistoric material or deposits within the marine zone have the potential to range between the Lower Palaeolithic and Mesolithic. The rise in sea-level in the Holocene inundated these once-dry landscapes and rendered them inhabitable and thus any Neolithic material found in the marine zone is likely of a maritime nature.

5.14.25 The study area covers the site of the submerged Arun River extension and the Northern Palaeovalley, part of a larger confluence of submerged palaeo-river systems in the English Channel (Gupta *et al.* 2004; Farr *et al.* 2017). This river system is situated in an erosive landscape and strong tidal streams have led to scouring of sediment in some parts (Gupta *et al.* 2008; Farr *et al.* 2017), however the study area does not appear to be significantly affected by these marine transgressive processes (Gupta *et al.* 2004).

5.14.26 This region of submerged palaeo-river systems was previously investigated by the Submerged Palaeo-Arun Survey (Gupta *et al.* 2004; 2008) with geophysical mapping of the landscapes and a programme of environmental sampling in the Owers Banks (as illustrated in **Figure 5.14.4**). The region has also been targeted by the aggregates industry but any licences within the Scoping Boundary are now inactive (122/1A, 122/1B, 123A, 123B; **Figure 5.14.4**). Active licenses within the marine archaeology study area include 396/1-2, 435/1-2, 453 and 488 (**Figure 5.14.4**).

5.14.27 No *in situ* prehistoric artefacts have been recovered and no protected areas or statutory designations in relation to submerged landscapes are within the study area.

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Brighton & Hove
A280
Arundel
A27
Shoreham-By-Sea
Hove
Brighton
Lancing
A259
Worthing
Littlehampton
East Saltdean
Newhaven
Sussex Bay
Bognor Regis
Selsey

453
488
396/2
435/2
435/2
435/1
396/1
435/1
123B
123A
122/1A
122/1B

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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Data derived from EMODnet © AZTI-Tecnalia and EMODnet 2019

Key

- Scoping Boundary
- Study area
- Palaeo-Arun Survey
- Palaeo-Arun Survey
- Active Aggregate Extraction Area
- Inactive Aggregate Extraction Area

Chelmsford
London
Canterbury
Portsmouth

Kilometres
0 1 2 4 6 8
1:200,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 5.14.4 Palaeo-Arun Survey and aggregate areas

Scoping Report

System Identifier:				Version:
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Company: MA Ltd	Drawn By: RLF	Chk/Aprvd: WOOD	Drawn Date: 21/05/2020	Status: FINAL

Basis for scoping assessment

5.14.28 The marine archaeology scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**.

- The construction of up to 116 WTGs on either monopiles, jackets, suction buckets or suction caissons with associated seabed preparation and scour protection, where required.
- The construction of up to three offshore substations and associated foundations including monopiles, jackets and topside platforms with associated seabed preparation and scour protection.
- It is anticipated that the array cables will be installed via either ploughing, jetting, trenching, or post-lay burial techniques, depending on ground conditions along the specific cable route. The array cables will typically be buried at a target burial depth of 1m below the seabed surface.
- The removal of all offshore infrastructure above the seabed during decommissioning.

5.14.29 The basis for the marine archaeology assessment also includes the embedded environmental measures (detailed below) where appropriate.

Embedded environmental measures

5.14.30 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on marine archaeology (see **Table 5.14.7**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.14.31 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.14.7 Relevant marine archaeology embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-57	A Marine Written Scheme of Archaeological Investigation (WSI) will be developed in accordance with the Outline Marine WSI. The Marine WSI will include the implementation of a Protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014).	DCO requirements or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
C-58	A offshore geophysical survey (including a UXO survey) will be undertaken prior to construction and will be subject to a full archaeological review in consultation with Historic England.	DCO requirements or DML conditions.
C-59	A offshore geotechnical survey will be undertaken prior to construction, including a staged geoarchaeological assessment and analysis of geotechnical data inclusive of publication, in consultation with Historic England.	DCO requirements or DML conditions.
C-60	The offshore export cable corridor and the array will be routed to avoid any identified archaeological receptors pre construction, with buffers as detailed in the Marine Written Scheme of Investigation WSI.	DCO requirements or DML conditions.

Likely significant effects

5.14.32 The likely significant effects on marine archaeology are summarised in **Table 5.14.8**. In line with the 2017 EIA Regulations, the EIA for Rampion 2 will only consider those impacts where there is an identified risk of likely significant effect to receptor pathways. Where available evidence indicates that an effect-receptor pathway will not lead to a significant impact, with regards to the EIA Regulations (2017), the pathway is scoped out from assessment.

5.14.33 The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for marine archaeology effects, relevant policy, standard/best practice guidance (listed in **5.14.11** above) and the professional judgement of qualified marine archaeologists.

5.14.34 **Table 5.14.8** is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered, is presented after the table, supported by the evidence base.

Table 5.14.8 Likely significant marine archaeology effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Removal of sediment containing undisturbed archaeological contexts during seabed preparation for WTG and offshore substation foundations leading to total or partial loss of the receptor (Construction).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Penetration of piling foundations resulting in total or partial loss of the receptor (Construction).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Compression of stratigraphic contexts containing archaeological material from combined weight of foundation, transition piece, tower and WTG (Construction).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Disturbance of sediment containing potential archaeological receptors (material and contexts) during the laying of inter-array cables (Construction).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Disturbance of sediment containing potential archaeological receptors (material and contexts) during export cable laying operations (Construction).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Penetration and compression effects of jack-up barges and anchoring of construction vessels during WTG, sub-station or cable	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
installation leading to total or partial loss of archaeological receptors (material or contexts) (Construction).		geophysical survey data; Geoarchaeological assessment of geotechnical data.			
Scour effects caused by the presence of WTG substation foundations and the exposure of inter-array and export cables or the use of cable protection measures (Construction).	C-57 C-58 C-59 C-60	Currently only the general locations of known wrecks and obstructions are available. Therefore, the position and extent of the marine archaeological resource within Rampion 2 is not yet established. Effects may include exposing archaeological receptors to natural, chemical or biological processes and causing or accelerating loss of the same.	**Scoped in.** A **simple assessment** approach will be adopted involving review of geophysical survey data, with an appraisal of potential receptor sensitivity to establish appropriate Archaeological Exclusion Zones (AEZs).	Discrete archaeological finds, sites or features, including palaeoenvironmental deposits.	100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data; Coastal Processes input to determine extent of scour effects.
Penetration and compression effects on seabed caused by corrective and preventative operation and maintenance activities (via jack-up vessels) (Operation).	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data.	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A
Draw-down of sediment into voids left by removed WTG foundations leading to loss of sediment (Decommissioning).	C-57 C-58 C-59 C-60	Currently only the general locations of known wrecks and obstructions are available. Therefore, the position and extent of the marine archaeological resource within Rampion 2 is not yet established. Effects may include the destabilisation of archaeological sites and contexts, and exposing such material to natural, chemical and biological processes, causing or accelerating loss of the same.	**Scoped in.** A **simple assessment** approach will be adopted involving review of geophysical survey data, with an appraisal of potential receptor sensitivity to establish appropriate AEZs.	Discrete archaeological finds, sites or features, including palaeoenvironmental deposits.	100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data; Geoarchaeological assessment of geotechnical data; Coastal Processes input to determine extent of scour effects.
Penetration and compression effects of jack-up barges and anchoring of	C-57 C-58 C-59 C-60	**No likely significant effect.** 100% of the final design plan for Rampion 2 will be subject to archaeological review of the geophysical survey data;	**Scoped out** Further rationale is provided in the section below (**paragraph 5.14.32**).	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
decommissioning vessels leading to total or partial loss of archaeological receptors (material or contexts) (Decommissioning)		Geoarchaeological assessment of geotechnical data.			

Impacts scoped out of assessment

5.14.35 All likely significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

5.14.36 The impacts that are being scoped out at this stage, as listed in **Table 5.14.8** above, have been determined based on the embedded environmental measures adopted for Rampion 2, forming commitments by RWE to avoid all identified archaeological receptors of a medium or high archaeological potential. Through the establishment of AEZs of an appropriate size and extent, the embedded environmental measures (primary, secondary and tertiary) will ensure that Rampion 2 is micro-sited so that direct impacts on marine archaeological receptors, such as those listed in **Table 5.14.8** above, will not occur.

5.14.37 Tertiary mitigation in the form of an archaeological WSI and project specific reporting protocol for unexpected discoveries will ensure that environmental measures are managed effectively post-consent. The implementation of a WSI, agreed with Historic England, will form a commitment in the deemed Marine Licences.

Cumulative effects

5.14.38 Cumulative effects on marine archaeology resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.14.39 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.

- During construction, potential cumulative changes to sedimentary transport from the installation of foundations and cables could occur with other developments in close proximity to Rampion 2.
- During construction, operation and maintenance of Rampion 2, potential cumulative effects of the deployment of jack-up barge spud-legs and anchoring of vessels, resulting in seabed disturbance, may occur.

5.14.40 Such cumulative effects may expose marine archaeology receptors to natural, chemical, or biological processes, causing and accelerating total or partial loss of the same.

Transboundary effects

5.14.41 Due to the localised nature of any potential impacts on marine archaeological receptors, transboundary effects are unlikely to occur and therefore it is proposed that this impact be scoped out from further consideration within the EIA, see **Appendix B**.

Proposed approach to PEIR and ES

5.14.42 The approach to both the PEIR and ES assessments is set out in **Chapter 4 The EIA Process**.

5.14.43 Consultation will be held with relevant statutory (Historic England) and non-statutory organisations as necessary and as part of the Evidence Plan process which is set out in **Section 4.3 Consultation and the evidence plan process**.

5.14.44 Impacts on marine archaeology will be mitigated though the application of embedded primary, secondary and tertiary environmental measures. In addition to the development of the baseline for the application of primary environmental measures, the assessment approach is highly dependent on the application of secondary environmental measures realised through the review of geophysical and geotechnical survey data in order to identify currently unknown marine archaeology receptors.

5.14.45 Secondary environmental measures will comprise a full archaeological review of marine geophysical survey data to identify receptors and assign them with an archaeological potential of low, medium or high. This will be based on geophysical survey data covering 100 percent of the seabed within the development area, currently expected to be undertaken June / July 2020.

5.14.46 This will be based on a limited coverage survey at the application phase, with 100 percent coverage of the final design plan reviewed prior to construction.

5.14.47 Primary and secondary mitigation will be developed based on the principles of avoidance as described in *Model Clauses for Written Schemes of Investigation* (The Crown Estate, 2010) and established industry best-practice. For discrete archaeological features this will be based primarily on avoidance.

5.14.48 Tertiary mitigation will be delivered through the development of an outline Marine WSI detailing all marine archaeology environmental measure commitments and outlining specific packages of work required to meet those commitments. The WSI will describe the roles and responsibilities of the applicant, statutory advisors, and archaeological contractors, and set out the requirements for further surveys and monitoring to deliver all requirements of the embedded environmental measures.

5.14.49 A Protocol for Archaeological Discoveries will also be developed alongside the WSI to inform all managers and contractors undertaking offshore work for Rampion 2 throughout all project phases.

5.15 Socio-economics

Introduction

5.15.1 The socio-economics assessment will consider the potential likely significant effects on the socio-economic receptors (including overall economic and tourism economy, demographic, accommodation and social and community infrastructure, as well as offshore and onshore recreation receptors) that may arise from the construction, operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within the

EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

5.15.2 Socio-economics interfaces with certain other aspects (both onshore and offshore) and as such, should be considered alongside these; namely:

- **Section 5.2: Other marine users** (for possible effect to related specific marine offshore sectors not covered by this chapter, relating to socioeconomic, recreation and the visitor economy);
- **Section 5.12: Landscape, seascape and visual** (for possible effect to onshore and offshore viewpoints to recreation and the visitor economy);
- **Section 6.2: Landscape and visual impact** (for possible effect from onshore viewpoints to recreation and the visitor economy socioeconomics and tourism industry);
- **Section 6.5: Noise and vibration** (for possible effects to onshore noise interacting with onshore recreation and the visitor economy); and
- **Section 6.7: Transport** (for possible effects to onshore traffic interacting with recreation and the visitor economy)).

Study area

5.15.3 The study area for the socio-economics assessment is defined as the Rampion 2 Scoping Boundary together with the Zones of Influence (ZOIs). These differ based on the receptors being assessed and take into consideration amongst other things uncertainty regarding the location of ports for both the construction and operation and maintenance (O&M) phases. However, the inclusion of Sussex as the primary study area suggests that this is the most likely location for the ports for both phases. Other UK-based ports may also be used, and as such a UK-wide study area is also included to capture the benefits associated with the use of other (non-Sussex) ports. As the project progresses and more information on potential ports is made available, scenarios considering the use of local ports and project expenditure captured by local businesses will be developed. Other ZOIs used in the assessment are outlined below:

- Zone of theoretical visibility (i.e. the area from which the Proposed Development will be visible) - used in assessing the impact of offshore infrastructure on the tourism economy;
- Onshore cable route – divided into sections reflecting characteristic areas along the cable route (such as landfall to South Downs National Park (SDNP) boundary, within SDNP, and the High Weald Area of Outstanding Natural Beauty (AONB)), and used in assessing the impact of onshore infrastructure on recreation and the tourism economy; and
- Inshore and offshore – used in the assessment of recreation activity.

5.15.4 An overview of the key receptors and respective ZOIs proposed is provided in **Table 5.15.1** below.

Table 5.15.1 Summary of receptors and ZOIs used

Receptor	Onshore / Offshore	Study area	Justification
Economy	Onshore	Sussex and UK	Given the relatively specialist nature, supply chain expenditure and employment is likely to be spread widely, and is best captured at the Sussex and national level.
Demographic	Onshore	Sussex	Labour market catchments for both construction and O&M activity typically extend over a 90-minute drive time, which roughly covers the whole of Sussex.
Social and community infrastructure (SCI) and accommodation	Onshore	Sussex	Demand on SCI and accommodation will reflect labour market catchments, but is likely to be concentrated within the largest settlements located close to selected construction and O&M ports and onshore cable route.
Tourism economy	Offshore	Zone of theoretical visibility	The impact of offshore infrastructure is best captured by considering the onshore area(s) from which the Proposed Development will be visible.
Tourism economy	Onshore	Cable corridor (divided into relevant sections – TBD)	The impact of onshore cable and substation construction activity on tourism and recreation activity will be focussed along the cable corridor route.
Recreation	Offshore	Offshore and inshore	Offshore and inshore recreation is likely to be impacted within the area of the Proposed Development, relevant safety buffers (during both construction and O&M) and in close proximity to landfall.
Recreation	Onshore	Cable corridor (divided into relevant sections – TBD)	The impact of onshore construction and O&M activity on recreation activity and the relevant receptors will be focussed along the cable corridor.

5.15.5 The study area will be reviewed and potentially amended in response to such matters as refinement of the offshore and onshore components, the identification

of additional impact pathways and in response where appropriate to feedback from consultation.

Assessment methodology

Introduction

5.15.6 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4**. However, whilst this has informed the approach that has been used in this socio-economics chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the socio-economics assessment.

5.15.7 In its guidance on socio-economics, the Overarching National Policy Statement for Energy states that all relevant socio-economic effects (which may include the creation of jobs and training opportunities, additional local services, improvements to local infrastructure, the effects on tourism and impacts on the labour) should be considered. However, guidance provided is limited, and as such, the assessment will consider the likely significant effects associated with both onshore and offshore infrastructure. For offshore infrastructure (e.g. turbines) the assessment will consider both onshore and offshore receptors. For instance, in relation to tourism activity, the assessment will consider the effect on both onshore and offshore recreation. However, the assessment of effects associated with onshore infrastructure (e.g. cable and substation construction) will be limited to only onshore receptors. The focus of the assessment will be on the tourism economy (as a whole), and how the offshore and onshore infrastructure will affect this in distinct ways. The socio-economic assessment does not differentiate between offshore and onshore infrastructure and the manner in which may lead to socio-economic effects.

Modelling economic activity and employment impacts

5.15.8 For the key quantitative measures of economic impact (i.e. employment ang GVA) the socio-economic assessment will use an economic impact model to estimate the direct and indirect employment and GVA impacts during the construction and operations and maintenance phases. The model makes assumptions about project expenditure for each phase and the retention of this expenditure within the study areas. Induced impacts have been excluded as they are typically affected by greater uncertainty and are more difficult to defend robustly in terms of their scale and additionality. The assessment of economic impacts will be calculated using an approach consistent with methods for economic impact assessment set out in HM Treasury Green Book (2018).

5.15.9 The assessment will develop estimates on the anticipated construction, O&M and decommissioning costs, drawing on evidence provided by the Crown Estate, the Catapult for Offshore Renewable Energy, recent developments, as well as the latest outcomes of contracts for difference (CfD) auctions. This approach will ensure that construction, O&M and decommissioning costs are based on best practice and take into consideration changes in costs for the industry, and overall lifecycle costs.

5.15.10 The assessment will also make assumptions on the use of local (i.e. both Sussex and UK-based) ports for construction, O&M and decommissioning phases of Rampion 2. The assessment will develop two scenarios based on varying assumptions in the amounts of goods and services sourced from within Sussex and the UK, in addition to the use of local ports. The sourcing assumptions will be informed by RED's track record delivering wind farms (in particular the existing Rampion 1 project), evidence of local and national supply chain strengths, and ex-post assessments for other offshore wind farms about the retention of construction, O&M and decommissioning expenditure in the UK.

Modelling demographic, housing and SCI impacts

5.15.11 To assess the impact of the Proposed Development on demographic, housing and SCI impacts, the socio-economic assessment will draw on the analysis of the workforce supported during the construction, O&M and decommissioning phases. Through this, we will understand the implications the Proposed Development will have on the demographic structure, and the increased demand on housing and SCI impacts. Under the maximum development scenario, it will be assumed that all jobs will be taken up by people who currently reside outside of the study area (i.e. net additional to Sussex), therefore resulting in the highest-possible level of demand on these resources. The increase in demand will be considered both qualitatively and quantitatively against the area's current baseline, drawing on the latest information from across various sources (including local authority datasets, the Department of Health and Social Care, and the Department for Education).

Tourism economy

5.15.12 The assessment of the tourist economy will draw on findings of the available (published) research assessing the impact of both onshore and offshore wind farms on visitors and the visitor economies in the UK. This includes both the WTGs and towers as well as the transmission and grid infrastructure. The assessment will examine the characteristics of the tourism sector within Sussex (including visitor centres, types of visiting activity, and types of visitors) against the scale, location and nature of the offshore and onshore infrastructure (in addition to the proposed methods of construction). Impacts associated with increased tourism activity related to the Proposed Development, or the existing Rampion 1 project (such as boat trips and/ or visits to the visitor centre) will be considered as part of the tourism economy.

Offshore recreation

5.15.13 The assessment of the Proposed Development on offshore recreation will draw on a desk-based review of research available, in addition to consultation with key stakeholders (including local authorities, relevant sector bodies and operators) and the engagement achieved through the Evidence Plan Process (EPP) set out in **Section 4.3)**. This will help build a picture of the existing environment and the potential magnitude of impacts and significance effects.

Onshore recreation

5.15.14 The Institute of Public Rights of Way and Access Management (IPROW) is currently (May 2020) developing best practice guidance for assessing development impacts upon outdoor access and recreation. Our approach will be consistent with IPROW's guidance. Essentially, this is a proportionate approach where the level of research is commensurate to receptor sensitivity. Effort will be concentrated upon assessing sensitive receptors identified through this scoping process and subsequent consultation and investigation.

Assigning significance of effect

5.15.15 With the exception of outdoor access, there are no formalised technical guidance and/or criteria when assessing the scale (and therefore significance) of socio-economic effects. The significance of effects upon outdoor access and recreation will be assigned in accordance with IPROW's guidance. Otherwise, the likely effects of Rampion 2 on the receptors identified will be based on professional judgement and consider the sensitivity of each receptor affects and the magnitude of change to the receptor brought about by the Proposed Development.

5.15.16 In accordance with EIA methodology, the sensitivity of each receptor will be evaluated as either very high, high, medium or low based on a review of the baseline position and its performance against benchmark areas, together with consideration of the importance of the receptor in policy terms.

5.15.17 The magnitude of change (or impact) to a receptor will be determined by considering the estimated deviation from baseline conditions once measures aimed at mitigating any adverse impacts are considered. The criteria used for the assessment of the magnitude of socio-economic impacts will be evaluated as either major, moderate, minor or negligible.

5.15.18 In assessing the likely scale of the effects of Rampion 2, with respect to the Proposed Development's construction, O&M and decommissioning phases, the assessment contextualises both the sensitivity of the receptor and magnitude of change identified above. A matrix is used to determine the scale of the socio-economic effects on a receptor is presented below, with the nature of the effect defined as beneficial, adverse or neutral.

Table 5.15.2 Matrix used to determine scale of effect

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Minor	Moderate	Major
Low	Negligible	Negligible	Minor	Minor/ Moderate
Medium	Negligible	Minor	Moderate	Moderate/ Major
High	Negligible	Minor/ Moderate	Moderate/ Major	Major
Very High	Negligible	Moderate/ Major	Major	Major

5.15.19 Based on the matrix presented above, effects defined as moderate and/ or major are identified as significant effects.

Baseline conditions

Data sources

5.15.20 **Table 5.15.3** below details the data sources and technical reports that will be used to inform the impact assessment. These will be used to identify baseline conditions within the study area and various ZOIs identified, in addition to socio-economic characteristics, opportunities and/ or challenges relevant to the construction and operations and maintenance of Rampion 2. The time periods selected for economic indicators are chosen to cover the whole of the economic cycle, although this is in some cases extended where there is reliable time series data and shortened where the period of available data is limited. For other datasets, it is necessary to rely on the latest-available data due to limited or inconsistent timeseries data.

5.15.21 The collection of research on local economic sector strengths and opportunities (including those specific to the offshore wind sector such as engineering, construction, marine activities and the tourism economy), as well as tourism and recreation assets is on-going. This will include research undertaken by East Sussex and West Sussex County Councils, the Coast to Capital Local Enterprise Partnership (LEP), local authorities, tourism and other sector bodies.

Table 5.15.3 Key sources of socio-economic data

Source	Date	Summary	Coverage of study area
Sub-national Gross Value Added (GVA)	2005-16	Current position and trends in the following for identified ZOIs: - total GVA;	Local authority boundaries (including

Source	Date	Summary	Coverage of study area
		- GVA in sectors of interest; - GVA per head; and - GVA per worker.	full coverage of Sussex).
Business Register and Employment Survey (BRES)	2009-15 and 2015-18	Current position and long-term trends in: - total employment (including full-time equivalent (FTE) employees); - sectoral mix; and - employment in relevant sectors: (i) energy sector, (ii) construction and manufacturing sectors relevant to offshore wind, (iii) tourism, (iv) ports and maritime activity, and (v) recreation activity.	Local authority boundaries (including full coverage of Sussex).
UK Business County	2010-19	Current position and long-term trends in total stock of businesses, including size and sectoral breakdown.	Local authority boundaries (including full coverage of Sussex).
Employment forecasts	2020-40 (or similar period)	Projected changes in (i) total employment (FTEs), and (ii) sectoral mix. Also provides historic data for range of economic and labour market indicators. The availability of forecasts will need to be determined in due course and could be provided/ made available via various sources (e.g. LEP, etc).	Typically local authority boundaries (including full coverage of Sussex).
Mid-year population estimates	2001-18	Current position and long-term trends in total and working age population.	Local authority boundaries (including full coverage of Sussex).
Sub-National Population Projections	2016-41	Projected total and working age population.	Local authority boundaries (including full coverage of Sussex).
Annual Population Survey	2004-19	Current position and long-term trends in:	Local authority boundaries (including

Source	Date	Summary	Coverage of study area
		- the local labour market including (i) economic activity, (ii) employment, and (iii) unemployment; - qualifications; and - occupations.	full coverage of Sussex).
Housing (including rented accommodation)	Latest available / TBD	Data on housing stock, dwelling type and tenure.	Local authority boundaries (including full coverage of Sussex).
Local tourism surveys	Latest available / TBD	Annual estimates of volume and value of tourism activity (day visitors and staying visitors); accommodation occupancy surveys.	Brighton and Hove
Economic Impact of Tourism	Latest available / TBD	Volume and value of tourism economy and the impact of visitor expenditure on the local economy	Brighton and Hove
SCI sources	Latest available / TBD	Data on baseline and capacity of housing and social and community infrastructure (including health and community facilities, education, places of worship, etc).	Local authority boundaries (including full coverage of Sussex)
Ordnance Survey Explorer maps OL10 & OL11	May 2020	The study area was transposed onto the OS sheets followed by a methodical search of the study area for recreation assets. A small, northern section of the study area was reviewed using on-line OS mapping.	Onshore study area
MAGIC – Multi-agency Geographic Information for the Countryside	May 2020	The interactive map-based datasets were interrogated to identify the full suite of formally defined access and recreation assets, ranging from Access Land to Millennium Greens	Onshore study area
Google Earth	May 2020	Aerial photography from Google Earth was used to ‘fly over’ the study area to provide a basic	Onshore study area

Source	Date	Summary	Coverage of study area
		understanding of the recreation geography and to potentially identify assets not recorded on the OS sheets or MAGIC.	
On-line searches onshore	May 2020	On-line searches were made for recreational pursuits involving the Rivers Arun and Adur. Both rivers are used for swimming events and angling. Both are tidal into the study area and small boats, especially canoes, kayaks and SUP use both rivers.	River Arun from Littlehampton to Arundel. River Adur from Steyning to Henfield.
On-line searches inshore	May 2020	On-line searches were made for recreational pursuits in the vicinity of Climping Beach. While the beach is recognised to be quieter than most on this stretch of coast, it is used regularly by windsurfers and kite surfers. At least one kite surfing school uses the beach for lessons.	Inshore at Climping Beach.
Recreational activity	Latest available / TBD	Data on use of offshore and related onshore recreational resources close to offshore wind farm infrastructure and the export and onshore cable corridor route.	TBD in due course.
Economic studies	Latest available / TBD	A range of research and specific assessments on economic activity, supply chain and skills strengths. Evidence of the relationships between offshore wind farm development and the tourism economy within the vicinity of them.	Local Authority boundaries (at this stage level of coverage across Sussex is unknown)
Ports and harbour infrastructure	Latest available / TBD	Literature on the nature and range of facilities, assets and use.	TBD in due course.

5.15.22 In addition to baseline sources outline above, a number of other sources will be used in assessing the potential socio-economic impacts of Rampion 2. Reports and resources include, but are not limited to the following:

- UK Offshore Wind: Charting the Right Course: Building the Offshore Wind Supply Chain;
- A Guide to an Offshore Wind Farm;
- socio-economic indicators of marine-related activities in the UK economy;
- The Economic Impacts of Wind Farms on Scottish Tourism: A report for the Scottish Government;
- Strategic Review of UK East Coast Staging and Construction Facilities;
- analysis of the Employment Effects of the Operation and Maintenance of Offshore Wind Parks in the UK. A Report for Vestas Offshore;
- Working for a Greener Britain: Vol 2 – Future Employment and Skills in the UK Wind and Marine Industries;
- Economic and Community Benefit Study Final Report;
- Tourist Attitude Towards Wind Farms;
- user data held by key stakeholder (e.g. visitor count results for the South Downs Way and the Sustrans routes 2 and 223);
- WSCC Rights of Way Improvement Plan and online interactive maps of PRoWs;
- Outdoor Recreation Valuation Tool (ORVal);
- data from key interest groups (e.g. walkers, riders, cyclists, kite surfers and wind surfers); and
- Natural England's Monitor of Engagement with the Natural Environment.

5.15.23 Furthermore, as part of the scoping report, we have also undertaken informal consultation with officers from the South Downs National Park Authority and West Sussex County Council. The consultation identified key recreational assets and any issues that will need particular attention. In addition, it was flagged that in-depth consideration will need to be given to events held on specific assets, notably the South Downs Way. Furthermore, consultation with West Sussex County Council identified the value of production of a PRoW Strategy, as undertaken for the existing Rampion 1 project.

Baseline

5.15.24 The baseline provides an overview of the socio-economic characteristics of the study area by exploring a range of indicators that are particularly relevant to the selected receptors.

Population

5.15.25 Sussex has a population of 1,413,400 people, of whom 824,100 are working age (or 58%), which is below the regional and national averages (of 61% and 63% respectively).

Table 5.15.4 Population, total and working age, 2018

Area	Population (000s)	Working Age (Aged 16-64) Population (000s)	Working Age Population as % of Total
Sussex	1,413	824	58%
South East	9,134	5,617	61%
UK	66,435	41,646	63%

Source: Office for National Statistics (2018a). Numbers are rounded to nearest 1,000.

Labour Market

5.15.26 Sussex's economic activity rate of 83%, is higher than the UK and South East averages, as is the employment rate (of 80%). The number of economically inactive people is just 17%, lower than both the South East (18%) and the UK (21%). This indicates a highly active population and a tight labour market.

Table 5.15.5 Labour market performance, Jan 2019 – Dec 2019

Area	Economically active		In Employment		Economical inactive	
	Number (000s)	% WAP	Number (000s)	% WAP	Number (000s)	% WAP
Sussex	678	83%	657	80%	143	17%
South East	4,571	82%	4,429	79%	1,003	18%
UK	32,557	79%	31,266	76%	8,774	21%

Source: Office for National Statistics (2019). Numbers are rounded to nearest 1,000.

5.15.27 The unemployment rate in Sussex (3%) is slightly lower than the average for the UK as a whole (4%) and the same as the regional average (3%).

Table 5.15.6 Number of Unemployed Residents, Jan 2019 – Dec 2019

Area	Number unemployed (000s)	Unemployment rate (% econ. active population)
Sussex	21	3%
South East	142	3%
UK	1,290	4%

Source: Office for National Statistics (2019). Numbers are rounded to nearest 1,000.

5.15.28 Sussex underperforms slightly in terms of higher-level skills when compared with the position nationally. Around 39% of working age residents in the Sussex have degree-level qualifications compared with 40% nationally and 43% in the South East. However, in terms of achieving lower than degree level qualifications, Sussex performs strongly, with just 6% of the working aged population with no qualifications.

Table 5.15.7 Qualifications of working-age residents, Jan 2019 – Dec 2019

Area	Level 4 +		Level 3 +		Other / Apprenticeships		Level 1 +		No Qualifications	
	Number (000s)	%	Number (000s)	%	Number (000s)	%	Number (000s)	%	Number (000s)	%
Sussex	323	39%	471	58%	47	6%	725	89%	46	6%
South East	2,416	43%	3,455	62%	299	5%	4,942	89%	322	6%
UK	16,573	40%	24,084	58%	2,733	7%	35,250	86%	3,244	8%

Source: Office for National Statistics (2019). Numbers are rounded to nearest 1,000.

5.15.29 Almost a third of Sussex's residents are in high skill occupations, one percentage point below the national average and four percentage points below the regional average. The proportion of residents in medium skill occupations is higher than the national average and the regional average. The proportion of residents in low skilled occupation is two percentage points higher than national average, but two percentage points lower than the regional average.

Table 5.15.8 Occupations of working age residents, Jan 2019 – Dec 2019

Area	High Skilled Occupations		Medium Skilled Occupations +		Low Skilled Occupations	
	Number (000s)	%	Number (000s)	%	Number (000s)	%
Sussex	224	32%	256	37%	215	31%
South East	1,677	36%	1,609	35%	1,336	29%
UK	10,625	33%	11,139	34%	10,674	33%

Source: Office for National Statistics (2019). Numbers are rounded to nearest 1,000.

Employment by Sector

5.15.30 There are 592,000 jobs within Sussex, equating to an estimated 466,000 FTE jobs. Employment density in the Sussex is around 718 jobs for every 1,000 working age residents, which is below the national average by 22 jobs for every 1,000 residents. From 2010 to 2018 employment has increased at a slower rate than nationally, +9% in Sussex compared with +11% in Great Britain. This is the same rate as the South East has seen over the same period.

Table 5.15.9 Employment and employment density, 2018

Area	Total Employment (000s)	Change in Employment 2010 - 2018	Employment Density (Jobs per 1,000 working age residents)	Estimated FTE Number of employees (000s)
Sussex	592	9%	718	466
South East	4,285	9%	763	3,455
GB	30,815	11%	740	24,945

Source: Office for National Statistics (2018b). Numbers are rounded to nearest 1,000.

5.15.31 Analysis of employment by sector highlights the importance of the wholesale and retail sector in Sussex. It is the largest employment sector within the area,

accounting for 17% of all employment. Location Quotient (LQ) analysis shows the transportation and storage sector in Sussex is the most relatively concentrated compared with Great Britain (LQ 1.25), reflecting the specialisation of the sector in Sussex. Other key employment sectors in Sussex include accommodation and food services in addition to human health & social care, which are both in the top five sectors in terms of employment and level of specialisation.

Earnings and Wealth Generation

5.15.32 On average East Sussex's residents earn just over £1,000 less the national average. Whereas West Sussex residents earn almost £1,000 more on average than the UK average. This puts the whole of Sussex on a similar standing to national earnings. However, earnings of Sussex residents are below the rest of the South East which outperforms the national indicator.

5.15.33 Workplace-based earnings are lower in Sussex than resident-based earnings, indicating a high level of out-commuting by Sussex residents (particularly to London). Workplace based earnings in East Sussex and West Sussex lag the national average by over £3,500 and almost £1,500 respectively.

Table 5.15.10 (gross annual) Resident and workplace median earnings for full-time employees

Area	Residence based earnings (£)	Workplace based earnings (£)
East Sussex	£29,345	£26,699
West Sussex	£31,259	£28,915
South East	£33,357	£32,120
UK	£30,353	£30,353

Source: Office for National Statistics (2018c).

5.15.34 In 2018 Sussex contributed £40.1 billion GVA to the UK economy. GVA per head of population shows a small gap between Sussex and the UK, with GVA per head for Sussex being 1% below the national average (approximately £28,400 compared with £28,700). There is a more significant GVA per head gap with the South East which Sussex lags by 6%.

Table 5.15.11 GVA and GVA per head

Area	Total GVA (£millions)	GVA per head
Sussex	£40,131	£28,392
South East	£277,260	£30,356

Area	Total GVA (£millions)	GVA per head
UK	£1,908,608	£28,729

Source: Office for National Statistics (2018d).

Supply Chain Capacity and Capability

5.15.35 Several sectors have the potential to be impacted by construction and O&M of the Proposed Development including construction and engineering sectors. It is likely that a share of this employment is already engaged in offshore wind supply chain activities given recent developments along the south coast and more widely nationally.

5.15.36 The existing Rampion 1 project is the only offshore wind farm along the south coast. As such, employment sectors commonly associated with wind farms do not show particularly high concentrations of employment in this region compared to the GB average.

Table 5.15.12 Employment in key strategic sectors

Sector	GB Employment		Sussex Employment		Sussex LQ
	Number (000s)	%	Number	%	
Manufacturing	2435	7.9%	40,500	6.8%	0.87
Construction	1494	4.8%	29,500	5.0%	1.03
Land based transport	569	1.8%	8,250	1.4%	0.76
Civil Engineering	216	0.7%	4,000	0.7%	0.97
Energy Generation	102	0.3%	1,335	0.2%	0.68
Marine Transport	13.5	0.04%	65	0.01%	0.25

Source: Office for National Statistics (2018b). Numbers are rounded to nearest 1,000.

Key Settlements

5.15.37 Brighton and Hove is the largest built-up urban area within Sussex. It is home to more than a third of Sussex's total population. There are, however several other significant towns which have populations exceeding 100,000 (as shown in the table below).

Table 5.15.13 Major Towns & Cities

Area	Population (000s)
Brighton and Hove	501
Crawley	192
Hastings	138
Eastbourne	125
Worthing	115
Bognor Regis	70

Source: Office for National Statistics (2018e). Numbers are rounded to nearest 1,000.

5.15.38 Sussex has a total housing stock of 635,000 dwellings, the majority of this is within the private sector (88%).

Table 5.15.14 Housing Stock, 2018

Area	Number of Dwellings (000s)
Sussex	635
South East	2,706
GB *	27,954

Source: Office for National Statistics (2018f). *Data for GB is for 2017.

Health Care

5.15.39 Health care in Sussex is the responsibility of three clinical commissioning groups covering East Sussex, West Sussex and Brighton and Hove. NHS data shows a total of nine hospitals in Sussex, the largest of which is the Royal Sussex County Hospital.

- Crawley Hospital;
- Crowborough War Memorial Hospital;
- Kent and Sussex Hospital;
- Nuffield Health, Brighton Hospital;
- Royal Sussex County Hospital;

- Spire Sussex Hospital;
- Sussex Eye Hospital;
- Sussex Orthopaedic Treatment Centre; and
- Worthing Hospital.

Offshore Recreation

5.15.40 Sussex attracted a total of over 9.5 million visitor day trips in 2018. Within Sussex, Brighton is a significant tourism hotspot. In total, around £864 million was spent on trips to Brighton and Hove in 2018 by overnight and day visitors. The highest proportion of visitors indicated that the main purpose of their visit to Brighton and Hove was for 'leisure/ holiday' purposes (79%). Many visitors engage in offshore recreation activities. 26% of all visitors had the sea/beach as the initial trigger for visiting Brighton and 1% of all visitors visited Brighton and Hove to pursue a water sport/interest (TSE Research, 2018). Detailed assessments of other (offshore) marine uses including water sports, recreational fishing and diving are provided in **Section 5.3: Other marine users, Section 5.6: Commercial fisheries and Section 5.9: Shipping and navigation**.

Onshore Recreation

5.15.41 The study area falls more than 50% within the SDNP, with a further section falling within the High Weald AONB. Approximately, 20-million day visits are made to the national park each year, the majority of which include activities such as walking, wildlife watching and/ or cycling.

5.15.42 The study area includes numerous PRoWs and other access routes which may be crossed by the Proposed Development, notably (from south to north):

- the England Coast Path National Trail;
- National Cycling Network route 2;
- Monarch's Way;
- the South Downs Way National Trail;
- the Coastal Link; and
- the Downs Link / National Cycling Network route 223.

5.15.43 The SDNP Authority's annual review for 2014/15 indicates that more than 300,000 people use the South Downs Way each year. Whilst this does not mean that each user completes the whole trail, it strongly suggests that a considerable number will be travelling through the section(s) crossed by the study area. Use of the South Downs Way is by a combination of cyclists, walkers and horse riders. A 2019 investment of more than £0.5 million of EAFRD funding to resurface the Downs Link illustrates the importance that West Sussex County Council and Sustrans attach to this route.

5.15.44 The rivers Arun and Adur are both both crossed by the study area and are significant recreational assets. Both re used for swimming events, are followed by PRoWs, and are recognised as canoeing/ kayaking assets.

5.15.45 At the coast, the main recreational asset is Climping Beach and inshore sea. There is considerable wind surfing and kite surfing in this area.

Basis for scoping assessment

5.15.46 The socio-economics scoping assessment is based on the following key assumptions which are also set out in **Chapter 2 The Proposed Development**.

- Landfall – It is assumed that HDD techniques will be used for making landfall, for passing under the rivers Arun and Adur and for passing under roads.
- Trenches and cables – It is assumed that where open trenching is used, conduits will be put in place so that cables can be pulled through at a later date, enabling the closure of trench section as soon as conduits are in place, therefore reducing the length of time onshore recreation assets are impacted by construction activity. It is anticipated that electrical cables will be left in-situ upon decommissioning, both offshore and onshore to minimise environmental impacts associated with removal. This means that the decommissioning of the proposed development will not require the need for any trenching.
- Operation and maintenance – It is assumed that the natural landscape will be reinstated following completion of construction works (all trenches are backfilled with approximately 1m of soil), As such, it is assumed that the impact of onshore infrastructure on inshore and onshore recreation during the O&M will be limited (to landfall, the onshore substation, and when emergency repairs are required). When repairs along the cable corridor are required these will likely be localised. Similar mitigation measures to those implemented during the construction (e.g. mufflers and acoustic barriers and temporary diversions to PRoWs) will be put in place to ensure that the disruption to users is minimised.
- Decommissioning – The decommissioning of the wind farm is anticipated to involve the removal of all offshore infrastructure above the seabed, and the removal and reinstatement of the onshore substation site. It is assumed that the level of offshore activity during decommissioning will involve similar levels of equipment and is likely to be undertaken in reverse to the sequence of construction works.

Embedded environmental measures

5.15.47 As part of the Rampion 2 design process, a number of embedded measures are proposed to reduce the potential for impacts on Socio-economics (see **Table 5.15.15**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

5.15.48 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 5.15.15 Relevant socio-economic embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length.	Development Consent Order (DCO) works plans, description of development and requirements.
C-2	Cables will be installed in ducting.	DCO work plans, description of development and requirements.
C-4	Horizontal Directional Drill (HDD) techniques will be used at the landfall location.	DCO works plan, description of development and requirements.
C–9	Joint bays will be completely buried, with the exception of where access will be required from ground level (via manholes).	DCO work plans, description of development and requirements.
C–18	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, public right of way (PRoW) and watercourse.	Code of Construction Practice (COCP) and DCO requirement.
C–19	The onshore cable route will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced. At regular intervals (typically 600m – 1,000m) along the route joint bays/ pits will be installed to enable the cable installation and connection process.	COCP and DCO requirement.
C–22	Core working hours for construction of the onshore components will be 07:00 to 19:00 Monday to Friday, and 08:00 to 13:00 on Saturdays, apart from specific circumstances to be set out and agreed in the COCP.	COCP and DCO requirement.
C–26	Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers and other suitable solutions will be applied.	COCP and DCO requirement.

ID	Environmental measure proposed	How the environmental measures will be secured
C–32	Signage and/ or temporary PRoW/ footpath diversions will be provided during construction.	COCP and DCO requirement.
C-33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users, existing land uses and provide details of measures to protect environmental receptors.	COCP and DCO requirement.
C-34	RED will identify opportunities for companies based or operating in the region to access supply chain for the Proposed Development.	COCP and DCO requirement.
C-35	RED will work with local partners and seek to maximise the ability of local people to access employment opportunities associated with the construction and operation of the Proposed Development.	COCP and DCO requirement.
C-46	Advanced warning and accurate location details of construction, maintenance and decommissioning operations, associated safety zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins. The undertaker must ensure that a local notice to mariners is issued at least 14 days prior to the commencement of the authorised project or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant locations.	DCO requirements or DML conditions.
C–56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined	Electricity application procedures (Section 95 of Energy Act 2004).

ID	Environmental measure proposed	How the environmental measures will be secured
	by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	
C–66	The Proposed Development will aim to minimise effects on the special qualities of the South Downs National Park and High Weald AONB through careful design consideration in terms of scale, size and location, and taking account of the relevant policy and guidance.	DCO work plans, description of development and requirements.
C–100	The soft-start programme will be determined in discussion with the Diving Liaison Officer. Consideration will be given to the potential for divers to be in the water outside of the advisory exclusion zone at the start of pile driving. This consideration will also include diving activities that could result in divers drifting into the advisory exclusion zone as part of their dive (i.e. tide and wind conditions will be assessed as part of the programme).	DCO requirement of DML conditions.
C–101	To limit potential exposure to hazardous levels of underwater noise, a comprehensive awareness and communications strategy (a Diver Communication Plan) will be developed by RED in agreement with regulatory authorities to notify the diving/ spearfishing community of the timing and duration of proposed works. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat operators, Coast Guard, and facilities within jetties and marinas etc. The strategy will be widely publicised	DCO requirement or DML conditions.

ID	Environmental measure proposed	How the environmental measures will be secured
	(e.g. on the internet), and will include details of the nature, location and timing of pile driving works and the extent of any relevant exclusion zones. The 'startle' reaction to underwater noise is anticipated as being less likely to occur in divers / spearfishers who have prior knowledge of the possibility of piling noise occurring.	

Likely significant effects

5.15.49 In line with the 2017 EIA Regulations, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations (2017) the pathway is scoped out from assessment.

5.15.50 The likely significant effects on socio-economics are summarised in **Table 5.15.16**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for socio-economic effects, and professional judgement (based on previous experience undertaking similar assessments). The approach to this assessment is set out in **Chapter 4: The EIA Process.**

5.15.51 This is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 5.15.16 Likely significant socio-economic effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impact on employment as a consequence of construction of the wind farm (Construction)	C–34; and C–35.	Potential for expenditure on the construction of the Proposed Development to support employment in UK (and Sussex-based) companies that are directly engaged in its construction supply chain. The Proposed Development could also go on to support employment indirectly in the wider supply chain.	**Scoped in Detailed assessment**	Employment	Desk-based analysis of baseline employment conditions in sectors related to the construction of offshore wind farms. This will draw on publicly available datasets.
Impact on GVA as a consequence of construction of wind farm (Construction)	C-34; and C–35.	Potential for expenditure on the construction of the Proposed Development to support GVA output in UK (and Sussex-based) companies that are directly engaged in its construction supply chain. The Proposed Development could also go to support GVA creation indirectly in the wider supply chain.	**Scoped in Detailed assessment**	GVA	Desk-based analysis of baseline GVA conditions in sectors related to the construction of offshore wind farms. This will draw on publicly available datasets.
Impact on population structure due to	None	**No likely significant effect** - Sustained change in the area's population, and overall demographic	**Scoped out** Further rationale is	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
increased demand for labour (Construction)		due to increased demand for labour during the construction phase.	provided in the section below **(paragraph 5.15.52)**.		
Impact on the demand for housing, accommodation and local services (Construction)	None	**No likely significant effect -** Direct and indirect employment generated during the construction phase could increase demand for housing, accommodation and local services.	**Scoped out** Further rationale is provided in the section below **(paragraph 5.15.52)**.	N/A	N/A
Impact on volume and value of the tourism economy (including day and overnight visitors) (Construction)	C-46	Changes to the number and overall expenditure by visitors (both day and overnight) to the local area during the construction phase. This will include an assessment of the visual impacts arising as a result of construction of offshore infrastructure, in addition to the impacts generated by onshore construction activity.	**Scoped in; Detailed assessment**	Tourism economy	Desk-based research and consultation with relevant local authority officers to ascertain conditions and scale of the tourism economy locally.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impact on access to and enjoyment of onshore recreation activity (Construction)	C–2; C–18; C–19; C–22; C–26; C–32; C–33; C–46; and C-66.	Direct effects on onshore recreational and utility users as a result of the loss of amenity land, closure and/ or diversion of PRoWs and disruption to tourism assets and attractions.	**Scoped in Detailed assessment**	Onshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups and providers of onshore recreation facilities.
Impact on offshore and inshore recreation activity (Construction)	C–4; C–100; and C-101.	Loss of amenity and/ or disturbance to offshore recreation as a result of construction activity and/ or buffer zones implemented as a means to protect personnel during construction phase.	**Scoped in Simple assessment**	Offshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups, and providers of offshore recreation.
Impact on employment as a consequence of O&M supply chain expenditure. (Operation)	C–34; and C–35.	Potential for expenditure on to support employment in UK (and Sussex-based) companies that are directly engage in its O&M supply chain. The Proposed Development could also go on to support employment indirectly in the wider supply chain.	**Scoped in Detailed assessment**	Economy	Desk-based analysis of baseline employment conditions in sectors related to the construction of offshore wind farms. This will draw on publicly available datasets.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impact on GVA supported as a consequence of O&M activity (Operation)	C–34; and C–35.	Potential for expenditure to support GVA output in UK (and Sussex-based) companies that are directly engaged in its O&M supply chain. The Proposed Development could also go to support GVA creation indirectly in the wider supply chain.	**Scoped in Detailed assessment**	Economy	Desk-based analysis of baseline GVA conditions in sectors related to the construction of offshore wind farms. This will draw on publicly available datasets.
Impact on population structure due to demand for labour (Operation)	None	**No likely significant effect** - Sustained change in the area's population, and overall demographic due to increased demand for labour during the O&M phase.	**Scoped out** Further rationale is provided in the section below **(paragraph 5.15.52)**.	N/A	N/A
Impact on the demand for housing, accommodation and local services (Operation)	None	**No likely significant effect -** Direct and indirect employment generated as a result of O&M activity could increase demand for housing, accommodation and local services.	**Scoped out** Further rationale is provided in the section below.	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impact on volume and value of the tourism economy (including day and overnight visitors) (Operation)	C–1; C–4; C–9; C–26; C–35; and C–46.	Changes to the number and overall expenditure by visitors (both day and overnight) to the local area as a result of O&M activity. This will include an assessment of the visual impacts of the Proposed Development's offshore infrastructure, in addition to the impacts generated by onshore infrastructure.	**Scoped in Simple assessment**	Tourism economy	Desk-based research and consultation with relevant local authority officers to ascertain conditions and scale of the tourism economy locally.
Impact on access to and onshore recreation activity (Operation)	C–1; C–9; C–26; and C-66.	Direct and long-term effects on onshore recreational and utility users as a result of changes to amenity land, closure and/ or diversion of PRoWs and disruption to tourism assets and attractions (when repairs are required).	**Scoped in Detailed assessment**	Onshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups and providers of onshore recreation facilities.
Impact on offshore and inshore recreation activity (Operation)	C–56.	**No likely significant effect** - Loss of amenity and/ or disturbance to offshore recreation as a result of O&M activity and/ or buffer zones implemented as a means to protect personnel during repair work.	Offshore recreation activity - **Scoped in simple assessment**	Offshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups, and providers of offshore recreation.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		Inshore recreation receptors are not anticipated to be affected during O&M activity,	Inshore recreation activity – **Scoped out** Further rationale is provided in the section below **(paragraph 5.15.52)**.		
Impact on employment as a consequence of decommissioning of the wind farm (Decommissioning)	C-34; and C-35.	Potential for expenditure on the decommissioning of the Proposed Development to support employment in UK (and Sussex0based) companies that are directly engaged in the decommissioning supply chain. Decommissioning could also go on to support employment indirectly in the wider supply chain	**Scoped in Simple assessment**	Employment	Desk-based analysis of baseline employment conditions in sectors related to decommissioning of the offshore wind farms. This will draw on publicly available datasets.
Impact on GVA as a consequence of	C-34; and C-35.	Potential for expenditure on the decommissioning of the Proposed Development to support GVA output	**Scoped in Simple assessment**	GVA	Desk-based analysis of baseline GVA conditions in sectors

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
decommissioning of wind farm (Decommissioning)		in UK (and Sussex-based) companies that are directly engaged in its decommissioning supply chain. Decommissioning could also go to support GVA creation indirectly in the wider supply chain.			related to decommissioning offshore wind farms. This will draw on publicly available datasets.
Impact on population structure due to increased demand for labour (Decommissioning)	None	**No likely significant effect -** Sustained change in the area's population, and overall demographic due to increased demand for labour during the decommissioning phase.	**Scoped out** Further rationale is provided in the section below **(paragraph 5.15.52)**.	N/A	N/A
Impact on the demand for housing, accommodation and local services (Decommissioning)	None	**No likely significant effect -** Direct and indirect employment generated during the decommissioning phase could increase demand for housing, accommodation and local services.	**Scoped out** Further rationale is provided in the section below **(paragraph 5.15.52)**.	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Impact volume and value of the tourism economy (including day and overnight visitors) (Decommissioning)	C–46	Potential For changes to the number and overall expenditure by visitors (both day and overnight) to the local area during the decommissioning phase. This will include an assessment of the visual impacts arising as a result of the decommissioning of offshore infrastructure, in addition to the impacts generated by onshore activity (which is anticipated to be limited).	**Scoped in Simple assessment**	Tourism economy	Desk-based research and consultation with relevant local authority officers to ascertain conditions and scale of the tourism economy locally.
Impact on access to and onshore recreation activity (Decommissioning)	C–22; C–26; C–33; and C–46.	Direct effects on onshore recreational and utility users as a result of the loss of amenity land, closure and/ or diversion of PRoWs and disruption to tourism assets and attractions.	**Scoped in Simple assessment**	Onshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups and providers of onshore recreation facilities.
Impact on offshore and inshore recreation activity (Decommissioning)	None	Potential Loss of amenity and/ or disturbance to offshore recreation as a result of construction activity and/ or buffer zones implemented as a means to protect personnel during construction phase.	**Scoped in Simple assessment**	Offshore recreation activity	Desk-based research and consultation with relevant local authority officers, user groups, and providers of offshore recreation.

Impacts scoped out of assessment

5.15.52 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

5.15.53 The impacts of construction, O&M and decommissioning activity on changes to population structure as a result of increased demand for labour and the subsequent demand for housing accommodation and local services are also proposed to be scoped out.

5.15.54 The effects generated during the construction and decommissioning phases of the Proposed Development will be temporary and over a relatively short time period. Whilst the investment in construction will support employment in construction and manufacturing for a few hundred jobs, these are likely to be located outside the study area (based on our understanding of the local supply chain and its ability to capture expenditure by Rampion 2). Labour supporting installation and/ or decommissioning activities is likely to be drawn from a wide area (including Sussex-based, a catchment of up to 90 minutes' drive and beyond. Overall, it is anticipated that only a proportion of the labour required will be in-migrants (i.e. net additional) to Sussex's current population. This will likely represent a very small proportion of the study area's current population (estimated to be over 1.4 million), therefore having a negligible impact on the population structure, and subsequent demand for housing and local services.

5.15.55 On the other hand, whilst the effects generated during the operational phase will be longer-term, the magnitude of the effect is likely to be smaller in scale than that required during construction and decommissioning activities. This depends on the level of expenditure captured and direct employment supported within the study area but can be anticipated to be below 100 workers. Once again, this number will represent a very small proportion of the study area's current population, having a negligible impact on the population structure and subsequent demand for housing and local services.

5.15.56 A such, the effect of Rampion 2 on changes to population structure as a result of increased demand for labour and the subsequent demand for housing accommodation and local services is not likely to be significant, and are therefore scoped out of the assessment.

Cumulative effects

5.15.57 Cumulative effects on socio-economics resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

5.15.58 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects.

- The impact on employment and GVA as a consequence of supply chain expenditure captured by Sussex-based businesses during construction, O&M and decommissioning of Rampion 2 and other developments.
- The impact on volume and value of the tourism economy as a result of Rampion 2 and other developments.
- The impact on access to and enjoyment of onshore recreation activity as a result of Rampion 2 and other developments.
- The impact on offshore and inshore recreation activity.

Transboundary Effects

5.15.59 In general, the majority of socio-economic effects generated by Rampion 2, and considered within the assessment will be localised and relevant to the study area and zones of influence. However, Rampion 2 will result in supply chain expenditure abroad, in addition to demand for specialist skills which are not available locally. This will, in turn lead to socio-economic benefits to areas outside the UK in the form of job creation and contribution to GVA/ GDP growth. Please refer to the Transboundary Screening Matrix in **Appendix B** for further information.

Proposed approach to PEIR and ES

5.15.60 The proposed approach to the assessment for the socio-economics is to undertake a desk-based study. This will include consultation with relevant socio-economic, tourism and recreation stakeholders from within the study area (such as Local Authorities and other relevant sub-regional bodies (e.g. South East Local Enterprise Partnership), relevant sector bodies, key interest groups (e.g. Natural England), recreation clubs and operators). The baseline assessment will be based on a number of primary and other data sources outlined above.

5.15.61 The approach to assessing the effects of the Proposed Development's on the identified receptors (see **Table 5.15.1**) will be based on the approach set out in **paragraphs 5.15.6** to **5.15.19**, including assumptions estimated construction costs, port selection, Sussex and UK-based sourcing, landfall, construction methods, O&M and decommissioning methods (see **paragraph 5.15.46**).

5.15.62 The approach to assessing the significance of effects on the receptors will be undertaken using the matrix set out in **Table 5.15.2** and will take into consideration the various environmental measures outlined above (see **Table 5.15.15**).

5.15.63 The PEIR will be updated to form the ES chapter based on representations submitted during the PEIR consultation period. This will include review and responses to any relevant Section 42 consultation responses, in addition to ongoing engagement with key stakeholders.

6. Environmental aspects onshore

6.1 Introduction

6.1.1 The basis for the onshore scoping exercise is described in the following sections:

- **Section 6.2: Landscape and visual impact;**
- **Section 6.3: Air quality;**
- **Section 6.4: Agriculture and soils;**
- **Section 6.5: Noise and vibration;**
- **Section 6.6: Terrestrial ecology and nature conservation;**
- **Section 6.7: Transport;**
- **Section 6.8: Ground conditions;**
- **Section 6.9: Historic environment;** and
- **Section 6.10: Water environment.**

6.2 Landscape and visual impact

Introduction

6.2.1 The landscape and visual impact assessment (LVIA) will consider the potential likely significant effects on the landscape resource and visual amenity that may arise from the construction, operation and decommissioning of the onshore elements (substation, cable corridor and landfall) of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.2.2 The LVIA interfaces with many other aspects and as such, should be considered alongside these; namely:

- **Section 5.13: Landscape, seascape and visual** (Offshore) (with regard to the close association between the LVIA and Seascape, landscape and visual impact assessment (SLVIA), and the inter-project effects of the onshore and offshore elements of the Proposed Development);
- **Sections 5.14 and 6.9: Archaeology and cultural heritage** (Offshore and Onshore) (with regard to visual effects on heritage features);
- **Section 6.4: Agriculture and soils** (Onshore) (with regard to landscape effects on agricultural and soils land-use);
- **Section 6.6: Terrestrial ecology and nature conservation** (Onshore) (with regard to visual effects on nature reserves); and

- **Section 5.15**: **Socio-economics** (Onshore and Offshore) (with regard to visual effects on recreational receptors and tourist attractions).

6.2.3 The LVIA will also be informed by information from **Section 6.5: Noise and vibration** (with regard to effects on tranquillity) and **Section 6.7: Transport** (in terms of understanding increases in traffic and transport numbers).

6.2.4 This section is supported by **Figures 6.2.1** to **6.2.4** and should be read in conjunction with **Chapter 2: The Proposed Development**.

Study area

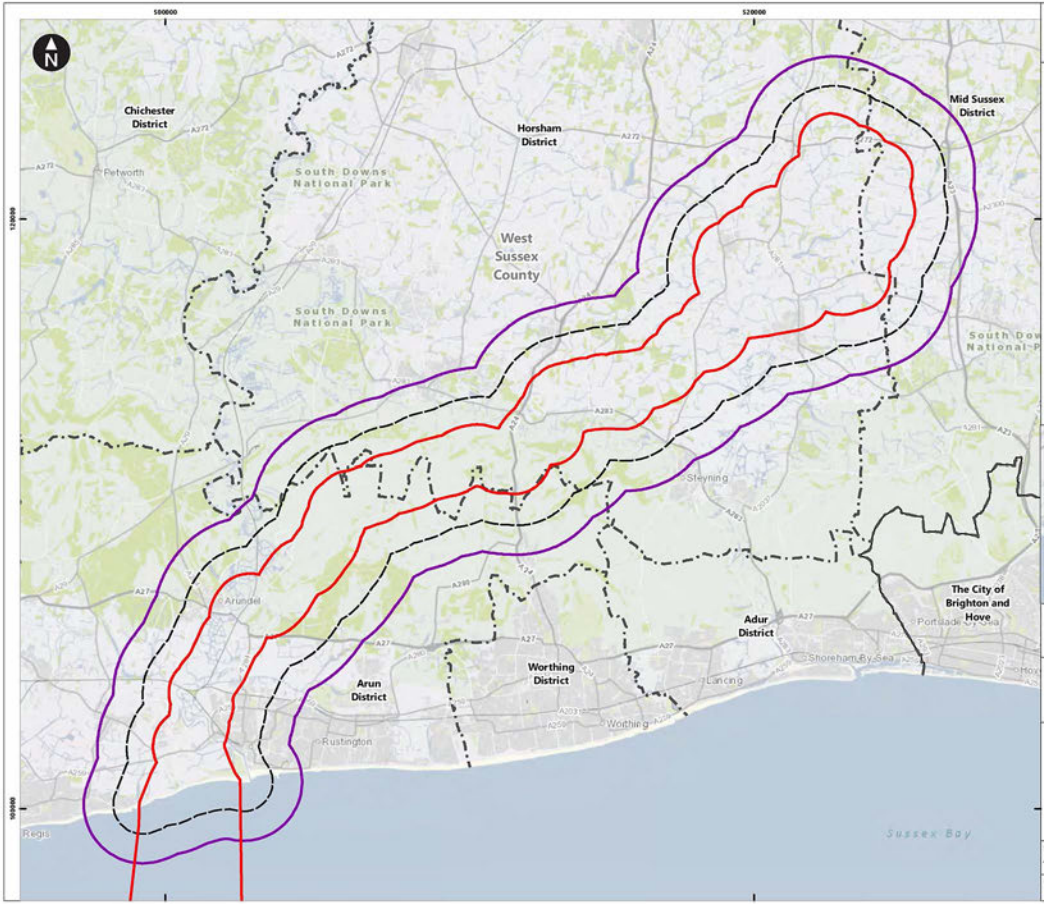
6.2.5 The study area for the LVIA is illustrated in **Figure 6.2.1** and extends to a 2 km buffer beyond the Scoping Boundary. It is likely to be supported by a small number of elevated, long-distance panoramic viewpoint locations within the wider landscape. The study area should be regarded as preliminary at this stage and will be informed by further desk and site-based analysis.

6.2.6 Institute of Environmental Management and Assessment (IEMA) Guidance (IEMA, 2015 and 2017) recommends a proportionate Environmental Statement (ES) focused on the likely significant effects of a development, and a proportionate ES aspect chapter. The LVIA study area must therefore be large enough to capture all likely significant effects. However, an overly large LVIA study area may be considered disproportionate if it makes understanding the key impacts of the Proposed Development more difficult by including extraneous baseline information, and hence receptors which are unlikely to be significantly affected by the Proposed Development.

6.2.7 This is supported by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (para 3.16) which recommends that *'The level of detail provided should be that which is reasonably required to assess the likely significant effects'.* Para 5.2 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner'.*

6.2.8 The study area therefore is based on professional judgement which aims to include those areas which are potentially and likely to be significantly affected by the Proposed Development. This judgement is based on our early understanding of the local landscape character and the scale of the construction and development proposed within the Scoping Boundary as well as a review of study areas used for similar projects including East Anglia TWO and THREE, Norfolk Vanguard and Thanet Extension offshore wind farms. A 2 km study area was also considered to be appropriate by stakeholders and consultees for the existing Rampion 1 project LVIA. Feedback is requested specifically on this aspect from stakeholders and consultees in order to confirm the LVIA study area.

6.2.9 The study area will be reviewed and amended in response to the maturing design and assessment process and where appropriate responses to consultation. This will result in the confirmation of an onshore LVIA study area that will be the focus of the onshore LVIA.



Assessment methodology

Introduction

6.2.10 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA process**. However, whilst this has informed the approach that has been used in this section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the LVIA.

6.2.11 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3), and other best practice guidance listed in **Paragraph 6.2.18**. A full description of the SLVIA methodology is provided in **Appendix C and the** LVIA methodology is provided in **Appendix D.** A summary of the LVIA assessment methodology is provided below.

6.2.12 Essentially, the landscape and visual effects (and whether they are significant) is determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the onshore elements of the Proposed Development. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the onshore elements of the Proposed Development. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change, the geographical extent and the duration of that change. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse. The assessment will also consider the cumulative effects resulting from the inter-project cumulative effects of the onshore and offshore elements of the Proposed Development, and cumulative effects with other similar developments to the onshore elements of the Proposed Development within the onshore study area.

6.2.13 The time period for the assessment covers the construction period of the onshore elements of the Proposed Development, their subsequent operation and the implementation and establishment of embedded landscape measures which are likely to overlap with the construction and or operation periods.

6.2.14 The landscape and visual assessment unavoidably involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion will be sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

Determining the significance of effects

6.2.15 A matrix presented in **Table 6.2.1** is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment

provided by use of the matrix alone. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale. The matrix as presented in **Table 6.2.1** should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment rationale.

6.2.16 Significant landscape and visual effects are highlighted in **bold** and shaded dark purple in **Table 6.2.1**, and relate to all those effects that result in a '**Major**' or a '**Major / Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded light purple) also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold and will be explained as part of the assessment, where they occur. White or un-shaded boxes in **Table 6.2.1** indicate a non-significant effect.

6.2.17 The type of effect will also be described and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

Table 6.2.1 Evaluation of Landscape and Visual Effects

Sensitivity	Magnitude of change					
	High	**Medium-high**	**Medium**	**Medium-low**	**Low**	**Negligible-Zero**
High	**Major** (Significant)	**Major** (Significant)	**Major / Moderate** (Significant)	**Moderate***	**Moderate***	Minor
Medium-high	**Major** (Significant)	**Major / Moderate** (Significant)	**Moderate***	**Moderate***	Moderate / Minor	Minor
Medium	**Major / Moderate** (Significant)	**Moderate***	**Moderate***	Moderate / Minor	Slight	Minor / Negligible
Medium-low	**Moderate***	**Moderate***	Moderate / Minor	Minor	Minor / Negligible	Negligible
Low	**Moderate***	Moderate / Minor	Minor	Minor / Negligible	Negligible	Negligible

***Note: Moderate levels of effect may be significant subject to the assessor's opinion which shall be clearly explained.**

Other technical guidance

6.2.18 In addition to GLVIA3 other methodological guidance for the LVIA is listed in the references at the back of this section. The main ones include documents from the Landscape Institute and Natural England, Scottish Natural Heritage, the Marine Management Organisation and IEMA.

Baseline conditions

Introduction

6.2.19 Information on the existing landscape resource or baseline conditions included in the LVIA will be collected from local plans, Ordnance Survey maps, and relevant literature, as well as information gathered from Site and study area surveys. The baseline information will be set out as an inventory of the existing landscape resource and will focus on those landscape and visual receptors with most potential to be significantly affected.

Data sources

6.2.20 A range of desk-based and site-based data will be sourced to undertake the LVIA, covering landscape and visual receptors and other relevant cumulative development. The desk-based data will be drawn from Ordnance survey and a range of document sources in addition to the relevant planning policy documents outlined in **Chapter 3: Planning and policy context**. The principal desk-based data sources used to inform this chapter are set out in **Table 6.2.2.**

Table 6.2.2 Key sources of LVIA data

Source	Date	Summary	Coverage of study area
Arun District Council	2006	Arun Landscape Study - Landscape and Visual Amenity Aspects of Development Choices in Arun District 2006-2026 (available online: https://www.arun.gov.uk/download.cfm?doc=docm93jijm4n6851.pdf&ver=6564)	Arun District
Campaign to Protect Rural England (CPRE)	2016	Interactive maps of the UK's light pollution and dark skies as part of a national mapping project (LUC/CPRE, 2016). Open Source data, used to understand and illustrate baseline lighting levels (available online: https://www.nightblight.cpre.org.uk/)	Full coverage of the study area
English Heritage	2020	Any specific visitor attractions / tourist destinations (available online: https://www.english-heritage.org.uk/visit/places/#?page=1&place=&mp=false&fe=false)	Full coverage of the study area
Google Earth Pro	2019	Aerial Photography	Full coverage of the study area
Historic England	2020	Registered Parks and Gardens and UNESCO World Heritage Sites (available online: https://historicengland.org.uk/listing/what-is-designation/registered-parks-and-gardens/)	Full coverage of the study area
Horsham District Council	2003	Horsham District Landscape Character Assessment (available online: https://www.horsham.gov.uk/planning/planning-policy/evidence-base/landscape-character-assessment).	Horsham District
Long Distance Walkers Association	2020	Overview map for Long Distance Paths and Walks (available online: https://www.ldwa.org.uk/ldp/public/ldp_overview_map.php)	Full coverage of the study area

Source	Date	Summary	Coverage of study area
Marine Management Organisation	2016	Marine Character Areas - South Inshore and Offshore Marine Plan Areas (available online: https://www.gov.uk/government/publications/the-south-marine-plans-documents)	Coastal section of study area
Mid-Sussex District Council	2005	Mid Sussex Landscape Character Assessment (available online: https://www.midsussex.gov.uk/media/1756/lca-part-one-intro-and-background.pdf).	Mid-Sussex District
National Trust	2020	Any specific visitor attractions / tourist destinations (available online: https://www.nationaltrust.org.uk/days-out)	Full coverage of the study area
Natural England	2013	National Character Area Profiles (NCAP), for information on National Landscape Character Areas: NCAP 120: Wealden Greensand NCAP 121: Low Weald NCAP 122: High Weald NCAP 125: South Downs NCAP 126: South Coast Plain (available online: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-south-east-england-and-london). Landscape Character Types and Landscape Description Units	Full coverage of the study area
Natural England	2020	Multi-Agency Geographic Information for the Countryside (MAGIC). (available online: https://magic.defra.gov.uk/).	Full coverage of the study area
Natural England	2019	GIS datasets for: National Parks (https://data.gov.uk/dataset/334e1b27-e193-4ef5-b14e-696b58bb7e95/national-parks-england). Areas of Outstanding Natural Beauty (AONB) (https://data.gov.uk/dataset/8e3ae3b9-a827-47f1-b025-f08527a4e84e/areas-of-outstanding-natural-beauty-england)	Full coverage of the study area

Source	Date	Summary	Coverage of study area
		County Parks (https://data.gov.uk/dataset/e729abb9-aa6c-42c5-baec-b6673e2b3a62/country-parks-england). Open Access Land (https://data.gov.uk/dataset/05fa192a-06ba-4b2b-b98c-5b6bec5ff638/crow-act-2000-access-layer).	
Ordnance Survey	2019	1:25,000 scale mapping: Explorer OL10 – Arundel & Pulborough Explorer OL11 – Brighton and Hove Explorer OL34 - Crawley & Horsham Topo 50 and 5 Digital Terrain Model (DTM) and Digital Surface Model (DSM) data.	Full coverage of the study area
Ordnance Survey Open Data	2019	Ordnance Survey County Region, Local Unitary Authority, Railways, Roads and Settlements (available online: https://www.ordnancesurvey.co.uk/business-government/products)	Full coverage of the study area
South Downs National Park	2011	South Downs Integrated Landscape Character Assessment (updated 2011) (available online: https://www.southdowns.gov.uk/planning-policy/landscape-character-assessments/south-downs-integrated-landscape-character-assessment/) South Downs Interactive Landscape Character Map (including Dark Night Sky Zones and Tranquillity) (available online: https://www.southdowns.gov.uk/planning-policy/south-downs-local-plan/policies-map/landscape-character-map/)	South Downs National Park
Sustrans	2020	National Cycle Network (GIS dataset) (available online: https://www.sustrans.org.uk/)	Full coverage of the study area
Visit England	2020	Any specific visitor attractions / tourist destinations (available online: https://www.visitengland.com/destinations/south-east-england)	Full coverage of the study area

Source	Date	Summary	Coverage of study area
West Sussex County Council	2003	Landscape character assessment of West Sussex (available online: https://www.westsussex.gov.uk/land-waste-and-housing/landscape-and-environment/landscape-character-assessment-of-west-sussex/).	West Sussex
West Sussex County Council	2010	Sussex Historic Landscape Classification (available online: https://www.westsussex.gov.uk/media/1773/sussex_hlc_volume_1.pdf)	West Sussex
West Sussex County Council	2020	Public Rights of Way iMap (available online: https://www.westsussex.gov.uk/land-waste-and-housing/public-paths-and-the-countryside/public-rights-of-way/public-rights-of-way-imap/).	West Sussex
West Sussex County Council	2019	Local distinctiveness study of West Sussex (available online: https://www.westsussex.gov.uk/land-waste-and-housing/landscape-and-environment/local-distinctiveness-study-of-west-sussex/)	West Sussex
Wood – Internal dataset	2020	Public Rights of Way	Full coverage of the study area
Woodland Trust	2020	Identified / Ancient Woodlands (available online: https://www.woodlandtrust.org.uk/visiting-woods/find-woods/)	Full coverage of the study area

Landscape baseline

Immediate landscape context

6.2.21 The topography of the landscape within the study area varies from being relatively flat in the south towards the coast rising to 238 m Above Ordnance Datum (AOD) at Chanctonbury Hill within the central part of the South Downs National Park (SDNP) before dropping down into the low-lying vales at around 10 m AOD in the northeast near Bolney. The landform rises again towards the High Weald Area of Outstanding Natural Beauty (AONB) beyond Bolney.

6.2.22 The landscape between the proposed landfall at Climping near Atherington and the edge of the SDNP is a coastal plain very gently rising north / northeast towards the National Park. The relatively flat, lower coastal plain is heavily urbanised and includes parts of the settlements of Littlehampton, Middleton-On-Sea and Arundel linked by road (A27, A259 and A284) and regional rail corridors. In between development and transport links is a farmed landscape of large open fields with few trees and hedgerows. Drainage ditches, wire fences or low banks are more usual as field boundaries. Further north, the upper coastal plain comprises flat, regular patterns of large fields with gentler forms and patterns, blending into the openness of the lower dip slope of the SDNP. Here the landscape is varied, incorporating both open arable farmland and low-density settlements, with a more wooded and semi-enclosed (somewhat suburban) character locally.

6.2.23 The part of the SDNP within the study area comprises a broad elevated east–west ridge with a predominantly steep, north facing scarp slope and a gentle southerly dip slope, breaking into a series of hills east and west beyond the study area. The area to the east of the River Arun is characterised by large open arable and grassland fields, with a general absence of woodland and hedgerow boundaries, creating an open, exposed landscape, however, the area to the south, and west of the River Arun features large woodlands. Roads and villages are mainly concentrated in the river valleys with the more elevated areas sparsely settled with scattered farmsteads. Public rights of way (PRoW) including the South Downs Way National Trail traverse this landscape with some routes benefiting from panoramic views across the downs and beyond.

6.2.24 Between the SDNP and the northeast of the study area, the topography of the landscape drops sharply into the broad, low-lying vales before rising again towards the High Weald AONB beyond. This landscape is predominantly agricultural, and largely pastoral with either grassland or meadows. Field boundaries of hedgerows enclose small, irregular fields linking small and scattered linear settlements. A number of smaller towns and villages including Henfield, Ashington, Cowfold, Patridge Green and Bolney are scattered among areas of woodland, where larger villages have grown around major transport routes including the A23, A272 and A281. Numerous woodland blocks are scattered throughout this landscape along with many small rivers, streams and watercourses.

National character areas

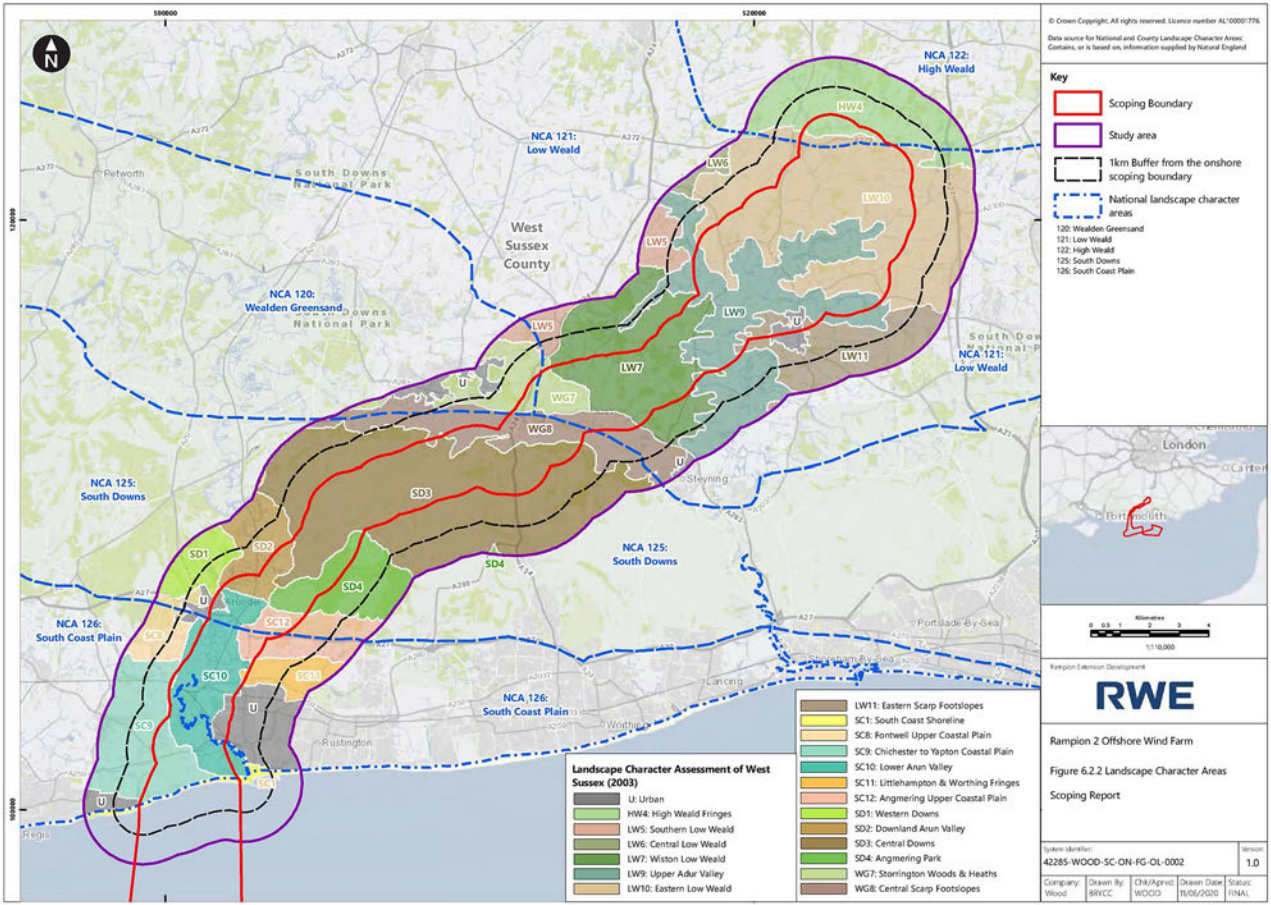
6.2.25 The study area contains five National Character Areas (NCAs) as illustrated on **Figure 6.2.2**. These are listed below and defined as areas of landscape

comprising significant tracts of land that exhibit a broad, cohesive character. All five NCAs are 'host' landscape character areas for the onshore elements of the Proposed Development.

- NCA 120: Wealden Greensand;
- NCA 121: Low Weald;
- NCA 122: High Weald;
- NCA 125: South Downs; and
- NCA 126: South Coast Plain.

6.2.26 An overview of the descriptions of each NCA, as set out by Natural England, is provided below.

- NCA120: Wealden Greensand: "*The curved Greensand ridge partially encircles the adjoining Low Weald NCA, while its outer edge is rimmed by the chalk outcrops of the North and South Downs, and the Hampshire Downs in the west. The ridge affords far-reaching views over the Low Weald, South Downs and London*."
- NCA121: Low Weald and NCA122: High Weald: "*The High and Low Weald National Character Areas (NCAs) together form an area known from Saxon times as the Weald whose landscape is the product of transhumance (the seasonal movement of people and animals between the settlements on the borders of the Weald and its interior) and a traditional system of integrated farming and forestry. Early in its history the Weald was linked economically and socially with its more habitable fringes where farming was easier. A dense network of droveways connects the Downs and the Weald, a visible legacy of the seasonal movement of people and animals into the woodland to take advantage of acorns and mast (fruit of forest trees). Today these routes can still be travelled as roads and public rights of way. The wooded nature of these linear routes together with the wooded gills provides a high degree of interconnectivity to ancient woodland habitats across the High and Low Weald*."
- NCA125: South Downs: "*The chalk ridge that comprises the South Downs National Character Area (NCA) extends west into the chalk plateau of the Hampshire Downs NCA, while the South Coast Plain NCA forms a transitional area between the central part of the southern chalk dip slope of the South Downs NCA and the sea. Extensive views are afforded from many of the scarp slopes to the north over the Low Weald NCA and Wealden Greensand NCA*."
- NCA 126: South Coast Plain: "*The South Coast Plain National Character Area (NCA) is a narrow strip running along the Hampshire and Sussex coast from the edge of Southampton in the west to Brighton and Hove in the east. The South Hampshire Lowlands NCA rises gently in the north until Portsmouth, after which the higher South Downs NCA forms the backdrop along the remaining northern boundary. The underlying geology is part of the Hampshire Basin which stretches to Dorset and the northern half of the Isle of Wight, within the chalk borders of the Purbeck Hills, Cranborne Chase, South Downs and Salisbury Plain*."


© Crown Copyright. All rights reserved. Licence number AL100001776.
Data source for National and County Landscape Character Areas: Contains, or is based on, information supplied by Natural England
Key
Scoping Boundary
Study area
1km Buffer from the onshore scoping boundary
National landscape character areas
120: Wealden Greensand
121: Low Weald
122: High Weald
125: South Downs
126: South Coast Plain
NCA 122: High Weald
NCA 121: Low Weald
NCA 120: Wealden Greensand
NCA 125: South Downs
NCA 126: South Coast Plain
South Downs National Park
West Sussex County
Petworth
Steyning
Worthing
Lancing
Rustington
Littlehampton
Portslade-By-Sea
Brighton & Hove
London
Portsmouth
Kilometres
0 0.5 1 2 3 4
1:110,000
Landscape Character Assessment of West Sussex (2003)
U: Urban
HW4: High Weald Fringes
LW5: Southern Low Weald
LW6: Central Low Weald
LW7: Wiston Low Weald
LW9: Upper Adur Valley
LW10: Eastern Low Weald
LW11: Eastern Scarp Footslopes
SC1: South Coast Shoreline
SC8: Fontwell Upper Coastal Plain
SC9: Chichester to Yapton Coastal Plain
SC10: Lower Arun Valley
SC11: Littlehampton & Worthing Fringes
SC12: Angmering Upper Coastal Plain
SD1: Western Downs
SD2: Downland Arun Valley
SD3: Central Downs
SD4: Angmering Park
WG7: Storrington Woods & Heaths
WG8: Central Scarp Footslopes
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.2.2 Landscape Character Areas
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OL-0002
Version: 1.0
Company: Wood
Drawn By: BRYCC
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
Status: FINAL
Document uncontrolled when printed
ISO A3 Landscape

National seascape character

6.2.27 The study area overlaps with one Marine Character Area (MCA) which is described as Selsey Bill to Seaford Head (MCA7). A description of the overall character of MCA7 as set out be the Marine Management Organisation (MMO), is provided below.

- MCA7 Selsey Bill to Seaford Head: "This expansive bay framed by the headlands is locally known as the Bay of Sussex. The coastline contains a number of towns including Selsey, Bognor Regis and Littlehampton to the west, Worthing and Brighton in the centre and Newhaven and Seaford to the east. The South Downs National Park is located inland to the north of the major settlements forming a prominent ridge and extends to the coastline at places in the east of the MCA, between Brighton and Rottingdean, Saltdean and Peacehaven and Newhaven and Seaford providing important visual connections to and from the sea. Shingle beaches offset the major coastal resorts in the west of the MCA and vertical chalk cliffs characterise the east, where there are views to the prominent white cliffs of Beachy Head (South Downs National Park) in MCA 8. Tidal currents are fast in the waters around the points of Selsey and Beachy Head, whilst the bay is more sheltered. Views seaward are frequently to an unbroken horizon with the main shipping traffic being located at a greater distance into the channel. Small recreational craft and fishing boats are the main sea users with cross channel ferries between Newhaven – Dieppe and freight from small ports at Shoreham, Newhaven and Littlehampton."

County and local landscape character

6.2.28 The landscape of the study area is characterised within five published local landscape character assessments as follows:

- County and SDNP level assessment:
  - Landscape Character Assessment of West Sussex (LCAWS), 2003;
  - South Downs Integrated Landscape Character Assessment (SDILCA), 2011;
- Local level assessment:
  - Horsham District Landscape Character Assessment (HDLCA), 2003;
  - Arun Landscape Study - Landscape and Visual Amenity Aspects of Development Choices in Arun District 2006-2026; and
  - A Landscape Character Assessment for Mid Sussex, 2005.

6.2.29 The LCAWS is the only one of these studies which covers the entire length of the onshore element of the Scoping Boundary and the study area. Therefore, the boundaries of the landscape character areas (LCAs) defined within the LCAWS will be used to inform the division of the onshore elements of the Proposed Development into sections which will be subsequently assessed in the LVIA.

6.2.30 There are 19 Local LCAs from the LCAWS within the study area as illustrated in **Figure 6.2.2** and are listed below:

- HW4: High Weald Fringes;
- LW5: Southern Low Weald;

- LW6: Central Low Weald;
- LW7: Wiston Low Weald;
- LW9: Upper Adur Valley;
- LW10: Eastern Low Weald;
- LW11: Eastern Scarp Footslopes;
- SC1: South Coast Shoreline;
- SC8: Fontwell Upper Coastal Plain;
- SC9: Chichester to Yapton Coastal Plain;
- SC10: Lower Arun Valley;
- SC11: Littlehampton & Worthing Fringes;
- SC12: Angmering Upper Coastal Plain;
- SD1: Western Downs;
- SD2: Downland Arun Valley;
- SD3: Central Downs;
- SD4: Angmering Park;
- WG7: Storrington Woods & Heaths; and
- WG8: Central Scarp Footslopes.

6.2.31 Further LCAs are defined for the SDNP and a number of other local LCAs are defined in the other three local landscape character assessments. A number of these will overlap with the LCAWS LCAs and the study area and the LVIA will assess these receptors according to their hierarchy (County, SDNP and local LCAs).

6.2.32 The LVIA will prepare a baseline description of relevant LCAs within the final LVIA study area and focus on assessing the likely significant effects on the LCAs considered most susceptible to changes as a result of the onshore elements of the Proposed Development. These LCAs are likely to be those, as identified above, where development may result from the construction of the substation, cable corridor and landfall or the operation of the substation.

Designated landscapes

6.2.33 The following nationally designated landscapes are located within the study area and are illustrated on **Figure 6.2.3**.

- South Downs National Park (SDNP): The SDNP is located within the central and southern parts of the study area from near Washington to Arundel; and
- High Weald AONB: The AONB is located towards the northern extremities of the study area near Bolney.

6.2.34 The special qualities of the SDNP are identified in the *South Downs Local Plan* (2019), which lists the special qualities of each of the nine broad areas and river corridors within the National Park. Figure 1.2 of the Local Plan, and the *South Downs National Park Special Qualities* (2011) also list and describe the overarching seven special qualities of the National Park as follows:

- "*diverse, inspirational landscapes and breathtaking views;*
- *a rich variety of wildlife and habitats including rare and internationally important species;*
- *tranquil and unspoilt places;*

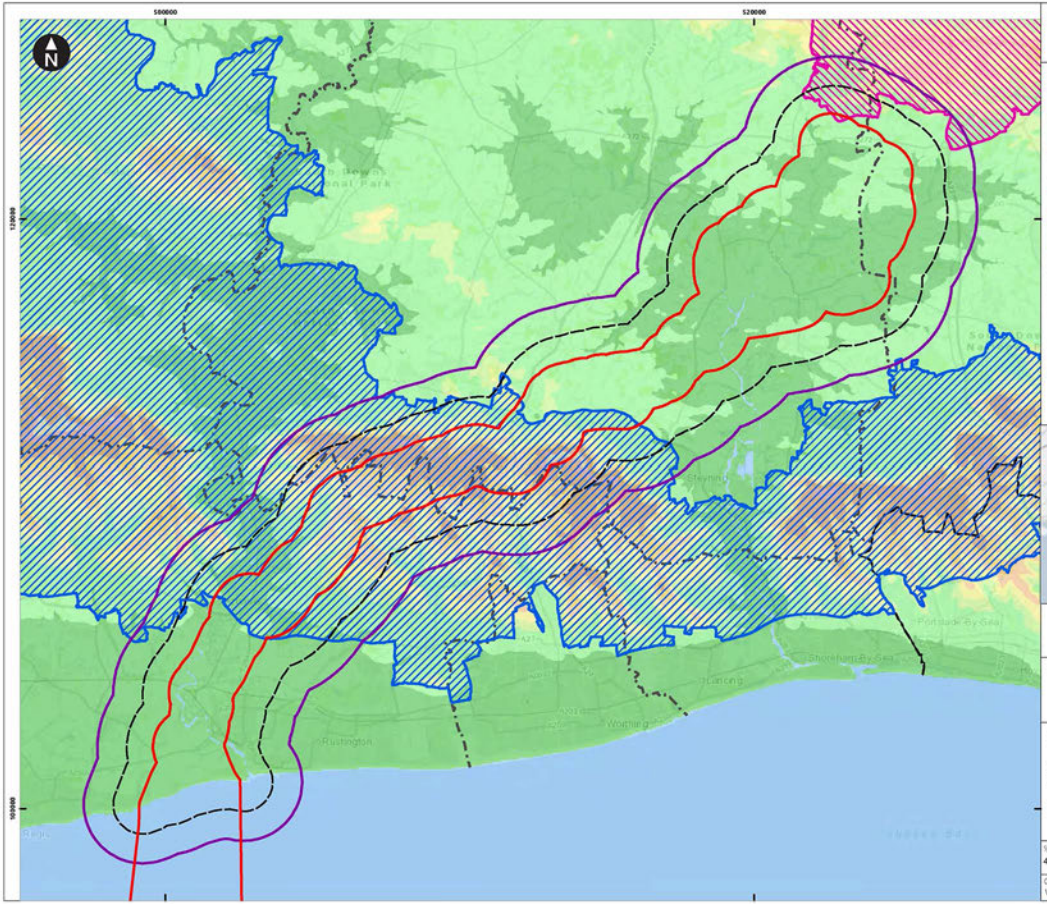
- *an environment shaped by centuries of farming and embracing new enterprise;*
- *great opportunities for recreational activities and learning experiences;*
- *well-conserved historical features and a rich cultural heritage; and*
- *distinctive towns and villages, and communities with real pride in their area.*"

6.2.35 The special characteristics and qualities of the AONB are identified in the *High Weald AONB Management Plan 2019-2024*. Five defining components of character of the AONB include:

- "*geology, landform and water systems – a deeply incised, ridged and faulted landform of clays and sandstone with numerous gill streams;*
- *settlement – dispersed historic settlement including high densities of isolated farmsteads and late Medieval villages founded on trade and non-agricultural rural industries;*
- *routeways – a dense network of historic routeways (now roads, tracks and paths);*
- *woodland – abundance of ancient woodland, highly interconnected and in smallholdings; and*
- *field and heath – small, irregular and productive fields, bounded by hedgerows and woods, and typically used for livestock grazing; with distinctive zones of lowland heaths, and inned river valleys*".

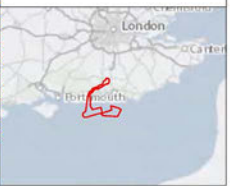
6.2.36 The LVIA will assess the effects of the onshore elements of the Proposed Development on the special qualities of the SDNP and High Weald AONB.

6.2.37 There are no locally designated landscapes within the study area. However, the effects on other designations including Registered Parks and Gardens, Conservation Areas, and Nature Reserves are covered by other aspects including **Section 6.9: Historic environment** and **Section 6.6: Terrestrial ecology and nature conservation**.



Key

- Scoping Boundary
- Study area
- 1km Buffer from the onshore scoping boundary
- Areas of outstanding natural beauty - High Weald
- South Downs National Park
- County council administrative boundaries
- Local authority district administrative boundaries
- Topography
  - 238m AOD and above
  - 0m AOD



Kilometres
0 0.5 1 2 3 4
1:110,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.2.3 Landscape Designations and Topography

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OL-0003				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Wood	BRYCC	WOOD	15/06/2020	FINAL

ISO A3 Landscape

Visual baseline

6.2.38 The visual baseline will be defined by a Zone of Theoretical Visibility (ZTV) for the onshore elements and visual appraisal of the Proposed Development.

6.2.39 Views experienced within the study area are influenced by landform and features such as woodlands and built development. Views tend to be open in the south, affording panoramic views out to sea from parts of the coastal plain with longer distance views of the surrounding landscape from more elevated parts of the SDNP and High Weald AONB (beyond the study area), where vegetation does not restrict views. Moving further inland to the northeast of the study area, away from the coastal plain and the SDNP, variations in topography and a greater concentration of woodlands and hedgerows combine to frame, filter and foreshorten views.

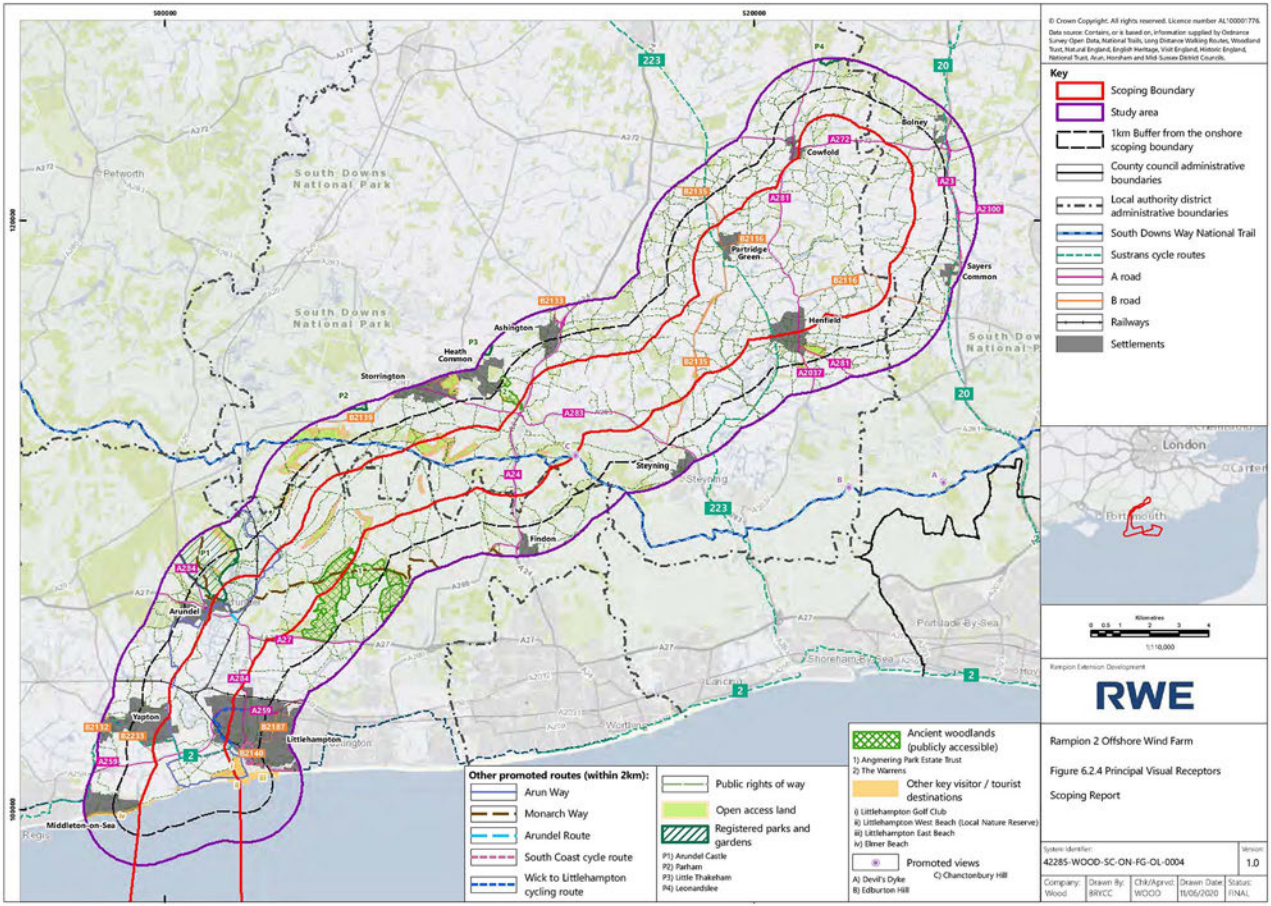
6.2.40 The distribution of settlements within the study area in which a high proportion of residential visual receptors are located is illustrated on **Figure 6.2.4**. The southern end of the study area is heavily urbanised and includes parts of the settlements of Littlehampton, Middleton-On-Sea, Yapton and Arundel. Other larger settlements are located in the northeast between the SDNP and High Weald AONB and include parts of Storrington, Steyning, Washington, Ashington, Henfield, Partridge Green, Cowfold and Bolney.

6.2.41 There is a network of principal roads and rail routes linking settlements, as illustrated on **Figure 6.2.4,** including the A23, A24, A27, A259, A272, A281, A283 and A284, and the regional rail routes connecting Littlehampton to other southern and northern settlements beyond the study area.

6.2.42 The existing National Grid's Bolney and Twineham substations are a feature in the northeast with a row of high voltage electrical pylons (Bolney to Lovedean 400kv overhead line) extending north / northwest to east and are visible in views from limited parts of this landscape.

6.2.43 Recreational visual receptors are widely distributed across the study area as illustrated on **Figure 6.2.4**. The South Downs Way National Trail extends east-west within the SDNP. With regard to Sustrans Cycle Routes (SCRs), these include SCR 2 along the southern coast, and SCR 223, and SCR 20 extending north-south across the eastern part of the study area. Other regional promoted recreational routes include the Arun Way, Monarch's Way, Arundel Route, South Coast Cycle Route and Wick to Littlehampton Cycling Route. **Figure 6.2.4** also indicates that the distribution of PRoWs has a generally moderate density across the study area.

6.2.44 Other key recreational destinations include nature reserves (Littlehampton West Beach), Registered Parks and Gardens (Arundel Castle, small parts of Parham, Little Thakeham and Leonardslee), popular beaches including Littlehampton East Beach and Elmer Beach, Littlehampton Golf Club, and publicly accessible Ancient Woodlands (Angmering Park Estate Trust and The Warrens). There are a small number of promoted viewpoints (including long-distance locations) within the SDNP such as Devil's Dyke, Edburton Hill and Chanctonbury Hill, as illustrated on **Figure 6.2.4**.


© Crown Copyright. All rights reserved. Licence number AL100001776.
Data source: Contains, or is based on, information supplied by Ordnance Survey Open Data, National Trails, Long Distance Walking Routes, Woodland Trust, Natural England, English Heritage, Visit England, Historic England, National Trust, Arun, Horsham and Mid-Sussex District Councils.
Key
Scoping Boundary
Study area
1km Buffer from the onshore scoping boundary
County council administrative boundaries
Local authority district administrative boundaries
South Downs Way National Trail
Sustrans cycle routes
A road
B road
Railways
Settlements
South Downs National Park
Petworth
Storrington
Ashington
Heath Common
Steyning
Findon
Arundel
Littlehampton
Middleton-on-Sea
Yapton
Bolney
Cowfold
Partridge Green
Henfield
Sayers Common
Shoreham-by-Sea
Lancing
Worthing
Portslade-by-Sea
London
Portsmouth
Kilometres
0 0.5 1 2 3 4
1:110,000
Other promoted routes (within 2km):
Arun Way
Monarch Way
Arundel Route
South Coast cycle route
Wick to Littlehampton cycling route
Public rights of way
Open access land
Registered parks and gardens
P1) Arundel Castle
P2) Parham
P3) Little Thakeham
P4) Leonardslee
Ancient woodlands (publicly accessible)
1) Angmering Park Estate Trust
2) The Warrens
Other key visitor / tourist destinations
i) Littlehampton Golf Club
ii) Littlehampton West Beach (Local Nature Reserve)
iii) Littlehampton East Beach
iv) Elmer Beach
Promoted views
A) Devil's Dyke
B) Edburton Hill
C) Chanctonbury Hill
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.2.4 Principal Visual Receptors
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OL-0004
Version: 1.0
Company: Wood
Drawn By: BRYCC
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
Status: FINAL
Document uncontrolled when printed
ISO A3 Landscape

Future baseline

6.2.45 Landscape change is an ongoing and inevitable process and would continue across the study area irrespective of whether the Proposed Development proceeds. Change can arise through natural processes (for example, the maturity of woodlands) and natural systems (for example, river erosion) or as a result of human activity including land use and land management.

6.2.46 Reference to the Arun, Horsham and Mid-Sussex Local Development Plans indicate strategic and economic growth within their districts which is likely to affect various settlements. Similarly, the *SDNP Local Plan* (2019) indicates a number of housing sites within its boundary.

6.2.47 The published profile report for all five NCAs within the study area reports on a number of drivers of change, particularly on climate change, which may also alter the existing landscape and visual baseline within the surrounding area. However, long-term changes as a result of climate change are unpredictable, and the LVIA will be carried out against the current baseline.

Basis for scoping assessment

6.2.48 The LVIA scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**.

- The onshore elements of the Proposed Development comprise a landfall at Climping, an underground cable corridor of approximately 36km in length, and a substation near the existing National Grid's Bolney substation.
- The operational lifetime of the onshore elements of the Proposed Development is assumed to be a minimum of 30 years.
- The proposed dimensions of the substation will be approximately 150m by 300m, with a maximum height of 14m.
- Construction of the landfall is anticipated to be via a trenchless technique such as Horizontal Directional Drilling (HDD). It is expected that the temporary working width of the cable construction corridor will be approximately 50m.
- The important elements for the LVIA will include the construction, operation and decommissioning of the substation, and the construction of the cable corridor and landfall. It is anticipated that once operational, the potential effects of the landfall and cable corridor will be greatly reduced by their presence underground, with a minimum amount of permanent elements visible above ground. Electrical cables that form part of the landfall and cable corridor will be left in-situ to minimise the landscape and visual effects associated with removal. There will therefore be no potential effects of the landfall and cable corridor during operation and decommissioning.
- The cumulative assessment will consider other similar consented or proposed developments (which do not form part of the existing baseline) that may be located or proposed within the final LVIA study area. The same cumulative developments included in the SLVIA for the offshore elements of the Proposed Development will also be considered in the LVIA, where applicable.

- A number of environmental measures are already embedded in the Proposed Development as outlined in the following section. The potential effects during operation will be moderated by the presence and growth of mitigation planting which is likely to be proposed around the substation. The gradual reduction in potential effects during operation will be assessed as part of the LVIA.

Embedded environmental measures

6.2.49 As part of the project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on landscape and visual amenity (see **Table 6.2.3**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.2.50 As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

6.2.51 The proposed embedded environmental measures in **Table 6.2.3** provide an aid to reduce the potential for impacts on landscape and visual amenity, as follows:

- eliminate the permanent landscape and visual effects of the cable route following its restoration and reinstatement (C-1);
- reduce the amount of time trenches need to be open, allowing for quicker backfilling and early restoration and reinstatement of the landscape (C-2);
- a smaller working width during construction will minimise the footprint on the receiving landscape (C-3);
- where practical, direct effects on landscape elements and features such as ancient woodlands, established woodland, field boundaries and notable tree specimens, and sensitive sites including nature reserves and Parks and Gardens, will be minimised or avoided. Where this would be unavoidable, a combination of appropriate construction techniques and a compensatory / new planting strategy would be developed as an integral part of the overall design of the Proposed Development (C-12);
- the limited stripping of soil will reduce the necessity for storage of material. Stripping and storage of material will be undertaken in accordance with a vegetation clearing / soil management plan. Material will be stored in low lying mounds along the working width, not longer or at greater depths than recommended best practice. Storage along the working width will assist in visually screening open trench works and activity within the corridor (C-12);
- where the cable route will result in the disturbance of hedgerows, their removal will be kept to a practical minimum with replacements being planted and fenced off during the first planting season following construction, to minimise landscape and visual effects, and enable previous conditions to be re-established. The guidance in BS 5837: 2012 Trees in Relation to Construction will be followed, and measures such as the erection of protective fencing will

be put in place in order to minimise effects on trees and their roots. Wherever possible, established trees will be fenced off and worked around (C-21); and

- in winter, some low-level lighting may be required between 16.00 – 19.00 on weekdays which will be minimised to face inwards and downwards towards the works to reduce any glare from the surrounding area (C-22).

Table 6.2.3 Relevant LVIA embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length where practicable.	Development Consent Order (DCO) works plans, description of development and requirements
C-2	Cables will be installed in ducting.	DCO works plans, description of development and requirements
C-3	At sensitive crossing locations the working width will be reduced as far as practicable.	DCO works plans, description of development and requirements
C-4	Horizontal Directional Drill (HDD) technique will be used at the landfall location.	DCO works plans and order limits, description of development and requirements
C-5	Main watercourses, railways and strategic network roads will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see commitment C-17).	DCO works plans and order limits
C-6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits
C-12	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil	Code of Construction Practice (COCP) and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
	deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	
C-21	Vegetation will be retained where possible. Where necessary vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas any vegetation removal will be undertaken under supervision and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally protected species is removed sensitively and in a legally compliant way.	COCP and DCO articles/ requirement
C-22	Core working hours for construction of the onshore components will be 0700 - 1900 Monday to Friday, and 0800 - 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the CoCP.	COCP and DCO requirement
C-32	Signage and / or temporary PRoW / footpath diversions will be provided during construction.	COCP and DCO requirement
C-33	A Code of Construction Practice (COCP) will provide details of measures to protect details of measures to protect environmental receptors and will be adopted to minimise temporary disturbance to residential properties, recreational users, and existing land users.	COCP and DCO requirement
C-66	The Proposed Development will aim to minimise effects on the special qualities of the South Downs National Park and High Weald AONB through careful design consideration in terms of scale, size and location, and taking account of the relevant policy and guidance.	DCO works plans, description of development and requirements
C-67	The onshore cable route will avoid the brows of hills as far as is reasonably practical and is likely to follow the established pattern of the landscape i.e. routed to closely follow the line of existing field boundaries as far as is practicable.	DCO works plans, description of development and requirements

ID	Environmental measure proposed	How the environmental measures will be secured
C-68	The final form of the substation will be finished to a high standard of design, using quality materials and integrated into the surrounding environment through the adoption of a robust, sustainable landscape planting strategy, taking account of the West Sussex Landscape Land Management Guidelines.	DCO works plans, description of development and requirements

Likely significant effects

6.2.52 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.2.53 The landscape and visual receptors that have been identified as being potentially subject to likely significant effects are summarised in **Table 6.2.4.** The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for landscape and visual effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.2.54 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of the potential effects, whether they are significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects which are therefore no longer considered is presented after **Table 6.2.4**, supported by an evidence base.

6.2.55 Viewpoint analysis and site survey, which includes an assessment of sensitivity and magnitude, will be used as part of the assessment to identify those receptors which are most likely to be significantly affected.

6.2.56 It is important to note that whilst some effects can be identified as likely to be significant at this pre-assessment stage, there is the potential for other receptors to be significantly affected and vice-versa, subject to evolution in design and further details of the LVIA.

Table 6.2.4 Likely significant LVIA effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction activities					
Land preparation (site clearance, earthworks) (Construction)	C-2 C-3 C-6 C-12 C-21 C-22 C-32 C-33 C-66 C-67	Removal of a high proportion of the landscape elements present under the baseline conditions. Direct and temporary localised effects on landscape elements may be significant.	**Scoped in (detailed assessment)** as per LVIA Methodology set out in **Appendix D**.	Landscape elements within the Scoping Boundary.	Collection of desk study data as outlined in **Table 6.2.2.**
Construction activity of the substation and cable corridor including the presence of cranes, other machinery, vehicle movements, contractors facilities and site	C-2 C-3 C-4 C-5 C-6 C-12 C-21 C-22 C-32 C-33 C-66	Direct and temporary effects on the host landscape character. Indirect and temporary effects related to the visibility of the construction activities and their	**Scoped in (detailed assessment)** as per LVIA Methodology set out in **Appendix D**.	Host National, County and District LCAs. National, County and District LCAs, and parts of National Park and AONB that are within ~2km of the Proposed Development and that	Collection of desk study data as outlined in **Table 6.2.2**. Further data to be collected following site visits to support assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
access (Construction)	C-67	effect on landscape character and the special qualities and characteristics of the South Downs National Park and High Weald AONB. Temporary effects on views and visual amenity resulting from visibility of the construction activities within ~2 km distance, subject to detailed viewpoint analysis.		are at least partly within the ZTVs. • residential properties; • roads, PRoW, part of the South Downs Way; and • local visitor attractions and facilities within ~2km that are within the ZTVs.	
Operational activities					
Implementation of the landscape strategy (Operation)	C-6 C-21 C-66 C-68	A new framework of landscape elements such as recontoured land, hedgerows and trees would be introduced surrounding the	**Scoped in (detailed assessment)** as per LVIA Methodology set out in **Appendix D**.	Landscape elements within the Proposed Development boundary.	Collection of desk study data as outlined in **Table 6.2.2**. Further data to be collected following site visits to support assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		substation and along the cable corridor, where applicable.			
Operation of the substation (Operation)	C-6 C-66 C-68	Direct effects on the host landscape character. Indirect effects related to the visibility of the substation and its effect on landscape character and the special qualities and characteristics of the South Downs National Park and High Weald AONB. Effects on views and visual amenity resulting from visibility of the substation within ~2km distance,	**Scoped in (detailed assessment)** as per LVIA Methodology set out in **Appendix D**.	Host National, County and District LCAs. National, County and District LCAs, and parts of National Park and AONB that are within ~2km of the substation that are at least partly within the ZTV. Residential properties, Roads, PRoW, part of the South Downs Way, Local visitor attractions and facilities within ~2km that are within the ZTVs.	Collection of desk study data as outlined in **Table 6.2.2**. Further data to be collected following site visits to support assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		subject to detailed viewpoint analysis.			
Operation of the cable corridor and landfall (Operation)	C-1	**No likely significant effects**. Significant effects are unlikely as the operational effects of the cable corridor and landfall will be underground and the landscape reinstated and restored at the end of construction.	**Scoped out** as discussed in **paragraph 6.2.56**.	Landscape and visual receptors within ~2km.	-
Decommissioning activities					
Decommissioning activity of the substation including the presence of cranes, other machinery, vehicle movements, contractors	C-2 C-3 C-4 C-5 C-6 C-12 C-21 C-22 C-32 C-33	Direct and temporary effects on the host landscape character. Indirect and temporary effects related to the visibility of the decommissioning	**Scoped in (detailed assessment)** as per LVIA Methodology set out in **Appendix D**.	Host National, County and District LCAs. National, County and District LCAs, and parts of National Park and AONB that are within ~2km of the Proposed	Collection of desk study data as outlined in **Table 6.2.2** Further data to be collected following site visits to support assessment.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
facilities and site access (Decommissioning)	C-66 C-67	activities and their effect on landscape character and the special qualities and characteristics of the South Downs National Park and High Weald AONB. Temporary effects on views and visual amenity resulting from visibility of the decommissioning activities within ~2km distance, subject to detailed viewpoint analysis.		Development and that are at least partly within the ZTVs. • residential properties; • roads, PRoW, part of the South Downs Way; and • local visitor attractions and facilities within ~2km that are within the ZTVs.	

Impacts scoped out of assessment

6.2.57 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below:

- Receptors outwith the ZTV:
  - all receptors within the LVIA study area that are outwith the ZTV will have ***no view*** of the onshore elements of the Proposed Development and are scoped out.
- Indirect effects upon NCAs and MCA7 within the 'final' study area:
  - NCAs and MCA7 cover extensive areas and consequently it is considered unlikely that the construction and operation of the onshore elements of the Proposed Development will have the potential to result in significant indirect landscape or seascape effects on NCAs or the MCA7. This conclusion is supported by GLVIA3 (Paragraph 5.14), which advises that "*Broad scale assessments at national and regional level can be helpful in setting the landscape context but are unlikely to be helpful on their own as the basis for LVIA – they may be too generalised to be appropriate for the particular purpose*".
- Effects during operation and decommissioning of the landfall and onshore cable corridor:
  - due to the nature of the works for the landfall and onshore cable corridor being underground and not visible following restoration and reinstatement, the assessment of these elements during operation is scoped out. There will be no decommissioning of the landfall and cable corridor at the end of their operational life as the electrical cables will be left in-situ to minimise the landscape and visual effects associated with removal. The assessment will therefore only focus on the effects of these elements during construction.

Cumulative effects

6.2.58 Cumulative effects on the landscape and visual baseline resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** (including specific LVIA methodology in **Appendix D**) and considering the other developments that have been screened in as part of the CEA screening exercise.

6.2.59 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- 'Whole project' effects resulting from the combined effects of the onshore and offshore elements of the Proposed Development.

- cumulative landscape and visual effects during construction, operation and decommissioning of the substation, and construction of the cable corridor and landfall:
  - effects on landscape character, elements and characteristics as a result of the onshore elements of the Proposed Development in addition and in combination with other similar development;
  - effects on landscape designations (special landscape qualities and integrity) as a result of the onshore elements of the Proposed Development in addition and in combination with other similar development; and
  - effects on visual receptors as a result of the onshore elements of the Proposed Development in addition and in combination with other similar development.

6.2.60 The cumulative assessment methodology for the LVIA will be described once the scope of any cumulative assessment is confirmed and agreed with stakeholders and consultees.

Transboundary effects

6.2.61 Transboundary effects apply only to the SLVIA and concern the overlap of the SLVIA 50km study area with French maritime waters. This is considered further in **Appendix B: Transboundary screening matrix**.

Proposed approach to PEIR and ES

Introduction

6.2.62 The proposed approach to the LVIA between Scoping and PEIR, and the ES are set out below.

Stakeholder engagement

6.2.63 Consultation will be a key feature of the LVIA process, from the pre-application to examination stage with relevant statutory and non-statutory organisations, the public and Interested Parties (IPs).

6.2.64 RED is seeking early engagement with stakeholders and consultees to gain input and local knowledge on the key landscape and visual constraints / sensitivities and discuss potential future environmental measures, as appropriate. RED considers it important to engage early to ensure all landscape and visual aspect matters are considered appropriately and proportionately with the relevant statutory consultees. RED is progressing early informal input from key stakeholders relevant to LVIA. Communications will not form part of the formal Evidence Plan Process (EPP) but seek to introduce the Proposed Development and gain high level insight on issues that key stakeholders would like to see included at scoping through early engagement.

6.2.65 RED will engage with stakeholders and consultees seeking early agreement of viewpoints to be included in the LVIA (prior to viewpoint photography), confirmation of the study area and assessment methodology.

6.2.66 Formal pre-application consultations with regards to LVIA will be undertaken primarily through specialist consultation via an Expert Topic Group (ETG) as part of the EPP, along with wider consultation through this Scoping Report and the PEIR. Numerous ETG meetings and site visits will be organised with representatives from Natural England, South Downs National Park Authority, High Weald AONB Partnership, West Sussex County Council, Arun District Council, Horsham District Council, Mid Sussex District Council and National Trust.

6.2.67 Feedback received through this consultation process will be considered in preparing the PEIR and ES where appropriate to be submitted with the Development Consent Order (DCO) application.

6.2.68 Public consultation will be undertaken in accordance Statement of Community Consultation, once agreed with the local planning authorities. Details of the proposed consultation phases are set out in **Section 4.3**: **Consultation and the evidence plan process** of this Scoping Report.

6.2.69 All consultation feedback pertaining to the LVIA will be presented in a Consultation Report, to be provided as part of the DCO Application, and will be summarised in the LVIA chapter together with information on how feedback has been addressed in the PEIR and ES.

Baseline (desk based and site survey work)

6.2.70 The LVIA undertaken as part of the PEIR and ES will be informed by desk-based studies and field survey work undertaken within the LVIA study area.

6.2.71 Relevant literature covering legislation, policy, assessment guidance, baseline data within the study area and related library sources will be collated. A review will also be undertaken of existing background technical reports and assessments relevant to landscape and visual amenity.

6.2.72 A preliminary desk-based assessment will be undertaken of landscape and visual receptors using ZTV analysis, to identify which receptors are unlikely to be significantly affected, which will be subject to a simple assessment, and those that are more likely to be significantly affected by the onshore elements of the Proposed Development, which require a detailed assessment.

6.2.73 Interactions will be identified between the onshore elements of the Proposed Development and landscape and visual receptors, to predict potentially significant effects arising and measures may be proposed to mitigate effects.

6.2.74 Site surveys, including appreciation of the ‘final’ study area and viewpoint photography from public locations in settlements and on roads, recreational routes or places and local attractions and visitor destinations.

6.2.75 Field surveys (subject to Covid-19 restrictions as described in **Section 4.2**) will be undertaken to observe, assess and record landscape and visual receptors and provide a photographic record of each assessment viewpoint in accordance with SNH (2017) *Visual Representation of Wind Farms*, Guidance (Version 2.2) and the Landscape Institute (2019) *Visual Representation of Development Proposals,* TGN 06/19. The field studies will include documented visits to all relevant landscape and visual receptors to assess the likely effects of the onshore elements of the

Proposed Development in the field, checking data, 'ground truthing' and examining landscape elements, characteristics / character and views / visual amenity.

6.2.76 Computer modelling of the landscape / landform, other cumulative development and the onshore elements of the Proposed Development will be undertaken using a variety of software to support the LVIA.

Approach to design and environmental measures

6.2.77 Environmental measures in respect of the 'final' study area will involve the sensitive siting and design of the onshore elements of the Proposed Development as part of the ongoing site selection work (refer to **Section 2.4**). The ongoing work will consider constraints and potential effects relating to physical landscape elements (such as woodlands, trees and hedgerows), landscape character, landscape designations and visual amenity, together with other environmental and technical constraints. The sensitivity of the surrounding landscape and of residents, road / rail users, and recreational users of the landscape will be a key consideration in the siting and design of the onshore elements of the Proposed Development within the 'final' study area.

6.2.78 The capacity of the landscape to accommodate development within the 'final' study area will be assessed in relation to the natural screening afforded by landform and woodlands, trees and hedgerows. An outline landscape strategy will be prepared to set out suitable environmental measures as required.

Viewpoint Selection and Production of visualisations:

6.2.79 Visual effects will occur when the introduction of the onshore elements of the Proposed Development changes or influences the visual amenity and views experienced by people in the study area. The visual baseline will be defined by a Zone of Theoretical Visibility (ZTV) for the onshore elements of the Proposed Development.

6.2.80 A viewpoint list will be agreed with stakeholders which will include the name, number, grid coordinates, viewpoint type, distance, receptor and visualisation method. It is likely that the majority of the viewpoints will be located within the preliminary 2 km study area with a small number of elevated, long-distance locations beyond from within the SDNP such as Devil's Dyke or Edburton Hill.

6.2.81 Stakeholders and consultees are requested to suggest any initial viewpoints within the study area in their scoping opinion.

6.2.82 Following viewpoint photography and design freeze, visualisations will be produced in accordance with SNH guidance on *Visual Representation of Windfarms* (2017) and Landscape Institute guidance on *Visual Representation of Development Proposals* (2019). Full details of the presentation techniques are described in the example methodology set out in **Appendix D**.

Assessment of effects in the PEIR and ES

6.2.83 The LVIA (including the cumulative assessment) will be reported in the PEIR and ES chapters and appendices as described in the assessment methodology in **Appendix D**.

Assessment of effects on the Dark Night Sky Zones within the SDNP

6.2.84 Lighting requirements for the onshore elements of the Proposed Development will be reviewed and assessed where required. The approach to the assessment including areas within the Dark Night Sky Zones will be agreed with stakeholders between scoping and PEIR.

6.3 Air quality

Introduction

6.3.1 The air quality assessment will consider the potential likely significant effects on air quality, dust and odour that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.3.2 Air quality interfaces with many other aspects and as such, should be considered alongside these; namely:

- **Section 6.6: Terrestrial ecology and nature conservation** which provides further assessment of receptors which may potentially be affected by air quality emissions; and
- **Section 6.7: Transport** which calculates road traffic characteristics which are an input to the air quality assessment.

Study area

6.3.3 The study area for the air quality assessment is defined as the area of the Proposed Development together with the Zones of Influence (ZOIs). ZOIs for air quality are the area immediately around the Proposed Development (for a distance based on expert judgement and recognised guidance), plus roads on which traffic related to the Proposed Development may travel. Guidance published by the Institute of Air Quality Management, IAQM (2014) suggests dust impacts may extend up to 350 m from construction site boundaries, and up to 500 m from the construction site entrance / exit along roads on which construction traffic is travelling. Guidance published jointly by the IAQM and Environmental Protection UK (EPUK) (2017) recommends a ZOI extending for distance of 200m from roads on which a significant increase in traffic would occur as a result of the development. The guidance further defines a significant increase in traffic as follows:

- cause a significant change in Light Duty Vehicle (LDV[19]) traffic flows on local roads with relevant receptors:

[19] LDV = cars and small vans <3.5t gross vehicle weight.

  - more than 100 AADT[20] within or adjacent to an Air Quality Management Area (AQMA); or
  - more than 500 AADT elsewhere.
- cause a significant change in Heavy Duty Vehicle (HDV[21]) flows on local roads with relevant receptors:
  - more than 25 AADT within or adjacent to an AQMA; or
  - more than 100 AADT elsewhere.
- realign roads, for instance changing the proximity of receptors to traffic lanes, where the change is 5m or more and the road is within an AQMA; or
- introduce a new junction or remove an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate (for example, traffic lights, or roundabouts).

6.3.4 The study area will be reviewed and amended in response to such matters as refinement of the onshore project components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.

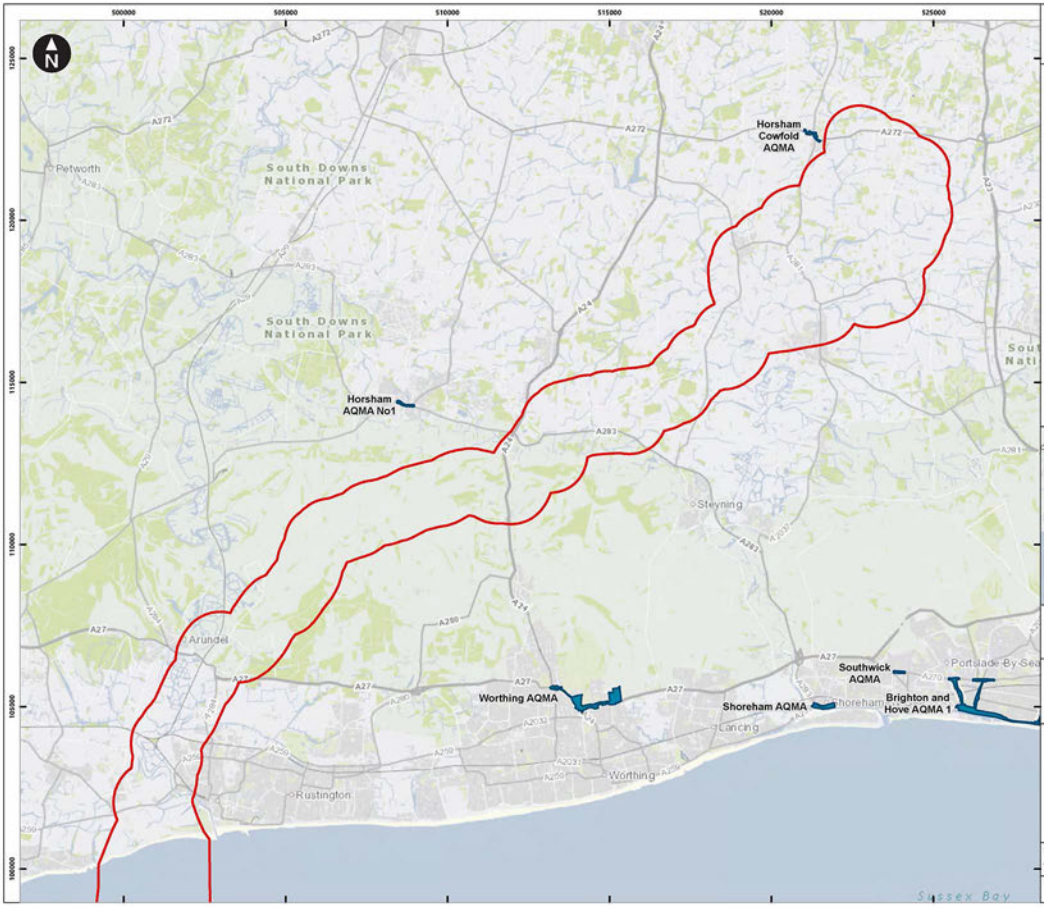
Assessment methodology

Introduction

6.3.5 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. This has informed the approach of the air quality assessment in conjunction with relevant guidance and best practice to address any specific needs.

6.3.6 Key stakeholders, including the local authorities within which the Scoping Boundary (**Figure 6.3.1**) lies, namely Arun, Horsham and Mid Sussex District Councils, and the South Downs National Park Authority, will be consulted.

[20] AADT = annual average daily flow (24-hour).
[21] HDV =goods vehicles + buses >3.5t gross vehicle weight.



Key

- Scoping Boundary
- Air Quality Management Areas (AQMAs)

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.3.1 Air Quality Management Areas (AQMAs)

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-QA-0001				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	20/05/2020	FINAL

ISO A3 Landscape

Air quality

6.3.7 The air quality assessment will be undertaken in accordance with guidance issued by the IAQM (2014, 2016, 2018 and 2020), IAQM and EPUK (2017), the Environment Agency (EA) (EA 2016) and Defra (2018).

6.3.8 Air quality in the UK is often characterised in terms of key pollutants including: nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), particulates (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2) and ozone (O_3). Although many other pollutants are present in the atmosphere, these key pollutants are recognised for generally being elevated above background levels and most associated with health effects or impacting on natural habitats. Rampion 2 will include activities that would give rise to emissions of NO_x, particulates and, to a lesser extent, SO_2. These activities are:

- operation of mobile plant and machinery during construction and decommissioning phases; and
- use of road vehicles during construction, operation and decommissioning phases.

6.3.9 IAQM and EPUK (2017) offers guidance on whether an air quality assessment is required, saying:

"This will need to be a matter of judgement and should take into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;
- the presence and location of AQMAs as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO_2), that would cause unacceptably high exposure for users of the new development; and
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development."

6.3.10 IAQM AND EPUK (2017) a quantitative method to assign standard descriptors to impacts depending on the magnitude of the change and the background concentration, in relation to the relevant assessment level. These are shown in **Table 6.3.1**. Although these descriptors have no official status, they are widely used and accepted.

Table 6.3.1 Impact descriptors for increases in annual mean concentrations

Absolute concentration with scheme, relative to assessment level	Increase in concentration relative to assessment level				
	0%	1%	2–5%	6-10%	>10%
75% or less	Negligible	Negligible	Negligible	Slight	Moderate
76–94%	Negligible	Negligible	Slight	Moderate	Moderate
95–102%	Negligible	Slight	Moderate	Moderate	Substantial
103–109%	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more	Negligible	Moderate	Substantial	Substantial	Substantial

The table is intended to be used by calculating percentages relative to the assessment level and then rounding the percentages to whole numbers.

6.3.11 The IAQM AND EPUK guidance then goes on to provide qualitative guidance on the assessment of significance. The descriptors above feed into this assessment, but not in a rigorously prescribed way. Rather, the assessment of significance is based on professional judgement, taking into account the guidance and the various relevant factors, Some of the relevant factors it identifies as needing to be taken into account are:

- "*the existing and future air quality in the absence of the development;*
- *the extent of current and future population exposure to the impacts; and*
- *the influence and validity of any assumptions adopted when undertaking the prediction of impacts.*"

Odour

6.3.12 If required, the odour assessment will follow IAQM (2018) guidance. In the absence of specific guidance on when an odour assessment may or may not be required, consideration is given to the presence of odour sources associated with the Proposed Development and proximity to vulnerable receptors.

Dust

6.3.13 If required, the dust assessment will follow IAQM (2014, 2016 and 2018) guidance. This guidance provides a procedure for a risk-based assessment of potential dust impacts which should be carried out on the assumption that no control or mitigation measures are applied. This risk-based assessment includes criteria about the dust-generating potential of various activities, the number of potential receptors within various distance bands of the activities and the sensitivity of different types of human and ecological receptors to various effects. The guidance then suggests suitable control and environmental measures, and advises that with these measures in place, the residual effect is normally not significant.

Baseline conditions

Data sources

6.3.14 Key sources of air quality data are summarised in **Table 6.3.2**. As well as baseline concentrations of pollutants, an important input into the assessment is the location of any AQMAs. These are areas designated by local authorities where there is or may be a risk of exceeding the air quality objectives prescribed by Government.

Table 6.3.2 Key sources of air quality data

Source	Date	Summary	Coverage of study area
Department for Environment, Food and Rural Affairs (Defra) background maps	2018	Provide forecast concentrations of pollutants at background locations.	Full coverage of study area.
Arun District Council Annual Status Report	2019	Provides details of AQMAs and monitoring results.	Arun District.
Horsham District Council Annual Status Report	2019	Provides details of AQMAs and monitoring results.	Horsham District.
Mid Sussex District Council Annual Status Report	2019	Provides details of AQMAs and monitoring results.	Mid Sussex District.

6.3.15 It is considered that these data sources are sufficient to characterise the baseline air quality, without the need for further monitoring.

Baseline

6.3.16 The Scoping Boundary (**Figure 6.3.1**) lies within the administrative areas of three District Councils: Arun, Horsham and Mid Sussex. Each district council produces an Annual Status Report which describes air quality in its administrative area, including any AQMAs in force, and the results of air quality monitoring.

6.3.17 There are two AQMAs within 5 km of the Scoping Boundary, both for annual mean NO_2:

- Storrington AQMA: a 540 m length of the A283 through Storrington, including properties close to the road. This AQMA is approximately 1,700 m north of the Scoping Boundary at its closest point; and
- Cowfold AQMA: a 700 m length of the A272 through Cowfold, including properties close to the road. This AQMA is approximately 110 m west of the Scoping Boundary at its closest point.

6.3.18 Within both AQMAs, monitoring of concentrations of NO_2 shows that levels are very sensitive to location, especially distance from the road and amount of vehicle queuing and congestion on the nearest part of the road. Concentrations in the Storrington AQMA in 2018 vary between 26.4 µg m^{-3} and 50.6 µg m^{-3}, and concentrations in the Cowfold AQMA in 2018 vary between 25.9 µg m^{-3} and 42.4 µg m^{-3}. In both cases there are localised exceedances of the limit value of 40 µg m^{-3} close to areas where traffic queues and accelerates, and a wider area where concentrations are close to the limit value.

6.3.19 The locations of the AQMAs is shown in **Figure 6.3.1**. Although both of these AQMAs are outside the Scoping Boundary, traffic associated with Rampion 2 may travel through each of the AQMAs.

6.3.20 Defra maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of current and future background air quality concentrations at a 1 km grid square resolution. The datasets include annual average concentration estimates for NO_2, as well as other pollutants. The PCM model is semi-empirical in nature: it uses data from the National Atmospheric Emissions Inventory (NAEI) to model the concentrations of pollutants at the centroid of each 1 km grid square but then calibrates these concentrations in relation to actual monitoring data. Concentrations represent background locations, not roadside locations or those particularly influenced by point sources.

6.3.21 The dataset was updated in 2019 for a reference year of 2017. Data is available for years covering 2017 to 2030, with modelled concentrations generally decreasing over that time period. For the grid squares covered by the study area, concentrations of background annual mean NO_2 in 2021 vary between 7 µg m^{-3} and 11 µg m^{-3}, which is typical of rural areas in England. These concentrations are well within the legal limit of 40 µg m^{-3}.

6.3.22 Ambient levels of dust and odour are typically very low and are not routinely monitored in the UK. Elevated levels of dust and odour can result in complaints which may then result in monitoring taking place in the local area to determine if a nuisance is present

Basis for scoping assessment

6.3.23 The air quality scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**.

Table 6.3.3 Basis for scoping assessment

Development element	Assumption
Landfall	• Cable landfall will be via a trenchless technique such as Horizontal Directional Drilling (HDD). • Transition joint bays will be underground.

Development element	Assumption
Onshore Cable	• The onshore grid connection will be made via an underground cable along the entire length of the route. The cable route will be refined during the EIA process in order to identify a cable route corridor which is the most desirable from an environmental, economic and engineering perspective. • The onshore cable system will be installed in trenches. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential effects where constraints are identified, including watercourse crossings. • It is expected that the width of the cable construction corridor for surface trenching will be approximately 50 m. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects.
Substation	• The overall site footprint for the proposed substation is anticipated to be up to 4.5 hectares (ha), and the exact location of the substation will be refined through the EIA process.
Operation and Maintenance	• Maintenance activities will be undertaken for both preventive and corrective maintenance requirements. • The operational lifetime is assumed to be a minimum of 30 years.
Decommissioning	• The decommissioning of the wind farm is anticipated to be restricted to the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise environmental impacts associated with removal. • The environmental regulatory and guidance regime is similar to that currently in effect.

Embedded environmental measures

6.3.24 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on air quality (see **Table 6.3.4**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.3.25 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.3.4 Relevant air quality embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C–6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	Development Consent Order (DCO) works plans and order limits
C–19	The onshore cable will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced. At regular intervals (typically 600m – 1,000m) along the route joint bays/pits will be installed to enable the cable installation and connection process.	Code of Construction Practice (COCP) and DCO requirement
C–24	Best practice air quality management measures will be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	COCP and DCO requirement

Likely significant effects

6.3.26 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.3.27 The likely significant effects on air quality are summarised in **Table 6.3.5**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for air quality effects, published guidance and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.3.28 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after **Table 6.3.5**, supported by the evidence base.

Table 6.3.5 Likely significant air quality effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Emissions of air pollutants from construction traffic on roads (Construction)	None	Likelihood of significant effects will depend on traffic data which is not yet available.	**Scoped in, simple assessment** (see **Paragraph 6.3.40**)	Residential properties and other locations where people may be exposed over relevant time periods, within 200 m of affected roads and especially in AQMAs. Sensitive ecological receptors within 200 m of affected roads.	Monitoring data from local authority monitoring programmes. Baseline traffic data (from Transport assessment) to determine which roads are likely to be affected.
Emissions of air pollutants from construction equipment on site (Construction)	C – 6, C – 19	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.30**)	Residential properties and other locations where people may be exposed over relevant time periods, especially in AQMAs. Sensitive ecological receptors.	None
Emissions of dust from construction (Construction)	C – 19, C – 24	Likelihood of significant effects will depend on extent of mitigation applied.	**Scoped in** (see **Paragraphs 6.3.36** to **6.3.39**)	Residential properties and other locations where people may be exposed. Sensitive ecological receptors	None

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Emissions of odour from construction (Construction)	C – 6, C – 19	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.31**)	Residential properties and other locations where people may be exposed.	None
Emissions of air pollutants during operational phase (Operation)	None	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.32**)	Residential properties and other locations where people may be exposed over relevant time periods, especially in AQMAs. Sensitive ecological receptors.	None
Emissions of dust during operational phase (Operation)	None	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.33**)	Residential properties and other locations where people may be exposed. Sensitive ecological receptors.	None
Emissions of odour during operational phase (Operation)	None	**No likely significant effects.** Further	**Scoped out** (see **Paragraph 6.3.34**)	Residential properties and other locations where people may be exposed.	None

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		rationale in the section below.			
Emissions of air pollutants from decommissioning traffic on roads (Decommissioning)	None	Likelihood of significant effects will depend on traffic data which is not yet available.	**Scoped in, simple assessment** (see **Paragraph 6.3.40**)	Residential properties and other locations where people may be exposed over relevant time periods, within 200 m of affected roads and especially in AQMAs. Sensitive ecological receptors within 200 m of affected roads.	Monitoring data from local authority monitoring programmes. Baseline traffic data (from Transport assessment)
Emissions of air pollutants from decommissioning equipment on site (Decommissioning)	C – 6, C – 19	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.30**)	Residential properties and other locations where people may be exposed over relevant time periods, especially in AQMAs. Sensitive ecological receptors.	None
Emissions of dust from decommissioning (Decommissioning)	C – 19, C – 24	Likelihood of significant effects will depend on extent of	**Scoped in** (see **Paragraphs 6.3.36** to **6.3.39**)	Residential properties and other locations where people may be exposed. Sensitive ecological receptors.	None

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		mitigation applied.			
Emissions of odour from decommissioning (Decommissioning)	C – 6, C – 19	**No likely significant effects.** Further rationale in the section below.	**Scoped out** (see **Paragraph 6.3.31**)	Residential properties and other locations where people may be exposed.	None

Impacts scoped out of assessment

6.3.29 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.

6.3.30 Emissions of air pollutants from mobile plant and construction equipment on site during the construction and decommissioning phases, and their effects at human and ecological receptors, have been scoped out of the air quality assessment, resulting from a conclusion of no likely significant effect. The small amount of construction plant required, the short duration of construction activity at any given location (embedded measure C – 19), the avoidance of sensitive receptors along the route (embedded measure C – 6), and the low background concentrations of air pollutants (**Paragraph 6.3.21**) mean that the risk of causing significant air quality impacts at either human or ecological receptors is very low. This is supported by the experience of previous similar projects, such as the existing Rampion 1 project (Infrastructure Planning Commission, 2010) and the Thanet Extension Offshore Wind Farm (Planning Inspectorate, 2017), where these effects were scoped out from the EIA.

6.3.31 Emissions of odour from the construction and decommissioning phases have been scoped out of the air quality assessment. No likely sources of odour have been identified, the short duration of construction activity at any given location (embedded measure C – 19) and the avoidance of historic landfill sites and of sensitive receptors along the route (embedded measure C – 6) mean that the risk of causing significant odour impacts at human receptors is very low.

6.3.32 Emissions of air pollutants during operational phase have been scoped out of the air quality assessment. There will be no emissions associated with the cable or substation. The amount of road traffic for servicing Rampion 2 will be very low and are highly unlikely to exceed the criteria given in **Paragraph** Error! Reference source not found.. Therefore, the risk of causing significant air quality impacts at either human or ecological receptors is very low.

6.3.33 Emissions of dust during operational phase have been scoped out because there are no dust sources associated with the operation of Rampion 2.

6.3.34 Emissions of odour during operational phase have been scoped out because there are no odour sources associated with the operation of Rampion 2.

Impacts remaining in the scope of the assessment

6.3.35 A number of potential effects are considered to remain in the scope of assessment

- emissions of air pollutants from construction traffic on roads (Construction);
- emissions of dust from construction (Construction);
- emissions of air pollutants from construction traffic on roads (Decommissioning); and

- emissions of dust from construction (Decommissioning).

6.3.36 Emissions of dust during the construction and decommissioning phases remain within the scope of the air quality assessment. The IAQM guidance on the assessment of dust (IAQM, 2014) recommends the following procedure for assessing the risk of a construction project causing significant dust impacts:

- first, the risk of significant dust impacts at sensitive receptors in the absence of any mitigation or control measures is assessed;
- then, suitable mitigation and control measures are identified; and
- finally, the residual risk is determined.

6.3.37 However, for Rampion 2, RED has already committed to undertake best practice mitigation and control measures in accordance with IAQM recommendations (embedded measure C – 24), and with these measures in place, the IAQM (2014) guidance states:

6.3.1 "*For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.*"

6.3.38 This should be possible for Rampion 2, and therefore it can be concluded that the residual effect is not significant.

6.3.39 In order to reach that conclusion, the IAQM guidance identifies some 52 specific mitigation and control measures, and states that which of these are required at a particular development depends on the outcome of a risk assessment. Therefore, the ES will include a dust risk assessment in order to determine which specific measures are required for Rampion 2; this will provide more detail on embedded measure C – 24.

6.3.40 The assessment of increased road traffic during construction and decommissioning remains within the scope of the air quality assessment in the absence of traffic data at this time.

Cumulative effects

6.3.41 Cumulative effects on air quality resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.3.42 The following air quality impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- dust from other construction projects within 350m of the Proposed Development; and
- impacts from road traffic.

6.3.43 These cumulative effects remain within the scope of the air quality assessment.

Transboundary effects

6.3.44 The potential effects from construction, operation (including maintenance) and decommissioning on air quality receptors are considered in **Appendix B: Transboundary screening matrix**. No transboundary effects from air quality, dust or odour are anticipated, so these transboundary effects have been scoped out.

Proposed approach to PEIR and ES

6.3.45 It is expected that most air quality issues can be scoped out. However, consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process as set out in **Section 4.3: Consultation and the evidence plan process**, and any remaining issues will be addressed in the PEIR and ES.

6.3.46 Air quality issues that cannot be scoped out at this stage include the impacts of dust and road traffic during construction and decommissioning. The assessment of dust will focus on identifying specific dust mitigation measures to be adopted to render residual impacts being negligible. The assessment of road traffic will depend on the provision of data from the transport analysis. It is likely that the construction and decommissioning road traffic will be below IAQM thresholds for scoping out. If so, this will be demonstrated in the PEIR and/or ES. If not, an assessment of the impacts from this source (including cumulative effects) will be included in the PEIR and/or ES.

6.4 Soils and agriculture

Introduction

6.4.1 The soils and agriculture assessment will consider the potential likely significant effects on the soil resource and the agricultural land resource that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.4.2 Soils and agriculture interfaces with other aspects and as such, should be consider alongside these; namely:

- **Section 5.14: Socio-economics** for assessment of potentially significant effects on socio-economic receptors that may arise from Rampion 2;
- **Section 6.8: Ground conditions** for the assessment of potentially significant effects with respect to land contamination, geohazards and geodiversity that may arise from Rampion 2**;** and
- **Section 6.10: Water environment** for assessment of potentially significant effects on water environment receptors including groundwater, surface water and flood risk that may arise from Rampion 2.

Study area

6.4.3 The study area for the soils and agriculture assessment is defined as the onshore area (landward of MHWS) within the Scoping Boundary (see **Figure 6.4.1**) only. There is no external zone of influence for soils and agriculture beyond the Scoping Boundary. The rationale for the study area is that soils and agricultural land are geographically discrete and not substantially influenced by changes to the surroundings. Therefore, soils and agricultural land will only be significantly affected by changes or activities (temporary or permanent) taking place on the resource itself, and therefore no additional buffer around the Scoping Boundary is required.

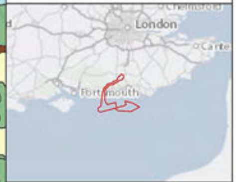
6.4.4 The study area will be reviewed and amended in response to such matters as refinement of the onshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation. The soils and agriculture assessment will consider the land directly affected by construction works and will therefore cover a smaller study area of land lying wholly within in the Scoping Boundary which for the purposes of scoping provides a design envelope.

Key

Scoping Boundary

Agricultural Land Classification Grade

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5



Kilometres

0 0.5 1 2 3 4

1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.4.1 Agricultural Land Classification data within the Scoping boundary

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OI-0001				1.0
Company: COMPANY	Drawn By: BARNB	Chk/Aprvd: WOOD	Drawn Date: 28/05/2020	Status: FINAL

Assessment methodology

Introduction

6.4.5 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA process**. However, whilst this has informed the approach that has been used in this soils and agriculture section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the soils and agriculture assessment.

6.4.6 The National Policy Statement for Energy EN-1 (Department for Energy and Climate Change, 2011) states that:

6.4.1 "*Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3 of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed*".

6.4.7 The soils and agriculture assessment will therefore focus on likely significant effects on:

- Soil resources; and
- Agricultural land resources.

6.4.8 The assessment of economic effects of the Proposed Development will be covered in the assessment carried out in socio-economic ES Chapter and further details are provided in **Section 5.14**.

6.4.9 The assessment of likely significant effects for soils and agriculture will be based on the extent of soils and agricultural land that might be affected and whether the effects would be temporary or permanent. The assessment will be informed by:

- information about the construction, operational and decommissioning activities associated with Rampion 2;
- relevant national policy, strategy, legislation and guidance documents;
- stakeholder engagement feedback; and
- professional judgement.

6.4.10 The assessment will take into consideration the sensitivity of the affected receptor or resource and the magnitude of change from the baseline conditions resulting from the Proposed Development. This will result in an evaluation of significance and an indication of likely significant effects which will be detailed in the ES.

Receptor sensitivity

6.4.11 Definitions of receptor sensitivity used in the assessment are provided in **Table 6.4.1**.

Table 6.4.1 Sensitivity of receptor / resource

Sensitivity	Criteria / description
High	Grade 1 and 2 agricultural land[22] Permeable loamy soils
Medium	Subgrade 3a agricultural land[23] Mixture of soil types
Low	Lower grade land Slowly permeable, damaged or contaminated soils

6.4.12 Planning guidance and the National Planning Policy Framework (NPPF) refer only to the need to protect Best and Most Versatile (BMV) agricultural land (grades 1-3a). Hence other land is regarded as of low sensitivity. In the south of England subgrade 3a land is a relatively common resource and therefore is regarded as of lower sensitivity than grade 1 and 2 land, which is the best available both locally and nationally.

Magnitude of change

6.4.13 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. **Table 6.4.2** provides examples of how various magnitudes of change could be determined with respect to soils and agriculture features.

6.4.14 Magnitude of change may be either beneficial or adverse. The criteria and examples in **Table 6.4.2** focus on adverse changes, however beneficial changes may also occur and will be considered on a case-by-case basis as required.

6.4.15 The magnitude of change on BMV land will depend on the amount to be affected by the development. Schedule 4 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 only requires Natural England to be consulted (on behalf of the Secretary of State for the Environment, Food and Rural Affairs (Defra) on development that involves the loss of not less than 20 hectares (ha) of grades 1, 2 or 3a agricultural land. Consequently, the magnitude of losses smaller than this threshold is considered to have a small effect on the national stock of BMV land. Losses of over 80 ha of BMV land are equivalent to the size of a medium to large farm and consequently the magnitude of effect is considered to be high.

[22] Grade 1: Excellent quality agricultural land with no or very minor limitations to agricultural use. Grade 2: Very good quality agricultural land with minor limitations which affect crop yield, cultivation or harvesting.
[23] Grade 3a: Good quality agricultural land capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.

Table 6.4.2 Magnitude of change

Magnitude	Criteria
High	Permanent damage to soils / agricultural land of an area in excess of 80ha
Medium	Permanent damage to soils / agricultural land of an area between 20 and 80ha
Low	Permanent damage to soils / agricultural land of area below 20ha or temporary damage over 20ha which will rectify without mitigation
Negligible	Temporary damage to areas less than 1ha

Evaluation of significance

6.4.16 During the assessment of effects for each identified receptor the sensitivity value in **Table 6.4.1** will be combined with the magnitude of change from **Table 6.4.2** to produce an overall significance rating based on the evaluation matrix shown in **Table 6.4.3**. A 'significant' effect is assessed as a Major rating whereas a Moderate rating will be considered to be 'potentially significant' at this stage of the EIA process. The latter will be subject to further investigation as part of the PEIR and ES following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

6.4.17 The evaluation of significance for soils will be undertaken using professional judgement, drawing upon information about the nature and extent of the soil resources present.

6.4.18 The evaluation of significance for agricultural land quality will be undertaken using professional judgement, drawing upon information about the area of BMV agricultural land (defined as Grade 1, 2 and 3a of the ALC) which might be lost or damaged together with contextual data about BMV land within the study area.

Table 6.4.3 Significance evaluation matrix

		Magnitude of change			
		High	**Medium**	**Low**	**Negligible**
Sensitivity	**High**	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Potentially significant)	Low (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Baseline conditions

Data sources

6.4.19 A desk-based review of literature and existing datasets has been undertaken to gain an overview of likely conditions and how this may vary geographically across the study area. This has been established to help inform the scoping of the soils and agriculture assessment and the key sources of data are provided in **Table 6.4.4** .

Table 6.4.4 Key sources of soils and agriculture data

Source	Date	Summary	Coverage of study area
National Soils Research Institute data	2020	1:250,000 National Soil Map (Sheet 6)	Full coverage of study area
Gov.uk open data / Multi-Agency Geographic Information for the Countryside (MAGIC) website	2019	1:250,000 Ministry of Agriculture Fisheries and Food (MAFF) provisional Agricultural Land Classification Map of England and Wales and post-1988 ALC data	Full coverage of study area
Ordnance Survey	2020	1:50,000 and 1:25,000 mapping	Full coverage of study area

Source	Date	Summary	Coverage of study area
British Geological Survey (BGS)	2020	On-line Geoindex 1:50,000 digital geology	Full coverage of study area
Open-access Google Earth aerial imagery	2020	Land use considerations	Full coverage of study area

6.4.20 These datasets will be reviewed and utilised within the soils and agriculture assessment in the PEIR and ES and will be supplemented with soils and agriculture information gained through onsite soil survey/sampling.

Baseline

Geology

6.4.21 Near the coast, surface deposits within the Scoping Boundary are recorded as Thames Group sand and gravels, partially overlain by alluvium and head deposits (Brickearth silty wind-blown sands). The Scoping Boundary crosses chalkland of the South Downs between Arundel and Steyning. Greensand is recorded to outcrop on the upper escarpment north of Steyning. In the Low Weald west of Burgess Hill Wealden Group (interbedded mudstone, siltstone and sandstone) is recorded. Further information on geology is provided in **Section 6.8 Ground conditions** and **Section 6.10: Water environment**.

Soils

6.4.22 The land near the coast is recorded (by the National Soil Map) as a mixture of silty soils formed in Brickearth (Hamble 2 Association) and fine loamy soils over gravel (Efford 1 Association). These soils give mainly high quality agricultural land (grade 1 or 2). On the South Downs, the soils are mainly shallow over chalk, with deeper soils in dry valleys (Andover 1 and 2 Associations). Deeper clayey soils are found in plateau drift (Carstens Association) on parts of the higher ground. This land often has droughtiness limitations to agriculture resulting from shallow soil depth, but most land is typically of good quality (subgrade 3a and above). Sandy and loamy soils of the Fyfield 1 Association are associated with the Greensand outcrop), giving a mixture of land quality depending on the sandiness. On the Weald, heavier soils over clays are recorded (Wickham 1 Association), which are typically wet and of moderate agricultural quality.

6.4.23 It should be noted that, given the low resolution of the published data, soils and agricultural land quality should be treated as provisional only.

Land use

6.4.24 The land of the coastal plain is dominated by arable farming. The South Downs has a mixture of arable and livestock farms with woodland plantation. The Weald is under grassland with variable proportions of cereal rotation.

Agricultural land quality

6.4.25 Provisional Agricultural Land Classification (ALC) mapping shows the land within the Scoping Boundary on the coastal plain to be a mixture of grade 1,2 and 3 quality, with grade 4 on the Arum floodplain. Land on the chalk downs is shown as mainly grade 3, with grade 4 on steeper slopes. Grade 2 is recorded on the Greensand outcrop. Land of the Low Weald is recorded as grade 3, with 4 on flood plains. Grades 1, 2 and 3a are considered to be 'best and most versatile' agricultural land and this is the land which is most flexible, productive and efficient in response to inputs. **Figure 6.4.1** shows the provisional ALC grades within the Scoping Boundary.

Basis for scoping assessment

6.4.26 The soils and agriculture scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**.

Table 6.4.5 Basis for soils and agriculture scoping assessment

Development element	Assumption
Landfall	• Cable landfall will be via a trenchless technique such as Horizontal Directional Drilling (HDD). • Transition joint bays will be underground.
Onshore Cable	• The onshore grid connection will be made via an underground cable along the entire length of the route. The cable route will be refined during the EIA process in order to identify a cable route corridor which is the most desirable from an environmental, economic and engineering perspective. • The onshore cable system will be installed in trenches. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential effects where constraints are identified, including watercourse crossings. • It is expected that the width of the cable construction corridor for surface trenching will be approximately 50 m. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects.

Development element	Assumption
Substation	• The overall site footprint for the proposed substation is anticipated to be up to 4.5 hectares, and the exact location of the substation will be refined through the EIA process.
Operation and Maintenance	• Maintenance activities will be undertaken for both preventive and corrective maintenance requirements. • The operational lifetime is assumed to be a minimum of 30 years. • There is no extensive processing, handling and storage of hazardous materials or intrusive maintenance required during the operation of Rampion 2.
Decommissioning	• The decommissioning of the wind farm is anticipated to be restricted to the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise environmental impacts associated with removal.

6.4.27 For the purposes of soils and agriculture assessment, it has been assumed that there will be permanent loss of agricultural land in the onshore substation area. Only temporary loss of agricultural land will occur in relation to the onshore cable corridor with land returning to agricultural land where appropriate.

6.4.28 The basis for soils and agriculture assessment includes the embedded mitigation detailed in **Table 6.4.6**.

Embedded environmental measures

6.4.29 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on soils and agriculture (see **Table 6.4.6**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.4.30 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.4.6 Relevant soils and agriculture embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length.	DCO works plans, description of development and requirements
C-5	Main watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see commitment C-17)	DCO works plans and order limits
C-7	Post construction the work area will be reinstated to pre-existing condition as far as reasonably practical in line with Defra 2009 Code of Construction Practice (COCP) for the Sustainable Use of Soils on Construction Sites PB13298.	COCP and DCO requirement
C-11	During construction topsoil and subsoil will be stored within the temporary working corridor of the onshore cable corridor. The topsoil and subsoil will be stored in separate stockpiles in line with Defra 2009 COCP for the Sustainable Use of Soils on Construction Sites PB13298. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	COCP and DCO requirement
C-12	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	COCP and DCO requirement
C-13	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bog-matting and geotextiles will be considered by the principal contractor for sensitive sections of the route to reduce impact.	COCP and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
C-33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users, and existing land users. It will provide details of measures to protect environmental receptors.	COCP and DCO requirement

Likely significant effects

6.4.31 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.4.32 The likely significant effects on soils and agriculture are summarised in **Table 6.4.7**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for soils and agriculture effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.4.33 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects ‘scoped in’ as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.4.7 Likely significant soil and agriculture effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Changes to soil structure due to inappropriate storage and/or handling of soils or due to the use of heavy machinery which causes compaction (Construction)	C-1, C-7, C-11, C-12, C-13, C-33	Potential for significant effect although no likely significant effect anticipated with the implementation of embedded measures. To be determined through further assessment.	**Scoped in, detailed assessment**	Soil / agricultural land	Soil / land type survey data on soil types and susceptibility
Soil erosion due to inappropriate storage and/or construction activities (Construction)	C-12	Potential for significant effect although no likely significant effect anticipated with the implementation of embedded measures. To be determined through further assessment.	**Scoped in, detailed assessment**	Soil / farm businesses and designated water courses	Soil / land type survey data on soil types and susceptibility
Temporary loss of topsoil due to removal associated with construction activities (Construction)	C-1, C-7, C-11, C-12, C-13, C-33	Potential for significant effect although no likely significant effect anticipated with the implementation of embedded measures. To be determined through further assessment.	**Scoped in, detailed assessment**	Soil / agricultural land	Soil / land type survey data on soil types and susceptibility

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Permanent loss of topsoil due to removal associated with construction activities (Construction)	C-7, C-11	Potential for significant effect although no likely significant effect anticipated with the implementation of embedded measures. To be determined through further assessment.	**Scoped in, detailed assessment**	Soil / agricultural land	Soil / land type survey data on soil types and susceptibility
Damage to drainage systems due to construction activities (Construction)	-	Potential for significant effect. To be determined through further assessment.	**Scoped in, detailed assessment**	Agricultural land	Soil / land type survey data on presence/likelihood of artificial drainage
Temporary loss of, or damage to agricultural land during the construction phase (Construction)	N/A	Potential for significant effect. To be determined through further assessment.	**Scoped in, detailed assessment**	Soils / agricultural land	Soil and ALC survey data
Permanent loss of agricultural land due to onshore infrastructure (Construction)	N/A	Potential for significant effect although no likely significant effect anticipated due to small scale of substation construction. To be	**Scoped in, detailed assessment**	Soils / agricultural land	Soil and ALC survey data

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		determined through further assessment.			
Loss of agricultural land due to operational and maintenance activities (Operation)	-	**No likely significant effect** as loss of agricultural land to occur in construction phase. Any disruption due to operations and maintenance during this phase are likely to be minimal and likely sort lived, with no loss of agricultural land.	**Scoped out (paragraph 6.4.34)**	Soils / agricultural land	N/A
Loss of soil due to operational and maintenance activities (Operation)	-	**No likely significant effect** as loss of soil resource to occur in construction phase. Any disruption due to operations and maintenance during this phase are likely to be minimal and likely short lived, with no loss of agricultural land.	**Scoped out (paragraph 6.4.34)**	Soils / agricultural land	N/A
Loss of soil resource and agricultural land due to decommissioning	-	**No likely significant effect** as loss of soil resource and agricultural land to occur in the decommissioning phase.	**Scoped out**	Soils / agricultural land	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
activities (Decommissioning)		Decommissioning is anticipated to be restricted to the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise disruption and environmental impacts associated with removal.			

Impacts scoped out of assessment

6.4.34 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. The scoped-out effects are considered below.

6.4.35 The loss of soil resources and best and most versatile agricultural land during the operational and decommissioning phases has been scoped out of the assessment. During the operational phase, there is not anticipated to be any loss of soil resources and agricultural land. Any disruption associated with operations and maintenance works along the cable route is likely to be minimal and short-lived. During the decommissioning phase, to limit disruption and environmental effects the electrical cable is proposed to be left in-situ with only removal of the substation planned. There is not anticipated to be a loss of soil resources and/or agricultural land as a result of decommissioning activities.

Cumulative effects

6.4.36 The soils and agriculture impacts associated with Rampion 2 are localised in extent and will be limited to within the Proposed Development footprint. It is therefore unlikely there will be impacts that may act cumulatively with impacts from other developments to contribute to cumulative effects on agriculture and soils receptors in the vicinity.

Transboundary effects

6.4.37 The potential effects from construction, operation (including maintenance) and decommissioning on soils and agriculture receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

Stakeholder engagement

6.4.38 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which is set out in **Section 4.3: Consultation and the evidence plan process**. Specifically, this will involve consultation with Natural England (to whom soils and agriculture are seconded from Defra) and the relevant local authorities.

6.4.39 It is anticipated that this consultation will be ongoing to support both the PEIR and ES submissions.

Development of site-specific environmental measures

6.4.40 The selection of the potential route(s) and substation location at PEIR stage will involve the translation of some of the embedded measures into site-specific measures associated with particular soils/ land types. These measures will be

developed in consultation with the wider environment team to ensure that the best environmental and technically feasible option for the proposed infrastructure is selected.

6.4.41 This exercise will result in the refinement of the proposed embedded measures and the potential development of some location-specific measures as required to demonstrate how particularly sensitive receptors will be protected.

Undertaking further survey work and assessments

6.4.42 A soils and Agricultural Land Classification survey will be carried out on all agricultural sections of the onshore cable corridor route and substation. This will involve obtrusive observations at a density of 1 per 100m or 1 per ha (dependent on the refinement of the Proposed Development boundary) along the cable corridor route. The survey will be conducted with hand tools to a maximum of 1.2 m using standard soil survey methods (Hodgson, 1974). Agricultural Land Classification will be conducted in strict accordance with ALC guidelines (MAFF, 1988) and with Natural England guidance for conducting ALC survey (TIN 049). The data collected will supplement the desk-based information collated on soils and agricultural land and will feed into the assessment of effects in the ES.

6.4.43 The soils and Agricultural Land Classification survey is planned to be carried out in late 2020 at a time with appropriate crop levels to limit disruption. In line with the approach regarding the current COVID-19 pandemic in **Section 4.2**, this survey will be carried out applying social distancing measures to keep surveyors and members of the public safe.

6.4.44 The soils and agriculture assessment in the PEIR and ES will address specific impacts on receptors and demonstrate how Rampion 2 will comply with relevant legislation and guidance. Any feedback from consultation and the PEIR will be taken into consideration in the assessment presented in the ES.

6.5 Noise and vibration

Introduction

6.5.1 The noise and vibration assessment will consider the potential likely significant effects on onshore noise and vibration receptors that may arise from the construction, operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.5.2 Noise and vibration interfaces with many other aspects and as such, should be considered alongside:

- **Section 6.2: Landscape and visual impact** as mitigation required to reduce noise effects, both during the construction phase and operational phase could result in visual effects for sensitive receptors;

- **Section 6.6: Terrestrial ecology and nature conservation** as all phases of the development could have noise and vibration effects on ecological resources;
- **Section 6.7: Transport** as the noise assessments will rely on traffic flows to predict changes in traffic noise level; and
- **Section 6.9: Historic environment** as the historic environment is considered a sensitive resource that could be affected by noise and vibration from the Proposed Development.

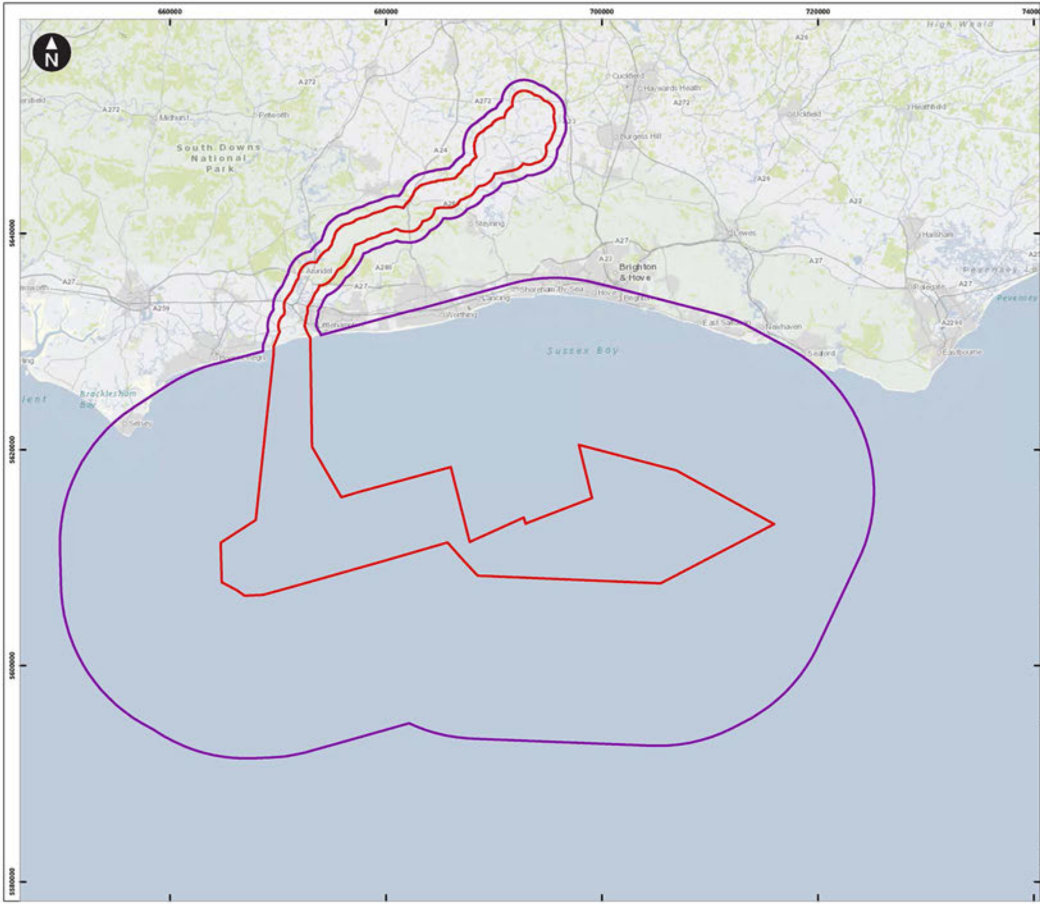
6.5.3 This section considers the potential onshore noise and vibration effects and therefore offshore noise and vibration effects seaward of Mean High Water Springs (MHWS) are addressed in **Section 5.9: Underwater noise**.

Study area

6.5.4 The study area for the construction noise and vibration assessment is defined as the onshore elements of the Scoping Boundary with a 1 km buffer zone around the cable route potential centreline and substation boundary. To allow for any potential movement of the centreline in future design iteration, the buffer has precautionarily been set 1 km from the onshore elements of the Scoping Boundary. For the EIA, this study area will be used to identify key noise and vibration sensitive receptors for noise and vibration predictions and assessment on the basis of proximity and sensitivity.

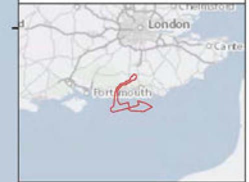
6.5.5 The study area for scoping operational noise from the offshore WTGs and substations is set at 15 km from the Scoping Boundary to cover onshore noise sensitive receptors on the coastal front from Selsey to Seaford.

6.5.6 The study area, presented on **Figure 6.5.1**, will be reviewed and amended in response to such matters as refinement of the onshore and offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation.



Key

- Scoping Boundary
- Study area



Kilometres

0 1.5 3 6 9 12

1:300,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.5.1 Noise and vibration study area

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-ON-0001				1.0
Company: WOOD	Drawn By: (LOT)	Chk/Aprvd: WOOD	Drawn Date: 27/05/2020	Status: FINAL

ISO A3 Landscape

Assessment methodology

Introduction

6.5.7 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this noise and vibration chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the noise and vibration assessment.

6.5.8 The noise and vibration assessment will compare current noise levels at identified receptors with those that would be predicted should Rampion 2 proceed and determine the resultant effect. In addition, absolute levels of noise from the Proposed Development will be assessed in relation to adverse effect levels as described within the *Noise Policy Statement for England* (NPSE) (Defra, 2010). The ES Chapter will present a review of relevant policy and how it guides the assessment, the results of noise measurements, and the assessment of the predicted noise and vibration against project criterion at receptors.

Baseline characterisation

6.5.9 As the locations of the offshore and onshore components continue to be refined, a desk-based review will be taken to identify potentially sensitive receptors and appropriate monitoring requirements. The identified approach will be agreed through consultation with the relevant local Environmental Health Department. The approach to monitoring will also take into consideration the ongoing COVID-19 pandemic which may result in changes in approach based on resumption of a 'normal' noise environment prior to submission of the PEIR and ES.

6.5.10 Sound monitoring for the onshore substation site will be undertaken in accordance with the methodologies advocated within British Standard (BS) BS 7445-1:2003 Description and measurement of environmental noise and BS 4142:2014 Methods for rating and assessing industrial and commercial sound (British Standards Institute (BSI), 2014). Each survey will cover day and night-time for a period of at least 5 days including both weekdays and the weekend. Measurements will be used to characterise the baseline environment for both the construction and operational phases of the substation.

6.5.11 The need for a baseline for the assessment of the operational offshore WTGs on onshore noise sensitive receptors would be considered once an initial 'screening assessment' has been undertaken as per guidance within ETSU-R-97 The Assessment and Rating of Noise from Wind Farms (Working Group on Noise from Wind Farms (NWG),1996). If this initial noise modelling exercise identifies a need for more detailed assessment work, monitoring will be conducted as per guidance within the Institute of Acoustics (IOA) Good Practice Guide to the Application of ETSU-R-97 For the Assessment and Rating of Wind Turbine Noise (GPG) (IOA, 2013).

6.5.12 It is not proposed to undertake sound monitoring to inform the construction assessment of the onshore cable trenching or construction of the offshore WTGs as the extents of the study area are such that the noise environment at receptors will vary widely. Instead, the lower cut-off values within BS 5228-1:2009+A1:2014 Code

of practice for noise and vibration control on construction and open sites Part 1 Noise (BSI, 2014) will be used as criteria as per Method 2 in Appendix E. Monitoring will be considered for receptors close to Horizontal Directional Drilling (HDD) sites that are situated in a noise environment where criteria might be higher than the lower cut-off values.

Construction assessment

6.5.13 A sound propagation model will be created based on anticipated construction methodologies and plant components (including mobile plant on specially created haul routes). The model will incorporate all noise sensitive receptors (such as residential dwellings, schools, medical facilities etc.) within the study area. The sound propagation model will utilise BS 5228-1 (BSI, 2014) methodology to predict noise, the results of which will be compared with the criteria within Method 2 of Appendix E. Periods of higher noise levels than lower cut-off levels shorter than a month will be assessed suing the trigger levels for temporary rehousing and noise insulation eligibility in Appendix E of BS 5228-1.

6.5.14 Construction road traffic noise will be initially predicted using a spreadsheet Basic Noise Level prediction methodology within the Calculation of Road Traffic Noise to compare 'with' and 'without' construction traffic scenarios. The difference between the 'with' and 'without' scenarios will be assessed using short-term criteria within the Design Manual For Roads And Bridges (DMRB) (Highways England, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). Detailed noise modelling for construction road traffic will be undertaken where a significant effect is identified as possible from the initial calculations.

6.5.15 Due to the uncertainties regarding ground conditions and final plant equipment, the assessment of vibration from likely sources, such as onshore piling equipment, will be undertaken qualitatively, but with consideration of empirical levels provided within BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2 Vibration (BSI, 2014).

Operational assessment

6.5.16 An assessment of operational sound generated by the onshore substation will be undertaken using prediction methodology within ISO 9613-2 (BSI, 1996) and assessed in accordance with BS 4142 (BSI, 2014).

6.5.17 Maintenance road traffic will be predicted using a spreadsheet Basic Noise Level prediction methodology within the Calculation of Road Traffic Noise to compare 'with' and 'without' operational traffic scenarios. The difference between the 'with' and 'without' scenarios will be assessed using short-term criteria within the DMRB (Highways England, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). Detailed noise modelling for operational road traffic will be undertaken where a significant effect is identified as possible from the initial calculations.

6.5.18 Operational WTG noise will be predicted in accordance with ISO 9613-2:1996 *Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (BSI, 1996) as modified by ETSU-R-97 (NWG, 1996) and the GPG (IOA, 2014). An initial screening assessment will identify whether noise from the wind

farm will exceed an a-weighted decibel level (dBA) of 35 dBA at 10 m/s wind speeds at residential receptors. If exceedances are identified, a full monitoring and assessment process would be undertaken for Rampion 2 in accordance with ETSU-R-97 and the GPG.

6.5.19 Vibration, either from the substation, maintenance traffic or WTGs would be considered qualitatively and against criteria within BS 5228-2 (BSI, 2014).

Decommissioning assessment

6.5.20 A sound propagation model would be created based on anticipated decommissioning methodologies and plant components (including mobile plant on specially created haul routes). The model would incorporate all noise sensitive receptors (such as residential dwellings, schools, medical facilities etc.) within the study area. The sound propagation model would utilise BS 5228-1 (BSI, 2014) methodology to predict noise, the results of which would be compared with the criteria within Method 2 of Appendix E. Periods of higher noise levels than lower cut-off levels shorter than a month would be assessed using the trigger levels for temporary rehousing and noise insulation eligibility in Appendix E of BS 5228-1.

6.5.21 Decommissioning road traffic noise would be initially predicted using a spreadsheet Basic Noise Level prediction methodology within the Calculation of Road Traffic Noise to compare 'with' and 'without' decommissioning traffic scenarios. The difference between the 'with' and 'without' scenarios would be assessed using short-term criteria within the DMRB (Highways England, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). Detailed noise modelling for decommissioning road traffic would be undertaken where a significant effect is identified as possible from the initial calculations.

6.5.22 Due to the uncertainties regarding ground conditions and final plant equipment, the assessment of vibration from likely sources, such as concrete breaking equipment, would be undertaken qualitatively, but with consideration of empirical levels provided within BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites Part 2 Vibration* (BSI, 2014).

Significance evaluation methodology

6.5.23 Based on the method presented in **Chapter 4: The EIA Process,** the criteria for defining sensitivity and magnitude can be found in **Table 6.5.1** and **Table 6.5.2,** along with example applications. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including BS 5228-1 (BSI, 2014), BS 5228-2 (BSI, 2014), BS 4142 (BSI, 2014) and DMRB (Highways England, 2020), all of which represent good practice for noise and vibration within EIA.

Sensitivity of receptor

6.5.24 Definitions of receptor sensitivity used in the assessment are provided in **Table 6.5.1**, with examples of receptors that would be placed in each class.

Table 6.5.1 Sensitivity of receptor / resource

Sensitivity	Description	Examples
High	Where the operation of receptors would be particularly susceptible to noise or vibration disturbance.	• Designated quiet areas or those of regional or national importance which would be noise or vibration sensitive. • Theatres / auditoria / studios. • Schools during the daytime. • Hospitals / residential care homes. • Places of worship.
Medium	Receptors moderately sensitive to noise or vibration, where it may cause some distraction or disturbance.	• Residences, including private gardens where appropriate. • Offices. • Outdoor leisure areas (not including designated quiet areas or those of regional or national importance which would be noise or vibration sensitive).
Low	Receptors where distraction or disturbance from noise or vibration is minimal.	• Buildings not occupied during working hours. • Factories and working environments with existing high noise levels. • Sports grounds when spectator noise is a normal part of the event. • Retail, entertainment venues and eateries.

Magnitude of change

6.5.25 **Table 6.5.2** provides examples of how various magnitudes of change could be determined with respect to noise and vibration. The criteria and examples in **Table 6.5.2** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.

Table 6.5.2 Magnitude of change

Magnitude	Site Construction Noise	Site Construction Vibration	Construction Traffic Noise	Operational Noise
High	Exceeds BS 5228-1 (BSI, 2014) cut-off values* for one month or more or trigger levels** by more than 9 days in a 15 day period by 10 dB.	X ≥ 10 mm/s Peak Particle Velocity (PPV)	Increase in traffic noise***, x ≥ 5 dB $L_{A10, 18 h}$	Plant noise rating level ($L_{Ar, T}$) difference with Background ($L_{A90,T}$), x ≥ 10 dB
Medium	Exceeds BS 5228-1 cut-off values for one month or more or trigger levels by more than 9 days in a 15 day period by 1 to 9 dB.	5 ≤ x < 10 mm/s PPV	3 ≤ x < 5 dB $L_{A10, 18 h}$	5 ≤ x < 10 dB
Low	Exceeds BS 5228-1 threshold values or trigger levels by less than temporal criteria of significance.	1 ≤ x < 5 mm/s PPV	1 ≤ x < 3 dB $L_{A10, 18 h}$	0 ≤ x < 5 dB
Very Low	Is within < 10 dB below BS 5228-1 threshold values or trigger levels.	0.1 ≤ x < 1 mm/s PPV	0 < x < 1 dB $L_{A10, 18 h}$	-10 ≤ x < 0 dB

*65 dB day, 07:00 – 23:00 Monday to Friday, 07:00 – 13:00 Saturday. 45 dB night-time 23:00-07:00. Assumes evening work would also necessitate night-time work, which would be the constraining time period.
**75 dB daytime, 55 dB night-time.
*** Change in $L_{A10, 18 h}$, construction traffic noise + baseline traffic noise minus baseline traffic noise in isolation.

6.5.26 The overall significance of effect rating (**Table 6.5.3**) is based on the evaluation matrix presented in **Chapter 4: The EIA Process**.

Table 6.5.3 Significance of effect matrix

Magnitude of Change	Level of Significance to Sensitivity of Receptor / Resource		
	High	**Medium**	**Low**
High	Major (Significant)	Moderate / Major (Significant)	Minor / Moderate (Potentially significant)
Medium	Moderate / Major (Significant)	Minor / Moderate (Potentially significant)	Minor (Not significant)
Low	Minor / Moderate (Potentially significant)	Minor (Not significant)	Negligible / Minor (Not significant)
Negligible	Minor (Not significant)	Negligible / Minor (Not significant)	Negligible (Not significant)
No Change	Neutral (Not significant)	Neutral (Not significant)	Neutral (Not significant)

6.5.27 The criteria for the assessment of offshore WTGs is largely tailored towards residential receptors with very little margin between acceptability and unacceptability (there is potential for 5 dB in daytime for discussion in terms of levels of effect). As such, the assessment of WTG noise does not readily fit into the standard EIA practice described above. Therefore, exceedances of ETSU-R-97 (NWG, 1996) criteria at residential receptors from the offshore WTGs will be considered to result in a significant effect and will not be assessed via the sensitivity of receptor and magnitude of change process.

Assessment of adverse effect levels on health

6.5.28 Separate from the assessment of significance based on sensitivity and magnitude of change, an assessment of significance will be undertaken in relation to the Noise Policy Statement for England (NPSE) (Defra, 2010). This will consider a set of absolute noise levels at which the following descriptions will apply:

- **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.

6.5.29 The aims of the NPSE are to avoid significant adverse impacts on health and quality of life from noise and to mitigate and minimise adverse impacts. As such, where the Proposed Development would result in notable increases in absolute noise level above the LOAEL (considered to be +3 dB), 'reasonable steps' should be taken to mitigate and minimise the adverse effects of noise. Where the Proposed Development would result in notable increases in absolute noise levels above SOAEL (considered to be +1 dB), mitigation should be applied to avoid this

increase, whilst taking into account the guiding principles of sustainable development.

6.5.30 The absolute noise levels to identify the LOAEL and SOAEL for the various noise sources within the Proposed Development will be taken from recent major infrastructure examples already taken through the planning process. These noise levels will be described and assessed within the PEIR.

Baseline conditions

Data sources

6.5.31 Existing monitoring data exists from the assessment of the existing Rampion 1 project consisting of attended noise measurements near to the existing Rampion 1 project cable route and substation site. Once the locations of the Proposed Development have been decided upon, the existing data will be reviewed to ascertain its potential use in the assessment of Rampion 2.

6.5.32 A review of Ordnance Survey (OS) mapping and Google Earth Pro (version 7.3.2.5776) has been undertaken in order to provide a high-level evaluation of the likely existing sound sources.

Baseline

6.5.33 The coastline is interspersed with villages largely backed by agricultural land with the A259 running east / west. Sound levels are likely to be influenced by road traffic and additional anthropogenic sources (gardening activities, conversation, music) closer to areas of habitation, as well as the sea on approaching the coast.

6.5.34 Inland from the coast, within the study area is predominantly rural, comprising a mosaic of arable and livestock farming land with blocks of commercial forestry. There are various isolated dwellings and some small villages throughout. Baseline sound levels are generally expected to be low and typical of a rural environment, being influenced by road traffic with additional anthropogenic sources closer to areas of habitation.

6.5.35 The largest settlement in the study area is Littlehampton. Sound levels here are principally likely to be influenced by local road traffic, and also rail traffic, as well as other anthropogenic sources.

6.5.36 Baseline vibration levels are likely to vary widely with localised temporary events, such as construction works. Levels of elevated vibration might be measurable adjacent to railways or poorly maintained roads. Otherwise, vibration levels are likely to be negligible for most of the study area.

Basis for scoping assessment

6.5.37 The noise and vibration scoping assessment is based on the project description in **Chapter 2**: **The Proposed Development**, with particular reference to the following key assumptions.

Construction noise and vibration

6.5.38 Sound generated from construction activities will be temporary. Noise and vibration effects will be most likely to result from the following onshore construction sound sources:

- staged trenching of onshore cable route including Horizontal directional drilling (HDD) at the landfall and at proposed crossing points along the onshore cable route (for example at landfall, sensitive watercourses or roads);
- construction works for the onshore substation will include creation of site access, site preparation works, installation of underground services and foundations, construction of the building, installation of electrical equipment, installation of perimeter fencing, and landscaping; and
- construction traffic will be made up of heavy goods vehicles (HGVs) delivering or removing equipment, materials and plant.

6.5.39 The offshore WTGs will be constructed on large monopiles, the construction of which has the potential to be audible at onshore receptors.

Operational noise

6.5.40 During operation, it is considered that operational noise effects could arise as a result of the inherent sound generated by the onshore substation, offshore substations and offshore WTGs.

Decommissioning

6.5.41 It is assumed that at decommissioning of the Proposed Development, all below ground infrastructure and the foundations of the onshore substation will remain *in-situ*. Above ground equipment at the onshore substation will be cleared and the site reinstated resulting in temporary noise effects at noise sensitive receptors.

Embedded environmental measures

6.5.42 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on noise and vibration (see **Table 6.5.4**). These embedded measures will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These embedded measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.5.43 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.5.4 Relevant noise and vibration embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C–10	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	Code of Construction Practice (COCP) and Development Consent Order (DCO) requirement
C–22	Core working hours for construction of the onshore components will be 0700 - 1900 Monday to Friday, and 0800 - 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the COCP.	COCP and DCO requirement
C–26	Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers and other suitable solutions will be applied.	COCP and DCO requirement
C–33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users, and existing land users and will provide details of measures to protect environmental receptors.	COCP and DCO requirement

Likely significant effects

6.5.44 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.5.45 The likely significant effects on noise and vibration are summarised in **Table 6.5.5**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for noise and vibration effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process.**

6.5.46 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects ‘scoped in’ as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.5.5 Likely significant noise and vibration effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction road traffic resulting in disturbance from increased traffic noise and vibration effects from poorly maintained roads (Construction).	C – 22	Potential for significant effect should there be construction traffic on small roads with otherwise low flow traffic resulting in a potentially high magnitude of change in noise. HGV on poorly maintained roads could result in vibration levels of medium magnitude.	**Scoped in, simple assessment**	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.	Baseline from existing traffic flows.
Activities from cable trenching, substation construction and offshore WTG piling resulting in noise from works and vibration from works if very close to sensitive receptors (Construction).	C – 10 C – 22 C – 26 C – 33	Potential for significant effect if the cable route is very close to sensitive receptors levels of noise and vibration could potentially result in a medium magnitude of change. Potential for significant effect from piling noise and vibration at the onshore substation on sensitive receptors. Potential for significant noise effect from piling for the offshore substation and WTGs at onshore receptors dependent on the piling equipment used and location / duration / times of work.	**Scoped in, detailed assessment**	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.	Monitoring near to proposed substation site to inform potential changes to baseline.
Horizontal directional drilling resulting in noise disturbance especially if required 24 hours a day. Potential vibration effects if very close to sensitive receptors (Construction).	C – 10 C – 22 C – 26 C – 33	Potential for significant effect if the HDD sites are very close to sensitive receptors levels of noise and vibration could potentially result in a medium magnitude of change. In particular a requirement for 24 hour working could result in significant disturbance during the night-time.	**Scoped in, detailed assessment**	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.	Potential use of sound monitoring to identify baseline.
Increases in noise from site traffic for substation and wind farm maintenance (Operation).	None	**No likely significant effect.** Operational road traffic will be minimal and will only have a negligible effect on existing road traffic flows. Further rationale in the section below.	**Scoped out (paragraph 6.5.47)**	N/A	N/A
Noise disturbance as a result of the onshore substation (Operation).	None	Potential for significant effect due to the proximity of the substation and the quiet character of the existing	**Scoped in, detailed assessment**	Residential properties, educational, religious and	Baseline noise monitoring.

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		noise environment will potentially result in large changes to the baseline noise environment.		medical premises, quiet or important outside leisure areas.	
Noise disturbance as a result of the offshore substations (Operation).	None	**No likely significant effect.** Noise would not be audible as a result of the sound attenuation from the distance between the offshore substations and onshore receptors. Further rationale is provided in the section below.	**Scoped out (paragraph 6.5.47)**	N/A	N/A
Noise disturbance from the operation of WTGs at onshore sensitive receptors (Operation).	None	Potential for significant effect however it is unlikely that the offshore wind farm will exceed criteria to result in a significant effect given the distances to the shoreline. However, the number of potentially affected receptors necessitates consideration even with a low risk.	**Scoped in, simple assessment** initially; leading to detailed if required by screening results	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.	Baseline noise monitoring if detailed assessment required.
Vibration disturbance from the operation of the onshore and offshore substations and offshore WTGs (Operation).	None	**No likely significant effect.** All operational components to the Proposed Development are sufficient distance that resulting vibration at sensitive receptors would not be perceptible. Further rationale is provided in the section below.	**Scoped out (paragraph 6.5.47)**	N/A	N/A
Noise and vibration disturbance from removal of equipment and reinstating sites, including associated traffic noise and vibration effects (Decommissioning).	None	**No likely significant effect.** The works for decommissioning will be small in extent and timescale, with plant used not being that normally associated with significant construction noise effects at the likely distances to sensitive receptors. Further rationale in the section below. Further rationale is provided in the section below.	**Scoped out (paragraph 6.5.47)**	N/A	N/A

Impacts scoped out of assessment

6.5.47 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.

6.5.48 As there will be no permanent staffing of the onshore substation, and maintenance activities will be limited with only small and intermittent numbers of staff and vehicle movements, it is proposed that the assessment of noise and vibration effects from maintenance activities, including associated traffic, during operation of the onshore transmission infrastructure be scoped out of the EIA.

6.5.49 At more than 10km from shoreline, the offshore substations are at sufficient distance that there would be no perceptible noise at onshore noise sensitive receptors. The assessment of noise disturbance from the operation of the offshore substations is therefore scoped out of the EIA.

6.5.50 The operation of the onshore and offshore substations would not result in perceptible ground borne vibration outside of the boundary of the sites. At more than 10km from shoreline, the WTGs are of sufficient distance that there would be no resulting vibration at onshore vibration sensitive receptors. The assessment of vibration disturbance from the operation of the onshore and offshore substations and offshore WTGs is therefore scoped out of the EIA.

6.5.51 The effects of decommissioning will be lower than construction with only the quieter works at the substation undertaken, without the need for piling or HDD. Any effects will be more limited in terms of noise level, timescale, and geographical extent. As such, it is proposed that an assessment of decommissioning effects is scoped out of the EIA.

Cumulative effects

6.5.52 Cumulative effects on noise and vibration resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: The EIA Process** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.5.53 Should there be other nearby developments constructed concurrently with the Rampion 2 onshore infrastructure, it is anticipated that the associated planning applications will include noise and vibration assessments in accordance with BS 5228-1 (BSI, 2014). Where available, the outputs of these assessments will be utilised to undertake an assessment of cumulative effects.

6.5.54 An assessment of planned, consented and operational industrial and energy infrastructure projects will be considered where these have the potential to result in cumulative effects. In particular, the cumulative effects of Bolney substation and existing Rampion 1 project would be included in the assessment where relevant (for instance, if the proposed substation was located near to the existing Bolney substation and if a detailed assessment was required for the offshore wind farm components).

Transboundary effects

6.5.55 The potential effects from construction, operation (including maintenance) and decommissioning on noise and vibration receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

Stakeholder engagement

6.5.56 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan process which is set out in **Section 4.3: Consultation and the evidence plan process**. In particular for noise and vibration, we will consult with the environmental health departments in the following local authorities:

- Chichester District Council;
- Arun District Council;
- Horsham District Council;
- Mid-Sussex District Council;
- Worthing Borough Council;
- Adur District Council;
- Brighton & Hove City Council;
- Lewes District Council;
- Wealden District Council; and
- Eastbourne Borough Council.

6.5.57 The South Downs National Park Authority will also be consulted.

Undertaking assessment

6.5.58 It is anticipated that the PEIR will include a draft of the full noise and vibration assessment which will be taken forward into the ES. This will likely include the following:

- collected baseline information (surveys permitting) except potential WTG baseline noise monitoring;
- computer noise modelling with initial predictions for the WTGs and construction road traffic complete and detailed modelling predictions for cable route, substation and WTG construction and substation operation; and
- likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate.

6.5.59 As outlined in **Paragraph 6.5.13**, the baseline surveys to inform the PEIR and/or subsequent ES will encompass measurements of the existing sound environment at locations representing residential receptors around the chosen substation site. For HDD sites, where affected noise sensitive receptors are close to high volume roads,

noise monitoring will be undertaken if predicted HDD noise levels would exceed criteria within BS 5228-1 (BSI, 2014). Where noise sensitive receptors potentially affected by the HDD are not near high volume roads, the use of lower cut-off values for noise will be used within the assessment. These surveys will be unattended sound measurements for a period of at least 5 days, capturing the weekend and weekday periods.

6.5.60 Due to the anticipated low levels of existing vibration, vibration measurements would not be considered beneficial to the assessment process.

6.5.61 If a full assessment of WTG noise on onshore noise sensitive receptors is required, this will be undertaken and presented in the ES as further baseline noise monitoring will likely be required. In addition, a detailed construction traffic noise assessment will be provided in the ES and depending on availability of the traffic flows may be included in the PEIR.

6.5.62 Consideration of comments received from the PEIR process and adjustments to the Proposed Development will necessitate updates to computer noise modelling and the full assessment and results will then be presented in the ES.

6.6 Terrestrial ecology and nature conservation

Introduction

6.6.1 The terrestrial ecology and nature conservation assessment will consider the potentially significant effects[24] on terrestrial and freshwater habitats and legally protected and notable species that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, an overview of the baseline conditions at the site, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.6.2 Terrestrial ecology and nature conservation interfaces with many other aspects and as such, should be considered alongside these; namely:

- **Section 5.5: Benthic, subtidal and intertidal ecology** (due to the intersections of habitats at mean high water springs (MHWS))**;**
- **Section 5.8: Offshore ornithology** (due to the presence of bird species that use both intertidal and terrestrial habitats)**;**
- **Section 6.3: Air quality** (due to the potential for emissions and dust associated with the Proposed Development to negatively affect habitats, flora and fauna**);**

[24] Other technical chapters use “likely significant effects” and “potential likely significant effects” to accord with the EIA Regulations 2017. Within the terrestrial ecology chapter the term “potentially significant effects” is used as it accords with CIEEM guidance to describe effects that have the potential to be significant prior to their assessment (i.e. until the end of the “scope of the assessment”), and the term “likely significant effects”, only once assessment has determined that they would indeed be significant. This is not to be confused with Likely Significant Effects (LSEs) when used in the context of the Habitats Regulations Assessment.

- **Section 6.4**: **Soils and agriculture** (due to potential overlap between priority habitats such as calcareous grassland and soil type)**;**
- **Section 6.5: Noise and vibration** (due to the potential for fauna to be disturbed or displaced by noise and vibration associated with the Proposed Development)**;**
- **Section 6.7: Transport** (due to the potential for vehicle emissions associated with the Proposed Development to negatively affect habitats);
- **Section 6.8: Ground conditions** (due to some designated sites having both ecological and geological aspects to their designation); and
- **Section 6.10: Water environment** (due to the close association between ecological features and local hydrology)**.**

Technical engagement

6.6.3 To inform the early stages of the Proposed Development, discussions were held with Natural England on 22 April 2020. These have helped to shape the extent of the desk study (see **Table 6.6.3**), the proposed future field survey scope and programme (see **Table 6.6.5**) and the approach to the assessment (see **Paragraphs 6.6.7** to **6.6.30**).

Study area

6.6.4 The study area encompasses the area over which all desk-based and field data was gathered to inform the terrestrial ecology and nature conservation scoping assessment presented in this section. Due to the presence of multiple ecological features[25] and many potential effects, the level and type of data collection varies across the study area. The “study area” comprises:

- land within the Scoping Boundary[26], (as shown on **Figure 6.6.1**);
- the desk study areas (known as “areas of search”) for sites designated for their nature conservation interest at the international, European, national and local levels;
- the area of search for legally protected and notable ecological features;
- the area of search for any legally controlled species; and
- the preliminary[27] field survey area.

6.6.5 The extent of the areas of search and field survey area (see **Table 6.6.3** and **Table 6.6.5**) were determined based on best practice guidance and a high level

[25] ‘Ecological feature’ is used within Ecological Impact Assessment (EcIA) published by the Chartered Institute of Ecology and Environmental Management (2018) in place of the term ‘terrestrial ecology receptor’. The term ecological feature is used throughout this chapter

[26] The term Scoping Boundary in this Section refers to onshore elements of the Proposed Development only. This is defined as all habitats above mean high water springs (MHWS).

[27] Preliminary field survey has been undertaken to inform the remote sensing effort only (see **Table 6.5**). The extent of future field survey area will differ dependent on ecological feature and evolution of the Proposed Development.

overview of the types of ecological features present, and the potential effects that could occur (see **Figure 6.6.1**). The study area was defined on a precautionary basis to ensure that the Zones of Influence (ZOI) relevant to all ecological features were covered during baseline data collection activities. ZOIs are the areas within which a potentially significant effect associated with the Proposed Development may be identified for a particular ecological feature.

6.6.6 The study area will be reviewed and amended in response to such matters as refinement of the onshore components, the identification of additional impact pathways and where appropriate in response to feedback from consultation, to ensure that there is sufficient data on which to conduct the assessment. These refinements are expected to reduce the extent of the study area as the Proposed Development progresses, whilst still reflecting recognised good practice.

Assessment methodology

Introduction – scoping assessment

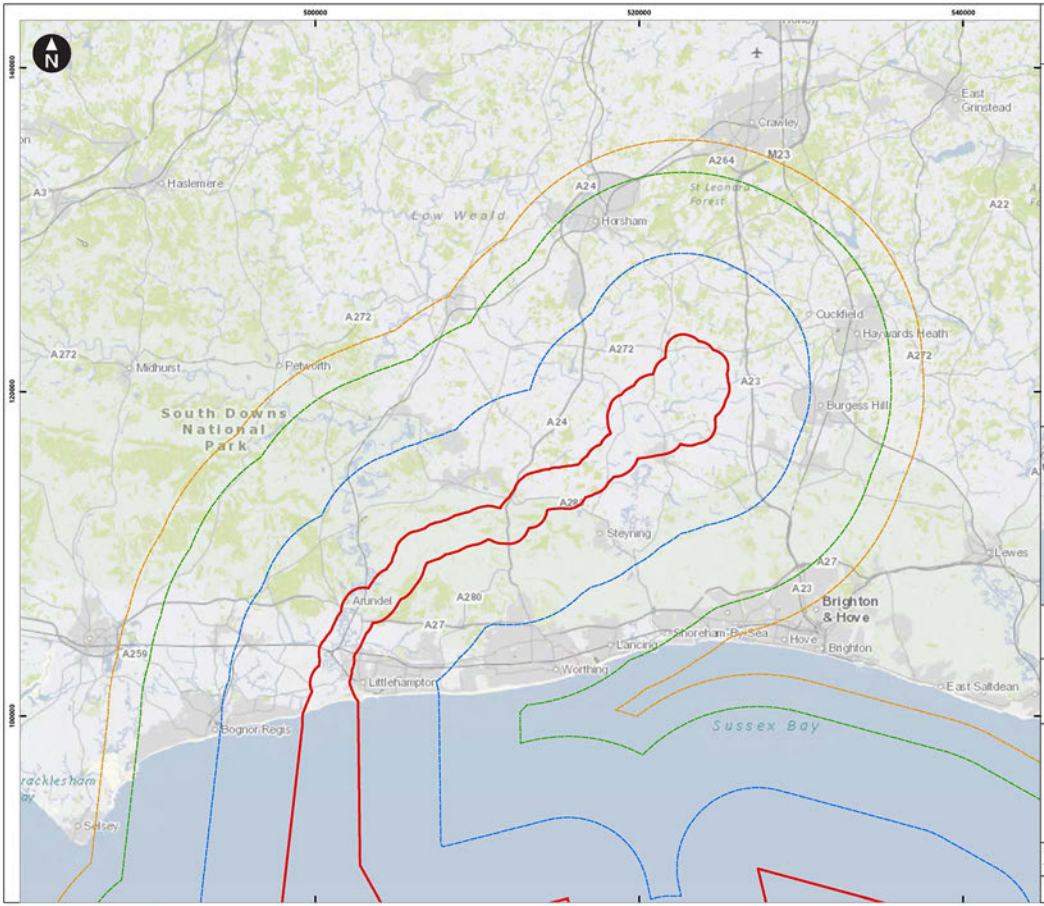
6.6.7 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this terrestrial ecology and nature conservation chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the terrestrial ecology and nature conservation assessment.

6.6.8 The starting point for defining the scope of the terrestrial ecology and nature conservation assessment was to use the baseline data that were collected through the desk study and remote sensing (see **Paragraphs 6.6.31** to **6.6.38**) to determine which of the identified ecological features are 'important'. Following CIEEM (2018, updated 2019) guidance, the importance of each ecological features was determined using a geographic scale[28] (see **Table 6.6.1**). The importance of the ecological features has been described in relation to UK legislation and policy and with regard to the extent of habitat or size of population that may be significantly affected by the Proposed Development.

6.6.9 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example, house sparrow is important at a national level (in policy terms) because it is a Species of Principal Importance and features on the Birds of Conservation Concern red list. However, a small population that could be affected by a development might be assessed as being of local importance only due to the large, albeit declining, UK population (in excess of five million pairs). Similarly, a small length of hedgerow (a Habitat of Principal Importance), even if deemed to be 'important' with regard to the Hedgerow Regulations, is unlikely to be considered to have greater than 'local' importance due to the extent of this habitat type across a given county.

[28] Where this was not possible due to the level of baseline information currently available the highest relevant level of importance is assumed to ensure no ecological features are scoped out of future assessment when not appropriate.

6.6.10 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features was used to inform the categorisation and determine importance at the project level. Where detailed criteria or contextual data were not available at this stage of the project, professional judgement was used to determine importance.



Key

- Scoping Boundary
- 5km Area of Search for SSSI, LWS, legally protected and notable species
- 10km Area of Search for SPA / Ramsar
- 12km Area of Search for SAC

Kilometres
0 1 2 4 6 8
1:200,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.1 Study Area

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0001				1.0
Company: WOOD	Drawn By: BUTLS	Chk/Aprvd: WOOD	Drawn Date: 12/06/2020	Status: FINAL

ISO A3 Landscape

Table 6.6.1 Defining Importance of Ecological Features

Geographic context of importance	Description
International or European	• European sites[29] including Special Protection Areas, Special Areas of Conservation, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), possible SACs (pSACs), Ramsar sites (designated under international convention) and proposed Ramsar sites are also considered in the same manner in accordance with national planning policy. • Areas of habitat or populations of species which meet the published selection criteria based on discussions with Natural England and field data collected to inform the EcIA for designation as a European site, but which are not themselves currently designated at this level.
National (UK context)	• A nationally designated site including Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNRs). • Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the EcIA, and in agreement with Natural England. • Species of Principal Importance (SPI) and Habitats of Principal Importance (HPI), Red listed and legally protected species that are not addressed directly in Part 2 of the "Guidelines for Selection of Biological SSSIs" but can be determined to be of national importance using the principles described in Part 1 of the guidance. • Areas of Ancient Woodland, for example woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.

[29] These statutory sites are defined collectively as "European sites" within Advice Note 10 Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate 2017 (version 8)).

Geographic context of importance	Description
Regional (south-east England)	• The South East Biodiversity Strategy[30] provides information on habitats at a regional scale. Habitats of regional importance will be determined for this Proposed Development based on the targets set in this document. • Regularly occurring HPI or populations of SPI, Red listed and legally protected species may be of regional importance in the context of published information on population size and distribution.
County (West Sussex)	• Local Nature Reserves (LNR) and Non-Statutory Designated sites including: Local Wildlife Sites (LWS) and notable roadside verges. • Areas which, based on field data collected to inform the EcIA, meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local	• HPI and SPI, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	• Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (for example, hard standing used for car parking, as roads etc.)

6.6.11 Where protected species are present and there is the potential for a breach of the legislation, those species are considered to be 'important' features. With the exception of such species receiving specific legal protection, or those subject to

[30] The South East Biodiversity Strategy was archived in 2009. However, targets were set for habitats for delivery in 2015. This strategy provides an overview of habitat types and extents that is not replicated elsewhere.

legal control (for example, invasive species), all ecological features determined to be important at negligible level are scoped out of the assessment. This approach is consistent with that described in CIEEM 2018.

6.6.12 Legally protected species and ecological features that are of sufficient importance that effects upon them as a result of the development of the Proposed Development could be significant, were then taken through to the next stage of the scoping assessment. Through an understanding of the activities associated with the Proposed Development and the resulting environmental change, it is possible to identify ecological features that may be subject to potentially significant effects. In order to identify such ecological features, all the activities and consequent environmental changes associated with the construction and operation of the Proposed Development have been considered. Given the ongoing design process, at this stage of the Proposed Development the environmental changes have been considered in broad categories only. Wherever there is uncertainty as to the potential level of effect or the occurrence of a particular ecological feature, a precautionary approach has been taken.

Spatial scope

6.6.13 Key to establishing a potentially significant effect is the determination of a ZOI for each ecological feature (in other words the area within which a significant effect on an ecological feature may occur as a result of the Proposed Development). ZOIs differ depending on the type of environmental change (in other words the change from the existing baseline) as a result of the Proposed Development, and the ecological feature being considered.

6.6.14 The construction and operation phases of the Proposed Development may result in the following broad environmental changes:

- permanent or temporary land take / land cover change (resulting in habitat loss or degradation and/or loss of fauna);
- fragmentation of habitats (resulting in a reduction in connectivity);
- increased noise and vibration (resulting in disturbance / displacement);
- increased light levels (resulting in disturbance / displacement);
- changes in hydrology (ground water levels and surface water run-off rates resulting in habitat change);
- pollution events (including the liberation of dust, sediments and chemicals resulting in loss or degradation of fauna and flora);
- emissions events[31] (changes in concentrations and deposition rates of nitrogen resulting in habitat degradation); and
- introduction of invasive non-native species (resulting in habitat degradation).

6.6.15 The most straightforward ZOI to define is the area affected by land-take and direct land-cover changes associated with the Proposed Development. This ZOI is the

[31] Emissions are considered with regards to European sites and SSSIs only.

same for all affected ecological features. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (for example noise created by construction), the ZOI may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change. For example, a dormouse might only be disturbed by noise generated very close to its nest, whilst nesting lapwing might be disturbed by noise generated at a much greater distance; other species (for example many invertebrates) may be unaffected by changes in noise. In view of these complexities, the definition of the ZOI that extends beyond the land-take area was based upon professional judgement informed, as far as possible, by a review of published evidence (for example disturbance criteria for various species).

6.6.16 It should be noted that the avoidance of potential effects through design are implicitly taken into account through the consideration of each ZOI. Furthermore, when scoping in or out ecological features from further assessment, embedded environmental measures (see **Table 6.6.11**) associated with good practice have been taken into account (for example dust suppression, appropriately scheduled vegetation removal etc.).

Introduction – Future Assessment

6.6.17 The assessment methodology within the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES) will be aligned with the standard industry guidance provided by CIEEM (2018, updated 2019), informed by the general approach described in **Section 4.4**. The assessment will be based upon not only the results of the desk study and field surveys, but also relevant published information (for example on the status, distribution, sensitivity to environmental changes and ecology of the features scoped in to the assessment, where this information is available), technical engagement with Natural England and others, and professional knowledge of ecological processes and functions.

6.6.18 For each scoped-in ecological feature (see **Table 6.6.12** Likely terrestrial ecology and nature conservation effects

6.6.19), effects will be assessed against the baseline conditions for that feature during construction and operation. Throughout the assessment process, findings about likely significant effects will be used to inform the definition of requirements for additional baseline data gathering and the identification of environmental measures to avoid or reduce adverse effects or to deliver enhancements.

6.6.20 The spatial extent of the assessment of each likely significant effect (see **Table 6.6.12** Likely terrestrial ecology and nature conservation effects

6.6.21) will reflect the area occupied by the ecological feature that is being assessed and the ZOI of the changes that are likely to affect it. Where part of a designated biodiversity site is located within the ecological feature's ZOI relating to a particular biophysical change as a result of the Proposed Development, an assessment will be made of the effects on the designated site as a whole. A similar approach will be taken for areas of important habitat. For species that occur within the ZOI, the assessment will consider the total area that is used by the affected individuals or the local population of the species (for example for foraging or as breeding territories).

6.6.22 The temporal scope of the terrestrial ecology and nature conservation assessment will be consistent with the period over which the Proposed Development would be carried out and therefore covers the construction and operational periods (construction considered to be five years, with operation being a minimum of 30 years after this).

Significance evaluation methodology

6.6.23 CIEEM (2018) defines a significant effect as one "that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general".

6.6.24 When considering likely significant effects on ecological features, whether these are negative or positive, the following characteristics of environmental change will be taken into account:

- extent – the spatial or geographical area over which the environmental change may occur;
- magnitude – the size, amount, intensity or volume of the environmental change;
- duration – the length of time over which the environmental change may occur;
- frequency – the number of times an environmental change may occur;
- timing – the periods of the day / year / season during which an environmental change may occur; and
- reversibility – whether the environmental change can be reversed through restoration actions or regeneration.

6.6.25 Although the characteristics described above are all important in assessing effects, a scale of the environmental change as a result of the Proposed Development will also be used, as described in **Table 6.6.2**, to provide a contextual understanding of the relative change from the baseline position.

Table 6.6.2 Guidelines for the assessment of the scale of magnitude

Scale of change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource / species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the project.

Scale of change	Criteria and resultant effect
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource / species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this receptor in the context of the project.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species / habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance.
Very Low	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

Negative effects

6.6.26 A negative effect is assessed as being significant if the favourable conservation status of an ecological feature would be compromised or lost as a result of the Proposed Development. Conservation status is defined in CIEEM 2018 (in paragraph 5.3.2) as follows:

- 'habitats - conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area'; and
- 'species - conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area'.

6.6.27 The decision as to whether the conservation status of an ecological feature has been compromised will be made using professional judgement, drawing upon the results of the assessment of how each feature is likely to be affected by the Proposed Development.

6.6.28 A similar procedure will be used where designated sites may be affected by the Proposed Development, except that the focus will be on the effects on the integrity of each site; defined as: '*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*'.

6.6.29 The *assessment* of effects on integrity will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

Positive effects

6.6.30 A development may result in positive effects where there is a resulting change from baseline that improves the quality of the environment (for example increases species diversity, increases the extent of a particular habitat etc.), or halts or slows down an *existing* decline. For a positive effect to be considered significant, the level of importance of an ecological feature determined at the baseline state would need to increase by one or more geographical levels (for example where an ecological feature of borough importance becomes of county importance following delivery of the Proposed Development).

Baseline conditions

Data sources – desk study

6.6.31 A data gathering exercise was undertaken to obtain existing information relating to relevant statutory and non-statutory biodiversity sites, habitats and species of principal *importance*, legally protected and controlled species and other notable species that have been recorded over the previous 10 years (2010 – 2020). **Table 6.6.3** lists the data compiled within the study area. **Appendix E: Terrestrial ecology desk study report** provides further details.

Table 6.6.3 Key sources of terrestrial ecology and nature conservation data

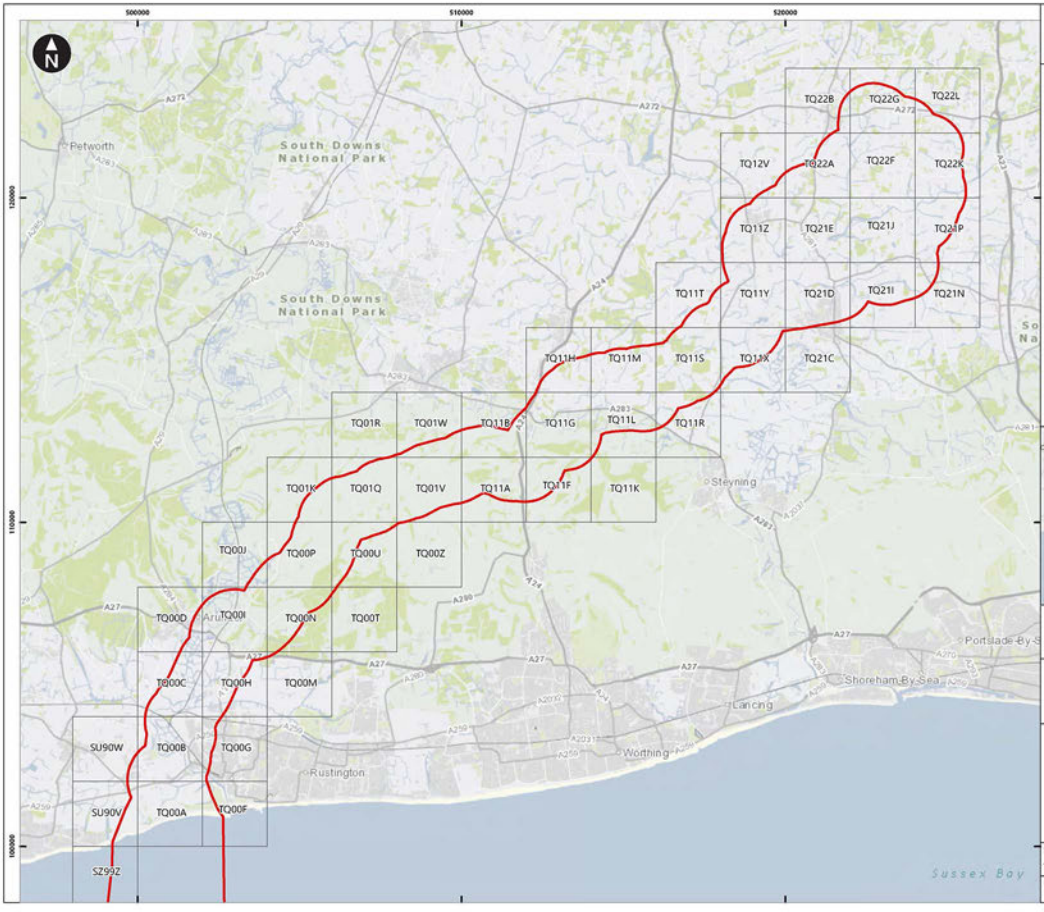
Ecological Feature	Example / Definition	Coverage of study area
Statutory sites designated under international conventions or European Directives	Sites of Community Importance (SCI), Special Areas of Conservation (SAC), candidate SAC (cSAC), Special Protection Areas (SPA), proposed SPA, Ramsar sites and	SACs and possible[32] SACs searched for inside and within 12km of the onshore element of the Scoping Boundary to reflect recommendations in the Draft Sussex Bat Special Area of Conservation: Planning and Landscape Enhancement Protocol (also known as the "Draft Sussex Bat SAC Protocol) (2018). SPAs, proposed SPAs, Ramsar sites and proposed

[32] Magic.gov.uk identifies possible SACs as a category, as opposed to candidate SACs. Possible SACs are sites that have been identified but have not been submitted to the European Commission for designation (cSACs are the same except they have been submitted are but are not yet designated). There are no candidate SACs currently for the UK – possible SACs were included to ensure completeness.

Ecological Feature	Example / Definition	Coverage of study area
	proposed Ramsar sites.	Ramsar sites searched for inside and within 10km of the onshore element of the Scoping Boundary reflecting the upper foraging distances of dark-bellied brent geese *Branta bernicla bernicla* (Summers & Critchley, 1990) and Bewick's swan *Cygnus columbianus bewickii* (Robinson et al. 2004) from roost locations. These species being identified as the species with the largest foraging distances for terrestrial habitats for any SPA features within the wider area.
Statutory sites designated under national legislation	Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs)).	SSSIs and NNRs searched for inside and within 5km of the Scoping Boundary following precedent for other large infrastructure projects and LNRs within 1km reflecting the purpose of their designation.
Locally designated sites	In Sussex these are termed as Local Wildlife Sites[33] or notable road verges.	LWS and notable road verges searched for inside and within 5km of the Scoping Boundary.
HPI and SPI, Red listed species and Legally protected species.	HPIs and SPIs, species recorded on The IUCN Red List of Threatened Species and/or local Red Lists for the UK or relevant sub-units (e.g. regions or counties) and legally protected habitats and species include those listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended), those included on	HPI and SPI, Red listed species and Legally protected species searched for inside and within 5km of the Scoping Boundary unless otherwise specified. Ornithological data provided by Sussex Ornithological Society is supplied by tetrad (a square containing four Ordnance Survey 1km grid squares). Data for all tetrads that are within or overlap with the Scoping Boundary have been obtained (see **Figure 6.6.2**) Data on stone curlew *Burhinus oedicnemus* and lapwing *Vanellus vanellus* nesting locations and habitat

[33] Note that other local designations are considered within other sections of this report. Marine Sites of Nature Conservation Importance (mSNCI) are considered in **Section 5.5 Benthic, subtidal and intertidal ecology** and Local Geological Sites (LGS) are considered in **Section 6.8 Ground Conditions**.

Ecological Feature	Example / Definition	Coverage of study area
	Schedules 2 and 5 of the Habitats Regulations. Badger and Hedgerows are provided protection under the Protection of Badgers Act 1992 and the Hedgerows Regulations 1997 respectively.	creation measures (e.g. stone curlew plots) supplied by the RSPB within the Scoping Boundary and within 500m of it. Summary Wetland Bird Survey (WeBS) data available from the British Trust for Ornithology (BTO) was obtained for all count sectors within the Scoping Boundary or within 1km of it at the closest point.
Legally controlled species	Legally controlled species include those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	Legally controlled species searched for within the Scoping Boundary
Bat roosting locations	Bat roost locations are considered separately from other species records in accordance with guidance.	Bat roosting locations were searched for within 5km of the Scoping Boundary
Water body locations	Water bodies may support species within the groups listed above (for example legally protected great crested newts).	Water body locations were searched for in the Scoping Boundary and within 500m of it.



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Key

- Scoping Boundary
- Tetrad Grid

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.2 Data coverage provision from Sussex Ornithological Society

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0002				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BUTLS	WOOD	12/06/2020	FINAL

ISO A3 Landscape

Source	Summary of information provided
Sussex Biodiversity Records Centre	Data on sites designated for nature conservation, priority habitats and legally protected and notable flora and fauna.
Sussex Ornithological Society	Data on species listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) and notable bird species within tetrads that overlap with the Scoping Boundary. Additional information requested on lapwing nesting habitat and Bewick's swan foraging habitat locations.
RSPB	Data on stone curlew and lapwing breeding within the Scoping Boundary and within 500m of it and location of habitat creation (e.g. stone curlew plots) within this area.
Magic.gov.uk	Data on the location of statutorily designated sites, data from the Ancient Woodland and Priority Habitat Inventories, granted European Protected Species Licence locations (2010 to 2020) and great crested newt eDNA survey outcomes from 2017-2019 effort by Natural England for district licensing purposes.
National Biodiversity Network Gateway	Information on legally protected and notable flora and fauna was interrogated within the Scoping Boundary and within 500m of it.
BTO Wetland Bird Survey Reports	Core count data (yearly peaks) for WeBS count sites within the Scoping Boundary and within 1km of it.

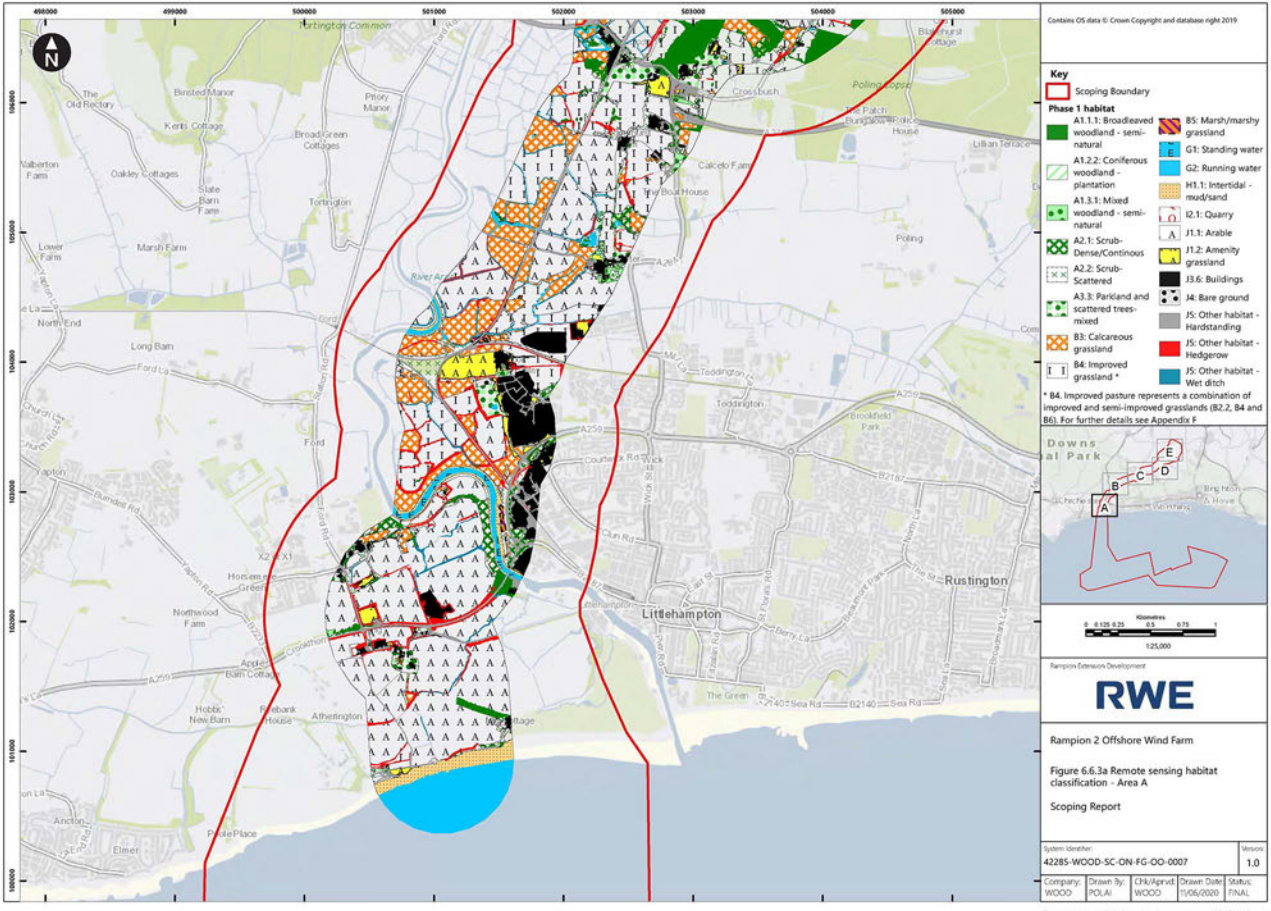
Data sources – remote sensing

6.6.33 Remote sensing techniques using data from the World View 2 satellite gathered in 2018 and 2020 have been used to broadly classify habitats based on the categories described by the Joint Nature Conservation Committee (JNCC) in the *Handbook for Phase 1 habitat survey* (2010). **Appendix F: Remote sensing report** provides further details of this exercise.

6.6.34 The remote sensing model was informed by a habitat sampling exercise that took place in April 2020. This sampling exercise recorded 2,294ha of habitat according to the Phase 1 habitat category definitions. Part of this dataset was used to train the model, whilst the remainder was used to test the accuracy of the outputs. Where the model could not accurately differentiate between habitat types (e.g. poor semi-improved grassland and neutral semi-improved grassland) categories were combined using professional judgement.

Table 6.6.5 Remote sensing data collection

Source	Date	Summary	Coverage of study area
Remote sensing	Satellite data – 2018 & 2020 Field samples – April 2020	Remote sensing has provided a broad habitat classification for the current onshore cable corridor options with a 500m buffer. This area is smaller than the onshore element of the Scoping Boundary (see **Figure 6.6.3 A** to **E**). The extent for the remote sensing exercise was based on areas where direct effects on habitats and species may be possible. The remote sensing model used satellite data to identify habitats based on a field survey that sampled 2,294 ha of habitat within the Scoping Boundary from Public Rights of Way	Remote sensing has classified habitats within 64.56% of the Scoping Boundary (landward of MHWS). See **Figure 6.6.3 A** to **E** for coverage.


Contains OS data © Crown Copyright and database right 2019
Key
Scoping Boundary
Phase 1 habitat
A1.1.1: Broadleaved woodland - semi-natural
A1.2.2: Coniferous woodland - plantation
A1.3.1: Mixed woodland - semi-natural
A2.1: Scrub-Dense/Continous
A2.2: Scrub-Scattered
A3.3: Parkland and scattered trees-mixed
B3: Calcareous grassland
B4: Improved grassland *
B5: Marsh/marshy grassland
G1: Standing water
G2: Running water
H1.1: Intertidal - mud/sand
I2.1: Quarry
J1.1: Arable
J1.2: Amenity grassland
J3.6: Buildings
J4: Bare ground
J5: Other habitat - Hardstanding
J5: Other habitat - Hedgerow
J5: Other habitat - Wet ditch
* B4. Improved pasture represents a combination of improved and semi-improved grasslands (B2.2, B4 and B6). For further details see Appendix F
Kilometres
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Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.3a Remote sensing habitat classification - Area A
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0007
Version: 1.0
Company: WOOD
Drawn By: POLAI
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
Status: FINAL
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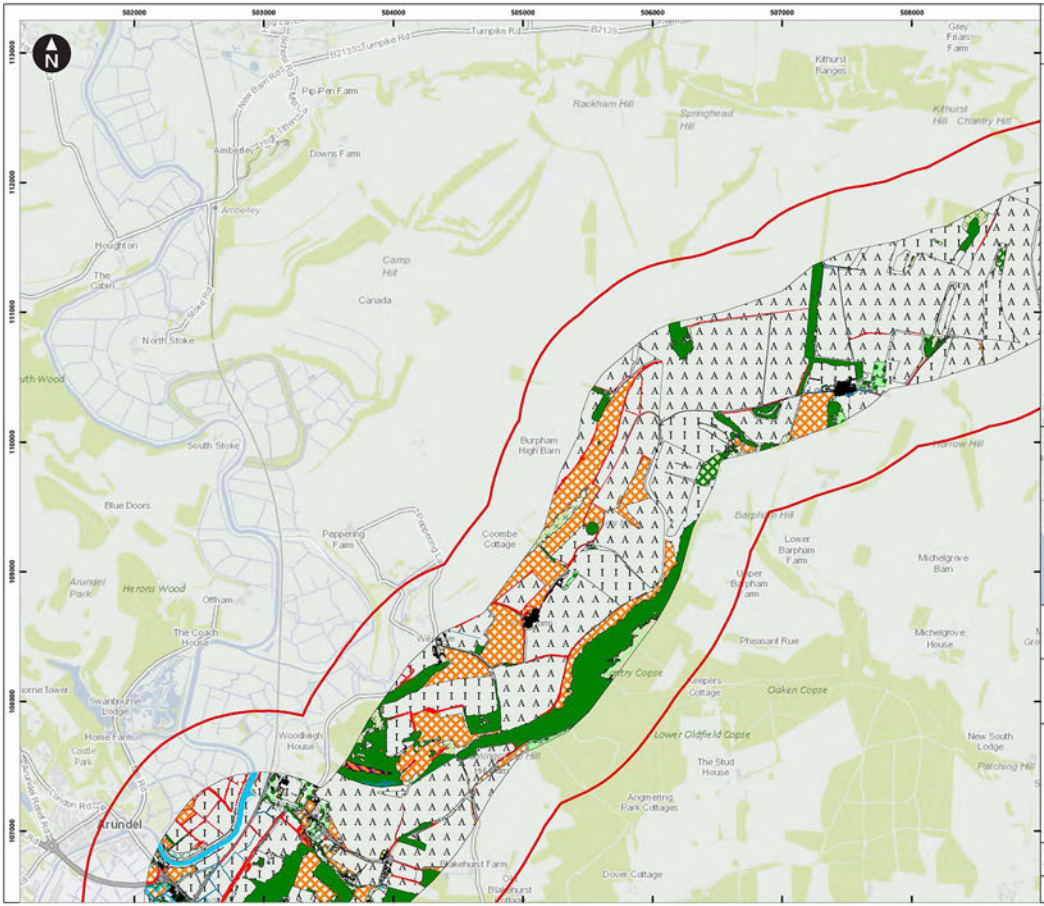
ISO A3 Landscape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Rackham Hill
Springhead Hill
Kithurst Hill
Chantry Hill
Pip Pen Farm
Downs Farm
Ambersham Hill
Amberley
Houghton
The Cabin
Camp Hill
Canada
North Stoke
Stoke Rd
South Stoke
Burpham High Barn
Harrow Hill
Blue Doors
Peppering Farm
Coombe Cottage
Arundel Park
Herons Wood
Offham
The Coach House
Burpham Hill
Lower Burpham Farm
Upper Burpham Farm
Michelgrove Barn
Michelgrove House
Pheasant Rue
Peppers Cottage
Oaken Copse
Lower Oldfield Copse
The Stud House
New South Lodge
Patching Hill
Angmering Park Cottages
Dover Cottage
Blakehurst Farm
Swanbourne Lodge
Home Farm
Castle Park
Woodleigh House
Arundel
Key
Scoping Boundary
Phase 1 habitat
A1.1.1: Broadleaved woodland - semi-natural
A1.2.2: Coniferous woodland - plantation
A1.3.1: Mixed woodland - semi-natural
A2.1: Scrub-Dense/Continous
A2.2: Scrub-Scattered
A3.3: Parkland and scattered trees-mixed
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B4: Improved grassland *
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J5: Other habitat - Hedgerow
J5: Other habitat - Wet ditch
* B4. Improved pasture represents a combination of improved and semi-improved grasslands (B2.2, B4 and B6). For further details see Appendix F
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Downs al Park
Chichester
Worthing
Bognor Regis
A
B
C
D
E
Kilometres
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1:25,000
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.3b Remote sensing habitat classification - Area B
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0012
Version: 1.0
Company: WOOD
Drawn By: POLAI
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
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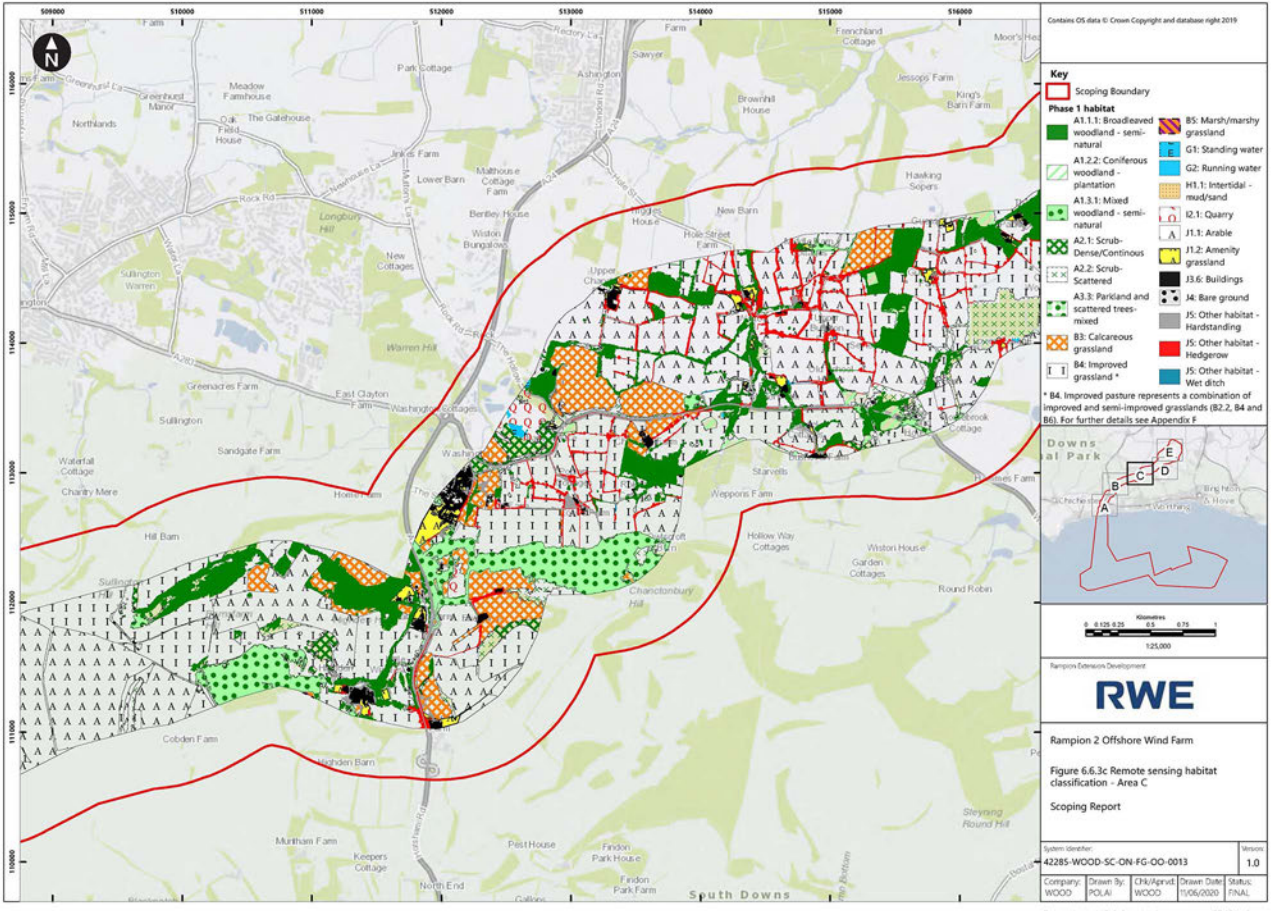
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J5: Other habitat - Hedgerow
J5: Other habitat - Wet ditch
* B4. Improved pasture represents a combination of improved and semi-improved grasslands (B2.2, B4 and B6). For further details see Appendix F
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Kilometres
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Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.3c Remote sensing habitat classification - Area C
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0013
Version: 1.0
Company: WOOD
Drawn By: POLAI
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
Status: FINAL
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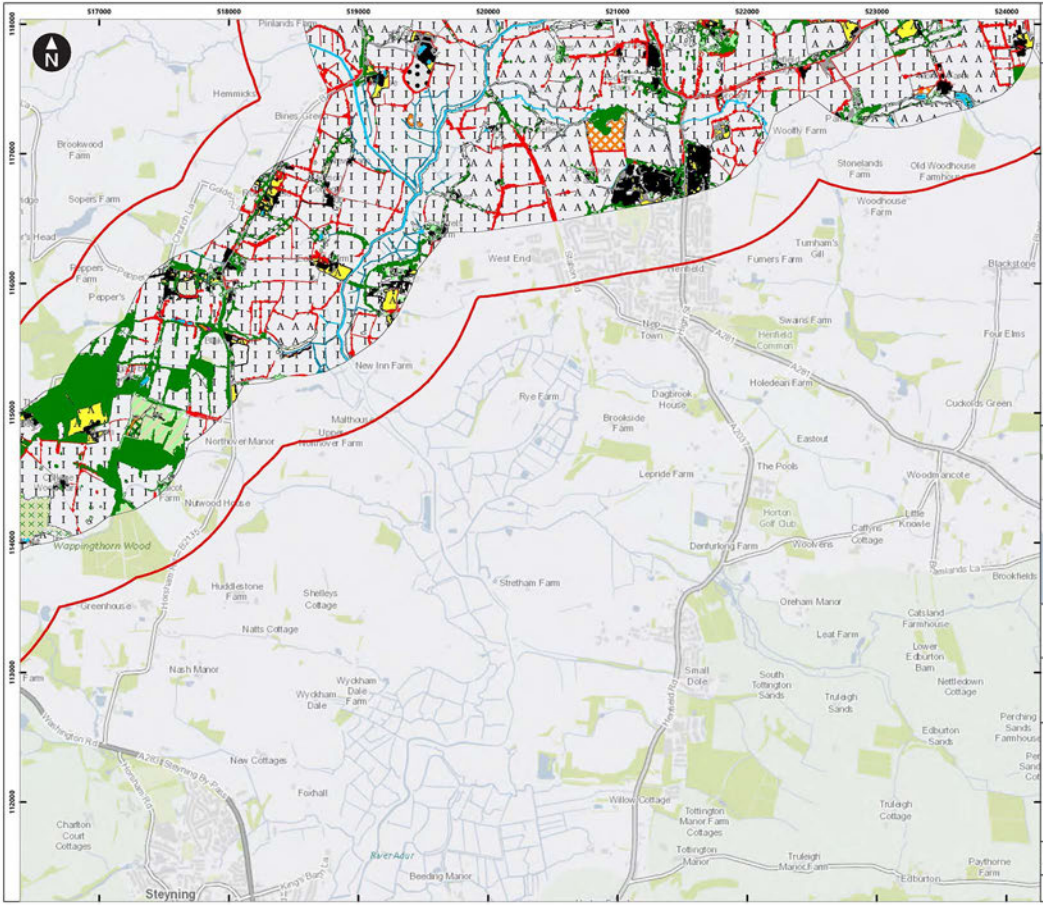

Key

Scoping Boundary

Phase 1 habitat

- A1.1.1: Broadleaved woodland - semi-natural
- A1.2.2: Coniferous woodland - plantation
- A1.3.1: Mixed woodland - semi-natural
- A2.1: Scrub-Dense/Continous
- A2.2: Scrub-Scattered
- A3.3: Parkland and scattered trees-mixed
- B3: Calcareous grassland
- B4: Improved grassland *
- B5: Marsh/marshy grassland
- G1: Standing water
- G2: Running water
- H1.1: Intertidal - mud/sand
- I2.1: Quarry
- J1.1: Arable
- J1.2: Amenity grassland
- J3.6: Buildings
- J4: Bare ground
- J5: Other habitat - Hardstanding
- J5: Other habitat - Hedgerow
- J5: Other habitat - Wet ditch

* B4. Improved pasture represents a combination of improved and semi-improved grasslands (B2.2, B4 and B6). For further details see Appendix F

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.3d Remote sensing habitat classification - Area D

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0014				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	11/06/2020	FINAL

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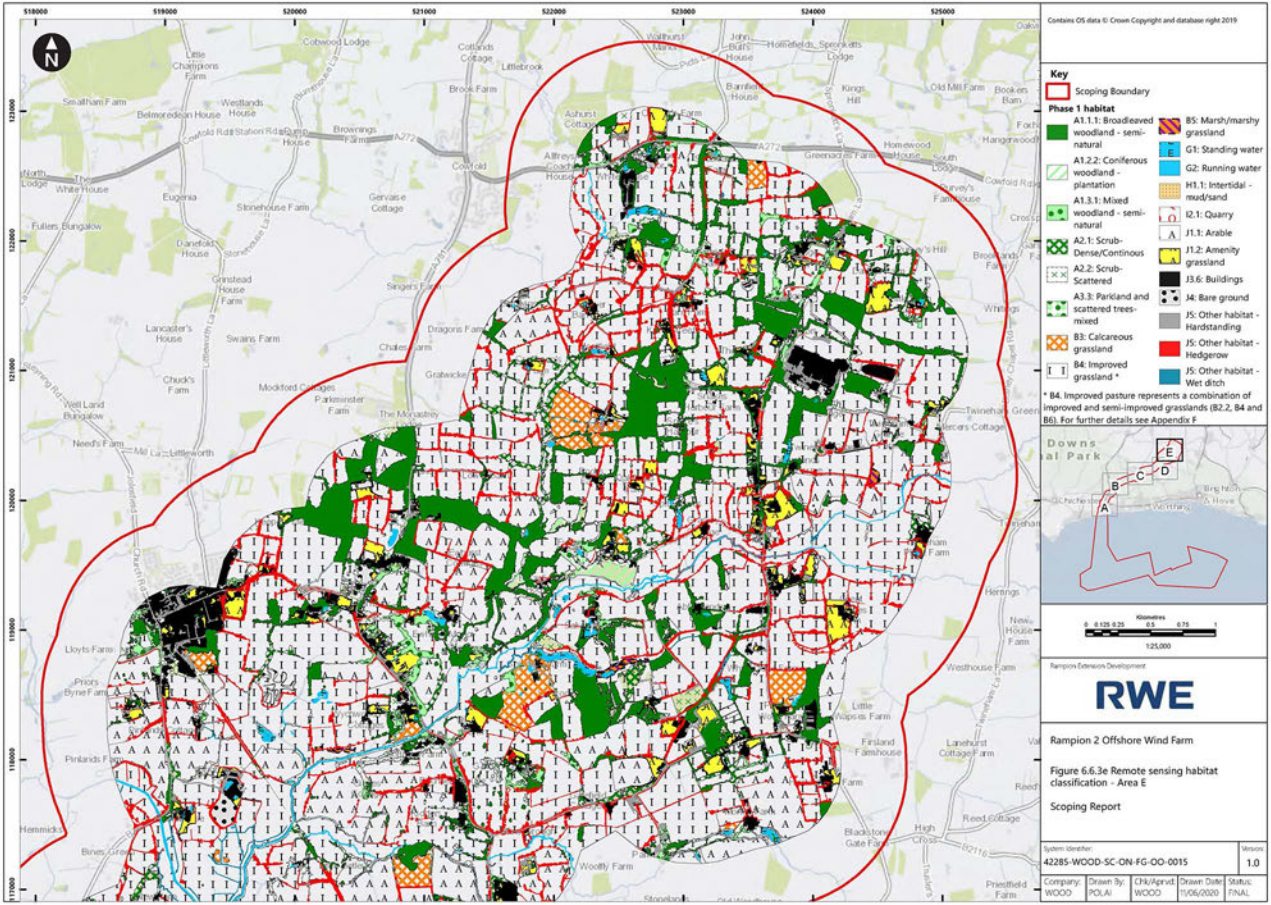
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Key
Scoping Boundary
Phase 1 habitat
A1.1.1: Broadleaved woodland - semi-natural
A1.2.2: Coniferous woodland - plantation
A1.3.1: Mixed woodland - semi-natural
A2.1: Scrub-Dense/Continous
A2.2: Scrub-Scattered
A3.3: Parkland and scattered trees-mixed
B3: Calcareous grassland
B4: Improved grassland *
B5: Marsh/marshy grassland
G1: Standing water
G2: Running water
H1.1: Intertidal - mud/sand
I2.1: Quarry
J1.1: Arable
J1.2: Amenity grassland
J3.6: Buildings
J4: Bare ground
J5: Other habitat - Hardstanding
J5: Other habitat - Hedgerow
J5: Other habitat - Wet ditch
* B4. Improved pasture represents a combination of improved and semi-improved grasslands (B2.2, B4 and B6). For further details see Appendix F
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Kilometres
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1:25,000
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.3e Remote sensing habitat classification - Area E
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0015
Version: 1.0
Company: WOOD
Drawn By: POLAI
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
Status: FINAL
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ISO A3 Landscape

6.6.35 lists the organisations and other sources that have supplied desk study data, together with the nature of that data. South Downs National Park Authority have confirmed that *they* will supply data to inform the Proposed Development. However, this was not available at the time of authoring this section.

Table 6.6.4 Sources of Desk Study Data

Source	Summary of information provided
Sussex Biodiversity Records Centre	Data on sites designated for nature conservation, priority habitats and legally protected and notable flora and fauna.
Sussex Ornithological Society	Data on species listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) and notable bird species within tetrads that overlap with the Scoping Boundary. Additional information requested on lapwing nesting habitat and Bewick's swan foraging habitat locations.
RSPB	Data on stone curlew and lapwing breeding within the Scoping Boundary and within 500m of it and location of habitat creation (e.g. stone curlew plots) within this area.
Magic.gov.uk	Data on the location of statutorily designated sites, data from the Ancient Woodland and Priority Habitat Inventories, granted European Protected Species Licence locations (2010 to 2020) and great crested newt eDNA survey outcomes from 2017-2019 effort by Natural England for district licensing purposes.
National Biodiversity Network Gateway	Information on legally protected and notable flora and fauna was interrogated within the Scoping Boundary and within 500m of it.
BTO Wetland Bird Survey Reports	Core count data (yearly peaks) for WeBS count sites within the Scoping Boundary and within 1km of it.

Data sources – remote sensing

6.6.36 Remote sensing techniques using data from the World View 2 satellite gathered in 2018 and 2020 have been used to broadly classify habitats based on the categories described by the Joint Nature Conservation Committee (JNCC) in the *Handbook for Phase 1 habitat survey* (2010). **Appendix F: Remote sensing report** provides further details of this exercise.

6.6.37 The remote sensing model was informed by a habitat sampling exercise that took place in April 2020. This sampling exercise recorded 2,294ha of habitat according to the Phase 1 habitat category definitions. Part of this dataset was used to train the model, whilst the remainder was used to test the accuracy of the outputs. Where the model could not accurately differentiate between habitat types (e.g.

poor semi-improved grassland and neutral semi-improved grassland) categories were combined using professional judgement.

Table 6.6.5 Remote sensing data collection

Source	Date	Summary	Coverage of study area
Remote sensing	Satellite data – 2018 & 2020 Field samples – April 2020	Remote sensing has provided a broad habitat classification for the current onshore cable corridor options with a 500m buffer. This area is smaller than the onshore element of the Scoping Boundary (see **Figure 6.6.3 A** to **E**). The extent for the remote sensing exercise was based on areas where direct effects on habitats and species may be possible. The remote sensing model used satellite data to identify habitats based on a field survey that sampled 2,294 ha of habitat within the Scoping Boundary from Public Rights of Way	Remote sensing has classified habitats within 64.56% of the Scoping Boundary (landward of MHWS). See **Figure 6.6.3 A** to **E** for coverage.

Future data sources – field survey

6.6.38 Field survey is proposed to take place within 2020 and 2021 to inform the next phases of the Proposed Development[34]. The proposed field survey programme outlined in **Table 6.6.6** is based on the results of the desk study, remote sensing, industry guidance and discussions with Natural England. Dates of field survey will depend on the availability of land access; however, all surveys will be undertaken in the appropriate season. Further engagement with Natural England regarding the field survey programme will take place as it progresses.

6.6.39 The areas that will be the focus of survey will not encompass the whole Scoping Boundary. This is because as the design evolves the ZOIs will become refined allowing for a more targeted survey programme to take place to inform future assessment.

Table 6.6.6 Field survey programme

Source	Summary	Coverage of study area
Phase 1 habitat survey	Phase 1 habitat survey will be used to provide general information on each habitat within the study area (as it becomes refined as cable corridor options become more defined). Surveys will follow the methods described in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 habitat survey (2010).	Surveys will focus on areas where direct land take may occur and within 50m of this. The extent of the survey area will reduce as cable corridor options and substation locations become more defined.
National Vegetation Classification (NVC) surveys	NVC surveys will take place within any habitats identified by the Phase 1 habitat survey that may qualify as Habitats of Principal Importance and could be subject to loss or degradation due to the Proposed Development. Surveys will follow the National Vegetation Classification: User's Handbook (Rodwell, 2010).	Surveys will focus on areas where direct land take may occur and within 50m of this. The extent of the survey area will reduce as cable corridor options and substation locations become more defined.
Hedgerows Regulations	Hedgerows Regulations Assessment surveys will follow the survey guidance appended	Surveys will focus on areas where direct land take may occur and within 15m of this.

[34] Field surveys are progressing whilst maintaining social distancing and other measures associated with Covid-19. See **Section 4.2** for further details. Covid-19 may influence field survey through issues associated with land access and the ability to complete certain types of survey safely.

Source	Summary	Coverage of study area
Assessment survey	to the Hedgerows Regulations 1997, focusing on hedgerows crossed by the cable corridor or at the location of the substation.	The extent of the survey area will reduce as cable corridor options and substation locations become more defined.
Arboriculture survey	An arboriculture survey following British Standard 5837 will be undertaken in areas where mature trees (including those that could constitute veterans) may be felled. This will focus on the cable corridor, plus a buffer of 25m, and the location of the substation.	Surveys will focus on areas where direct land take may occur and within 25m of this. The extent of the survey area will reduce as cable corridor options and substation locations become more defined.
River Habitat Surveys	River Habitat Surveys following The River Habitat Survey in Britain and Ireland Field Survey Guidance Manual (Environment Agency, 2003) will be undertaken to describe river habitats in locations where they would be directly affected.	Surveys will only take place on rivers or large streams where direct effects will be realised due to the cable installation techniques specified. Where trenchless crossing techniques are specified River Habitat Surveys will not be undertaken, with information from the Phase 1 habitat survey relied upon.
Otter *Lutra lutra* surveys	Otter surveys, looking for signs of activity and resting places, will take place using techniques described by Chanin in "Monitoring the Otter" (2003).	Surveys will take place in areas where direct land take may occur and within 50m of this. Wider search areas (up to 250m upstream and downstream) will take place on large rivers and streams with potential for otter that will be crossed and directly affected by the cable installation.
Water vole *Arvicola amphibius* surveys	Water vole surveys, looking for signs of activity, places, will take place using techniques described in the "Water Vole Mitigation Handbook" (Dean et al. 2016)	Surveys will take place in areas where direct land take may occur and within 50m of this. Wider search areas (up to 250m upstream and downstream) will take place on large rivers, streams and ditches with potential for water vole that will be crossed and directly affected by the cable installation.

Source	Summary	Coverage of study area
Badger *Meles meles* surveys	Badger surveys, informed by Natural England standing advice (2015) and good practice guidelines by Scottish Badgers (2018), will focus on identifying signs of activity and places of shelter (setts).	Surveys will focus on areas where direct land take may occur and within 50m of this. The extent of the survey area will reduce as cable corridor options and substation locations become more defined.
Bat surveys	Bat surveys will be split in to two parts; bat roost surveys and bat activity surveys. Bat roost surveys will focus on establishing which buildings and trees within the construction area, and within 25m of it[35], support roosting bats. This will be achieved via a mix of internal building inspections, tree climbing inspections and emergence/re-entry surveys. These surveys will follow the Bat Conservation Trust Good Practice Guidelines (2016). Bat activity surveys will be focused on areas only where proposed works will remove large amounts of optimal habitat or important linking features. The majority of habitats that will be crossed by the cable corridor are sub-optimal for bats (e.g. arable land) hence the approach described. The locations and extent of bat activity surveys will be discussed with Natural England prior to implementation.	Optimal habitats for bats within the proposed temporary construction working area and within 15m of it.
Dormouse *Muscardinus avellanarius* surveys	Dormouse surveys following Natural England guidelines "Hazel or common dormouse: surveys and mitigation for development projects" (2015).	Habitats with the potential to support dormouse within the proposed temporary construction working area and within 15m of it.

[35] The definition of a 25m survey area for bat roosts, outside of the proposed construction area, is based on an allowance for the control of light spill from any necessary temporary construction lighting.

Source	Summary	Coverage of study area
Great crested newt *Triturus cristatus* surveys	Great crested newt surveys following Natural England guidelines "surveys and mitigation for development projects" (2015).	Suitable water bodies (ponds and ditches) with habitat links within 250m of the cable corridor (temporary above ground works) and 500m of the substation locations.
Reptile surveys	Reptile surveys following Froglife (1999) Advice sheet 10 Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.	Suitable consolidated habitats (i.e. not hedgerow bottoms between unsuitable habitats) in areas where translocation may be required to remain legally compliant.
Schedule 1 breeding bird surveys	Breeding bird surveys will be targeted on particular habitats and species identified during the desk study that could be subject to disturbance due to construction works.	Habitats with the potential to support schedule 1 birds outside of the proposed temporary construction working area, but within 100m of it.
Wintering bird surveys (Bewick's swan)	Wintering bird surveys will target habitats used for foraging by Bewick's swan.	Suitable habitats within the Scoping Boundary that overlap with desk study records of previous Bewick's swan usage.

Baseline – site context and surrounding habitats

6.6.40 The land within the Scoping Boundary is approximately 9,698ha in extent (compared to a temporary and permanent land take onshore predicted to be less than 300ha) and is dominated by agricultural habitats (both arable and pasture), although there are frequent areas of woodland including extensive areas of both semi-natural broadleaved woodland and plantation woodland. Other land uses include golf courses, residential and commercial premises and transport infrastructure. There are also several rivers including the River Arun and River Adur. These rivers have relatively large areas of functioning flood plain (often classified as grazing marsh) associated with them.

Baseline – statutory nature conservation sites

6.6.41 **Figure 6.6.4** illustrates the locations of the sites designated through international convention and European directives, whilst **Figure 6.6.5** shows the locations of sites designated via national legislation. **Table 6.6.7** provides summary details of the designations, further detail is provided in **Appendix E**.

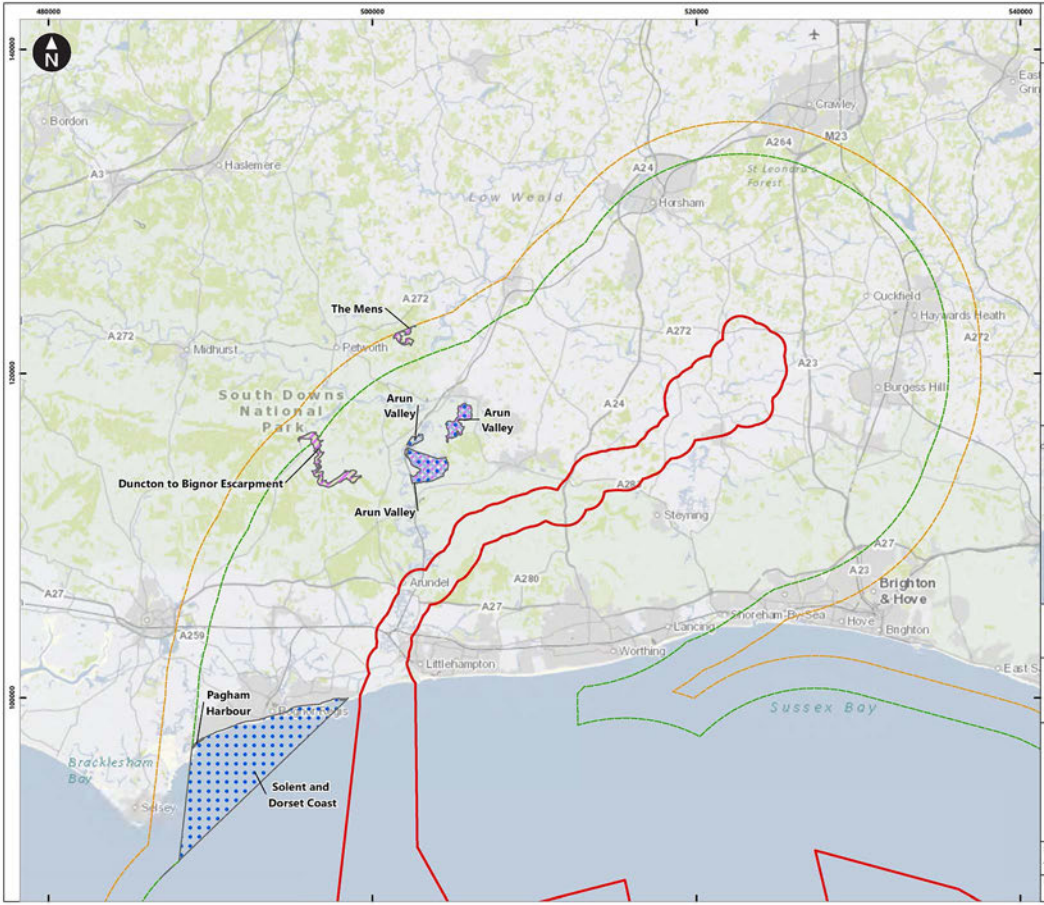
Table 6.6.7 Details of statutorily designated sites

Site name	Designated feature summary	Distance and direction from the Scoping Boundary
Arun Valley Ramsar site	• Wetland invertebrate and plant species, assemblage of wintering waterfowl	• 2.8km N
Arun Valley SAC	• Ramshorn snail *Anisus vorticulus*	• 2.8km N
Arun Valley SPA	• Bewick's swan (non-breeding) • Waterfowl assemblage (non-breeding): including shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas Penelope* and Bewick's swan	• 2.8km N
The Mens SAC	• Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) • Barbastelle *Barbastella barbastellus*	• 11.0km NW
Duncton to Bignor Escarpment	• Asperulo-Fagetum beech forests	• 6.5km NW
Pagham Harbour Ramsar site	• Dark-bellied brent goose	• 10.0km W
Pagham Harbour SPA	• Common tern *Sterna hirundo* (breeding) • Dark-bellied brent goose (non-breeding) • Little tern *Sterna albifrons* (breeding) • Ruff *Calidris pugnax* (non-breeding)	• 10.0km W
Solent and Dorset Coast SPA	• Sandwich tern *Sterna sandvicensis* (breeding) • Common tern • Little tern	• 0.7km W

Site name	Designated feature summary	Distance and direction from the Scoping Boundary
Amberley Mount to Sullington Hill SSSI[36]	• Calcareous grassland, juniper *Juniperus communis*, fly honeysuckle *Lonicera xylosteum*, adonis blue butterfly *Polyommatus bellargus*	• Within Scoping Boundary
Amberley Wild Brooks SSSI	• Redshank *Tringa tetanus* (breeding), Bewick's swan (non-breeding), shoveler (non-breeding), teal (non-breeding), breeding bird assemblage, invertebrate assemblage, lowland ditch system, dragonfly assemblage, true fox-sedge *Carex vulpine*, cut-grass *Leersia oryzoides*, swamp habitats, variety of wintering bird species, Vascular plant assemblage	• 2.8km N
Arun Banks SSSI	• Woodland habitats, *Schoenoplectus lacustris* sub-species *tabernaemontani x triqueter*	• 1.2km N
Arundel Park SSSI	• Breeding bird assemblage, calcareous grassland, invertebrate assemblage, field cricket *Gryllus campestris*, cut-grass.	• Within the Scoping Boundary
Beeding Hill to Newtimber Hill SSSI	• Calcareous grassland, great crested newt, IK – Karst, IS – quaternary of South-East England, red star-thistle *Centaurea calcitrapa*, adonis blue butterfly, woodland habitats.	• 4.7km E
Cissbury Ring SSSI	• Breeding bird assemblage, calcareous grassland, adonis blue butterfly	• 2.7km E
Chanctonbury Hill SSSI	• Breeding bird assemblage, calcareous grassland, woodland, great crested newt	• Within the Scoping Boundary
Chantry Mill SSSI	• EA – Aptian - Albian	• 0.9km N
Climping Beach SSSI	• Sanderling *Calidris alba*, shingle and dune communities.	• Within the Scoping Boundary

[36] Amberley Mount to Sullington Hill SSSI and Arundel Park SSSI are also identified as groundwater dependent terrestrial ecosystems in **Section 6.10: Water environment**. This aspect of the SSSI will be considered alongside the designated features in all future assessment.

Site name	Designated feature summary	Distance and direction from the Scoping Boundary
Fairmile Bottom SSSI	• Silver-washed fritillary *Argynnis paphia*, calcareous grassland, woodland.	• 3.3km NW
Horton Clay Pit SSSI	• ED – Aptian - Albian	• 3.1km E
Felpham SSSI	• EC – Tertiary palaeobotany	• 4.3km W
Hurston Warren SSSI	• Dry heath, wet heath and bog pool habitats	• 4.3km N
Pulborough Brooks SSSI	• Pintail *Anas actua* (non-breeding), ruff (non-breeding), shoveler (non-breeding), teal (non-breeding), wigeon (non-breeding), breeding bird assemblage, invertebrate assemblage, vascular plant assemblage	• 4.6km N
Parham Park SSSI	• Lichens, invertebrate assemblage, woodland	• 1.8km N
Sullington Warren SSSI	• Breeding bird assemblage, dry heath habitat	• 1.2km N
Wolstonbury Hill SSSI	• Calcareous grassland	• 4.6km E
West Beach LNR	• Sand flats, tide line, shingle, sand dunes and related fauna (part of Climping Beach SSSI)	• Within the Scoping Boundary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Petworth
The Mens
South Downs National Park
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Arun Valley
Duncton to Bignor Escarpment
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Steyning
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Arundel
A280
Brighton & Hove
Shoreham-By-Sea
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Lancing
Worthing
Littlehampton
A259
Pagham Harbour
Bracklesham Bay
Selsey
Solent and Dorset Coast
Sussex Bay
East Sussex
Service Layer Credits: Contains OS data © Crown Copyright and database right 2019
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Key
Scoping Boundary
10km Area of Search for SPA / Ramsar
12km Area of Search for SAC
SPA
Ramsar
SAC
London
Portsmouth
Kilometres
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Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.4 Location of European sites within defined Areas of Search
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0003
Version: 1.0
Company: WOOD
Drawn By: BUTLS
Chk/Aprvd: WOOD
Drawn Date: 11/06/2020
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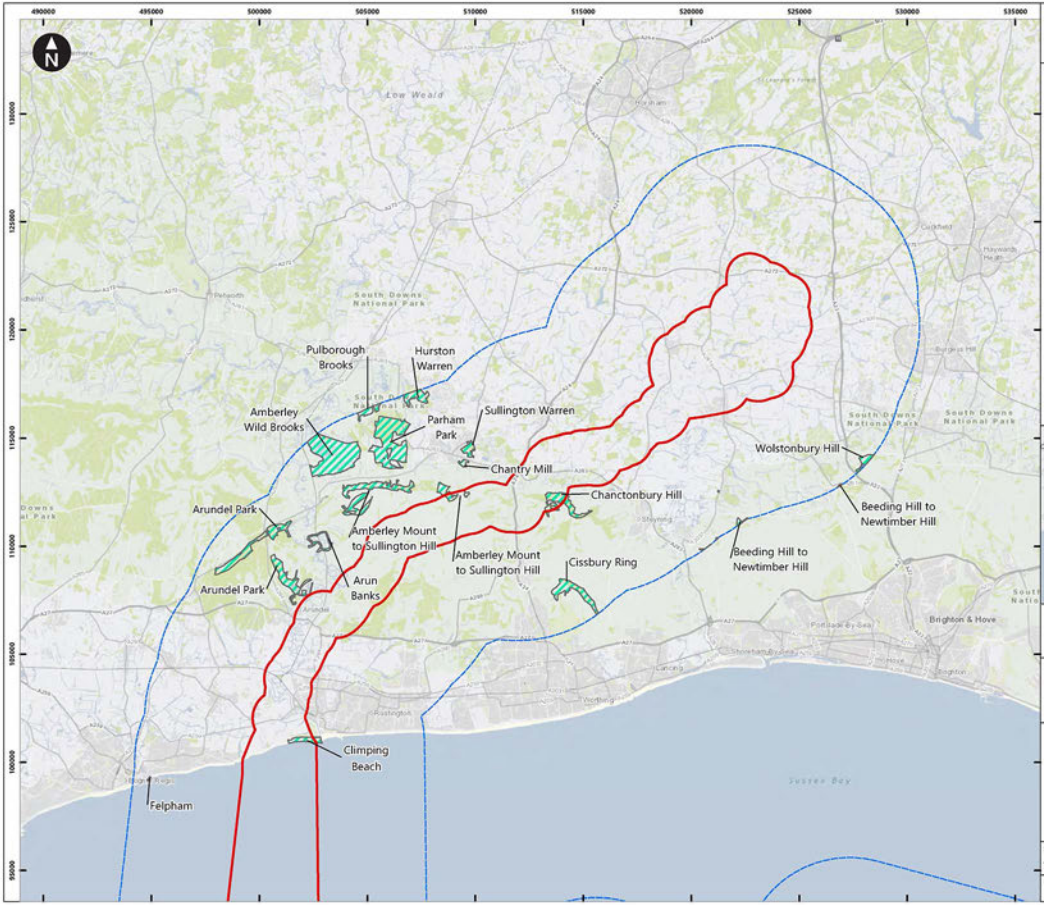

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Key

- Scoping Boundary
- 5km Area of Search for SSSI
- SSSI

Kilometres
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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.5 Location of SSSIs within defined Areas of Search

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0004				1.0
Company: WOOD	Drawn By: BUTLS	Chk/Aprvd: WOOD	Drawn Date: 11/06/2020	Status: FINAL

Baseline – Non-statutory nature conservation sites

6.6.42 **Table 6.6.8** provides the details of the nine Local Wildlife Sites that are within the Scoping Boundary. Those outside (an additional 32 LWS), but within 5km of the Scoping Boundary are detailed in **Appendix E**. **Figure 6.6.6** shows the location of the LWS identified.

Table 6.6.8 Details of non-statutorily designated sites

Site name	Description
Arun Valley, Watersfield to Arundel LWS	• This section of the River Arun and its floodplain forms an extensive tract of wetland, a nationally declining habitat. • Although many of the flood meadows have been improved, the wet grassland is important for breeding and wintering waders and wildfowl. There is a good network of ditches, some of which are very important botanically. • The site is important for birds, dragonflies, water beetles, snails and plants, and supports many rare and declining species. The unimproved meadows of Watersfield Brooks are of great botanical interest.
Bines Green LWS	• Bines Green is an area of common land that straddles the B2135 road. It is damp, unimproved, neutral grassland of considerable botanical interest with a small, overgrown pond to the west of the road.
Conyers Bank LWS	• Conyers Bank is a small, isolated field of unimproved chalk grassland on a steep, north-facing hillside. Situated above the floodplain of the River Arun, it is surrounded by semi-natural woodland and improved water meadows. The site has a rich flora.
Elmer Rocks LWS	• Elmer beach is a fine example of vegetated shingle, an internationally rare habitat. The intertidal area supports a diverse community including intertidal sand and eight ‘rock islands’ constructed in the early 1990s in the mid-tide zone to form a coastal defence against the eroding coastline. The rock islands have provided a habitat type that is very rare, if not unique, in West Sussex. The rock pools are probably the best in the county.

Site name	Description
Littlehampton Golf Course & Atherington Beach LWS	• Littlehampton Golf Course is of outstanding importance botanically. Although much of its grassland has been improved there are patches of species-rich turf. The southern edge of the golf links includes an area of dry dune grassland, adjacent to the sand dune system of Climping Beach SSSI. The site also includes an area of vegetated shingle beach, a nationally uncommon habitat.
Poling Copse LWS	• Poling Copse is a large block of ancient, semi-natural woodland on the Coastal Plain south of the South Downs, just to the east of Arundel. It consists predominantly of Oak-Hazel woodland, a type typical of base-poor soils in the area. Sycamore woodland dominates on South Fields – a section which has probably regenerated on an old field.
Sullington Hill LWS	• This stretch of the South Downs escarpment supports moderately species-rich chalk grassland on north and east-facing slopes. Some areas are maintained by grazing while others are no longer grazed and have become heavily scrub-invaded. The site includes small areas of semi-natural woodland.
Warningcamp Hill and New Down LWS	• The steep, north-west facing slope of New Down supports herb-rich chalk grassland with extensive patches of Burnet Rose *Rosa pimpinellifolia*, an uncommon plant in West Sussex. Warningcamp Hill supports a very large population of the rare Small-flowered Buttercup *Ranunculus parviflorus*. The site also includes an old chalk pit and a small area of ancient, semi-natural woodland.
Washington Chalk Quarry LWS	• This area of open downland and scattered scrub lies at the western end of Chanctonbury Hill. It includes a collection of disused chalk pits which now support species-rich grassland. The flora and butterflies are both of great interest. Part of the site has recently been fenced and sheep grazing reinstated. The South Downs Way runs through the site.

6.6.43 SxBRC also returned 33 records of notable road verges within the study area. **Figure 6.6.6** shows the location of the notable road verges identified.

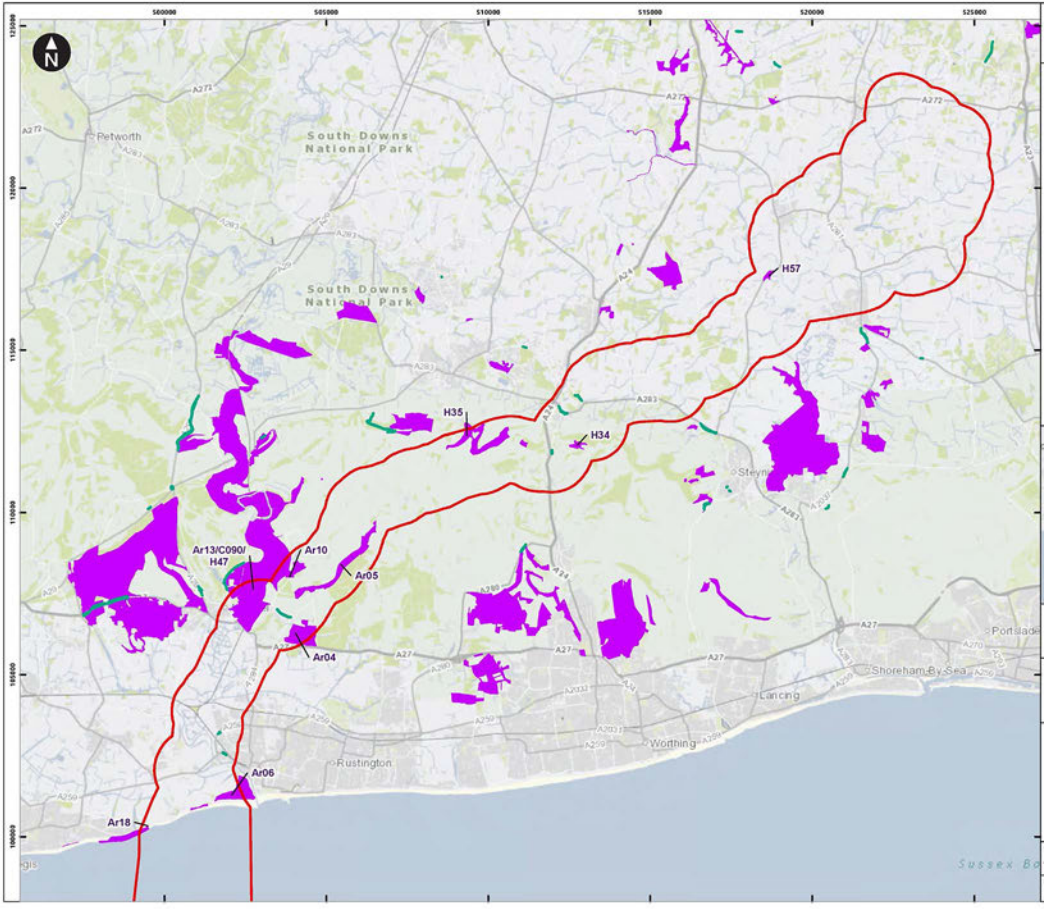
Baseline – habitats and flora

6.6.44 Woodland listed on the Ancient Woodland Inventory is present within the Scoping Boundary (see **Figure 6.6.7**). Approximately 186.4ha of ancient semi-natural woodland is present, alongside 178.6ha of ancient replanted woodland. These habitats occur within a network of woodlands of various sizes and are often immediately adjacent to other woodland types. These habitats are relatively common across the area encompassed by the Scoping Boundary, with the exception being within the general area of the landfall (south of Arundel).

6.6.45 Habitats within the Scoping Boundary identified from the Priority Habitats Inventory are provided in **Table 6.6.9.**

Table 6.6.9 Priority Habitat Inventory information

Habitat type	Area within Scoping Boundary (ha)
Coastal and floodplain grazing marsh	462.4
Coastal saltmarsh	3.4
Coastal sand dunes	10.2
Coastal vegetated shingle	7.3
Deciduous woodland	843.7
Lowland calcareous grassland	109.3
Lowland fens	0.1
Maritime cliffs and slopes	4.4
Mudflats	4.0
Traditional orchard	4.7
No main habitat but additional habitats present	91.1



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Key

- Scoping Boundary
- Local wildlife sites
- Notable road verges

Kilometres
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1:100,000

Rampion Extension Development

RWE

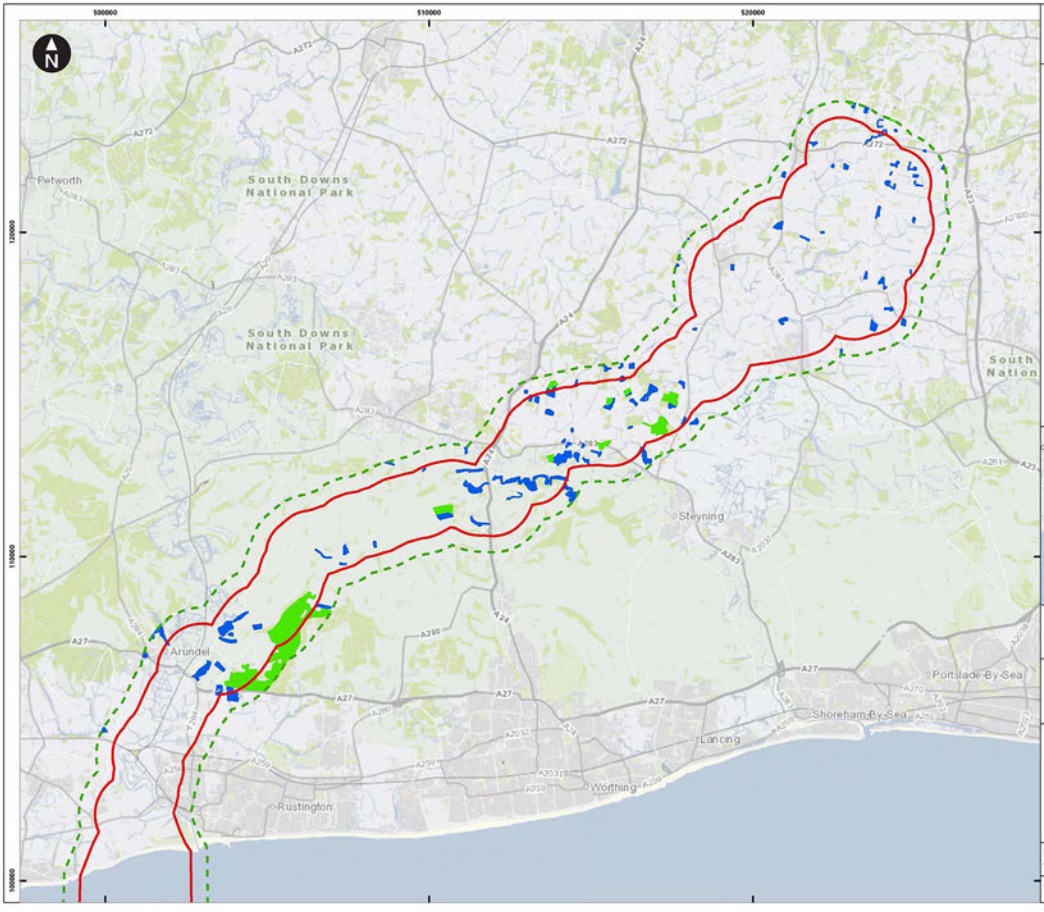
Rampion 2 Offshore Wind Farm

Figure 6.6.6 Non-statutory Biodiversity Sites

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0011				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BARNB	WOOD	15/06/2020	FINAL

ISO A3 Landscape



Key

- Scoping Boundary
- Scoping Boundary 500m Buffer
- Ancient Woodland - Semi-Natural
- Ancient Woodland - Replanted

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.7 Woodland listed on the Ancient Woodland Inventory

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0005				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BUTLS	WOOD	11/06/2020	FINAL

ISO A3 Landscape

6.6.46 The habitat map derived from remote sensing information is shown on **Figure 6.6.3 A to E**. Within the area that has had its habitats classified the main habitat types are arable fields, improved / semi-improved grasslands and broad-leaved woodland. **Table 6.6.10** provides the habitat types and the extent of the areas identified.

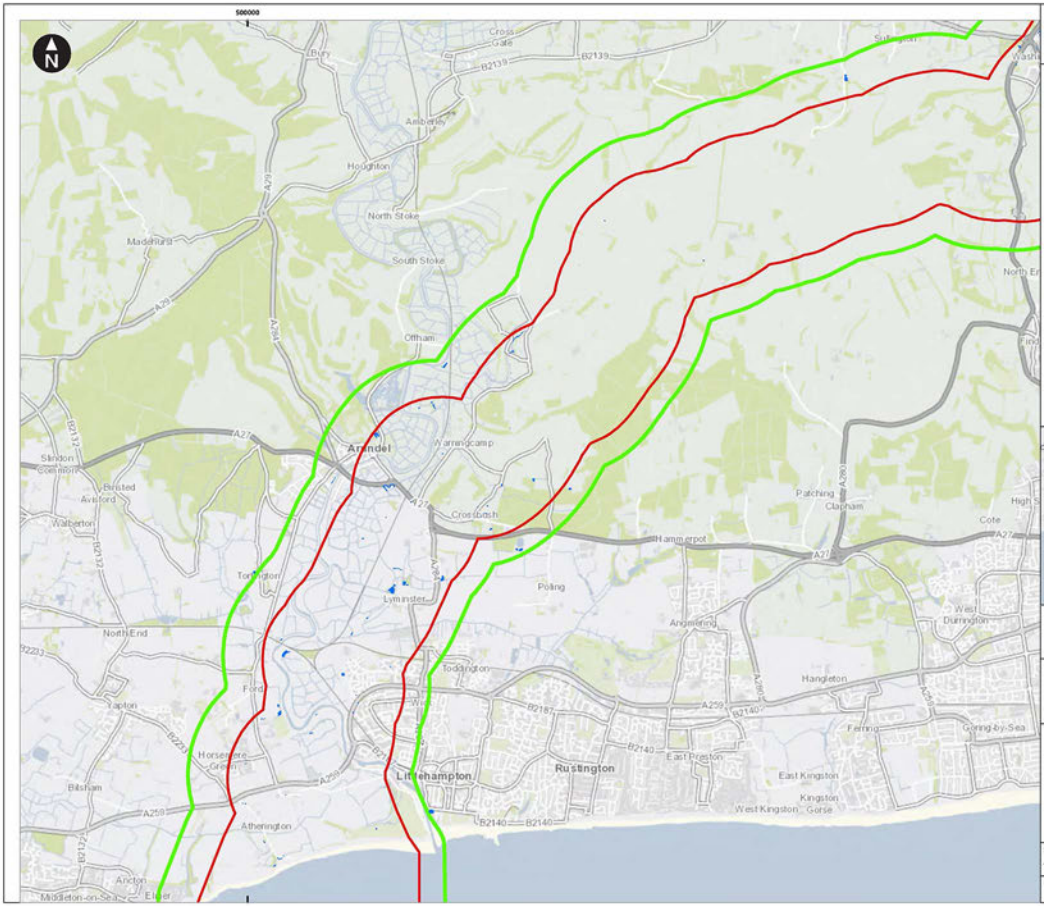
Table 6.6.10 Remote sensing habitat information

Class	Area (ha)
Amenity grassland	134.62
Bare ground	24.45
Improved and semi-improved grassland	2,412.00
Hedgerow	222.98
Arable	1,338.87
Scrub – scattered	167.06
Hardstanding	96.01
Calcareous grassland	345.53
Parkland and scattered trees – mixed	36.16
Scrub – dense/continuous	102.00
Mixed woodland	119.91
Intertidal – mud/sand	18.39
Buildings	179.33
Marsh/marshy grassland	6.59
Broadleaved woodland	621.10
Quarry	11.41
Standing water	23.45
Wet ditch	15.54
Running water	58.85
Coniferous woodland - plantation	46.29

6.6.47 SxBRC returned records of three plants listed on Schedule 8 of the Wildlife & Countryside Act 1981 (as amended) within the study area, namely bluebell *Hyacinthoides non-scripta,* millimetre moss *Micromitrium tenerum* and small Alison

Alyssum alyssoides. Bluebell was the only Schedule 8 species identified within the Scoping Boundary. In addition, across the study area there were 89 legally protected and notable species (including at the county level) of flora identified.

6.6.48 A total of 621 water bodies have been identified within the Scoping Boundary, with a further 56 within 500m of it. Water bodies become more common in areas north and east of Washington; shape and size vary, although there are no particularly large water bodies (for example, large drinking water reservoirs) with the vast majority being less than a hectare in extent. **Figure 6.6.8 A** and **B** show the distribution of the water bodies.



Key

- Scoping Boundary
- 500m area of search
- Waterbodies

Rampion Extension Development

RWE

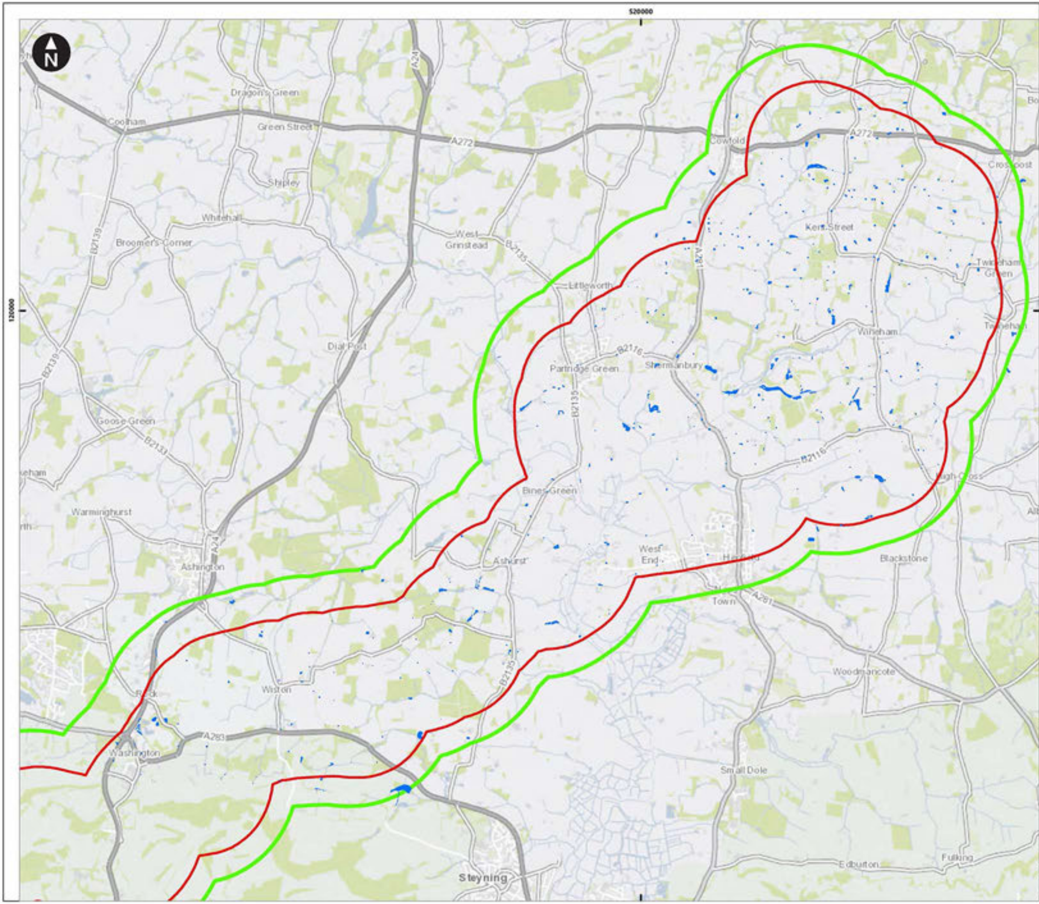
Rampion 2 Offshore Wind Farm

Figure 6.6.8a Waterbodies within the Rampion scoping boundary and within a 500m area of search

Scoping Report

System Identifier:				Version
42285-WOOD-SC-ON-FG-OO-0009				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BARNB	WOOD	15/06/2020	FINAL

ISO A3 Landscape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120000
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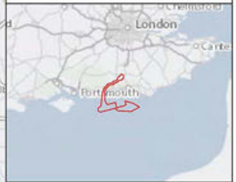
Coolham
Green Street
A272
A24
Shipley
Whitehall
West Grinstead
B2135
B2139
Broomers Corner
Littleworth
Cowfold
Kent Street
A281
Twineham Green
Wineham
Twineham
Dial Post
B2116
Partridge Green
Shermanbury
Goose Green
B2133
Bines Green
Warminghurst
A24
Ashington
Ashurst
West End
Henfield
Blackstone
High Cross
Town
A281
Wiston
Woodmancote
B2135
A283
Washington
Small Dole
Steyning
Edburton
Fulking
Cross Post

Key

- Scoping Boundary
- 500m area of search
- Waterbodies



Kilometres
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1:50,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.6.8b Waterbodies within the Rampion scoping boundary and within a 500m area of search

Scoping Report

System Identifier:	Version:
42285-WOOD-SC-ON-FG-OO-0008	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BARNB	WOOD	15/06/2020	FINAL

Baseline – species

6.6.49 The area within the Scoping Boundary and the areas within 5km of it support a wide range of legally protected and notable species. Legally protected and notable mammal species include:

- Alcathoe bat Myotis alcathoe;
- Barbastelle;
- Badger;
- Bechstein's bat Myotis bechsteinii;
- Brown hare Lepus europaeus;
- Brown long-eared bat *Plecotus auritus;*
- Common pipistrelle Pipistrellus pipistrellus;
- Daubenton's bat Myotis daubentonii;
- Hazel dormouse;
- Hedgehog Erinaceus europaeus;
- Leisler's bat Nyctalus leisleri;
- Natterer's bat Myotis natereri;
- Noctule Nyctalus noctula;
- Otter;
- Polecat Mustela putorius;
- Serotine *Eptesicus serotinus*;
- Soprano pipistrelle Pipistrellus pygmaeus;
- Water vole; and
- Whiskered bat Myotis mystacinus.

6.6.50 **Figure 6.6.9** provides the distribution of bat records provided by SxBRC within the Scoping Boundary, whilst **Figure 6.6.10** shows the distribution of records of other mammals within the Scoping Boundary.

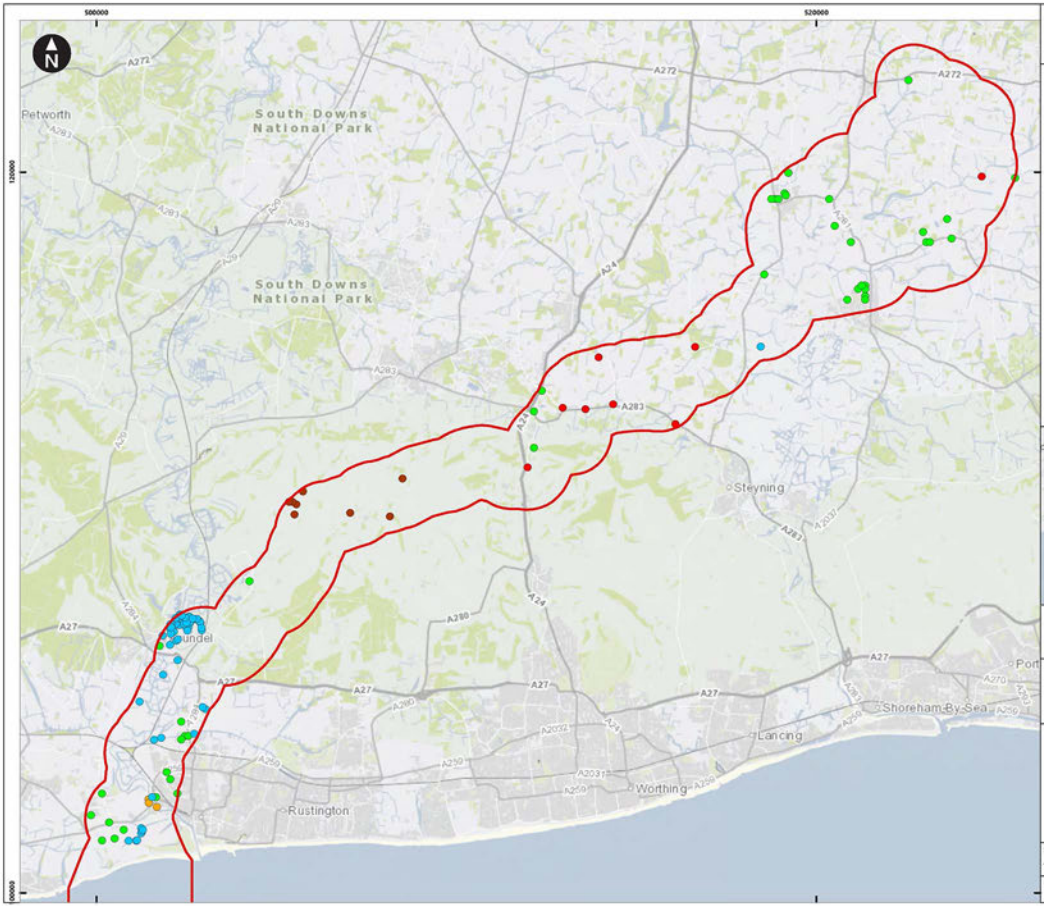
6.6.51 Herptiles present in the study area that are either legally protected or notable include great crested newt, common toad *Bufo bufo*, sand lizard *Lacerta agilis*, adder *Vipera berus*, grass snake *Natrix helvetica*, slow worm *Anguis fraglis* and common lizard *Zootoca vivipara*. The majority of these are reasonably widespread according to desk study records, with only sand lizard and adder being restricted to particular areas. **Figure 6.6.11** provides the distribution of herptile records provided by SxBRC within the Scoping Boundary.

6.6.52 Sussex Ornithological Society has records of 18 SPI and 28 species listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) in tetrads that overlap fully or partially with the Scoping Boundary. These include a wide-range of

species including wildfowl (e.g. Bewick's swan, dark-bellied brent goose), waders (e.g. lapwing, little ringed plover *Charadrius dubius*), raptors (e.g. red kite *Milvus milvus*, peregrine *Falco peregrinus*) and passerines (e.g. kingfisher *Alcedo atthis*, Cetti's warbler *Cettia cetti*). Many of the species use both intertidal and terrestrial habitats in the area, with a number also focused on the pasture, arable and woodland habitats. **Figure 6.612** provides the distribution of breeding lapwing across the study area.

6.6.53 There are several locations where large aggregations of over-wintering birds are regularly recorded during the BTO's regularly undertaken Wetland Bird Survey. These are associated with the flood plain and linked habitats of the River Arun and River Adur and include species such as wigeon, gadwall, shoveler and black-tailed godwit *Limosa limosa*, as well as those described in **Paragraph 6.6.44.**

6.6.54 Large numbers of invertebrate records have been returned through the desk study, with particular emphasis on lepidoptera. Of the 45 species considered to be on the "Sussex list" (Sussex branch of Butterfly Conservation identify records of 52 species with 7 considered to be rare or occasional visitors only) records of 17 of these species were provided for the study area. These included the Adonis blue and the Duke of Burgundy.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5120000
5100000
N
Petworth
South Downs National Park
South Downs National Park
A272
A283
A29
A24
A27
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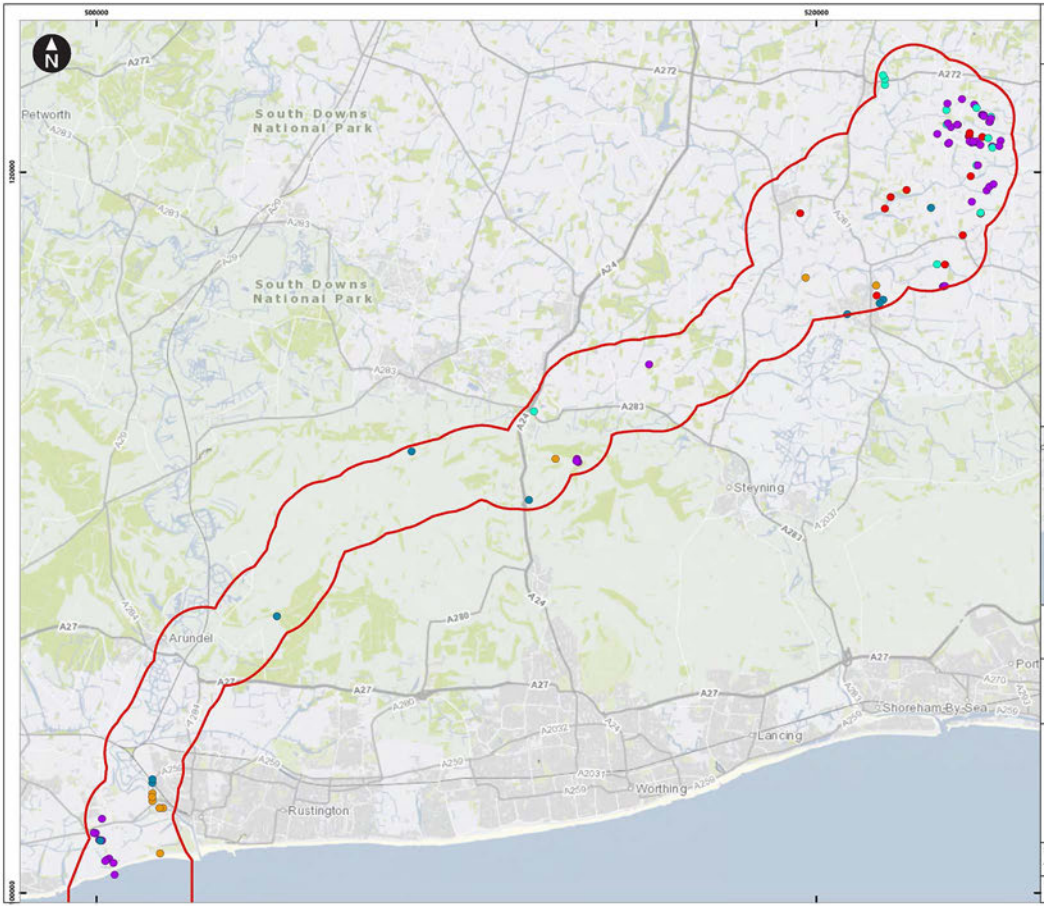
A2032
A2031
A259
Steyning
Arundel
Rustington
Worthing
Lancing
Shoreham-By-Sea
Portsmouth
London
Key
Scoping Boundary
Brown hare
European water vole
Harvest mouse
Polecat
West European hedgehog
OS Opendata:
© Crown copyright and database rights year [2020] Ordnance Survey
Contains public sector information licensed under the Open Government Licence v3.0.
Kilometers
0 0.5 1 2 3 4
1:90,000
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.10 Records of legally protected and notable mammals (excluding bats) within the Scoping Boundary
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OO-0018
Version: 1.0
Company: WOOD
Drawn By: BARNB
Chk/Aprvd: WOOD
Drawn Date: 15/06/2020
Status: FINAL
Document uncontrolled when printed
ISO A3 Landscape



Key

- Scoping Boundary
- Adder
- Common lizard
- Common toad
- Grass snake
- Great Crested newt
- Slow-worm

Kilometers
0 0.5 1 2 3 4
1:90,000

Rampion Extension Development

RWE

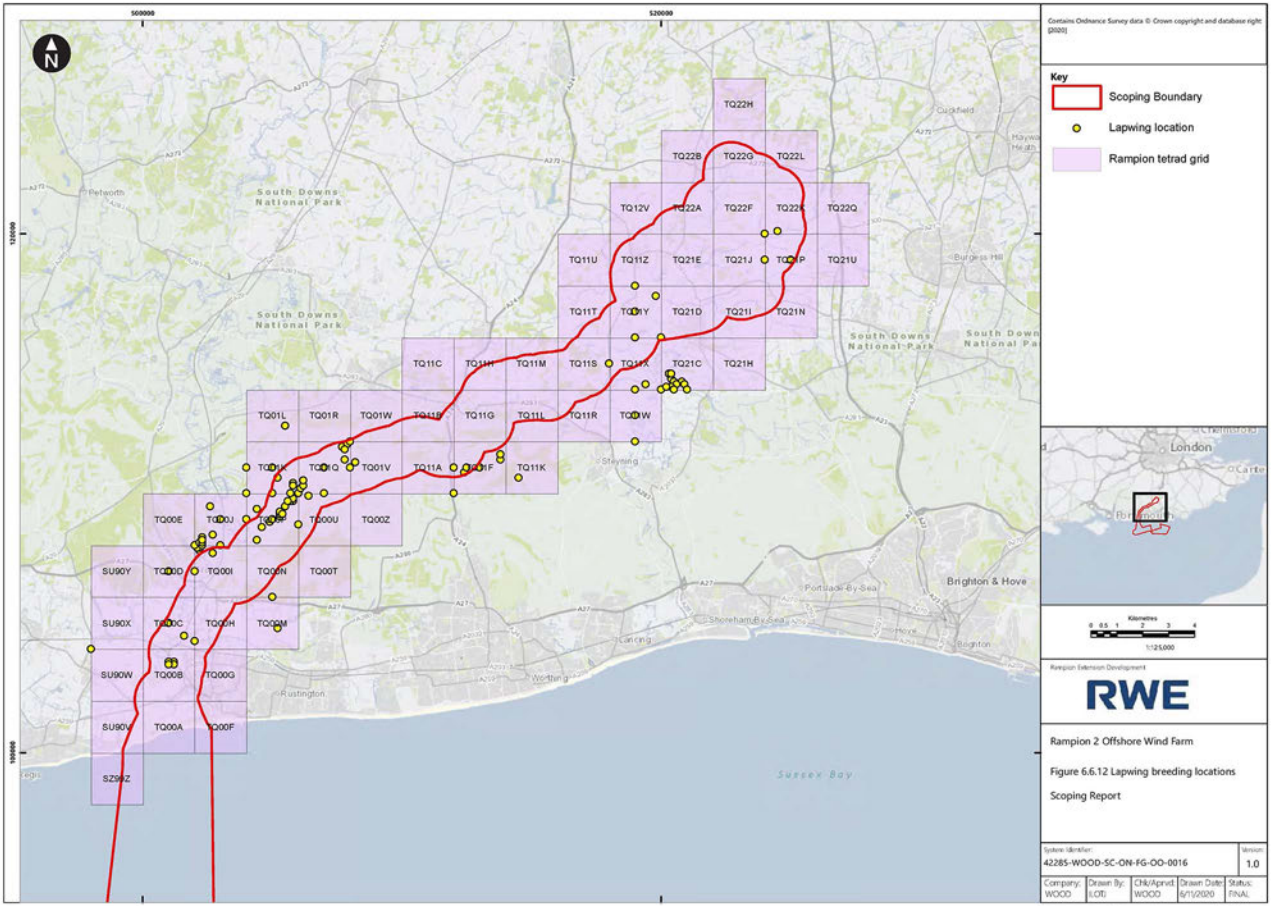
Rampion 2 Offshore Wind Farm

Figure 6.6.11 Records of legally protected and notable herptiles within the Scoping Boundary

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OO-0019				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BARNB	WOOD	15/06/2020	FINAL

ISO A3 Landscape


Contains Ordnance Survey data © Crown copyright and database right (2020)
Key
Scoping Boundary
Lapwing location
Rampion tetrad grid
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.6.12 Lapwing breeding locations
Scoping Report
42285-WOOD-SC-ON-FG-OO-0016
1.0
WOOD
(LOE)
WOOD
6/11/2020
FINAL
Document uncontrolled when printed
ISO A3 Landscape
South Downs National Park
Brighton & Hove
Rustington
Worthing
Lancing
Shoreham-By-Sea
Portslade-By-Sea
Steyning
Burgess Hill
Cuckfield
Petworth
London
Sussex Bay
TQ22H
TQ22B
TQ22G
TQ22L
TQ12V
TQ22A
TQ22F
TQ22K
TQ22Q
TQ11U
TQ11Z
TQ21E
TQ21J
TQ21P
TQ21U
TQ11T
TQ11Y
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SZ99Z

Basis for scoping assessment

6.6.55 The terrestrial ecology and nature conservation scoping assessment is based on the following key assumptions which are also set out in **Chapter 2**: **The Proposed Development.**

- All transmission cables are buried, as opposed to being carried on overhead lines.
- The temporary construction corridor for the installation of underground cables will typically be approximately 50m in width, with widening at specific locations only (for example: for launch or retrieval pits for trenchless installations, construction compounds and laydown areas etc.)
- The cable at the landfall point will be installed through the use of Horizontal Directional Drilling (HDD); a trenchless technique that will remove the need to excavate in any beach or sand dune habitats present.
- Cable installation will take place in a phased manner, with sections being excavated, ducts installed and then back-filled sequentially. This will reduce the time between physical works occurring and restoration taking place in any given location.

Embedded environmental measures

6.6.56 As part of the project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on terrestrial ecology and nature conservation (see **Table 6.6.11**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.6.57 As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.6.11 Relevant terrestrial ecology and nature conservation embedded environmental measures

ID	Embedded environmental measure proposed	How the embedded environmental measures will be secured
C-1	The onshore cable route would be completely buried underground for its entire length.	DCO works plans, description of development and requirements
C-3	At sensitive crossing locations the working width will be reduced as far as practicable.	DCO works plans, description of development and requirements

ID	Embedded environmental measure proposed	How the embedded environmental measures will be secured
C-4	Horizontal Directional Drill (HDD) technique will be used at the landfall location.	DCO works plans, description of development and requirements
C-5	All watercourses and railways will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible. Appropriate permits or consents will be applied for works withing the permitting distance from the Environment Agency (Main Rivers) or Lead Local Flood Authority (LLFA).	DCO works plans and order limits
C-6	Where practical, sensitive sites would be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits
C-21	Vegetation will be retained where possible. Where necessary vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas any vegetation removal will be undertaken under supervision and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally protected species is removed sensitively and in a legally compliant way.	COCP and DCO articles/ requirement
C-24	Best practices air quality management measures would be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	COCP and DCO requirement
C-76	Pollution control strategy. In line with good practice, pollution prevention plans will be drawn up to detail how ground and surface waters would be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals	COCP and DCO requirement

ID	Embedded environmental measure proposed	How the embedded environmental measures will be secured
	and pollution incidence response planning. These will include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	
C-103	Areas of temporary habitat loss will be reinstated, wherever practicable, following the completion of construction in each area. Wherever possible reinstatement will be back to the type of habitat crossed.	COCP and DCO requirement
C-104	Enhancements to terrestrial ecology will be achieved as part of the Proposed Development through the delivery of new or improved habitats or measures to boost populations of certain species. Opportunities for these enhancements will be identified following further evolution of the Proposed Development design and through engagement with stakeholders. These enhancements may be delivered directly by RWE within or close to the DCO boundary or via collaboration with independent organisations.	DCO works plans, description of development and requirements
C-105	A lighting design of all temporary and permanent lighting will be developed once contractors are appointed; however the principles of lighting design will be detailed at the time of application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals (2018). The lighting design will account for the potential effects on terrestrial ecology by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations – this is to decrease the potential displacement effects on light sensitive fauna such as bats.	COCP and DCO requirement
C-106	Speed limits will be imposed on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna such as badgers, otters, bats and barn owls.	COCP and DCO requirement

ID	Embedded environmental measure proposed	How the embedded environmental measures will be secured
C-107	The use of tried and tested invasive species control and biosecurity measures to avoid the spread of infested materials will be applied.	COCP and DCO requirement

6.6.58 The installation of the onshore cable for the existing Rampion 1 project was completed in 2017. During 2018, the re-establishment and creation of new habitats progressed across the entire route. The monitoring report (RSK, 2019) describes the results of habitat walk-overs and botanical survey and notes the actions that have been taken for each location where habitats have been created or restored. It is evident in the report that this is an early phase of the mitigation programme, with habitats still in the establishment phase. However, it also demonstrates that early progress with regards to specialist mitigation (turf translocations of calcareous grassland), tree planting and arable wildflower margins are showing signs of promise and that active adaptive management is being undertaken (e.g. re-seeding, weed control) where necessary. Taken together this suggests that the early indications of habitat restoration following cable installation in the local area are positive and that RWE Renewables Ltd are actively and effectively managing the process to ensure remedial measures are rapidly implemented to respond to conditions (for example last year's dry summer period). The experience and lessons learned from the existing Rampion 1 project, provide a strong basis for understanding and implementing habitat restoration for Rampion 2.

Likely significant effects

6.6.59 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.6.60 The likely significant effects on terrestrial ecology and nature conservation are summarised in **Table 6.6.12** Likely terrestrial ecology and nature conservation effects

6.6.61 **.** The scoping assessment is based on a combination of the project definition of the Proposed Development at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for terrestrial ecology and nature conservation effects, CIEEM guidance on Ecological Impact Assessment (2018, updated 2019) and professional judgement.

6.6.62 **Table 6.6.12** Likely terrestrial ecology and nature conservation effects

6.6.63 is a tool aimed at delivering a proportionate approach to the EIA. For each ecological feature presented, the potential environmental changes and broad

effects resulting from the Proposed Development are provided, alongside the justification for the scoping decision.

Table 6.6.12 Likely terrestrial ecology and nature conservation effects

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
European sites	International	International	Land take / land cover change	Within the Scoping Boundary	N/A	**Scoped out.** The Scoping Boundary does not overlap with any European site (see **Paragraphs 6.6.56 to 6.6.59**)	N/A
European sites	International	International	Fragmentation of habitats	• 12km (for bats) • 3.5km (for teal, shoveler and wigeon) • 10km (for Bewick's swan and dark-bellied brent goose)	C-1, C-3, C-5, C-6, C-103	**Scoped in (detailed assessment).** • The Mens SAC supports barbastelle bats. These bats may use or commute across areas that may be subject to construction. • The Arun Valley SPA is within 10km of areas that may be subject to construction and supports Bewick's swan. **Scoped out.** Pagham Harbour SPA is over 10km from the proposed landfall point. WeBS data show that the dark-bellied brent geese present in the area are over 10km from the SPA suggesting that these birds are not linked to the SPA. Therefore, Pagham Harbour SPA can be scoped out (see **Paragraphs 6.6.56 to 6.6.59**). **Scoped out.** These areas are over 3.5km (Johnson et al., 2014) from the Arun Valley SPA boundary meaning fragmentation effects on shoveler, teal and wigeon can be scoped out (see **Paragraphs 6.6.56 to 6.6.59**).	Habitat survey, bat survey and winter bird survey information
European sites	International	International	Increased noise and vibration	500m	C-3, C-6, C-21, C-103	**Scoped in (detailed assessment).** The Bewick's swan from Arun Valley SPA / Ramsar site could forage in areas within 500m of construction.	Winter bird survey information
European sites	International	International	Increased light levels	450m	C-105	**Scoped in (detailed assessment).** Barbastelle bats from The Mens SAC could be disturbed / displaced from areas artificially lit by construction/security lighting.	Habitat survey and bat survey information

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
European sites	International	International	Changes in hydrology	1km[37]	C-5, C-103	**Scoped in (detailed assessment).** The Bewick's swan from Arun Valley SPA / Ramsar site could forage in areas within 1km of construction works.	Outputs of hydrological assessment
European sites	International	International	Pollution events	500m	C-76	**Scoped out** (see **Paragraphs 6.6.56 to 6.6.59**). There are no European sites within 500m of the Scoping Boundary.	N/A
European sites	International	International	Emissions events	200m	C-24	**Scoped out** (see **Paragraphs 6.6.56 to 6.6.59**). There are no European sites within 200m of the Scoping Boundary. Those within 200m of a road that could be used by construction traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible.	N/A
European sites	International	International	Introduction of invasive non-native species	Within the Site	C-107	**Scoped out.** The Scoping Boundary does not overlap with any European site.	N/A
SSSIs	National	National	Land take / land cover change	Within the Scoping Boundary	C-6	**Scoped in (detailed assessment).** There are four SSSIs within the Scoping Boundary (see **Table 6.6.7**). **Scoped out.** All SSSIs outside of the Scoping Boundary.	Habitat survey information
SSSIs	National	National	Fragmentation of habitats	5km	C-1, C-3, C-5, C-6, C-103	**Scoped in (detailed assessment).** The Bewick's swan from Amberley Wild Brooks and Pulborough Brooks SSSIs could forage in areas within the Scoping Boundary. **Scoped out.** All other SSSIs identified in **Table 6.6.7** as the designated features would not be expected to move regularly between the given designated site and the construction area.	Habitat survey, bat survey and winter bird survey information
SSSIs	National	National	Increased noise and vibration	500m	C-3, C-6, C-21, C-103	**Scoped in (detailed assessment).** The Bewick's swan from Amberley Wild Brooks and Pulborough Brooks SSSIs could forage in areas within 500m of construction. **Scoped out.** All other SSSIs identified in **Table 6.6.7** as there designated features are outside of the ZOI.	Winter bird survey information

[37] A 1km ZOI is applied in this scoping assessment for GWDTE as a precaution. This ZOI will be reviewed following detailed assessment of hydrological impacts at later stages of the application.

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
SSSIs	National	National	Increased light levels	450m	C-105	**Scoped out.** There are no SSSIs identified within 5km of the Scoping Boundary that support bats as designated features.	N/A
SSSIs	National	National	Changes in hydrology	1km	C-5, C-103	**Scoped in (detailed assessment).** There are four SSSIs within the ZOI (see **Table 6.6.7**). **Scoped out.** All SSSIs outside of the ZOI (see **Paragraphs 6.6.56 to 6.6.59**)	Outputs of hydrological assessment
SSSIs	National	National	Pollution events	500m	C-76	**Scoped in (detailed assessment).** There are four SSSIs within the ZOI (see **Table 6.6.7**). **Scoped out.** All SSSIs outside of the ZOI (see **Paragraphs 6.6.56 to 6.6.59**)	Habitat survey information
SSSIs	National	National	Emissions events	200m	C-24	**Scoped out** (see **Paragraphs 6.6.56** to **6.6.59**). SSSIs within 200m of a road that could be used by construction traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible.	N/A
SSSIs	National	National	Introduction of invasive non-native species	Within the Site	C-107	**Scoped in (detailed assessment).** There are four SSSIs within the Scoping Boundary (see **Table 6.6.7**). **Scoped out.** All SSSIs outside of the Scoping Boundary. (see **Paragraphs 6.6.54** to **6.6.57**)	Habitat survey information
Local Wildlife Sites / Local Nature Reserves	County	County	Land take / land cover change	Within the Scoping Boundary	C-3, C-6	**Scoped in (detailed assessment).** There are 9 LWS and one LNR within the Scoping Boundary. **Scoped out.** All LWS outside of the Scoping Boundary.	Habitat survey information
Local Wildlife Sites / Local Nature Reserves	County	County	Fragmentation of habitats	Within the Scoping Boundary	C-3, C-6, C-21, C-103	**Scoped in (detailed assessment).** There are 9 LWS and one LNR within the Scoping Boundary. **Scoped out.** All LWS outside of the Scoping Boundary.	Habitat survey information
Local Wildlife Sites / Local Nature Reserves	County	County	Increased noise and vibration	500m	C-6, C-21, C-103	**Scoped in (detailed assessment).** There are LWS that may be within 500m of construction works.	Habitat survey information

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
Local Wildlife Sites / Local Nature Reserves	County	County	Increased light levels	450m	C-105	**Scoped out.** There are no LWSs identified within the Scoping Boundary or 450m of it that support bats as a recognised feature.	N/A
Local Wildlife Sites / Local Nature Reserves	County	County	Changes in hydrology	1km	C-5	**Scoped in (detailed assessment).** There are LWS and LNR within the ZOI (see **Table 6.6.7**). **Scoped out.** All LWSs outside of the ZOI (see **Paragraphs 6.6.58 to 6.6.60**)	Outputs of hydrological assessment
Local Wildlife Sites / Local Nature Reserves	County	County	Pollution events	500m	C-76	**Scoped in (detailed assessment).** There are LWS and LNR within the ZOI (see **Table 6.6.7**). **Scoped out.** All LWSs outside of the ZOI (see **Paragraphs 6.6.56 to 6.6.59**)	Habitat survey information
Local Wildlife Sites / Local Nature Reserves	County	County	Introduction of invasive non-native species	Within the Site	C-107	**Scoped in (detailed assessment).** There are nine LWS and one LNR within the Scoping Boundary (see **Table 6.6.7**). **Scoped out.** All LWSs outside of the Scoping Boundary. (see **Paragraphs 6.6.54** to **6.6.57**)	Habitat survey information
Ancient woodland and veteran trees	National	National	Land take / land cover change	Within the Scoping Boundary	C-3, C-6	**Scoped in (detailed assessment).** Ancient woodland is present within the Scoping Boundary.	Habitat survey information
Ancient woodland and veteran trees	National	National	Fragmentation of habitats	Within the Scoping Boundary	C-3, C-6, C-21	**Scoped in (detailed assessment).** Ancient woodland is present within the Scoping Boundary.	Habitat survey information
Ancient woodland and veteran trees	National	National	Changes in hydrology	1km	C-5	**Scoped in (detailed assessment).** Ancient woodland is present within the Scoping Boundary.	Habitat survey information
Ancient woodland and veteran trees	National	National	Pollution events	500m	C-76	**Scoped in (detailed assessment).** Ancient woodland is present within the Scoping Boundary.	Habitat survey information
Ancient woodland and veteran trees	National	National	Introduction of invasive non-native species	Within the Scoping Boundary	C-107	**Scoped in (detailed assessment).** Ancient woodland is present within the Scoping Boundary.	Habitat survey information
All habitats within the Scoping	Local and above (upper level of importance to	To be confirmed following field	Land take / land cover change	Within the Scoping Boundary	C-6, C-21, C-103, C-104	**Scoped in (detailed assessment).** Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
Boundary with a level of importance of local or above	be confirmed via field survey)	survey and design evolution					
All habitats within the Scoping Boundary with a level of importance of local or above	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Fragmentation of habitats	Within the Scoping Boundary	C-1, C-2, C-5, C-6, C-103, C-104	**Scoped in (detailed assessment).** Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information
All habitats within the Scoping Boundary with a level of importance of local or above	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Changes in hydrology	1km	C-5	**Scoped in (detailed assessment).** Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information
All habitats within the Scoping Boundary with a level of importance of local or above	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Pollution events	500m	C-76	**Scoped in (detailed assessment).** Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information
All habitats within the Scoping Boundary with a level of importance of local or above[38]	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Introduction of invasive non-native species	Within the Scoping Boundary	C-107	**Scoped in (detailed assessment).** Habitats of local importance or above are present within the Scoping Boundary.	Habitat survey information
All protected and notable species[39]	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Land take / land cover change	Up to 500m – dependent on species	C-1, C-3, C-5, C-6, C-103, C-104	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information

[38] Habitats will be considered individually at future stages of the application process
[39] Legally protected and notable species will be considered individually, or in relevant groups, at future stages of the application process

Ecological Feature	Importance – legislation and policy	Importance – Proposed Development level	Effects	ZOI	Embedded measures	Proposed approach to assessment (scoped in or scoped out)	Further data baseline requirements
All protected and notable species	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Fragmentation of habitats	Up to 500m – dependent on species	C-1, C-3, C-5, C-6, C-103, C-104	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information
All protected and notable species	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Increased noise and vibration	Up to 500m – dependent on species	C-1, C-6, C-106	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information
All protected and notable species	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Increased light levels	Up to 500m – dependent on species	C-105	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information
All protected and notable species	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Changes in hydrology	Up to 500m – dependent on species	C-6	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information
All protected and notable species	Local and above (upper level of importance to be confirmed via field survey)	To be confirmed following field survey and design evolution	Pollution events	Up to 500m – dependent on species	C-24, C-76	**Scoped in (detailed assessment).** Species of local importance or above are present within the Scoping Boundary.	Field survey information

Impacts scoped out of assessment

6.6.64 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

6.6.65 The following European sites have been scoped out of the assessment as there are no pathways of likely effect identified.

- Arun Valley SAC – there is no direct land take to remove habitat for ramshorn snail within the SAC. Distance from the Scoping Boundary (2.8km) ensures that any changes in hydrology or pollution events would not reach the SAC. Emissions associated with construction traffic can be discounted as no main roads that may be used for access to the construction area are within 200m of the SAC boundary.
- Pagham Harbour SPA / Ramsar site – this SPA supports four species, three of which common tern, little tern and ruff are considered within **Section 5.8 Offshore ornithology**. Dark-bellied brent goose from Pagham Harbour SPA will feed in arable and grassland habitat inland, however this species typically forages within 10km of roosting areas. The landfall point is almost 11km from the closest point of the SPA / Ramsar site and data from Sussex Ornithological Society (over 400 records) and WeBS suggests that occurrence of this species in this area away from the coastal strip is infrequent suggesting that the birds noted around Climping are unlikely to roost regularly within the SPA / Ramsar site and can therefore be considered to be independent of it.
- Duncton to Bignor Escarpment SAC – there is no direct land take to remove habitat within the SAC. Distance from the Scoping Boundary (6.5km) ensures that any changes in hydrology or pollution events would not reach the SAC. Emissions associated with construction traffic can be discounted as no main roads that may be used for access to the construction area are within 200m of the SAC boundary.
- Solent and Dorset Coast SPA – features of this SPA are considered within the assessment of offshore ornithology (see **Section 5.8: Offshore ornithology**).

6.6.66 The following SSSIs have been scoped out of the assessment as there are no pathways of effect identified.

- Beeding Hill to Newtimber Hill SSSI (4.7km), Cissbury Ring SSSI (2.7km), Fairmile Bottom SSSI (3.3km), Hurston Warren SSSI (4.3km), Pullborough Brooks SSSI (4.6km), Parnham Park SSSI (1.8km), Sullington Warren SSSI (2.4km), Wolstonbury Hill SSSI (4.6km) – there is no direct land take within these SSSIs. Distance from the Scoping Boundary ensures that any changes in hydrology or pollution events would not reach these SSSIs. Emissions associated with construction traffic can be discounted as the SSSIs are largely set back from any roads, the roads are unlikely to carry high levels of construction traffic (due to location) and any usage would be over a very short

period[40] making any contribution to nitrogen concentrations and deposition rates both temporary and reversible over a short time period (Natural England 2018).

- Chantry Mill SSSI, Horton Clay Pit SSSI, Felpham SSSI – these are SSSIs designated for geological interests. Geology is considered in **Section 6.8: Ground conditions.**
- Climping Beach SSSI and West Beach LNR – although this SSSI (and overlapping LNR) is close to the landfall point and within the Scoping Boundary, it will be avoided by the cable installation. In addition, habitats contiguous with sand dune habitats within the SSSI will be avoided through the installation technique of HDD.

6.6.67 The following habitats and species have been scoped out of the assessment.

- Habitats of negligible importance. Based on the remote sensing data this will include hard standing (including roads, built development etc.), arable fields, improved pasture and amenity grassland.
- Breeding birds (other than those listed on Schedule 1 of the WCA) have been scoped out of the assessment due to the temporary nature of the works across the majority of the area, the narrow, linear working area and the embedded environmental measures in place to maintain legal compliance.

6.6.68 The following impacts have been scoped out for all ecological feature.

- Emissions associated with construction traffic and plant are scoped out for all relevant ecological features (European sites and SSSIs) based on the temporary nature of the effect (see **Section 6.7 Transport**), the relatively limited amount of traffic likely serving construction[16] at any single location due to the nature of cable installation and the reversible nature of this effect; this is in line with advice provided to competent authorities by Natural England (2018).

Cumulative effects

6.6.69 Cumulative effects on terrestrial ecology and nature conservation resulting from the impacts of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.6.70 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- permanent and temporary habitat loss and degradation of notable habitats with corresponding effects on local populations;

[40] Traffic numbers associated with the installation of the cable and construction of the substation for the current Rampion Wind Farm (RSK Environmental Ltd 2012) were low in comparison to usual traffic flows. This traffic was also well spread using different routes to reach different sections of the cabling route as it was constructed. This pattern would be repeated for the Proposed Development.

- permanent and temporary fragmentation of the landscape reducing the viability of some local populations to access sufficient resources; and
- temporary disturbance caused by construction activity resulting in the displacement of local populations.

Transboundary effects

6.6.71 The potential effects from construction, operation (including maintenance) and decommissioning on terrestrial ecology and nature conservation receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

Introduction

6.6.72 The proposed approach to terrestrial ecology and nature conservation between Scoping and PEIR, and the ES are set out below.

Stakeholder engagement

6.6.73 Technical engagement will be sought with a range of stakeholders in order to inform the terrestrial ecology and nature conservation assessment. This will include seeking engagement with government advisors Natural England and the Environment Agency, the South Downs National Park Authority and Non-governmental organisations such as Sussex Wildlife Trust. Local voluntary groups such as the Sussex Bat Group will be contacted should the assessment process identify a need to engage detailed local knowledge to address identified issues.

6.6.74 This technical engagement will take place within the wider context of the consultation strategy. Public consultation will be conducted primarily through a series of Public Information Days (PIDs) and public meetings. Details of the proposed consultation phases are set out in **Section 4.6: Consultation and the evidence plan process** of this Scoping Report.

Baseline

6.6.75 Future baseline data collection will consist of a programme of field surveys as outlined in **Table 6.6.6.** This programme will be regularly reviewed in light of the results of the surveys and the evolution of the design of the Proposed Development.

Approach to design and environmental measures

6.6.76 During the design process, the terrestrial ecology and nature conservation constraints will be identified and highlighted to enable the “mitigation hierarchy” of avoidance, mitigation and then compensation to be implemented as required through the Overarching National Policy Statement for Energy (EN-1), paragraph 5.3.7. Through the design process the refinement of the location of infrastructure and the method of installation will consider ecological features as required.

6.6.77 The general approach to environmental measures with regards ecological features are described in **Table 6.6.11**. These environmental measures will be reviewed as the Proposed Development progresses, however further detail will be added to enable the likely effectiveness of these measures to be evaluated (for example: details of restoration at hedgerow crossings, methods for vegetation clearance to avoid harm to dormice etc.).

Assessment of effects in the PEIR and ES

6.6.78 Assessment of effects in the PEIR and ES will follow that described in **Paragraphs 6.6.17 to 6.6.28**.

Habitats Regulations Assessment

6.6.79 The Secretary of State for Business, Energy and Industrial Strategy will be required to undertake a HRA of the Proposed Development. The HRA is a staged process that is described in the Planning Inspectorate's "*Advice Note Ten Habitats Regulations Assessment relevant to nationally significant infrastructure projects*" as follows.

- Stage 1 – Screening: Screening for Likely Significant Effects (LSE). Stage 1 sets out which European sites may experience LSE and which potential effects can be screened out. The European sites identified at the screening stage as potentially experiencing LSE will be taken forward to Stage 2 (appropriate assessment).
- Stage 2 – Appropriate assessment: If Stage 1 identifies LSE, it is necessary to assess the implications of the Proposed Development on the affected site(s)' conservation objectives.
- Stage 3 – Assessment of alternatives: A consideration of alternative solutions is required if it cannot be concluded that there will be no adverse effect on the integrity of the affected European site(s).
- Stage 4 – Consideration of IROPI: If there are no alternative solutions, an assessment of imperative reasons of overriding public interest (IROPI) is required.

6.6.80 In order to facilitate the Secretary of State in making a decision, RED are required to provide information required for an assessment to take place. This information will be provided at later stages of the application process and will follow that outlined in Advice Note Ten. However, the potential effects identified in **Table 6.6.12** Likely terrestrial ecology and nature conservation effects

6.6.81 provides an outline of the types of LSE that will be considered.

6.7 Transport

Introduction

6.7.1 This section will consider the potential for significant traffic related environmental effects on the receptors of the local and regional highways network that may arise from the construction and operation (and maintenance) and decommissioning of

the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.7.2 This section considers the potential onshore transport effects and therefore offshore transport effects seaward of Mean High Water Springs (MHWS) are addressed in **Chapter 5: Environmental aspects offshore** including

- **Section 5.3: Other marine users** which considers the effects on other human users of the sea that may arise from Rampion 2;
- **Section 5.6: Commercial fisheries** which considers the effects on commercial fisheries receptors that may arise from Rampion 2;
- **Section 5.9: Shipping and navigation** which considers the effects on shipping and navigation that may arise from Rampion 2; and
- **Section 5.11: Civil and military aviation** which considers the effects on civil and military aviation that may arise from Rampion 2.

6.7.3 All offshore project components are assumed to be fabricated off-site, stored at a suitable port facility and transported directly offshore as needed. Therefore, offshore materials and equipment will be brought to site by sea and will not form part of the onshore transport assessment and have been scoped out of the EIA.

Transport study area

6.7.4 The transport study area has been informed by:

- The onshore elements of the Scoping Boundary – roads providing access for construction and operational traffic generated by the Proposed Development and points on the transport network that will be crossed by the onshore cable corridor. As set out in the description of Rampion 2 in **Section 2.3**, the onshore cable system will be installed in trenches or by other methods such as horizontal directional drilling (HDD) to avoid major roads, operating railway lines and watercourses. Temporary construction working areas and laydown areas will be required along the onshore cable corridor, and potentially in the vicinity of these crossing points.
- The key routes outside of the Scoping Boundary that construction and operational traffic will take to access the construction areas and the Proposed Development.

6.7.5 The proposed transport study area is set out in **Figure 6.7.1**. The transport study area will be reviewed and amended in response to refinement of the onshore project components including substation locations and resultant cable connections, the identification of additional impact pathways, further information available on the construction traffic levels and working and laydown areas and in response where appropriate to feedback from consultation.

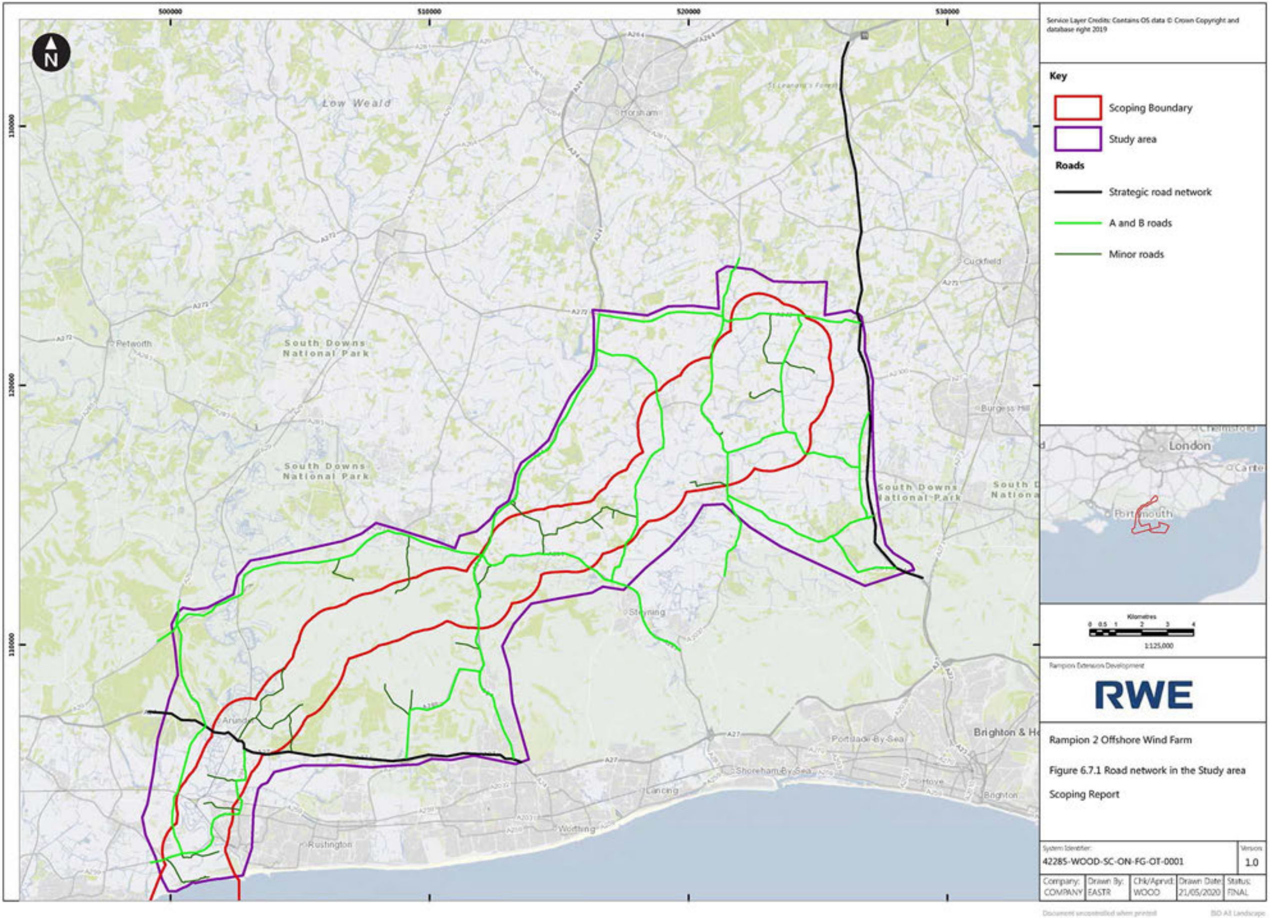


Figure 6.7.1 Road network in the Study area

Assessment Methodology

Introduction

6.7.6 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the transport assessment based on the appropriate guidance.

General approach

6.7.7 The guidance that is followed when assessing the potential significance of road traffic effects is the Guidelines for the Environmental Assessment of Road Traffic (GEART), Institute of Environmental Assessment (IEA), 1993, which states that:

"*The detailed assessment of impacts is likely to concentrate on the period during which the absolute level of an impact is at its peak, as well as the hour at which the greatest level of change is likely to occur.*" (Paragraph 3.10, IEA, 1993).

6.7.8 To assess the impact at its peak, the likely percentage increase in traffic is determined by comparing estimates of traffic generated by the Proposed Development with future predicted baseline traffic flows on the road links within the defined study area.

6.7.9 GEART sets out that the following transport effects that need to be considered in any assessment:

- Severance: the separation of people from places and other people and places or impede pedestrian access to essential facilities;
- Driver delay: traffic delays to non-development traffic;
- Pedestrian amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width / separation from traffic;
- Pedestrian delay: the ability of people to crossroads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions;
- Fear and intimidation: these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths;
- Accidents and safety: the risk of accidents occurring where the Proposed Development is expected to produce a change in the character of traffic; and
- Hazardous Loads.

Determination of significance

6.7.10 The EIA Regulations 2017 recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA

process. The EIA Regulations 2017 identify those environmental resources that warrant investigation as those that are likely to be significantly affected by Rampion 2.

6.7.11 The EIA Regulations 2017 do not define significance and it is necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction, operation or decommissioning is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the change. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by Rampion 2.

6.7.12 GEART (IEA, 1993) provides two rules that are used to establish whether an environmental assessment of traffic effects should be carried out on receptors:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include sensitive areas where traffic flows are predicted to increase by 10% or more. These include locations with vulnerable road users, such as school, nursing homes, and locations with high pedestrian activity.

6.7.13 It should be noted that, according to GEART, predicted traffic flow increases below 10% are generally not considered to be significant as daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flows below this level are, therefore, assumed not to result in significant environmental effects and have therefore not been assessed further as part of this study.

6.7.14 **Table 6.7.1** sets out the how significance will be determined based on receptor sensitivity and the magnitude of change.

Table 6.7.1 Significance evaluation matrix

		Magnitude of change			
		High	**Medium**	**Low**	**Negligible**
Receptor sensitivity	**High**	Major (Significant)	Major (Significant)	Moderate (Significant)	Negligible (Not significant)
	Medium	Major (Significant)	Moderate (Significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
	Negligible	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Receptor sensitivity

6.7.15 The sensitivity of each highway link to be included in the assessment will be assigned a sensitivity in accordance with the advice provided in the GEART, as summarised in **Table 6.7.2** and based on professional judgement.

Table 6.7.2 Receptor sensitivity

Sensitivity	Description / Reason	Receptor
High	Receptors of high sensitivity to change in traffic flows: schools, colleges, playgrounds, accident blackspots, retirement homes and urban / residential homes without footways that are used by pedestrians and cyclists.	Residents / workers travelling to and from work or home on foot and by bicycle, school children, leisure walkers and equestrians.
Medium	Receptors of medium sensitivity to change in traffic flows including congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centres, parks and recreation facilities.	Residents / workers travelling to and from work or home on foot and by bicycle, people visiting these land uses.
Low	Receptors with low sensitivity to change in traffic flows: places of worship, public open space, nature conservation areas, listed buildings, tourist/visitor attractions and residential areas with adequate footway provision.	Residents / workers travelling to and from work or home on foot or bicycle and people visiting these land uses.
Negligible	Receptors with negligible sensitivity to change in traffic flows including Motorways and Dual Carriageways and/or land uses sufficiently distant from affected routes and junctions.	Residents / workers travelling by foot or bicycle.

6.7.16 In accordance with GEART, where the sensitivity of a road link is judged as high or medium, Rule 2 will be applied and where traffic flows are predicted to increase by 10% or more, an assessment of environmental effects will be undertaken. Where the sensitivity is judged as low or negligible results, Rule 1 will be applied and where traffic flows are predicted to increase by more than 30%, or where the number of HGVs is predicted to increase by more than 30%, an assessment of environmental effects will be undertaken of the road link.

Identification of receptors that could be subject to likely significant effects

6.7.17 The scope of the assessment provides comprehensive coverage of the routes surrounding the Proposed Development and it will consider of the implications of the construction and operation of Rampion 2. This will be focused on a series of traffic and transport receptors on the local highways network. These receptor locations will be defined as the Rampion 2 design develops and becomes fixed in the future in line with consultation with the local and regional highways authorities. It is these receptors which will be taken forward into the assessment in relation to potentially traffic related effects.

6.7.18 Receptors are the users or beneficiaries of the highways network assets and facilities such as pedestrians, cyclists, equestrian and drivers who travel within the vicinity of the Rampion 2.

6.7.19 GEART identifies the following groups and special interest groups that may be affected:

- People at home;
- People at work;
- Sensitive groups including children, elderly and disabled;
- Sensitive locations such as hospitals, churches and historical buildings;
- Pedestrians;
- Cyclists;
- Open spaces recreational areas and shopping areas; and
- Sites of ecological and nature conservation value; and Sites of tourist/visitor attractions.

Magnitude of change

6.7.20 GEART recognises that professional judgement should be used as part of the assessment and states the following:

6.7.1 "*For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.*" (Paragraph 4.5, IEA, 1993)

6.7.21 Based on the Rule 1 and Rule 2 and the sensitivity of the receptors, **Table 6.7.3** shows the magnitude of change will be applied to the environmental effects to help identify levels of significance. The indicators to assess the magnitude of change are based on advice included within GEART and professional judgement.

Table 6.7.3 Magnitude of change

Transport Effect	High	Medium	Low	Negligible
Severance	Change in total traffic or HGV flows over 91%	Change in total traffic or HGV flows of 61%-90%	Change in total traffic or HGV flows of 31-60%	Change in total traffic or HGV flows of less than 30%
Driver Delay	High increase in queuing at junctions and/or congestion on road links	Medium increase in queuing at junctions and/or congestion on roads links	Low increase in queuing at junctions and/or congestion on roads links	Low or no increase in queuing at junctions and/or congestion on roads links
Pedestrian amenity; **Pedestrian delay; and** **Fear and intimidation**	Based on general level of pedestrian activity, visibility and physical conditions such as traffic flow, traffic composition, crossing points and pavement width/separation from traffic			
Accident and safety	Informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic.			
Hazardous Loads	Informed by a review of accident records which can give values of accidents per million vehicle kilometres.			

Desk-based assessment

6.7.22 An initial desk-based baseline assessment will be undertaken to gather information on highway infrastructure, construction routes and restrictions. Bing Maps, Google Maps UK and Google Street View will be used to provide an overview of the study area and the highway network and connections. Where appropriate, this will be supplemented with a site visit where current COVID-19 restrictions allow as outlined in **Paragraphs 6.7.25** to **6.7.28**.

6.7.23 Traffic generation as a result of Rampion 2 will be identified as the project progresses and the transport related environmental effects will be assessed.

6.7.24 Baseline traffic and accident data will be sought from existing sources such as;

- Department for Transport (DfT) permanent count locations;
- Data held by West Sussex County Council (WSCC); and

- Accident Data – personal injury accident (PIA) data will be required to identify road safety issues that may be affected by the traffic generated by Rampion 2. This data will be purchased from WSCC.

Site based assessment

6.7.25 There will be two elements of site-based work required to inform the baseline;

- commissioned traffic counts – to supplement the existing traffic data from DfT and WSCC; and
- site visit assessment – a site visit will be required to inform the assessment and clarify the high-level desktop based assessments. Detailed notes and a photographic record will be undertaken on the site visit and consideration will be given to the identification of receptor locations.

6.7.26 The current restrictions imposed during the COVID-19 pandemic have potential implications on Rampion 2, in particular with regard to normal consultation activities and conducting EIA surveys. Measures are being taken by RED to achieve as much as possible during the EIA programme whilst working fully within the restrictions and being mindful of and managing any potential implications.

6.7.27 Traffic count surveys need to reflect normal traffic conditions and it is unknown at this stage when this is likely to be established. The approach to identifying traffic flows will be discussed with the key stakeholders. This may include use of available traffic count data and agreement on an appropriate growth factor.

6.7.28 Recent changes with regards to the COVID-19 lockdown situation in the UK mean that site work can currently be undertaken by the transport team and special health and safety arrangements will be made to ensure that this complies with the social distancing rules. Should the situation change, the approach will be amended accordingly to reflect the most up-to-date Government guidance.

Baseline conditions

Data sources

6.7.29 The data sources to be used are summarised in **Table 6.7.4**.

Table 6.7.4 Key sources of transport data

Source	Date	Summary	Coverage of study area
Ordnance Survey (OS) Mapping	11 May 2020	Use of online mapping of 1:50,000 and 1:25,000 Ordinance Survey Mapping	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%
Google Traffic	8 May 2020	Use of online congestion data from Google Maps. Traffic data for key local roads was reviewed.	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%

Source	Date	Summary	Coverage of study area
		(Available online: https://www.google.co.uk/maps)	
Crashmap	11 May 2020	Use of Crash map a free online resource for looking at the accident record of road networks. (Available online: https://www.crashmap.co.uk)	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%
Google Street View	8 - 11 May 2020	Use of street view views of local road network from Google Maps. (Available online: https://www.google.co.uk/maps)	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%
PRoW Information	8 May 2020	PRoW information from the definitive online map for West Sussex and South Downs National Park: (Available online: https://www.westsussex.gov.uk/land-waste-and-housing/public-paths-and-the-countryside/public-rights-of-way/public-rights-of-way-imap/) (Available online: https://cams.southdowns.gov.uk/standardmap.aspx)	Within the Scoping Boundary at crossing points
Traffic Data	December 2012	Review of the traffic data presented in the Rampion 1 ES Traffic and Transport Chapter (Section 29) prepared by E.ON In 2012	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%
Traffic Data	TBC	Undertake baseline traffic counts as required via a sub consultant on roads and at receptors when identified	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%
Traffic Data	TBC	Review DfT permanent count locations at any locations identified as receptors	Key traffic routes and where Proposed Development traffic is higher than 10% or 30%

6.7.30 Some data has already been collected as part of this scoping exercise and some will be required for the assessment in the ES. These datasets will be collated, reviewed and updated to enable completion of the assessment.

Current baseline

6.7.31 The Scoping Boundary shows the landfall location at Climping, West Sussex and an onshore route to the north east. The Scoping Boundary covers a number of roads and settlements alongside roads which will comprise the receptors to be considered in the baseline once there is more information on traffic numbers and routeing traffic routes. The main settlements within the Scoping Boundary which might be impacted by traffic generated by Rampion 2 include Littlehampton, Wick, Lyminster, Arundel, Warningcamp, Wepham, Washington, Wiston, Ashurst, Hendfield and Wineham.

Road network

6.7.32 There are a number of 'A', 'B', 'C' and unclassified roads within the study area which have the potential to be affected directly by a crossing of the proposed infrastructure or as an access route. **Table 6.7.5** sets out the main 'A' and 'B' roads within the study area. This will be refined through the EIA process when more is known about vehicle numbers and routes. The Transport ES chapter will include a description of the routes affected.

Table 6.7.5 Main 'A' and 'B' Roads within the transport study area

Type of road	Road name
A Roads	A259, A248, A27, A280, A24, A284, A283, A281, A272, A23
B Roads	B2139, B2135, B2116, B2118

High level accident review

6.7.33 A review of data within the Crashmap has indicated that there have been hundreds of accidents in the last five years across the transport study area, and in some locations on the roads within the study area, clusters of accidents are noted. Without fixed routes to site it is not possible at this stage to identify all clusters of accidents that need to be considered in detail, but the following have been noted as accident hotspot locations on the SRN:

- A27 / A284
- A27 / A24;
- A24 / A283; and
- A24 / A297.

6.7.34 An assessment of key routes for construction traffic will be undertaken in the Transport ES chapter and detailed findings and recommendations will be presented.

Public Rights of Way

6.7.35 There are numerous PRoWs that will be affected by the onshore cable corridor within the Scoping Boundary area, including the following key national walking routes:

- Monarchs Way;
- South Downs Way; and
- The Downs Link.

6.7.36 The details of the specific PRoWs that will be impacted by the onshore cable corridor construction will be defined in the Transport ES Chapter and mitigation identified.

Key local cycling routes

6.7.37 **A number of cycling routes will potentially be affected by the onshore cable corridor within the Scoping Boundary. This includes the following** National Cycle Network (NCN) routes:

- **NCN Route 2 - Littlehampton to Bognor Regis Section; and**
- **NCN Route 223 - Shoreham-by-Sea to Chertsey.**

6.7.38 The details of the specific sections of the NCN as well as any other key local routes that will be impacted by the onshore cable corridor construction will be defined in the Transport ES Chapter and environmental measures identified.

Future baseline

6.7.39 In accordance with GEART (IEA, 1993), the period in which the level of traffic (future baseline + development) is at its peak will be considered within the assessment. The peak construction period will be based on the construction programme and the anticipated construction traffic movements. The future baseline will take into account traffic growth as a result of new development which will be based on growth factors from the Department for Transport (DfT) National Trip End Model (NTEM) derived from the Trip End Model Presentation Programme (TEMPro). Engagement with the highway authorities will identify appropriate growth rates based on the traffic data available and will take into account any changes in travel behaviour as a result of COVID-19 if this is being monitored and measured by the authorities.

6.7.40 The future baseline will also consider the implications of changes to the transport infrastructure, such as changes to roads and or junctions and new infrastructure. This will be established during engagement.

Basis for scoping assessment

6.7.41 The transport scoping assessment is based on the key assumptions presented in **Table 6.7.6.** These assumptions are also set out in **Chapter 2: The Proposed Development**.

Table 6.7.6 Basis for scoping assessment

Development element	Assumption
Landfall	• Cable landfall will be via a trenchless technique such as Horizontal Directional Drilling (HDD). • Transition joint bays will be underground.
Onshore Cable	• The onshore grid connection will be made via an underground cable along the entire length of the route. The cable route will be refined during the EIA process in order to identify a cable route corridor which is the most desirable from an environmental, economic and engineering perspective. • The onshore cable system will be installed in trenches. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential effects where constraints are identified, including watercourse, road and rail crossings. • It is expected that the width of the cable construction corridor for surface trenching will be approximately 50m. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects.
Substation	• The overall site footprint for the proposed substation is anticipated to be up to 4.5 hectares (ha), and the exact location of the substation will be refined through the EIA process.
Operation and Maintenance	• Maintenance activities will be undertaken for both preventive and corrective maintenance requirements. • The operational lifetime is assumed to be a minimum of 30 years.
Decommissioning	• The decommissioning of the wind farm is anticipated to be restricted to the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise environmental impacts associated with removal.

Embedded environmental measures

6.7.42 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on transport (see **Table 6.7.7**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.7.43 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.7.7 Relevant transport embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length.	Development Consent Order (DCO) works plans, description of development and requirements
C-2	Cables will be installed in ducting.	DCO works plans, description of development and requirements
C-5	Main watercourses, railways and roads that form a part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see commitment C-17).	DCO works plans, description of development and requirements
C-18	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, PRoW and watercourse.	Code of Construction Practice (COCP) and DCO requirement.
C-32	Signage and/or temporary PRoW / footpath diversions will be provided during construction.	COCP and DCO requirement.

Likely significant effects

6.7.44 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and

available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.7.45 The likely significant effects on transport are summarised in **Table 6.7.8**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for traffic and transport effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.7.46 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.7.8 Likely significant transport effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Landfall – Cable and associated earthworks resulting in potential impacts on roads, PRoW and users of these routes (Construction)	C-5, C-18, C-32	Impact of construction traffic at sensitive highway receptors. Impact of construction traffic and proposed route on PRoW. Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.	**Scoped in – detailed assessment**	Transport receptors will be defined based on; • People at home; • People at work; • Sensitive groups • Sensitive locations; • Pedestrians; • Cyclists; • Open spaces recreational areas and shopping areas; and • Sites of ecological and nature conservation value; and • Sites of tourist / visitor attractions.	Traffic Data from local highways network at the receptor locations
Onshore route – Cable route construction (inducing highways and PRoW crossings) and associated earthworks	C-1, C-2, C-5, C-18, C-32	Impact of construction at sensitive highway receptors. Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and	**Scoped in – detailed assessment**	Transport receptors to be defined based on; • People at home; • People at work; • Sensitive groups • Sensitive locations; • Pedestrians;	Traffic Data from local highways network at the receptor locations

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
resulting in a potential impact on roads, PRoW and users of these routes (Construction)		mitigation to be identified. To be confirmed through assessment.		• Cyclists; • Open spaces recreational areas and shopping areas; and • Sites of ecological and nature conservation value; and • Sites of tourist / visitor attractions.	
Substation construction and associated earthworks resulting in potential impacts on the local and strategic road network (Construction)	C-1, C-2, C-32	Impact of construction and operational traffic at sensitive highway receptors. Impact of proposed scheme on PRoW. Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.	**Scoped in – detailed assessment**	Transport receptors to be defined based on; • People at home; • People at work; • Sensitive groups • Sensitive locations; • Pedestrians; • Cyclists; • Open spaces recreational areas and shopping areas; and • Sites of ecological and nature conservation value; and • Sites of tourist / visitor attractions.	Traffic Data from local highways network at the receptor locations

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Operation and maintenance activities resulting in potential impact on roads, PRoW and users of these routes (Operation)	N/A	**No likely significant effect**. Operational traffic anticipated to be negligible and infrequent. Magnitude of change and significance of effect will be negligible. Further rationale provided in the section below.	**Scoped out** as traffic flows will be negligible	N/A	N/A
Decommissioning activities resulting in a potential impact on local roads, and PRoW and the users of these routes (Decommissioning)	N/A	**No likely significant effect**. Decommissioning activities will be less than construction. Further rationale provided in the section below.	**Scoped out** as traffic flows will be less than during construction phase	N/A	N/A

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Hazardous Loads (All phases)	N/A	**No likely significant effect**. No hazardous loads are anticipated. Further rationale provided in the section below.	**Scoped out –** No Hazardous Loads expected	N/A	N/A

6.7.47 As can be seen from **Table 6.7.8,** an assessment of transport effects will be undertaken for the construction phase only. The assessment will consider the sensitivity of the receptors and the magnitude of change as a result of the traffic generated by Rampion 2. It is anticipated that the likely significance of effects will be not significant based on the evaluation matrix set out in **Table 6.7.1** however this will be confirmed through detailed assessment.

Impacts scoped out of assessment

6.7.48 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. Each scoped out effect is considered in turn below.

Operation and maintenance activities related to the underground cable and substations

6.7.49 The vehicle movements during operation of Rampion 2 will be small, comprising occasional inspection and maintenance requirements. It is considered this traffic will be negligible and has therefore been scoped out of the assessment.

Decommissioning phase activities of the Proposed Development

6.7.50 The assessment of decommissioning phase activities of Rampion 2 have been scoped out of further assessment as these are considered to be limited from an onshore perspective and the traffic will be significantly less than that for the construction phase as. For example, the cable will remain in-situ underground and there will be no requirement for vehicles to transport equipment or staff to remove cables and to reinstate earth works. Therefore, the construction phase is the maximum development case scenario in terms of traffic generation and disturbance to constraints such as PRoWs, roads, and so on.

6.7.51 In addition, any baseline data collected for the purposes of the current assessment will no longer be relevant at decommissioning phase.

Hazardous loads

6.7.52 Hazardous loads are not anticipated and are therefore scoped out of the assessment.

Cumulative effects

6.7.53 Cumulative effects on transport resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.7.54 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- Permitted / committed developments within and in the vicinity of the transport study area that will result in additional traffic on the road network. To some

extent, this will be accounted for within the TEMPro growth factors that will be applied as a 'blanket growth' on the network, however, the highway authorities may require that specific developments are included as the development traffic from these will have localised impacts on specific parts of the road network. This will be identified with the highway authorities through further consultation and the CEA screening process; and

- Committed transport schemes that will affect the transport network, such as junction improvements and new road links. These will be identified with the highway authorities through further consultation and the CEA screening process.

Transboundary effects

6.7.55 The potential transboundary effects from construction, operation (including maintenance) and decommissioning on transport receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

Stakeholder engagement

6.7.56 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan process which as set out in **Section 4.3: Consultation and the evidence plan process**. This will include West Sussex County Council, South Downs National Park and Highways England. These discussions will aim to discuss the following key issues:

- **proposed traffic growth to future year;**
- **committed highways schemes that may affect the future baseline;**
- **committed development that may affect the future baseline;**
- **scope of assessment;**
- **existing traffic data and data collection techniques with consideration of the COVID-19 restrictions;**
- **PRoW management at cable crossing points;**
- **proposed traffic generation;**
- **HGV Management; and**
- **identification** of additional transport evidence base documents to support the DCO, such as a Construction Traffic Management Plan (CTMP), Abnormal Indivisible Load (AIL) access study and PRoW Management Plan.

Undertaking further assessments

6.7.57 As outlined earlier in this Section, further collection of baseline data will be carried out through a desk-based assessment supplemented with site based information (for example traffic count data and site visit data).

6.7.58 A baseline assessment and analysis of findings will be then included in the PEIR and then refined in line with consultation feedback up to ES submission.

6.7.59 Our approach to the transport assessment as set out in this section will be in accordance with the GEART (IEA, 1993). The main transport effects will be associated with the construction phase and the traffic movements of the following to and from the transport study area:

- **construction staff vehicles, including cars and light vans;**
- **Heavy Goods Vehicles (HGVs) – vehicles 3.5t gross weight (>3.5t) delivering materials and equipment; and**
- **Abnormal Loads – vehicles longer than 17m and/or wider than 4m.**

6.7.60 Additional transport related technical documents will be identified through the EIA process. This may include the need for a Construction Traffic Management Plan (CTMP), an AIL Study and a Public Rights of Way Management Plan (PRoWMP). It is considered that a Transport Assessment will not be required as the peak hour traffic flows associated with Rampion 2 are anticipated to be very low.

6.7.61 Where significant transport effects are identified, mitigation requirements will also be presented in the ES.

6.8 Ground conditions

Introduction

6.8.1 The ground conditions assessment will consider the potential significant effects with respect to land contamination, geohazards and geodiversity that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report describes the methodology to be used within the EIA, an overview of the baseline conditions at the site, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.8.2 Ground conditions interfaces with many other aspects and as such, should be considered alongside these; namely:

- **Section 6.4: Agriculture and soils** for assessment of potentially significant effects with respect to soil resources and soil structure;
- **Section 6.6: Terrestrial ecology and nature conservation** for assessment of impacts on designated sites (excluding sites designated for their geological importance which are addressed in this Section) including those dependant on the water environment; and
- **Section 6.10: Water environment** for assessment of potentially significant effects with respect to groundwater and surface water levels, flows and interactions including flood risk receptors and effects of construction dewatering.

Study area

6.8.3 At this early stage of the EIA process, the Scoping Boundary (illustrated in **Figure 1.1**) has been used as the study area to inform the ground conditions scoping assessment and comprises the area within which the Proposed Development and associated onshore infrastructure will be located, including the temporary and permanent construction and operational work areas.

6.8.4 As Rampion 2 progresses and the onshore components are refined, the ground conditions study area will be reviewed and amended using the principles outlined below:

- along the route of the onshore cable corridor, the study area will be defined as a Zone of Influence (ZOI) 250m from the edges of the cable corridor; and
- around the onshore substation, the study area will be increased to be a ZOI 500m around the boundary of the land required for the substation.

6.8.5 The rationale for the ZOI used to define the study area is informed by considering:

- the spatial extent (taking into account contaminant degradation, dilution and dispersion in the environment) at which significant ground conditions effects have the potential to be realised through potentially active contaminant linkages;
- the spatial extent from which off-site sources of contamination have the potential to lead to significant effects on receptors within the Proposed Development; and
- the spatial extent from which geohazards such as compressible and collapsible ground have the potential to lead to significant effects on receptors within the Proposed Development.

6.8.6 The study area will be reviewed and amended in response to such matters as refinement of the onshore components, the identification of additional impact pathways and in response, where appropriate, to feedback from consultation.

Assessment methodology

Introduction

6.8.7 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this ground conditions scoping assessment, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ground conditions assessment.

6.8.8 The assessment and management of ground conditions is usually based on the risk presented by the presence of a hazard (for example, contamination) for a given circumstance, for instance, the probability and consequence of an event occurring. However, EIA seeks to identify the magnitude of a change in status from baseline (impact) caused by the Proposed Development and the consequences of those changes (effects).

6.8.9 Consequently, for the ground conditions assessment, it is intended to define the impact and its effect as a change in risk, and then assess the magnitude of the change in risk from baseline, through construction to post development conditions. The methodology that is proposed for assessing these risks is set out below.

Risk assessment

6.8.10 The process of managing land contamination, as set out in the Environment Agency guidance *Land Contamination: Risk management* (LCRM), is based on risk assessment. The assessment of risks from contaminated land is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of:

- a source of contamination;
- a receptor capable of being harmed; and
- an active pathway capable of exposing a receptor to the contaminant.

6.8.11 The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both of the following.

- The magnitude of the potential consequence (for instance, severity). It takes into account both the potential severity of the hazard and the sensitivity of the receptor.
- The magnitude of probability (for instance, likelihood). It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

6.8.12 The definitions for the qualitative risk assessment have been taken from "*Guidance for the Safe Development of Housing on Land Affected by Contamination*" Annex 4 R&D Publication 66: 2008 Volume 2.

6.8.13 The likelihood classifications for the contaminant linkages being realised is presented in **Table 6.8.1**.

Table 6.8.1 Likelihood classification of contaminant linkage being realised

Classification	Definition	Examples
High Likelihood	There is a contaminant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing a number of Underground Storage Tanks (USTs).
Likely	There is a contaminant linkage and all the elements are present	a) Elevated concentrations of toxic contaminants are present in

Classification	Definition	Examples
	and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low Likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Unlikely	There is a contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 years old containing a double skinned UST with annual integrity testing results available.

6.8.14 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure *via* the linkage being examined. The classification of consequence is presented in **Table 6.8.2**.

Table 6.8.2 Classification of consequence

Classification	Human Health	Controlled Water	Ecology / Geodiversity	Property / Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the Environmental Protection Act (EPA) 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems or a geodiversity site, which is likely to result in a substantial adverse change in its functioning or harm to a species or site of special interest that endangers the long-term maintenance of the population or site.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (for example, cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).

Classification	Human Health	Controlled Water	Ecology / Geodiversity	Property / Structures/ Crops and animals	Examples
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to Environment Agency Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems or a geodiversity site, which may result in a substantial adverse change in its functioning or harm to a species or site of special interest that may endanger the long-term maintenance of the population or site.	Significant damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (for example, cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Damage to building rendering it unsafe to occupy, for example, foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to "significant harm".	Equivalent to Environment Agency Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity	Minor or short-lived damage to aquatic or other ecosystems or a geodiversity site, which is unlikely to result in a substantial adverse change in its	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (for example, mild skin rash). Surface spalling of concrete.

Classification	Human Health	Controlled Water	Ecology / Geodiversity	Property / Structures/ Crops and animals	Examples
		value, agriculture or commerce.	functioning or harm to a species or site of special interest that would endanger the long-term maintenance of the population or site.		
Minor	No measurable effects on humans	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures	The loss of plants in a landscaping scheme. Discoloration of concrete.

6.8.15 The risk matrix to link the likelihood and consequence is shown in **Table 6.8.3**.

Table 6.8.3 Risk matrix

Likelihood / Potential Consequence	Unlikely	Low Likelihood	Likely	High Likelihood
Severe	Moderate/low risk	Moderate Risk	High Risk	Very High Risk
Medium	Low	Moderate/low risk	Moderate Risk	High Risk
Mild	Very low risk	Low Risk	Moderate/low risk	Moderate Risk
Minor	Very low risk	Very low risk	Low Risk	Low Risk

6.8.16 The overall risk definitions are summarised in **Table 6.8.4**.

Table 6.8.4 Risk definitions

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to

Risk	Definition
	determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

Significance evaluation methodology

6.8.17 To use risk assessment as the basis for the evaluation of the significance of effects, it is necessary to evaluate the change in risk from baseline conditions to those during and following the Proposed Development. In order to define the baseline risk the initial assessment and classification of risk is carried out for the study area in its pre-development state. A separate assessment of risk will then be conducted for the site post-development (including environmental measures inherently embedded in the development) to enable an evaluation of the change in risk due to the Proposed Development.

6.8.18 **Table 6.8.5** uses the risk classification pre- and post-development as the basis for a significance evaluation matrix for the purposes of EIA.

Table 6.8.5 Ground conditions significance evaluation matrix

			Risk Post-development (Including embedded measures)					
			Very Low	**Low**	**Moderate / Low**	**Moderate**	**High**	**Very High**
Risk Pre-development	**Existing Receptors**	**Very High**	Major Positive (Significant)	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)
		High	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)
		Moderate	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)
		Moderate / Low	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)
		Low	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)
		Very Low	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)
	No Receptor Present Pre-development	**N/A**	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)	Major Negative (Significant)
	Risks that remain at moderate, high or very high post-development are unlikely to be considered acceptable and further environmental measures will be required to enable the development to proceed.							

Baseline conditions

Data sources

6.8.19 Baseline data will be collected for the ground conditions study area and presented as a Phase 1 Desk Study report. **Table 6.8.6** outlines the key data sources that will be used to prepare the Phase 1 Desk Study Report.

Table 6.8.6 Key sources of ground conditions data

Source	Date	Summary	Coverage of study area
Gov.uk open data	2020	Rivers shapefile Source Protection Zones (SPZs) Historic and Authorised landfills shapefiles Environmental Pollution incidents (database) Consented discharge data	Full coverage of study area
MAGIC.gov.uk website	2020	Designated sites Aquifer designations and groundwater vulnerability Geological Sites of Special Scientific Interest (SSSIs) information.	Full coverage of study area
Ordnance Survey	2020	1:50,000 and 1:25,000 mapping	Full coverage of study area
British Geological Survey (BGS)	2020	On-line Geoindex 1:50,000 digital geology Borehole Record Viewer (offers access to the National Geoscience Data Centre collection of onshore scanned boreholes, shafts and well records)	Full coverage of study area
Landmark Information Group	2020	1:10,000 and 1:50,000 historical mapping Historic and current aerial photography and mapping Environmental data (Envirocheck® Report) including information on geohazards	Full coverage of study area
Zetica Limited	2020	Unexploded Ordnance (UXO) mapping	Full coverage of study area

Source	Date	Summary	Coverage of study area
Sussex Geodiversity Partnership / Sussex Biodiversity Record Centre	2020	Information on geological SSSIs, Regionally Important Geological Sites (RIGS) and Local Important Geological Sites (LIGS)	Full coverage of study area
Natural England	2020	Geological SSSI citations	Full coverage of study area
Local authorities	2020	Environmental site register data Contaminated land register data Landfills data Information on geological SSSIs, Regionally Important Geological Sites (RIGS) and Locally Important Geological Sites (LIGS)	Full coverage of study area within the local authority boundary

6.8.20 These key data sources will be used to develop a Conceptual Model (CSM) from which the ground conditions assessment can be undertaken.

6.8.21 The CSM will identify the sources, receptors and potentially active pathways within the study area. Receptors will be grouped into the categories outlined in **Table 6.8.7**.

Table 6.8.7 Ground conditions receptors

Receptor Group	Receptor included with group
Human Health	Residential Commercial / industrial Public open space Land and property (including land used for allotments, agriculture (crops and livestock), existing and future structures, utilities and infrastructure)
Controlled Waters	Groundwater in superficial deposits Groundwater in bedrock Surface waters (for example, reservoirs, streams, rivers, lakes and ponds).
Geodiversity	Geological Sites of Special Scientific Interest (SSSI) RIGS LIGS

Baseline

6.8.22 An overview of the baseline has been determined from freely available data sources and relevant information obtained for the existing Rampion 1 project (E.ON, 2012) such as regional geological and hydrogeological mapping and data from the areas around the existing Bolney substation.

6.8.23 Superficial deposits are present in the study area, predominantly beneath the southwestern part of the onshore element of the Scoping Boundary at the landfall location, around Arundel and along the course of the River Arun and River Adur. The deposits comprise alluvium and head deposits (brickearth, silt and blown sands) with clay with flints and river terrace deposits in some locations.

6.8.24 Underlying the superficial deposits in the southwestern part of the onshore element of the Scoping Boundary at the landfall location and around Arundel the solid geology comprises predominantly Chalk overlain by a narrow band of Lambeth Group and Thames Group (London Clay Formation) just to the south of Arundel.

6.8.25 As the onshore element of the Scoping Boundary progresses northeastwards, the solid geology comprises a narrow band of the Gault Formation and the Upper and Lower Greensand Formations, with much of the solid geology comprising Weald Clay.

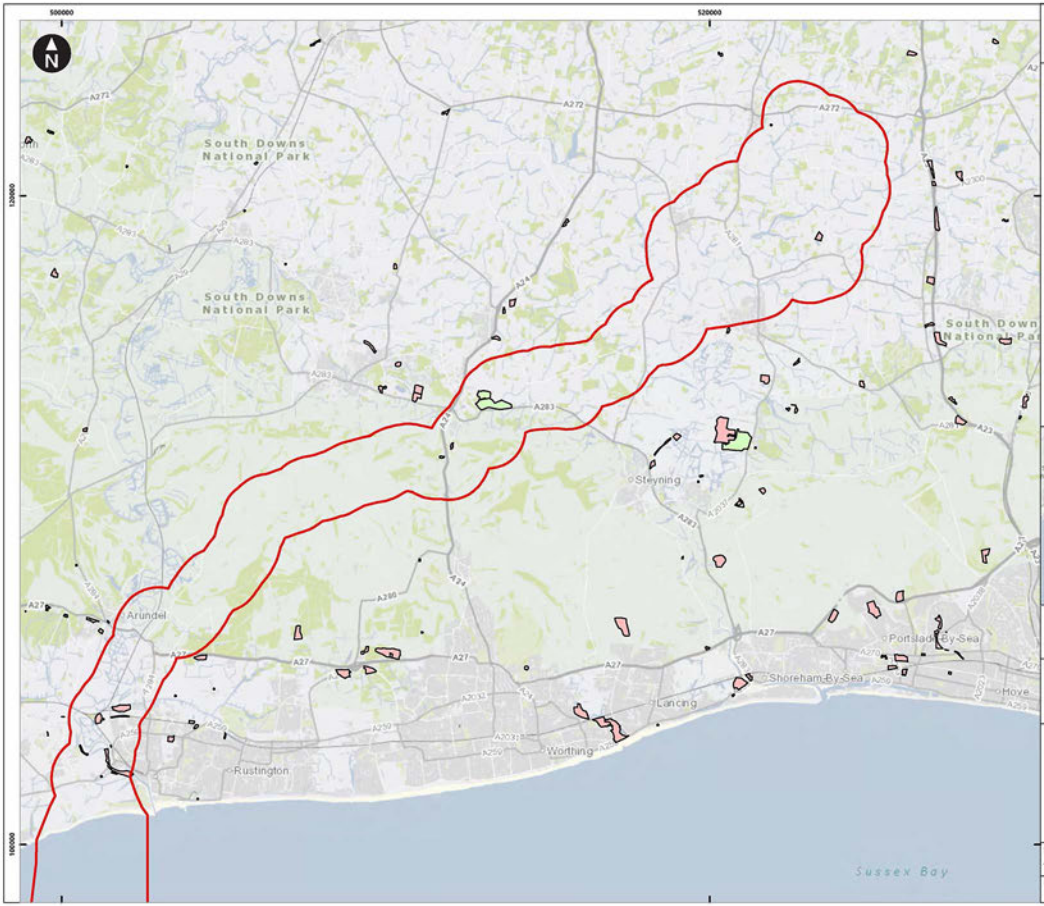
6.8.26 **Figures 6.10.3 and 6.10.4** show the superficial and solid geology in the study area as obtained from BGS information.

6.8.27 Groundwater is likely to be present in the permeable parts of the superficial deposits, Lambeth Group and Greensand Formations which the Environment Agency classifies as Secondary (A) Aquifers. The main hydrogeological unit is the Chalk, which the Environment Agency classifies as a Principal Aquifer. The Weald Clay is classified as Unproductive Strata. Environment Agency data also indicated that there are a number of existing groundwater abstractions within the Scoping Boundary which passes through a number of SPZs to the northeast of Arundel as shown on **Figure 6.10.5.**

6.8.28 Numerous ponds and streams are indicated by OS mapping to be present within the onshore element of the Scoping Boundary, which crosses two rivers (the River Arun and the River Adur). In addition, there is anticipated to be numerous drainage ditches present on the agricultural land along the potential route of the cable corridor. The main rivers in the study area are shown on **Figure 6.10.1**.

6.8.29 The general land use within the onshore element of the Scoping Boundary is agricultural (arable and improved grassland), with a number of towns, villages and commercial areas connected by roads. The existing Bolney substation operated by National Grid and a sewerage treatment works to the south of the village of Partridge Green are also present in the study area.

6.8.30 Environment Agency data indicate that there are a number of historical landfills within the study area, predominantly to the south of Arundel. An authorised landfill (Windmill Quarry, operated by Biffa Waste Services Ltd) is also shown to be present in the central part of the onshore cable corridor, to the northeast of the village of Washington. The landfill locations are shown on **Figure 6.8.1**.



Key

- Scoping Boundary
- Historic landfill sites
- Authorised landfill

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

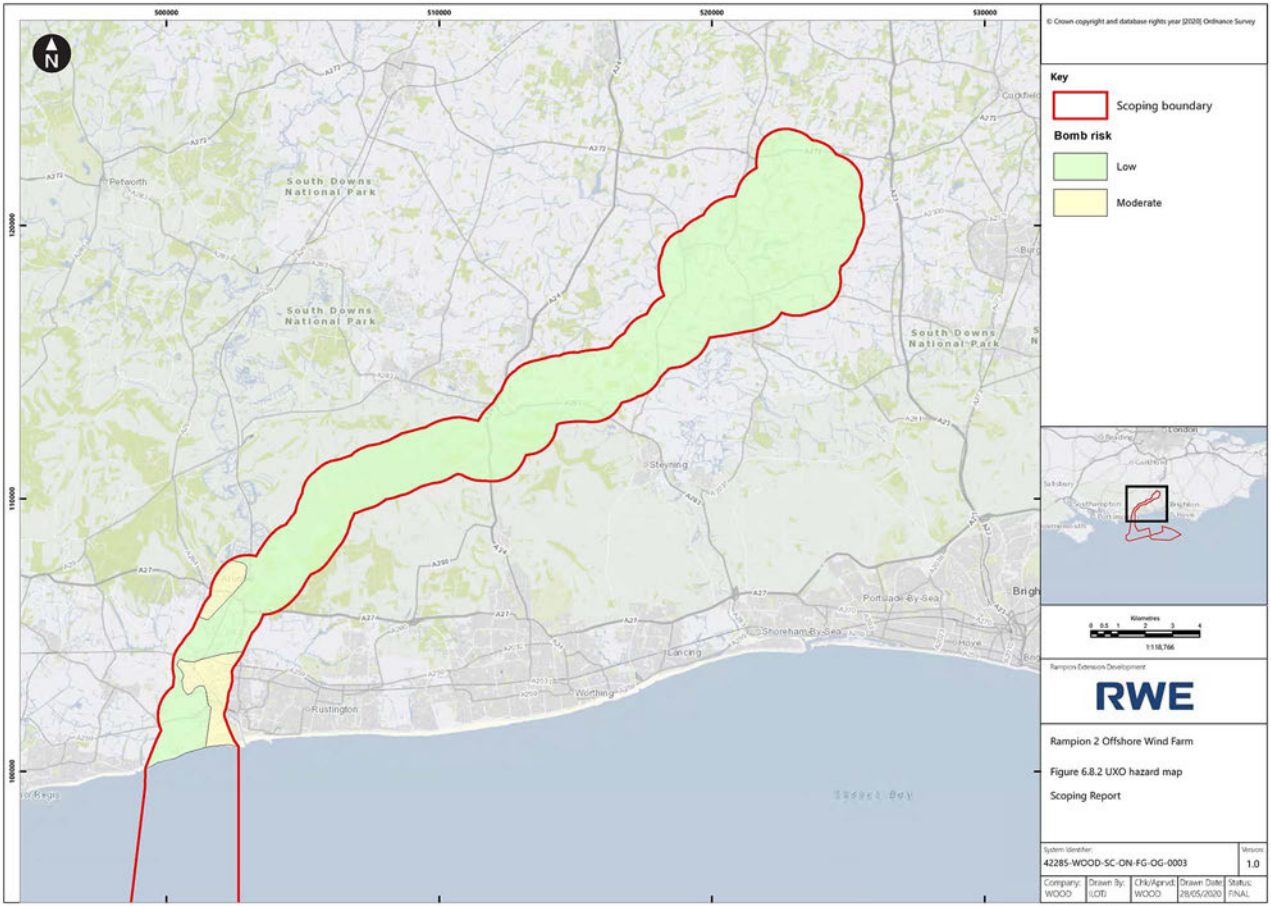
Rampion 2 Offshore Wind Farm

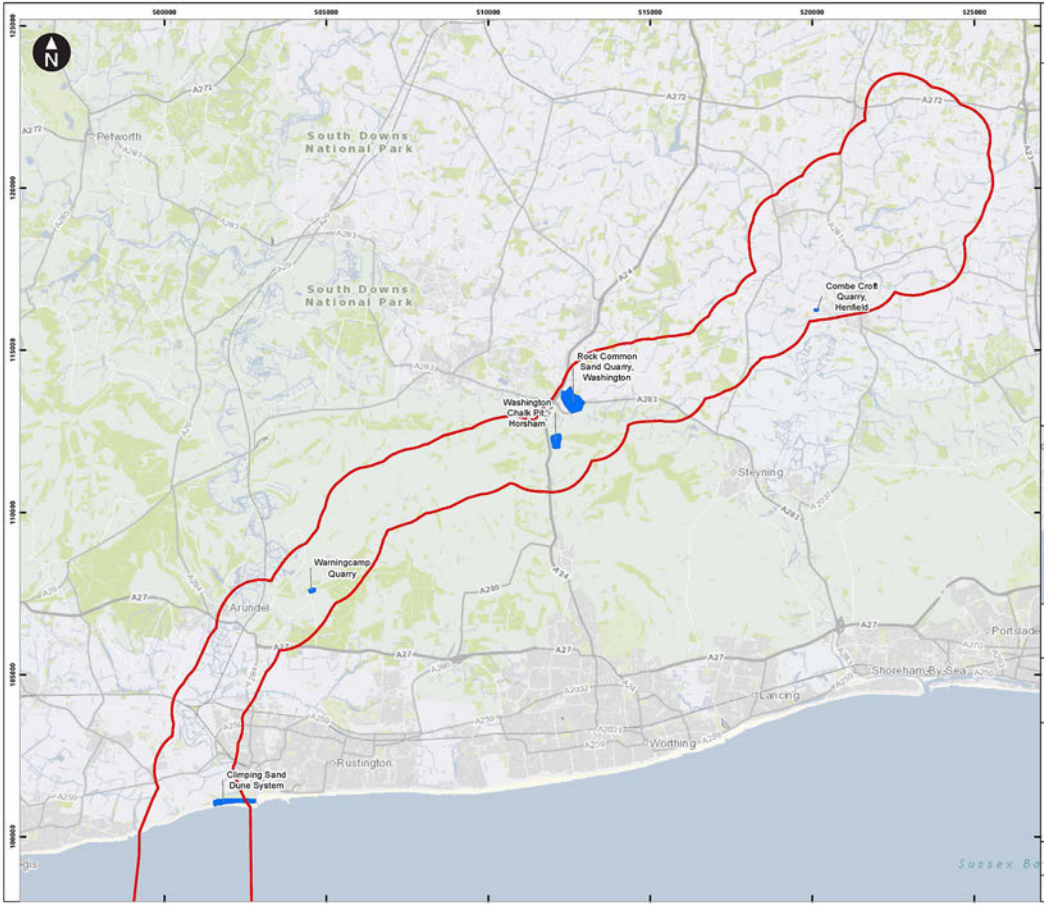
Figure 6.8.2 Historic and authorised landfill sites

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OG-0002				1.0
Company: WOOD	Drawn By: (Ltr)	Chk/Aprvd: WOOD	Drawn Date: 27/05/2020	Status: FINAL

ISO A3 Landscape


500000
510000
520000
530000
120000
110000
100000
N
South Downs National Park
Petworth
Steyning
Lancing
Shoreham-By-Sea
Portslade-By-Sea
Worthing
Rustington
A27
A24
A23
A259
© Crown copyright and database rights year [2020] Ordnance Survey
Key
Scoping boundary
Bomb risk
Low
Moderate
Kilometres
0 0.5 1 2 3 4
1:58,766
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.8.2 UXO hazard map
Scoping Report
System Identifier:
42285-WOOD-SC-ON-FG-OG-0003
Version
1.0
Company: WOOD
Drawn By: (OB)
Chk/Aprvd: WOOD
Drawn Date: 28/05/2020
Status: FINAL
Document uncontrolled when printed
ISO A3 Landscape



Key

- Scoping Boundary
- Locally Important Geological Sites (LIGS)

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.8.3 Locally Important Geological Sites (LIGS)

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OG-0004				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	22/06/2020	FINAL

ISO A3 Landscape

6.8.31 One geological SSSI is shown to be present within 2km of the onshore element of the Scoping Boundary (Chantry Mill SSSI) alongside a number of LIGS for which further data will be obtained as part of the detailed baseline. The SSSI's location is shown on **Figure 6.6.4** and the LIGS are shown on **Figure 6.8.3**.

6.8.32 The majority of the study area is classified as having a low Unexploded Ordnance hazard with two areas of moderate UXO hazard identified around the landfall location and the town of Arundel. The UXO hazard mapping is shown on **Figure 6.8.2**

6.8.33 Potential sources of contamination which may be present in the vicinity of the onshore components are, therefore, anticipated to include agricultural land (and the associated farms which may have tanks etc.), historical and authorised landfills, commercial properties, a sewerage treatment works at Partridge Green and the existing Bolney substation.

6.8.34 At this stage, all of the receptors outlined in **Table 6.8.7** are considered to be present in the study area and will require further assessment as part of the PEIR and ES.

Basis for scoping assessment

6.8.35 The ground conditions scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the onshore elements of the Proposed Development comprise an underground cable corridor and a new substation site;
- the onshore cable will not be oil-filled and there are no fluids required to be introduced into the cable trenches;
- there is no extensive processing, handling and storage of hazardous materials or intrusive maintenance required during the operation of Rampion 2;
- the decommissioning of the onshore elements of Rampion 2 is anticipated to be restricted to the removal and reinstatement of the onshore substation site with the onshore cables left *in-situ*; and
- several environmental measures will be embedded in the Proposed Development as outlined in the following section.

Embedded environmental measures

6.8.36 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on ground conditions (see **Table 6.8.8**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.8.37 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered

inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.8.8 Relevant ground conditions embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C–5	Main watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see commitment C-17).	Development Consent Order (DCO) works plans and order limits
C–6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits
C–8	During construction and operation refuelling of machinery will be undertaken in line with good practice within a designated area where spillages can be easily contained. Any tanks and pipework will be double skinned and provided with intermediate leak detection equipment. Areas at risk of spillage will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or local watercourses.	Code of Construction Practice (COCP) and DCO requirement
C–14	Potential risks to human health from any unexpected ground contamination will be avoided by the use of Personal Protective Equipment (PPE) and by adopting appropriate working practices.	COCP and DCO requirement
C–15	Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development.	COCP and DCO requirement
C–17	Where HDD techniques are not required or are not practical, the crossing of drainage ditches or engineered channels may be crossed by open cut techniques or the installation of culverts or bridges to	COCP and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
	allow water to continue flowing. Where this is the case this will be done in accordance with advice notes, guidance documents and Environment Agency Pollution Prevention Guidelines (PPGs). Appropriate environmental permits or land drainage consents will be applied for works from the Environment Agency (e.g. for Main Rivers, works on or near sea defences / flood defence structures or in a flood plain) or from the Lead Local Flood Authority (for ordinary watercourse crossings).	
C–23	Where possible micrositing will be undertaken during detailed design to avoid ponds.	COCP and DCO requirement
C–24	Best practices air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	COCP and DCO requirement
C–25	All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.	COCP and DCO requirement
C–31	Any disposal off-site of excavated material will be undertaken in consultation with the landowner/occupier and in accordance with the Waste Management Regulations.	COCP and DCO requirement
C–33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users and existing land users and provide details of measures to protect environmental receptors.	COCP and DCO requirement
C–69	Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials from the onshore cable construction corridor where practicable and feasible. Prior to construction, a Materials Management Plan (MMP) will be prepared that outlines where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practice is being followed.	COCP and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
C–70	An emergency response plan in accordance with 'Unexploded ordnance, A guide for the construction industry CIRIA C681' will be developed prior to construction. Site inductions, toolbox talks and appropriate training on the risks from UXO will also be undertaken as part of the construction approach for Rampion 2. In areas with a moderate UXO hazard level and above, a detailed UXO desk study will be undertaken prior to construction to identify where additional mitigation such as non-intrusive geophysical clearance or supervision by an explosive ordnance clearance (EOC) operative is required.	COCP and DCO requirement
C–71	RED will ensure that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (Land Contamination: Risk Management). The precise design of any remediation strategy will be confirmed in the detailed design after DCO grant.	DCO and UK legislative requirement
C–72	Prior to construction, an unexpected contamination protocol will be produced in line with UK statutory guidance (LCRM) to minimise the potential risks to human health and controlled waters from any unexpected ground contamination. The protocol will take into account the requirements for the use of Personal Protective Equipment (PPE) and adoption of best practice methods during construction.	COCP and DCO requirement
C–76	In line with good practice pollution prevention plans will be drawn up to detail how ground and surface waters will be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning. These will include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	COCP and DCO requirement

Likely significant effects

6.8.38 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section

draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.8.39 The likely significant effects associated with ground conditions are summarised in **Table 6.8.9**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures and understanding of the likely baseline conditions at this stage. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.8.40 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.8.9 Likely significant ground conditions effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction activities located on, or adjacent to landfills and other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities (Construction)	C – 5 C – 6 C – 15 C – 17 C – 23 C – 69 C – 72 C – 76	Mobilisation of contamination via numerous pathways (including groundwater, surface water and leaching from soil) resulting in contamination of controlled waters. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Controlled waters receptors (groundwater and surface waters)	Collection of desk study data as outlined in **Section 6.8.19**
	C – 6 C – 15 C – 24 C – 69 C – 72 C – 76	Mobilisation of contamination via numerous pathways (including groundwater, surface water, leaching from soil, migration of vapours and windblown dusts) resulting in health effects. Unlikely to be significant. To be	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Human health receptors (residential, agricultural land, commercial/industrial and public open space)	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		determined through assessment.			
	C – 6 C – 15	Build-up of gases in confined spaces in existing or newly constructed infrastructure on and adjacent to the land required for the Proposed Development. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Human health receptors (residential, commercial/industrial land) and property (including existing and new infrastructure)	Collection of desk study data as outlined in **Section 6.8.19**
	C – 6 C – 14 C – 15 C – 24 C – 25 C – 72 C – 76	Exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts resulting in health effects. **No likely significant effect.**	**Scoped out** as discussed in **Section 6.8.45**	Human health receptors (construction workers)	Not applicable
	C – 6 C – 15 C – 71	Damage to newly constructed infrastructure from aggressive ground conditions (such as	**Scoped in – simple assessment** as	Human health receptors, land and property (including	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		sulphate attack on concrete) and geohazards including unstable ground conditions. Unlikely to be significant. To be determined through assessment.	outlined in **Section 6.8.41**	existing and new infrastructure)	
Construction activities located near to sites of geological importance (Construction)	C – 6	Damage to or detrimental impact on sites of geological importance. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Sites of geological importance (SSSIs, RIGS or LIGS)	Collection of desk study data as outlined in **Section 6.8.19**
UXO encounter during construction activities (Construction)	C – 25 C – 70	Damage to existing property or infrastructure in vicinity of construction works or disruption to local communities. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Human health receptors and property (including existing and new infrastructure)	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction vehicle and equipment maintenance and storage of fuels/oils for construction vehicles and equipment (Construction)	C – 5 C – 8 C – 17 C – 23 C – 25 C – 33	Accidental spillages and leaks resulting in ground contamination and risks to controlled waters during construction. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Controlled waters receptors (groundwater and surface waters)	Collection of desk study data as outlined in **Section 6.8.19**
	C – 8 C – 14 C – 25 C – 33	Accidental spillages and leaks resulting in ground contamination and risks to human health during construction. **No likely significant effect.**	**Scoped out** as discussed in **Section 6.8.45**	Human health receptors (construction workers)	Not applicable
Presence of significant quantities of artificial ground, disturbed landfill material or excavated and re-used material beneath permanent	C – 6 C – 15 C – 31 C – 69 C – 71 C - 72	Generation of landfill leachate, which, if not properly managed, could accumulate and/or migrate to controlled waters. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Controlled waters receptors (groundwater and surface waters)	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
infrastructure (Operation)	C – 6 C – 15 C – 71	Damage to infrastructure from aggressive ground conditions and geohazards including unstable ground conditions and settlement. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Human health receptors, land and property (including existing and new infrastructure)	Collection of desk study data as outlined in **Section 6.8.19**
	C – 6 C – 15 C – 31 C – 71	Build-up of ground gases in confined spaces in existing or newly constructed infrastructure on and adjacent to the Proposed Development boundary. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Human health receptors (residential, commercial/industrial) and land and property (including existing and new infrastructure)	Collection of desk study data as outlined in **Section 6.8.19**
Operational vehicle and equipment maintenance and storage of fuels/oils	C – 8	Accidental spillages and leaks resulting in ground and/or controlled waters contamination. Unlikely	**Scoped in – simple assessment** as	Controlled waters receptors (groundwater in	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
for operational vehicles and equipment (Operation)		to be significant. To be determined through assessment.	outlined in **Section 6.8.41**	superficial deposits and surface waters)	
	C – 8	Accidental spillages and leaks resulting in ground contamination and risks to human health. **No likely significant effect.**	**Scoped out** as discussed in **Section 6.8.45**	Human health receptors (construction workers)	Not applicable
Decommissioning activities including removal and reinstatement of the onshore substation (Decommissioning)	C – 8 C – 14 C – 15 C – 33 C – 76	Mobilisation of contamination via numerous pathways (including groundwater, surface water and leaching from soil) resulting in contamination of controlled waters. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Controlled waters receptors (groundwater and surface waters)	Collection of desk study data as outlined in **Section 6.8.19**
	C – 8 C – 14 C – 15	Mobilisation of contamination via numerous pathways	**Scoped in – simple assessment** as	Human health receptors (residential, agricultural land,	Collection of desk study data

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
	C – 33 C – 76	(including groundwater, surface water, leaching from soil, migration of vapours and windblown dusts) resulting in health effects. Unlikely to be significant. To be determined through assessment.	outlined in **Section 6.8.41**	commercial/industrial and public open space)	as outlined in **Section 6.8.19**
	C – 8 C – 14 C – 15 C – 33 C – 76	Exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts resulting in health effects. **No likely significant effect.**	**Scoped out** as discussed in **Section 6.8.45**	Human health receptors (construction workers)	Not applicable
	C – 8 C – 14 C – 15 C – 33 C – 76	Accidental spillages and leaks resulting in ground contamination and risks to controlled waters during decommissioning. Unlikely to be significant. To be determined through assessment.	**Scoped in – simple assessment** as outlined in **Section 6.8.41**	Controlled waters receptors (groundwater and surface waters)	Collection of desk study data as outlined in **Section 6.8.19**

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
	C – 8 C – 14 C – 15 C – 33 C – 76	Accidental spillages and leaks resulting in ground contamination and risks to human health during decommissioning. **No likely significant effect.**	**Scoped out** as discussed in **Section 6.8.45**	Human health receptors (construction workers)	Not applicable

6.8.41 As detailed in **Table 6.8.9**, a 'simple' assessment will be undertaken for each of the identified potentially significant effects. This will follow the methodology outlined in the Assessment methodology section of this chapter (i.e. collection of baseline desk study data and a qualitative assessment of the change in level of risk). This 'simple' assessment is analogous to the Preliminary Risk Assessment stage of LCRM.

6.8.42 Where a risk classification of moderate or greater has been determined, it is considered that the source–pathway–target contaminant linkage requires some form of risk management or intervention, and the first step will be a more 'detailed' assessment.

6.8.43 Such 'detailed' assessment would normally take the form of further investigation, such as an intrusive ground investigation, with the additional knowledge gained allowing the risk to be more accurately assessed and potentially the classification may be lowered. This first step of the more 'detailed' assessment is analogous to the Site Investigation and Detailed Quantitative Risk Assessment stages of LCRM.

6.8.44 However, if after this first step, the risk classification remains at moderate or above then remediation, in the form of environmental measures, may be required to reduce or remove the source of contamination or disrupt the pathway to the receptor. This final step will be analogous to undertaking the Remediation Implementation and Verification stage of LCRM.

Impacts scoped out of assessment

6.8.45 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site based context) existing best practice. The scoped-out effects are considered below.

6.8.46 Construction work for the construction or decommissioning of Rampion 2 must comply with the law. Construction workers will therefore be subject to The Construction (Design and Management) (CDM) Regulations 2015 and safe working practices as part of normal construction health and safety management under the Health and Safety at Work Act (1974) and regulations made under the Act. In addition, the COCP further embeds the CDM Regulations and use of control measures such as method statements and PPE. As such there will be no significant adverse effects on construction workers as a result of the Proposed Development and the following effects have been scoped out of this assessment:

- Exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts from construction activities located on, or adjacent to landfills and other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities resulting in health effects for construction workers;
- Accidental spillages and leaks resulting in ground contamination and risks to human health from construction vehicle and equipment maintenance and storage of fuels / oils for construction vehicles and equipment;

- Accidental spillages and leaks resulting in ground contamination and risks to human health from operational vehicle and equipment maintenance and storage of fuels/oils for operational vehicles and equipment;
- Exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts resulting in health effects for construction workers during decommissioning activities including removal and reinstatement of the onshore substation; and
- Accidental spillages and leaks resulting in ground contamination and risks to human health during decommissioning activities including removal and reinstatement of the onshore substation.

6.8.47 All other potentially significant effects identified will be considered at further stages of the assessment as more detail regarding the design becomes available and greater levels of baseline data are collected and analysed.

Cumulative effects

6.8.48 Cumulative effects on ground conditions resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.8.49 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative ground conditions effects during construction of the onshore elements of the Proposed Development:

- mobilisation of contamination (for example through generation of dusts, spillages and leaks etc) resulting in impacts to human health and controlled waters receptors in combination with construction activities for other developments; and
- damage to geodiversity sites resulting impacts to geodiversity receptors in combination with construction activities for other developments.

6.8.50 For ground conditions, UK legislation requires all developments to be suitable for their proposed use in which risks to human health and controlled waters from land contamination and risks from damage to geodiversity sites have been appropriately managed. Therefore, there are not considered to be any impacts from the operational phase of Rampion 2 that have the potential to act cumulatively with impacts from other developments to contribute to cumulative ground conditions effects.

Transboundary effects

6.8.51 The potential transboundary effects from construction, operation (including maintenance) and decommissioning on ground conditions are considered in **Appendix B**.

6.8.52 Based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely, there are not considered to be any transboundary effects on ground conditions receptors from Rampion 2.

Proposed approach to PEIR and ES

6.8.53 Between Scoping and PEIR, the primary focus of the ground conditions aspect will be to collect the data required to produce the Phase 1 Desk Study Report and establish the existing baseline conditions of the study area.

6.8.54 Where possible, the Phase 1 Desk Study will include a site walkover of key sections of the proposed cable corridor and substation location. As detailed in **Section 4.2,** the site walkover will be planned to proceed whilst applying social distancing measures to keep surveyors and members of the public safe. Should it not be possible to undertake the site walkover as a result of the current COVID-19 pandemic, a precautionary approach will be taken to identifying potential ground condition sources and receptors within the Phase 1 Desk Study Report in order to ensure a reasonable worst case is assessed in the EIA.

6.8.55 Consultation and engagement will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process which is set out in **Section 4.6: Consultation and the evidence plan process**. For the ground conditions aspect these are set out in **Table 6.8.10**.

Table 6.8.10 Future consultation and engagement for ground conditions aspect

Stakeholder	Areas of consultation and engagement
Environment Agency	Provision of baseline data Approach to ground conditions assessment Review of Phase 1 desk study report Embedded measures
Local authorities: • **Arun District Council** • **Horsham District Council** • **Mid Sussex District Council**	Provision of baseline data Approach to ground conditions assessment Review of Phase 1 desk study report Embedded measures

6.8.56 Likely significant effects will be described in the PEIR following the simple assessment methodology outlined in this chapter. The assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA**.

6.8.57 In line with the use of the design envelope approach, the ground conditions assessment will primarily relate to the area of land on which construction will take place. Between Scoping and PEIR/ES the study area will be refined as a more evolved understanding of the final cable corridor and substation location becomes available. However, the principles used to define the ground conditions study area will remain unchanged from those presented in this Scoping Report.

6.8.58 Between Scoping and PEIR/ES, it is anticipated that increased levels of information regarding construction methods and a more evolved understanding of the infrastructure integral to the Proposed Development will allow refinement of the assessment of the likely significant effects on ground conditions as a result the Proposed Development.

6.9 Historic environment

Introduction

6.9.1 The historic environment assessment will consider the potential likely significant effects on heritage assets that may arise from the construction and operation (and maintenance) and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area. This section of the scoping report describes the methodology to be used within the EIA, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.9.2 Historic environment interfaces with many other aspects and as such, should be consider alongside these; namely:

- **Section 6.2: Landscape and visual impact assessment (LVIA)** which considers the potentially significant effects on landscape and visual receptors associated with Rampion 2; and
- **Section 6.5: Noise and vibration** which considers the potentially significant effects on the onshore noise and vibration receptors associated with Rampion 2.

Study area

6.9.3 The study area for the historic environment assessment is defined as the onshore part of the Scoping Boundary together with the Zones of Influence (ZOIs), extending 1km from this Scoping Boundary to establish the archaeological and historical context and inform assessment of the potential for previously unrecorded buried archaeological remains to be present (see **Figure 6.9.1**).

6.9.4 An ‘extended study area’ will be used to identify heritage assets that may be subject to adverse effects arising through change to setting. The extended study area will be determined through consultation with stakeholders with reference to the landscape context, type of heritage asset and nature of development. It is not intended to draw an arbitrary 5km or 10km boundary, rather the study area will be informed through baseline study, local knowledge and site walkovers.

6.9.5 The study area will be reviewed and amended in response to such matters as refinement of the onshore project components, the identification of additional impact pathways and through ongoing consultation.

Assessment methodology

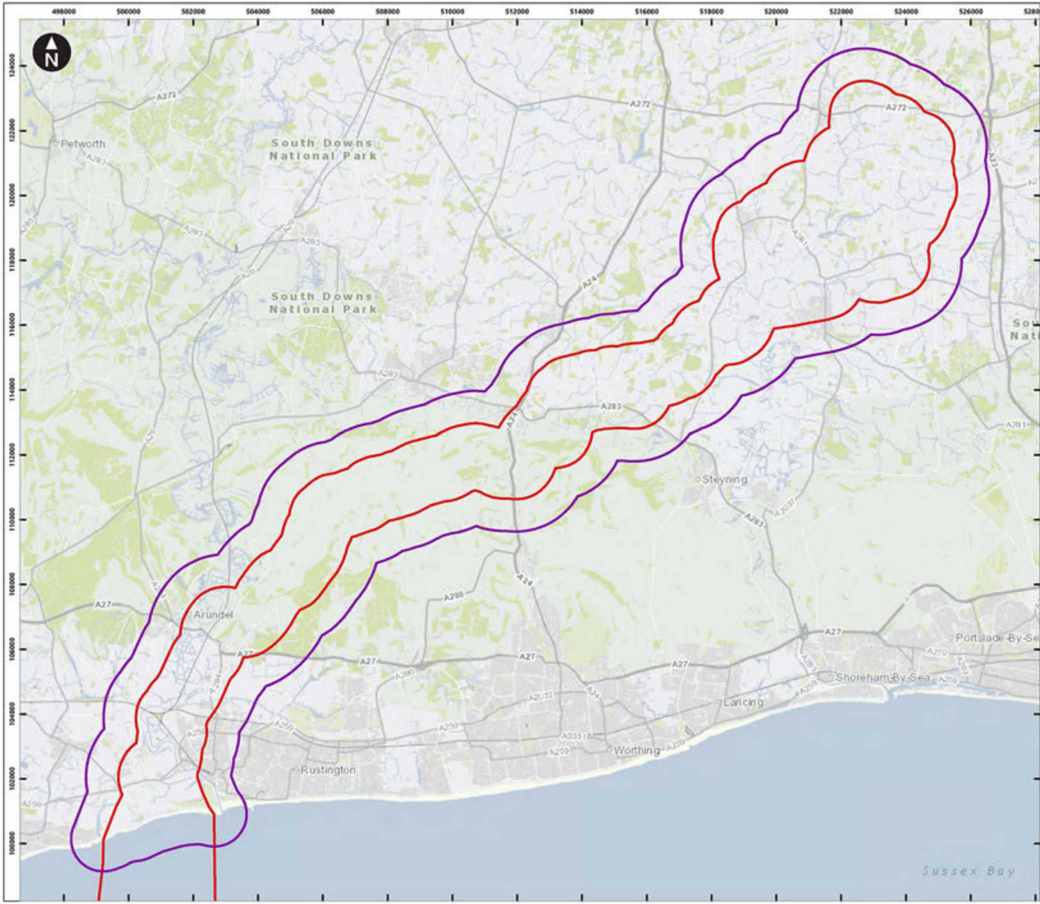
Introduction

6.9.6 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this historic environment chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the historic environment assessment.

6.9.7 The methodology for establishing a detailed historic environment baseline is provided below, together with the methodology for assessing the significance of effects.

6.9.8 To establish a detailed baseline, appropriate and proportionate assessments and surveys will be carried out following refinement of the onshore project components. These are expected to include:

- a review of desk-based data within the study area, using sources detailed in **Table 6.9.4,** as well as relevant readily available regional and local contextual studies, desk and field studies, geological and geotechnical data, historic mapping and aerial photographs;
- national and local archive visits to source relevant cartographic, documentary and photographic evidence;
- review of readily available Lidar data;
- site walkovers of the landfall site, temporary construction corridor, temporary construction laydown areas and substation construction plot, and site visits to offsite heritage assets to inform the assessment of effects arising from change to setting;
- detailed deposit modelling will inform early characterisation of sites, identify potential for prehistoric deposits and alluvial deposits that could overlie archaeological remains. Deposit modelling will provide a useful tool to determine effectiveness of geophysics, and to target possible boreholes and/or trial trenching;
- archaeological investigation of areas within the Scoping Boundary likely to be directly impacted by construction activities, which may include geophysical survey, geoarchaeological monitoring of ground investigation works and archaeological trial trenching;
- representative viewpoints for the Landscape and Visual Impact Assessment (LVIA) assessment will be used to inform the settings assessment, where appropriate; and
- cross-referencing with the LVIA and other workstreams (including Noise) where appropriate to ensure an integrated approach to assessment.



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Key

- Scoping Boundary
- Study area

Kilometres

0 0.5 1 2 3 4

1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.1 Scoping Boundary and study area

Scoping Report

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WOOD	POLAI	WOOD	26/05/2020	FINAL

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Assessment of effects and determining significance

6.9.9 National Policy Statement (NPS) EN-1 (Department of Energy & Climate Change 2011) requires change to the significance of heritage assets to be considered in developing an understanding of the potential effects of the Proposed Development.

6.9.10 The significance of a heritage asset is a product of the value which it holds to this and future generations as a result of its historic, archaeological, architectural or artistic interests. These interests are set out in NPS EN-1 and are discussed in more detail in Conservation Principles and GPA2 (Historic England 2015):

- archaeological: the potential of a heritage asset to hold evidence about the past which can be retrieved through specialist investigation;
- historical: which can be through association with past events or people, or where a heritage asset is illustrative of a particular asset type, theme or period; and
- architectural/artistic: values which derive from a contemporary appreciation of a heritage asset's aesthetics.

6.9.11 NPS EN-1 notes that setting contributes to an asset's significance and sets outs policies regarding change to the setting of heritage assets but does not offer an explicit definition. Setting is defined in both the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government 2019) and by Historic England in GPA 3 (Historic England 2017) as:

"…the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance, or may be neutral."

6.9.12 For the purposes of assessing the significance of effects, heritage significance is assigned to one of four classes, with reference to the heritage interests described above and relying on professional judgement as informed by policy and guidance. The hierarchy given in **Table 6.9.1** reflects the EN-1 distinction between designated and non-designated heritage assets. EN-1 distinguishes between designated assets of the highest heritage significance (i.e. scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites) and other designated heritage assets. This further distinction is relevant to planning policy but has less influence on the establishment of the significance of an effect in EIA terms.

Table 6.9.1 Establishing the sensitivity of receptors

Sensitivity	Criteria	Receptor type
High	Assets of national importance, which have significance for an outstanding level of archaeological, architectural, historic and/or artistic interest.	Designated heritage assets.

Sensitivity	Criteria	Receptor type
	It is possible that low-moderate impacts upon these assets or their settings could lead to significant effects.	
Medium	The sensitivity of these assets will largely be dependent upon their current setting and their character. Asset has significance for a high level of archaeological, architectural, historic and/or artistic interest.	Non-designated sites and monuments of regional importance.
Low	Assets of local interest, which have significance for elements of archaeological architectural, historic or artistic interest. Although these assets must be considered, and mitigation may be required, it is considered that significant effects would only exist if the assets were to be predominantly or totally destroyed as a result of the Proposed Schemes.	Non-designated assets of local importance
Negligible	Due to its nature of form / condition / survival, cannot be considered as an asset in its own right.	Non-extant HER record

6.9.13 Magnitude of change is a measure of the extent to which the significance of an asset would be disturbed or lost.

6.9.14 In respect of buried archaeological deposits, where no remains are visible above ground, this would arise from direct disturbance or removal of archaeological material resulting in the loss of archaeological interest. In certain instances, elements of architectural and historic interest can also be affected. Similarly, direct loss, damage or alteration of a structure would primarily affect architectural interest, although historic and archaeological interests may also be affected.

6.9.15 The effects of change in the setting of a heritage asset depends on the contribution of that setting to the significance of the asset, and assessments must be, by their nature, specific to the individual assets being considered.

6.9.16 The magnitude of change (or impact) is based on the extent to which the significance of an asset is affected, which can be influenced by a number of factors:

- the permanence of the impact (temporary, permanent or reversible);
- physical changes caused by the impact (both positive and negative); and

- the extent of the heritage asset or its setting that would be affected (for example, the whole or a very small part) and the contribution of that part to significance.

6.9.17 Impacts on receptors, in this case heritage assets, are assigned to one of four classes of magnitude, defined in **Table 6.9.2 .** Impacts can be adverse or beneficial and it is recognised that EN-1 looks to developers to make, where possible, a positive contribution to the historic environment as part of its design response.

Table 6.9.2 Establishing the magnitude of change

Sensitivity	Criteria (Adverse)	Criteria (Beneficial)
High	Loss of significance resulting from irreversible total or substantial demolition or disturbance of a heritage asset or from the disassociation of an asset from its setting.	Sympathetic restoration of an at-risk or otherwise degraded heritage asset and/or its setting. Bringing an at-risk heritage asset into sustainable use, with robust long-term management secured.
Medium	Loss of significance arising from partial disturbance or inappropriate alteration of asset which will adversely affect its importance. Change to the key characteristics of an asset's setting, which gives rise to lasting harm to the significance of the asset, but which still allows its archaeological, architectural or historic interest to be appreciated.	Appropriate stabilisation and/or enhancement of a heritage asset and, or its setting that better reveal the significance of the asset or contribute to a long-term sustainable use or management regime.
Low	Minor loss to, or alteration of, an asset which leaves its current significance largely intact. Minor and, or short-term changes to setting which do not affect the key characteristics and in which the historical context remains substantially intact.	Minor enhancements to a heritage asset and, or its setting that better reveal its significance or contribute to sustainable use and management.
Negligible	Minor alteration of an asset which does not affect its significance in any discernible way. Minor and, or short term or reversible change to setting which does not affect the significance of the asset.	Minor alteration of an asset which does not affect its significance in any discernible way. Minor and, or short term or reversible change to setting which does not affect the significance of the asset.

6.9.18 The matrix in **Table 6.9.3** has been prepared to guide the assessment of whether effects on the historic environment for the purposes of EIA are to be considered

significant or not. The classification of the effect is judged on the relationship of the magnitude of impact to the assessed heritage significance of the resource. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant. However, professional judgement is applied, where appropriate, to determine significance of effect.

Table 6.9.3 Significance assessment matrix

Receptor heritage significance	**Magnitude of Change**			
	High	**Medium**	**Low**	**Negligible**
High	Significant	Significant	Potentially Significant	Not Significant
Medium	Significant	Potentially Significant	Not Significant	Not Significant
Low	Potentially Significant	Not Significant	Not Significant	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Not Significant

6.9.19 All assessments will be presented as narrative discussions, setting out the significance of the relevant heritage asset(s), and where appropriate contribution of their settings to significance, providing a description of the anticipated change and setting out the magnitude of change in line with the definitions set out **Table 6.9.2** .

6.9.20 NPS EN-1 further distinguishes between ‘harm’ and ‘substantial harm’ and sets out how development that gives rise to harm should be considered within the planning process.

6.9.21 For the purposes of this assessment, adverse impact of low or medium magnitude to a designated heritage asset or non-designated heritage assets of equivalent heritage significance would normally be considered to comprise harm, while a high magnitude of impact would normally comprise substantial harm.

6.9.22 Special consideration, however, needs to be given to the particular context in which the assessment is taking place. Comments on the magnitude of any harm accruing to designated heritage assets or non-designated heritage assets of equivalent heritage significance will be made in the narrative assessment.

Baseline conditions

Data sources

6.9.23 The principal data sources used to inform this chapter are listed in **Table 6.9.4**.

Table 6.9.4 Key sources of historic environment data

Source	Date	Summary	Coverage of study area
National Heritage List for England (NHLE) maintained by Historic England	20 May 2020	National Heritage List for England (NHLE), for information on designated heritage assets (scheduled monuments, listed buildings, registered parks and gardens, registered battlefields and world heritage sites) (available online: https://historicengland.org.uk/listing/the-list/).	Full coverage of the study area
West Sussex Historic Environment Record (HER)	30 April 2020	GIS-based records of a wide range of buildings, monuments, find spots, places, and landscapes of archaeological, architectural, artistic or historic interest.	Full coverage of the study area
UK Hydrographic Office (UKHO)	24 April 2020	GIS-based records of wrecks.	Full coverage of the study area

Baseline

Designated heritage assets

6.9.24 There are no world heritage sites, registered battlefields, protected wreck sites or protected military sites within the onshore part of the Scoping Boundary or 1km study area.

6.9.25 There are 18 scheduled monuments, 327 listed buildings, one registered park and garden and six conservation areas within the onshore part of the Scoping Boundary. A full gazetteer of these will be provided at PEIR.

6.9.26 The scheduled monuments reflect multi-period occupation and exploitation of the South Downs, and include:

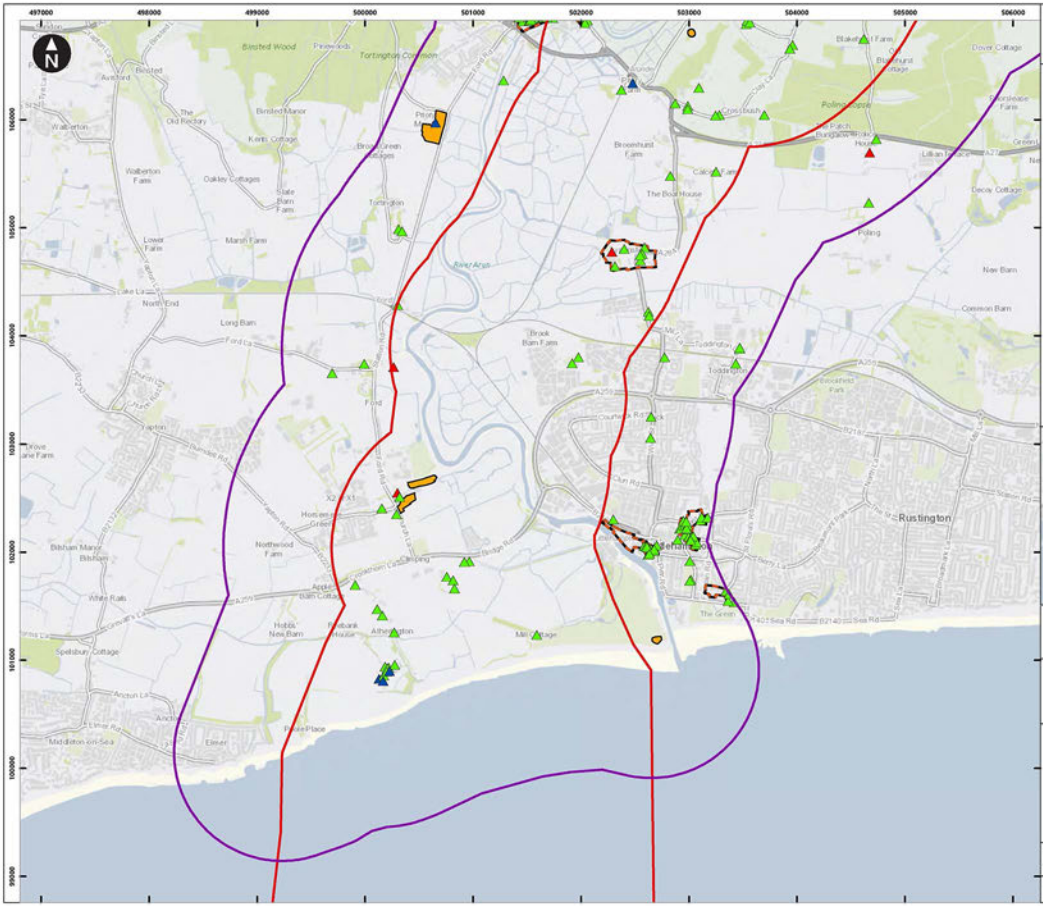
- prehistoric barrow sites (List entry no. 1015116, 1020352, 1015713, 1015117), earthworks (List entry no. 1015115, 1015715, 1015714, 1015716), settlements and a flint mine (List entry no. 1015239);
- Iron Age defensive settlements (List entry no. 1005894, 1015114);
- a Roman period temple precinct (List entry no. 1015114) and settlement (List entry no. 1005823);
- an Anglo-Saxon burh (List entry no. 1005894); and

- medieval fortifications (List entry no. 1012177), a medieval motte and bailey castle (List entry no. 1012500), deserted medieval settlements (List entry no. 1015882, 1005828), a moated medieval manor site (List entry no. 1009868) and Dominican friary ruins (List entry no. 1005865).

6.9.27 Within the Scoping Boundary, listed buildings are found east of the A24 and southwest of Burpham (**Figure 6.9.2a-d**). They are either found clustered within historic settlement cores, identified as conservation areas, or are dotted across the landscape reflecting historic farmstead locations or isolated agricultural buildings.

6.9.28 There are eight grade I listed buildings within the Scoping Boundary, primarily comprising parish churches with medieval origins, as well as the medieval remains of Arundel Castle (List entry no. 1027926), and the gateway and porters lodge northwest of Ewhurst Manor (List entry no. 1194178). There are 13 grade II* listed buildings ranging from parish churches, houses and a monastery. The remaining 306 grade II listed buildings within the Scoping Boundary comprise mainly houses and agricultural buildings.

6.9.29 Within the 1km study area, extending from the Scoping Boundary, there are a further 18 scheduled monuments, 394 listed buildings and seven conservation areas, a full gazetteer will be provided at PEIR.



Key

- Scoping Boundary
- Study area
- Registered parks and gardens
- Scheduled monuments
- Conservation areas

Listed buildings

- Grade I
- Grade II
- Grade II*

Rampion Extension Development

RWE

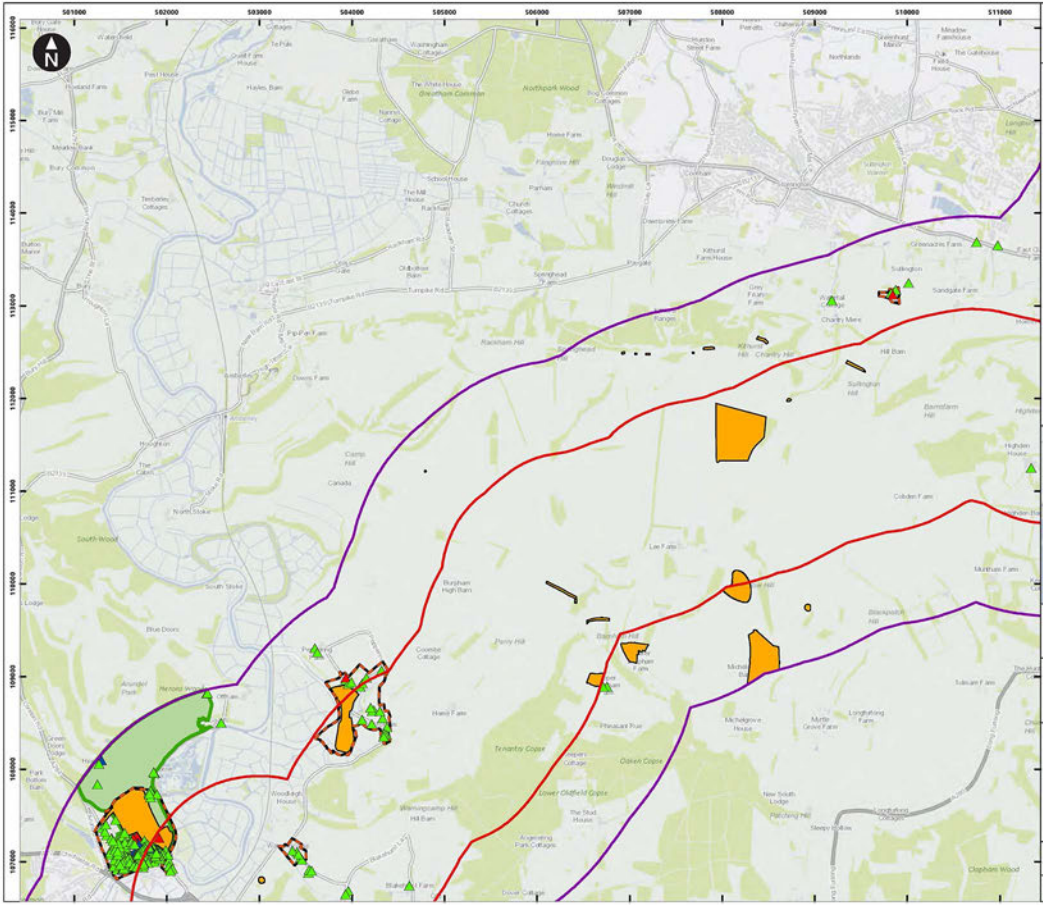
Rampion 2 Offshore Wind Farm

Figure 6.9.2a Designated heritage assets (National Heritage List for England 2020 and West Sussex HER 2020) - Area A

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0002				1.0
Company: WOOD	Drawn By: POLAI	Chk/Aprvd: WOOD	Drawn Date: 02/06/2020	Status: FINAL

ISO A3 Landscape



Key

- Scoping Boundary
- Study area
- Registered parks and gardens
- Scheduled monuments
- Conservation areas

Listed buildings

- Grade I
- Grade II
- Grade II*

Kilometres
0 0.25 0.5 0.75 1
1:35,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.2b Designated heritage assets (National Heritage List for England 2020 and West Sussex HER 2020) - Area B

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0003				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
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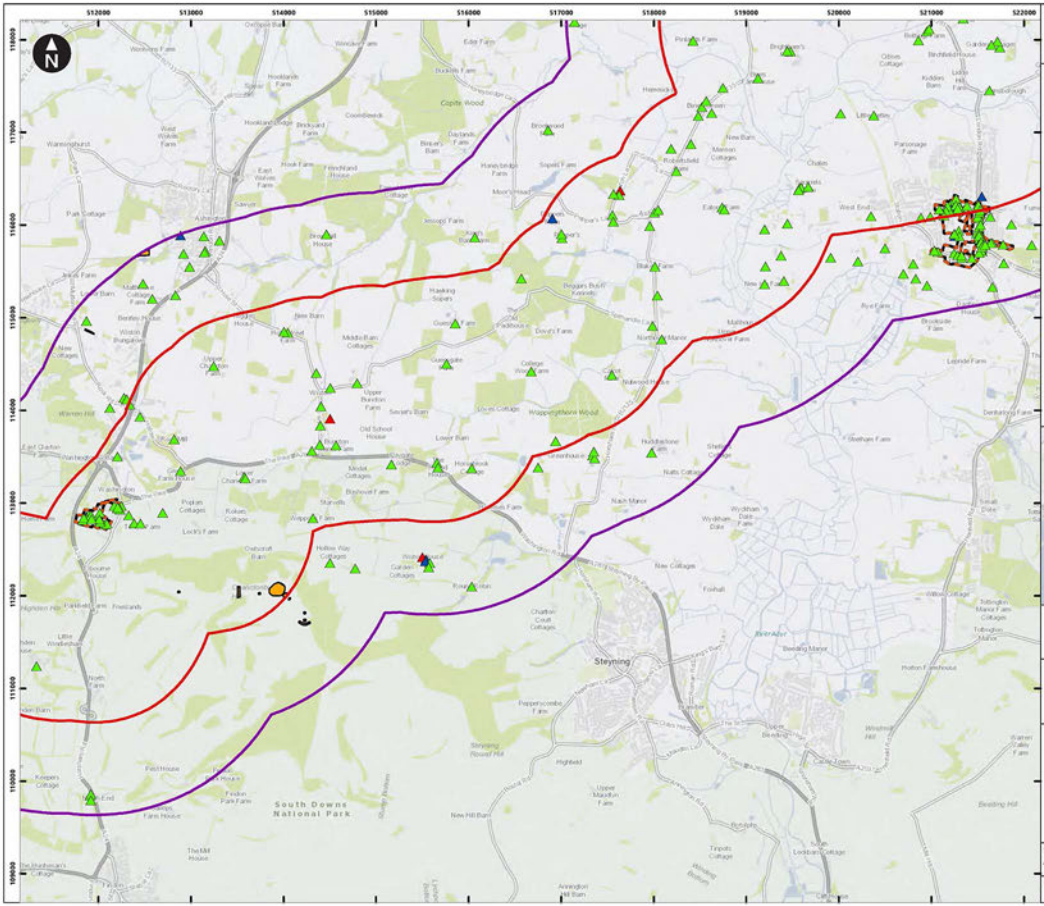
ISO A3 Landscape



Key

- Scoping Boundary
- Study area
- Registered parks and gardens
- Scheduled monuments
- Conservation areas

Listed buildings

- Grade I
- Grade II
- Grade II*

Kilometres
0 0.25 0.5 0.75 1
1:35,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.2c Designated heritage assets (National Heritage List for England 2020 and West Sussex HER 2020) - Area C

Scoping Report

System Identifier:				Version:
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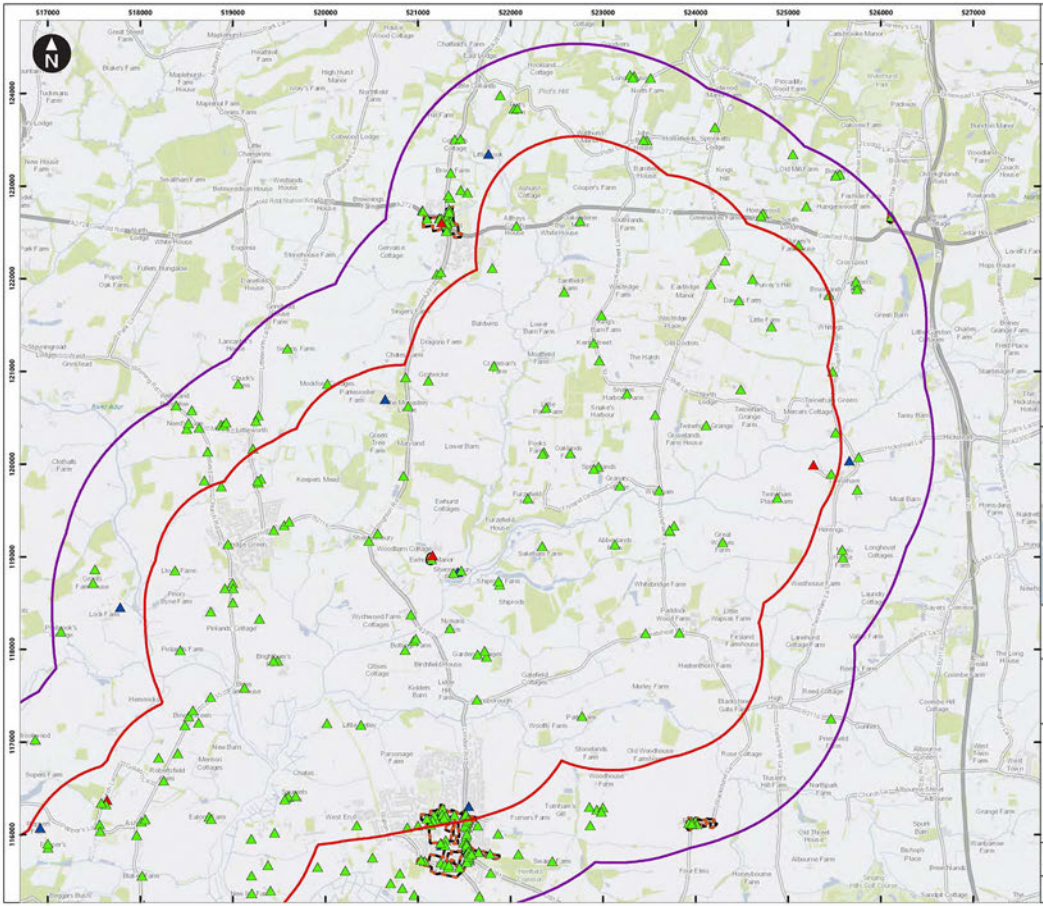
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	02/06/2020	FINAL

ISO A3 Landscape



Key

- Scoping Boundary
- Study area
- Registered parks and gardens
- Scheduled monuments
- Conservation areas

Listed buildings

- Grade I
- Grade II
- Grade II*

Kilometres
0 0.25 0.5 0.75 1
1:35,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.2d Designated heritage assets (National Heritage List for England 2020 and West Sussex HER 2020) - Area D

Scoping Report

System Identifier:				Version:
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Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	26/05/2020	FINAL

ISO A3 Landscape

Area Notification Areas

6.9.30 Within the onshore part of the Scoping Boundary there are 62 Archaeological Notification Areas (ANA), which are based on information held in the HER (see **Figures 6.9.3a – c**). The ANAs delineate the existence, or probable existence, of archaeological heritage assets. Substantial areas of the South Downs are encompassed by numerous ANAs, all relating to multi-period occupation and activity.

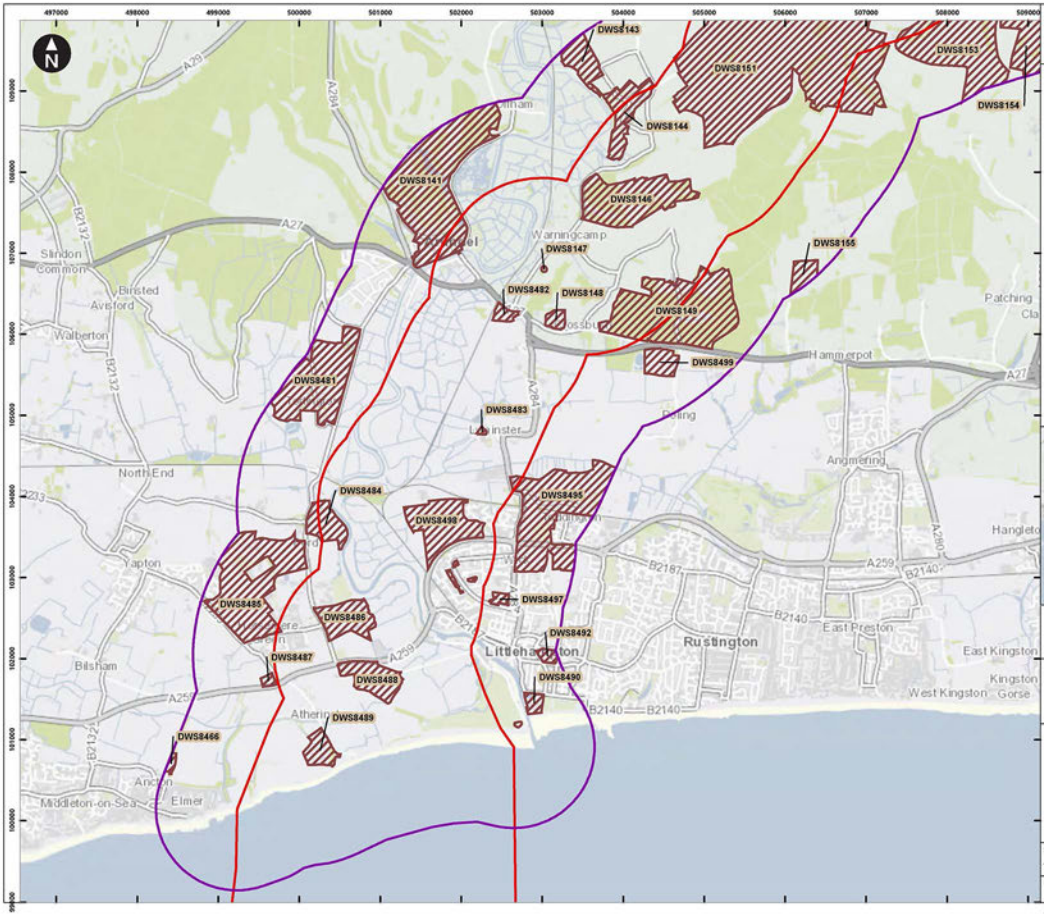
6.9.31 Of the ANAs, 41 are categorised as red, defined as, “very sensitive area for Archaeology, where new building(s), ground excavation or landscaping may have major adverse impact on nationally important and other significant archaeological sites.” The other 21 ANAs are categorised as amber, defined as “a sensitive area for Archaeology, where new building(s), ground excavation or landscaping may have adverse impact upon an archaeological site/sites, depending upon scale and exact location of development.” (West Sussex County Council 2016).

6.9.32 Within the study area there are a further 25 ANAs, which may provide additional contextual information.

Non-designated heritage assets

6.9.33 There are 814 HER records located within the onshore part of the Scoping Boundary and a further 939 HER records within the study area (see **Figures 6.9.4a – d**). These represent all periods from Palaeolithic to modern and comprise a range of record types including small find locations, historic landscapes, farmsteads, extant monuments, earthworks, buildings, military structures, memorials, telephone boxes, and archaeological sites and deposits.

6.9.34 Within the study area there are also four wrecks identified on the UKHO data.



Key

- Scoping Boundary
- Study area
- Archaeological Notification Areas (ANAs)

Kilometres
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1:40,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.3a Archaeological Notification Areas (ANAs) (West Sussex HER 2020) - Area A

Scoping Report

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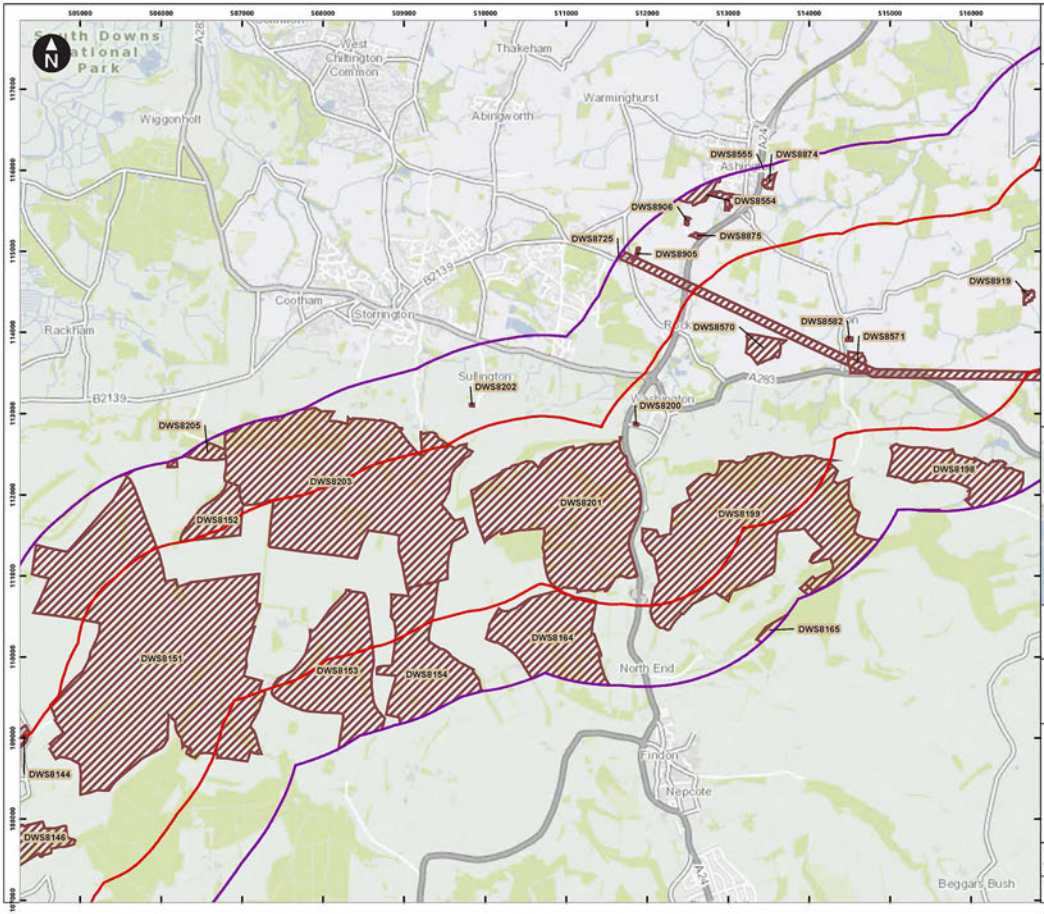
ISO A3 Landscape



Key

- Scoping Boundary
- Study area
- Archaeological Notification Areas (ANAs)

Kilometres
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1:40,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.3b Archaeological Notification Areas (ANAs) (West Sussex HER 2020) - Area B

Scoping Report

System Identifier:				Version:
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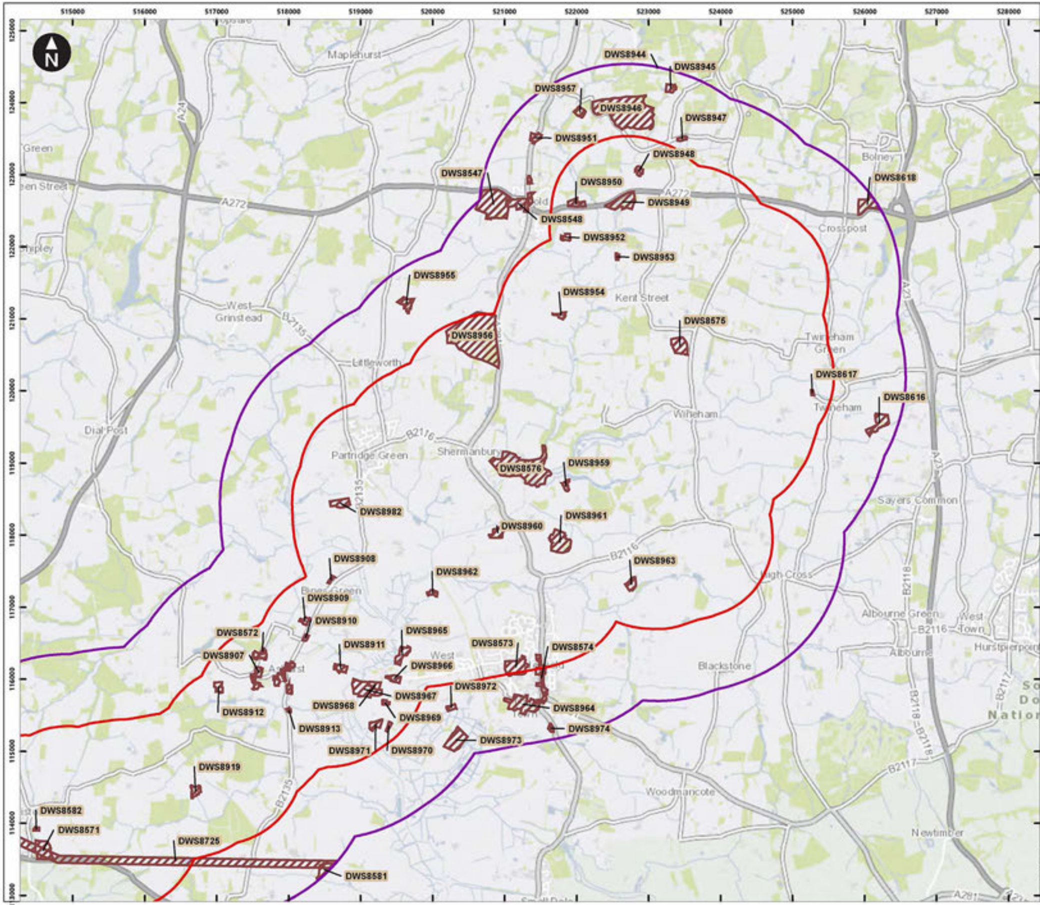
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	02/06/2020	FINAL

ISO A3 Landscape



Maplehurst
DWS8944
DWS8945
DWS8957
DWS8946
DWS8947
DWS8951
DWS8948
DWS8547
DWS8950
DWS8949
DWS8548
DWS8618
Bolney
A272
A24
Green
en Street
Crosspost
DWS8952
DWS8953
DWS8955
DWS8954
Kent Street
West Grinstead
B2135
DWS8956
DWS8575
Twineham Green
Littleworth
DWS8617
DWS8616
Twineham
Wineham
Dial Post
B2116
Partridge Green
Shermanbury
DWS8576
DWS8959
Sayers Common
DWS8982
DWS8960
DWS8961
DWS8963
DWS8908
DWS8962
High Cross
DWS8909
DWS8910
Albourne Green
West Town
DWS8572
DWS8965
DWS8911
DWS8573
DWS8574
DWS8907
DWS8966
Hurstpierpoint
Albourne
Blackstone
DWS8912
DWS8967
DWS8972
DWS8968
DWS8964
DWS8969
DWS8913
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DWS8919
B2117
B2118
Woodmancote
DWS8582
DWS8571
DWS8725
Newtimber
DWS8581
A23
A281

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Key

- Scoping Boundary
- Study area
- Archaeological Notification Areas (ANAs)

Kilometres
0 0.25 0.5 1 1.5 2
1:45,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.3c Archaeological Notification Areas (ANAs) (West Sussex HER 2020) - Area C

Scoping Report

System Identifier:				Version:
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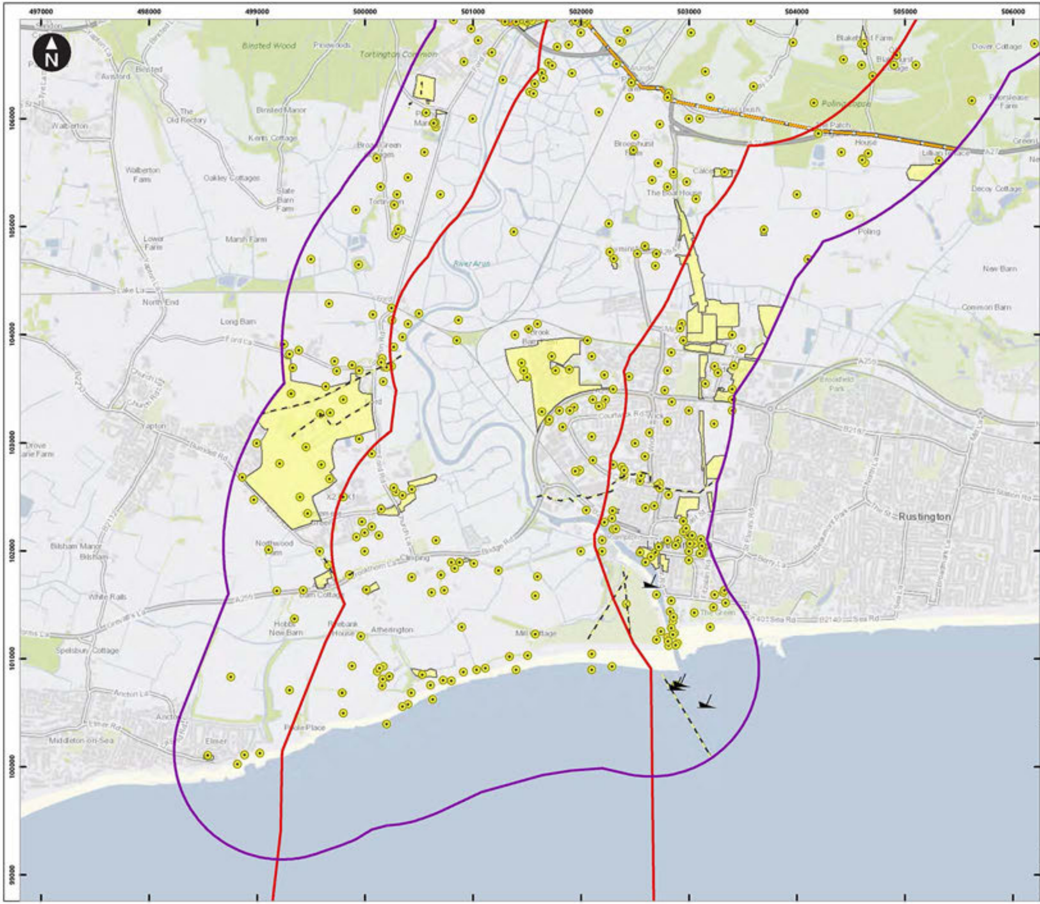

Key

- Scoping Boundary
- Study area
- HER monument records (area)
- HER monument records (line)
- HER monument records (point)
- Roman road

UKHO Wreck Site

- Wreck

Kilometres
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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.4a Historic Environment Record (HER) monument records (West Sussex HER 2020) and UKHO Wreck Sites (UK Hydrographic Office 2020) - Area A

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0009				1.0
Company: WOOD	Drawn By: POLAI	Chk/Aprvd: WOOD	Drawn Date: 26/05/2020	Status: FINAL

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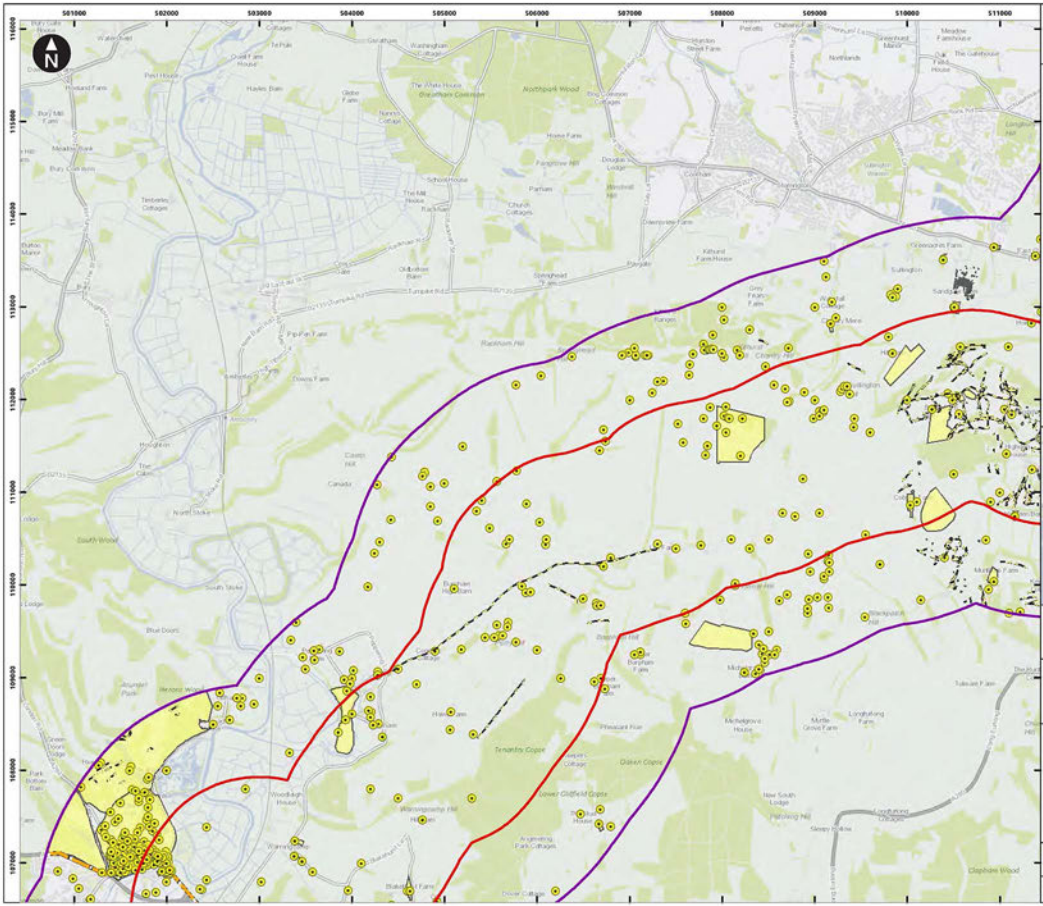

Key

- Scoping Boundary
- Study area
- HER monument records (area)
- HER monument records (line)
- HER monument records (point)
- Roman road

Kilometres
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1:35,000

Rampion Extension Development

RWE

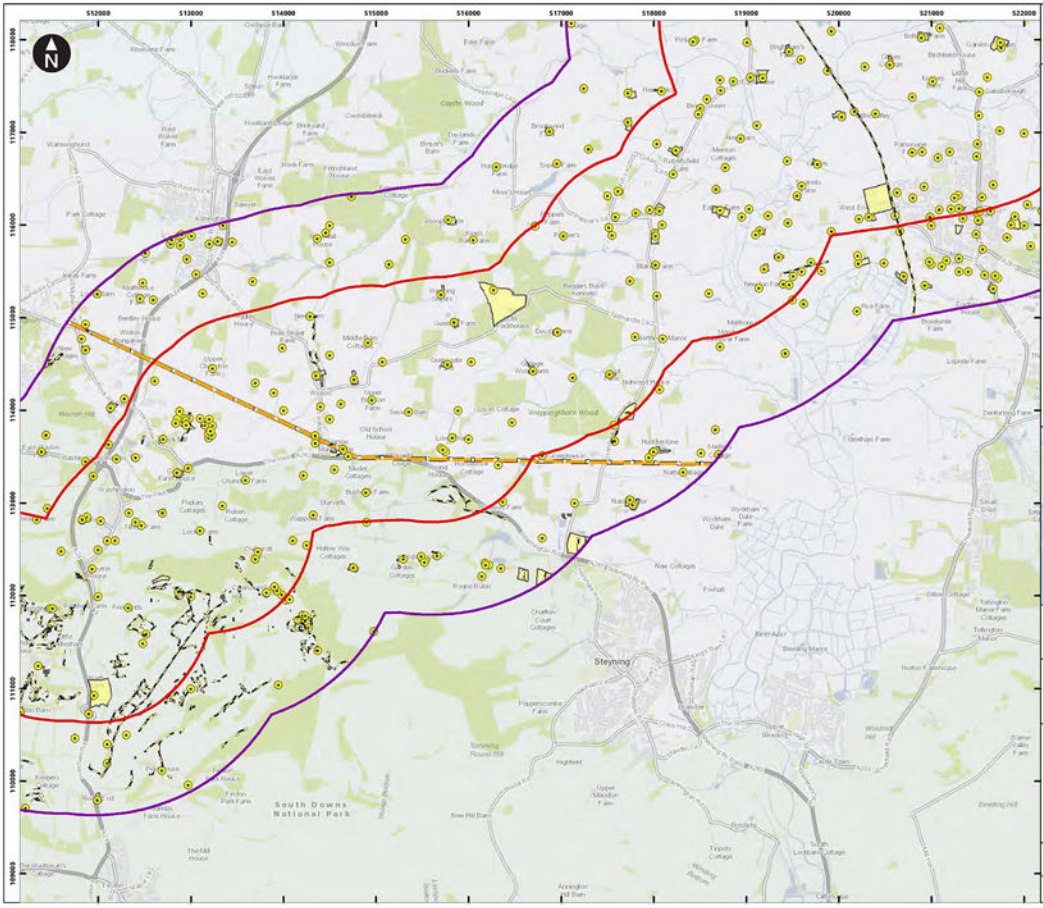
Rampion 2 Offshore Wind Farm

Figure 6.9.4b Historic Environment Record (HER) monument records (West Sussex HER 2020) and UKHO Wreck Sites (UK Hydrographic Office 2020) - Area B

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0010				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	02/06/2020	FINAL

ISO A3 Landscape



Key

- Scoping Boundary
- Study area
- HER monument records (area)
- HER monument records (line)
- HER monument records (point)
- Roman road

Kilometres
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1:35,000

Rampion Extension Development

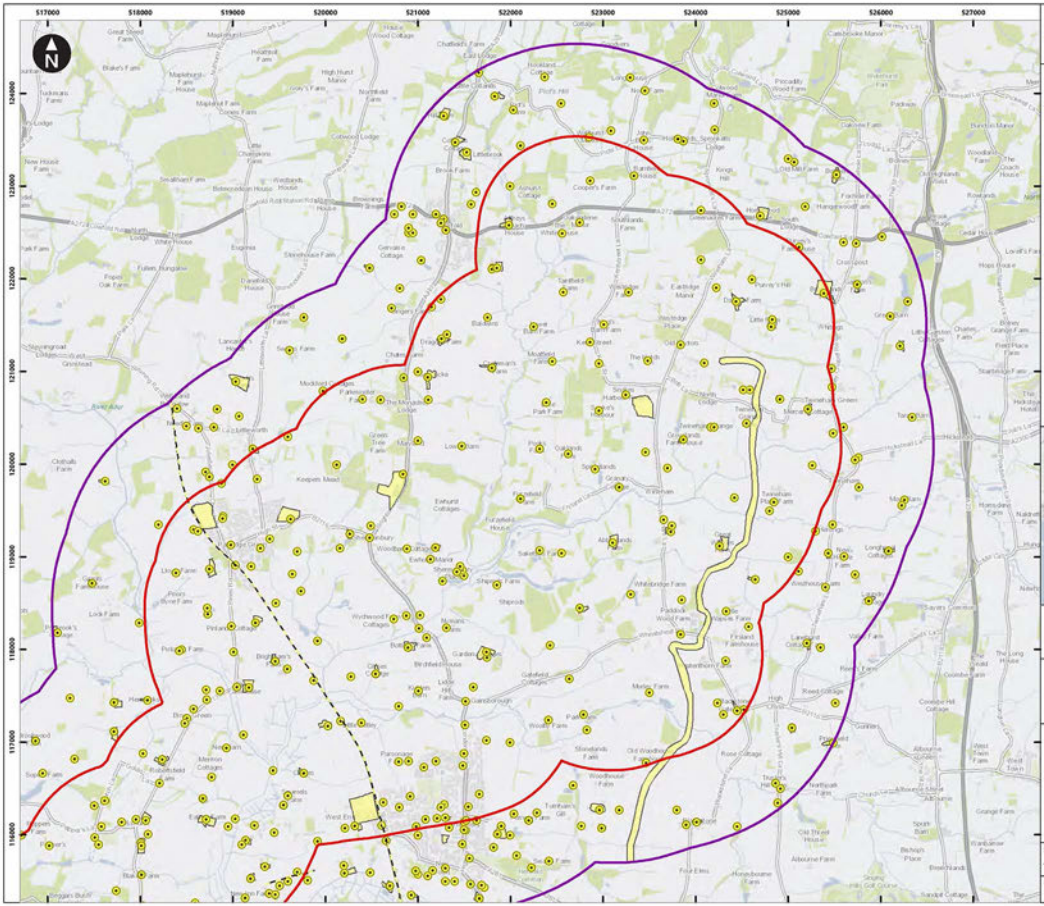
RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.4c Historic Environment Record (HER) monument records (West Sussex HER 2020) and UKHO Wreck Sites (UK Hydrographic Office 2020) - Area C

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0011				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	12/06/2020	FINAL



Key

- Scoping Boundary
- Study area
- HER monument records (area)
- HER monument records (line)
- HER monument records (point)
- Roman road

Kilometres
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Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.4d Historic Environment Record (HER) monument records (West Sussex HER 2020) and UKHO Wreck Sites (UK Hydrographic Office 2020) - Area D

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0012				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	26/05/2020	FINAL

ISO A3 Landscape

Summary

6.9.35 This summary provides a broad chronological overview of known heritage assets within the Scoping Boundary recorded in the West Sussex HER and NHLE. The establishment of a full and detailed baseline will form part of the proposed surveys, as listed in **Paragraph 6.9.8**.

6.9.36 All periods are represented within the Scoping Boundary, which occupies the distinct landscapes of the coastal plains, South Down chalk ridge and the Low Weald.

6.9.37 Early prehistoric evidence, including isolated Palaeolithic stone tools and Mesolithic flint scatters, is generally focused to the south and north of the chalk hills of the South Downs.

6.9.38 Later prehistoric activity includes remains of Neolithic flint mines. Neolithic stray finds have been recovered from across the Scoping Boundary but, except for a flint scatter at Littlehampton, in situ sites are only recorded on the South Down hills. Similarly, Bronze Age sites, including the many scheduled barrows, are largely found on the South Down hills or areas nearer to the coast.

6.9.39 The Iron Age is represented by hillforts (for example, Chanctonbury Ring Iron Age Hillfort), and enclosed settlements with associated field systems. Some survive as earthworks, whilst others are visible as cropmarks on aerial photographs or were recorded during excavation.

6.9.40 Roman rural settlement is characterised by isolated farmsteads (for example at Harrow Hill) with associated field systems, which are clustered on the chalk downland. There are two Roman road routes which cross the Scoping Boundary, broadly east-west. A section of the Hardham to Barcome Mills road, evidenced by excavation,and the projected route from Chichester toward Brighton further to the south.

6.9.41 Early medieval (Anglo-Saxon) settlement evidence is relatively limited. An Anglo-Saxon burh was established on a former Iron Age fort at Burpham, with remains comprising earthworks, pits, and timber structures. Mortuary sites are more common; including a cemetery at Wepham Down, a barrow cemetery at Perry Hill, a platform barrow at Barpham Hill and cremations at Sullington Hill. A Saxon coin hoard was also discovered near Washington.

6.9.42 During the medieval period the Domesday Book of 1086 (Open Domesday 2020) records numerous settlements of varying sizes within the Scoping Boundary. The historic cores of these settlements and dispersed farmsteads are still identifiable though surviving historic buildings and archaeological remains (for example at Washington, Lyminster and Henfield). A scheduled Norman motte-and-bailey castle, which may have also been the site of former late Saxon defences, survives at Arundel, a strategic crossing point of the River Arun.

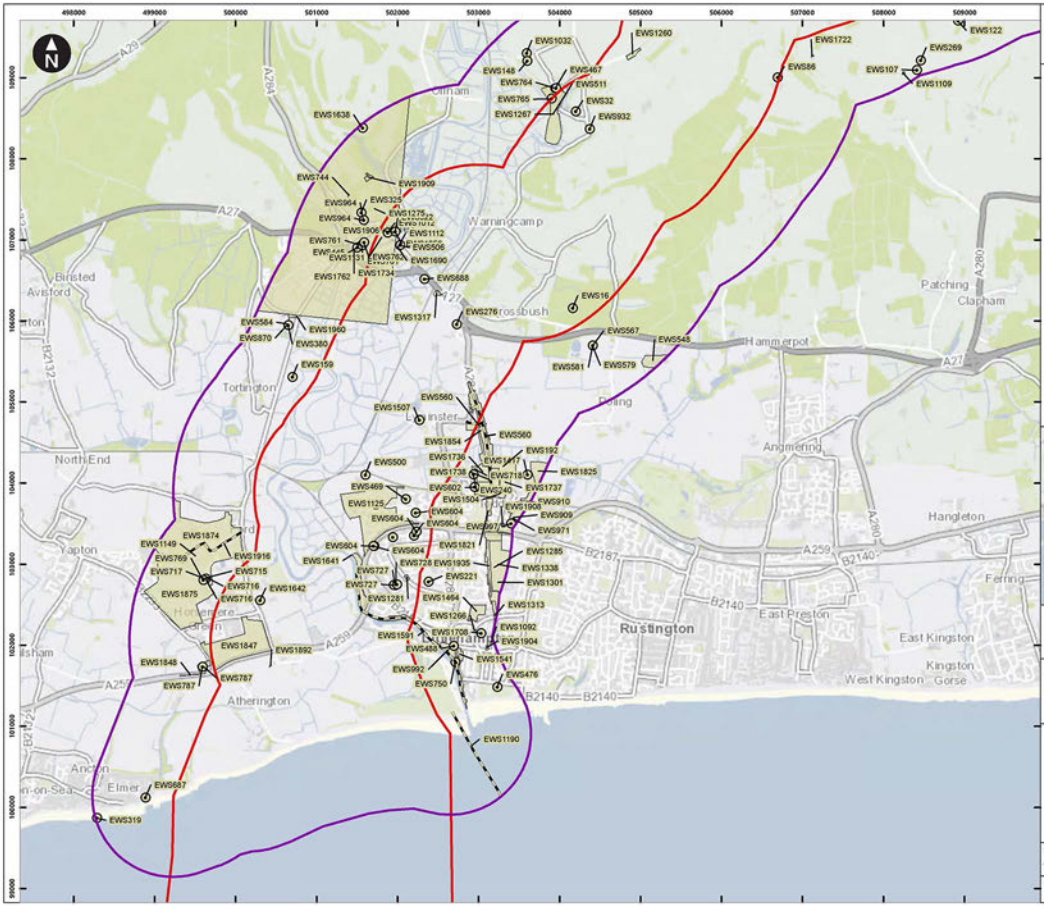
6.9.43 The medieval settlement pattern largely persists into the post-medieval period, excepting those settlements which were abandoned or contracted following significant events such as the Black death in the mid-1300s AD and social and economic changes of the 15th century AD (see **Figures 6.9.5a - c**). These former medieval settlements now only survive as archaeological remains and earthworks (for example at Upper Barpham Farm and at Climping).

6.9.44 The historic landscape character (HLC) data (see **Figures 6.9.6a - d**) indicates that large areas of the medieval and post-medieval agricultural landscape is still preserved, particularly within the north of the Scoping Boundary. There are many post-medieval buildings located across the Scoping Boundary, many of which are listed and others which have some heritage value, such as the large number of 19th century farmsteads.

6.9.45 There are surviving military structures dating to World War Two, including anti-tank and anti-aircraft installations along the coast, evidence for training exercises within the prehistoric monuments on the chalk hills, pillboxes and infantry posts also on the chalk hills and the former Ford airfield.

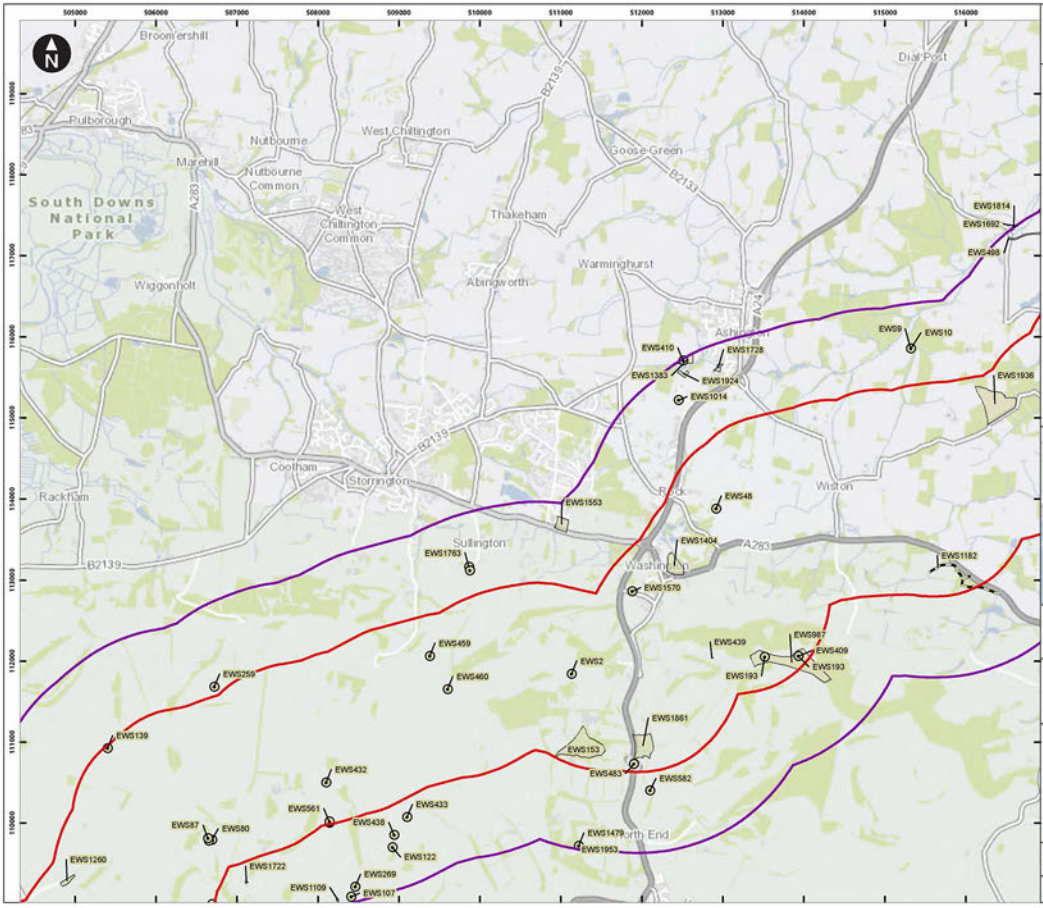
6.9.46 The summary baseline demonstrates that there are known designated and non-designated heritage assets across the Scoping Boundary. Overall, the available evidence indicates that there is potential for as yet unknown archaeological remains within the Scoping Boundary, relating to all periods. Areas of known archaeological sensitivity are indicated by ANAs, as defined by West Sussex Council (2016) (**Figures 6.9.3a-c**). In particular, the chalkland ridge of the South Downs has a high archaeological potential.

6.9.47 As part of the proposed approach to PEIR and ES, a detailed baseline will further refine the archaeological potential encountered by the Proposed Development.



Key

- Scoping Boundary
- Study area
- Event records (area)
- Event records (line)
- Event records (point)



Key

- Scoping Boundary
- Study area
- Event records (area)
- Event records (line)
- Event records (point)

Kilometres
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Rampion Extension Development

RWE

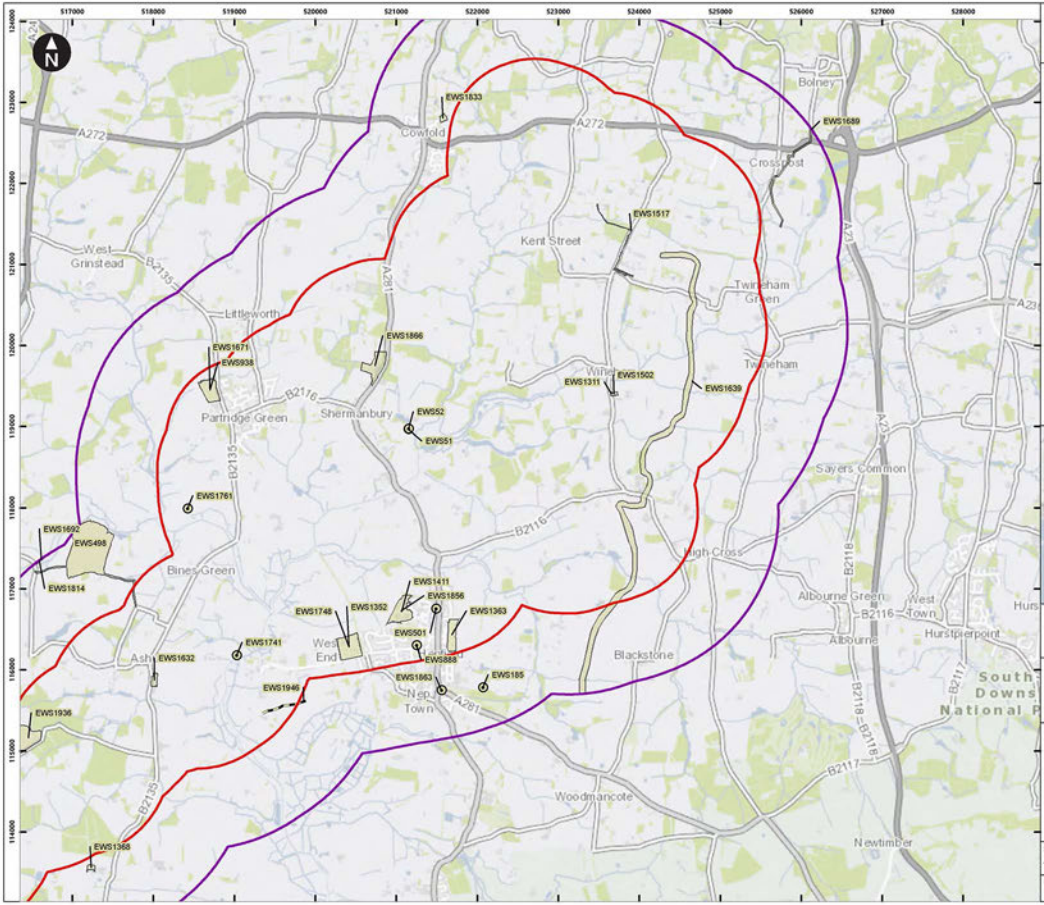
Rampion 2 Offshore Wind Farm

Figure 6.9.5b Event records (West Sussex HER 2020) - Area B

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0014				1.0
Company: WOOD	Drawn By: POLAI	Chk/Aprvd: WOOD	Drawn Date: 26/05/2020	Status: FINAL

ISO A3 Landscape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Cowfold
Bolney
Crosspost
Kent Street
West Grinstead
Littleworth
Partridge Green
Shermanbury
Wineham
Twineham Green
Twineham
Sayers Common
High Cross
Albourne Green
Albourne
West Town
Hurstpierpoint
Bines Green
Ashurst
West End
New Town
Blackstone
Woodmancote
Newtimber
South Downs National Park
EWS1633
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EWS1517
EWS1866
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© Crown copyright and database rights year 2019 Ordnance Survey
Key
Scoping Boundary
Study area
Event records (area)
Event records (line)
Event records (point)
A
B
C
Kilometres
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0.25
0.5
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1.5
2
1:40,000
Rampion Extension Development
RWE
Rampion 2 Offshore Wind Farm
Figure 6.9.5c Event records (West Sussex HER 2020) - Area C
Scoping Report
System Identifier: 42285-WOOD-SC-ON-FG-OH-0015
Version: 1.0
Company: WOOD
Drawn By: POLAI
Chk/Aprvd: WOOD
Drawn Date: 26/05/2020
Status: FINAL
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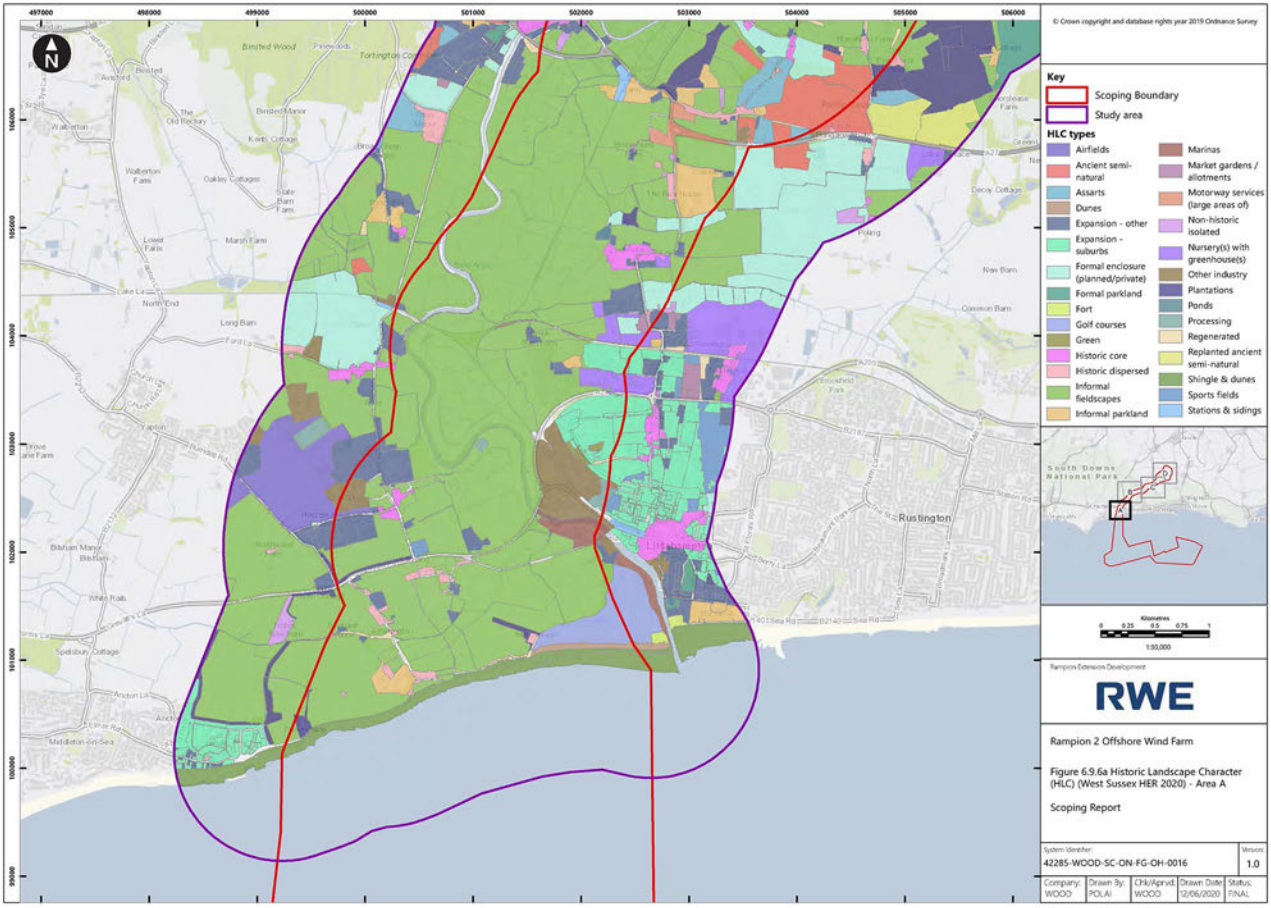
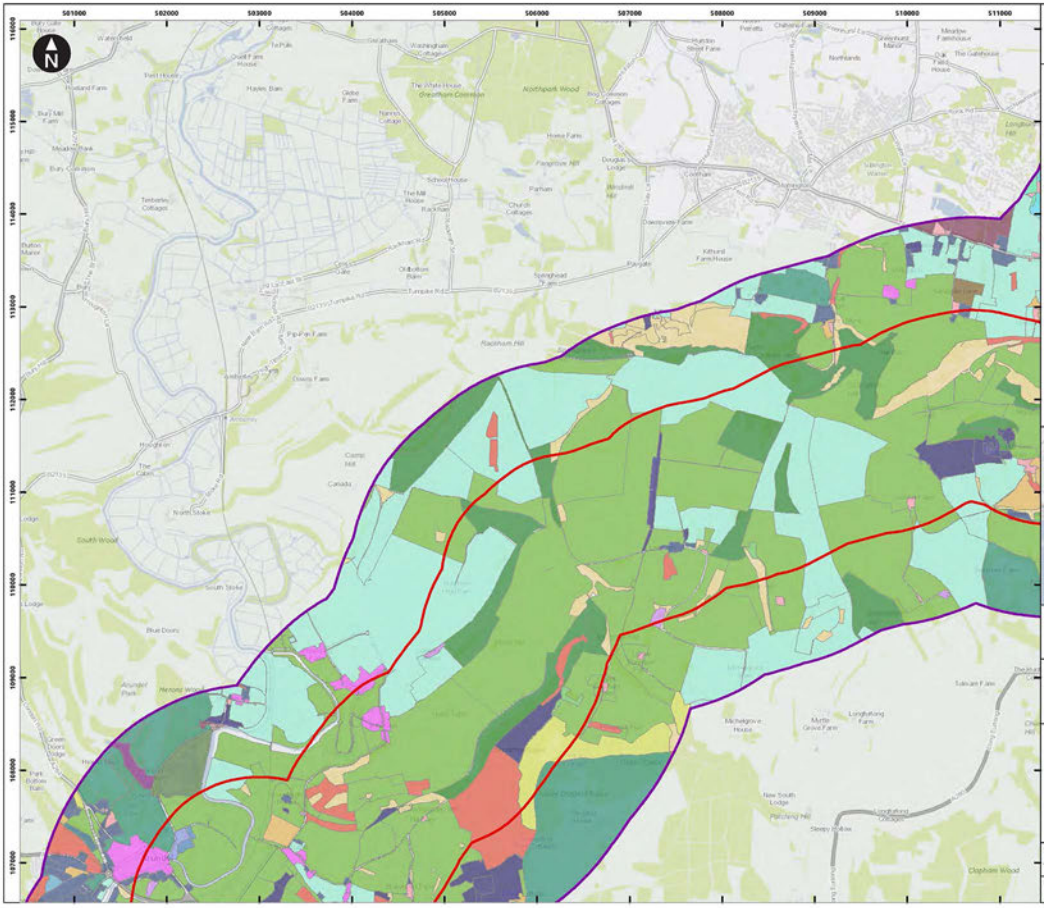


Key

- Scoping Boundary
- Study area

HLC types

- Airfields
- Ancient semi-natural
- Assarts
- Dunes
- Expansion - other
- Expansion - suburbs
- Formal enclosure (planned/private)
- Formal parkland
- Fort
- Golf courses
- Green
- Historic core
- Historic dispersed
- Informal fieldscapes
- Informal parkland
- Marinas
- Market gardens / allotments
- Motorway services (large areas of)
- Non-historic isolated
- Nursery(s) with greenhouse(s)
- Other industry
- Plantations
- Ponds
- Processing
- Regenerated
- Replanted ancient semi-natural
- Shingle & dunes
- Sports fields
- Stations & sidings



Key

- Scoping Boundary
- Study area

HLC types

- Ancient semi-natural
- Assarts
- Downland
- Expansion - other
- Expansion - suburbs
- Extraction
- Formal enclosure (planned/private)
- Formal parkland
- Golf courses
- Historic core
- Historic dispersed
- Informal fieldscapes
- Informal parkland
- Lakes
- Marsh fresh
- Non-historic isolated
- Other industry
- Other woodland
- Plantations
- Ponds
- Regenerated
- Replanted ancient semi-natural
- Sports fields
- Wooded over common

Kilometres
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1:35,000

Rampion Extension Development

RWE

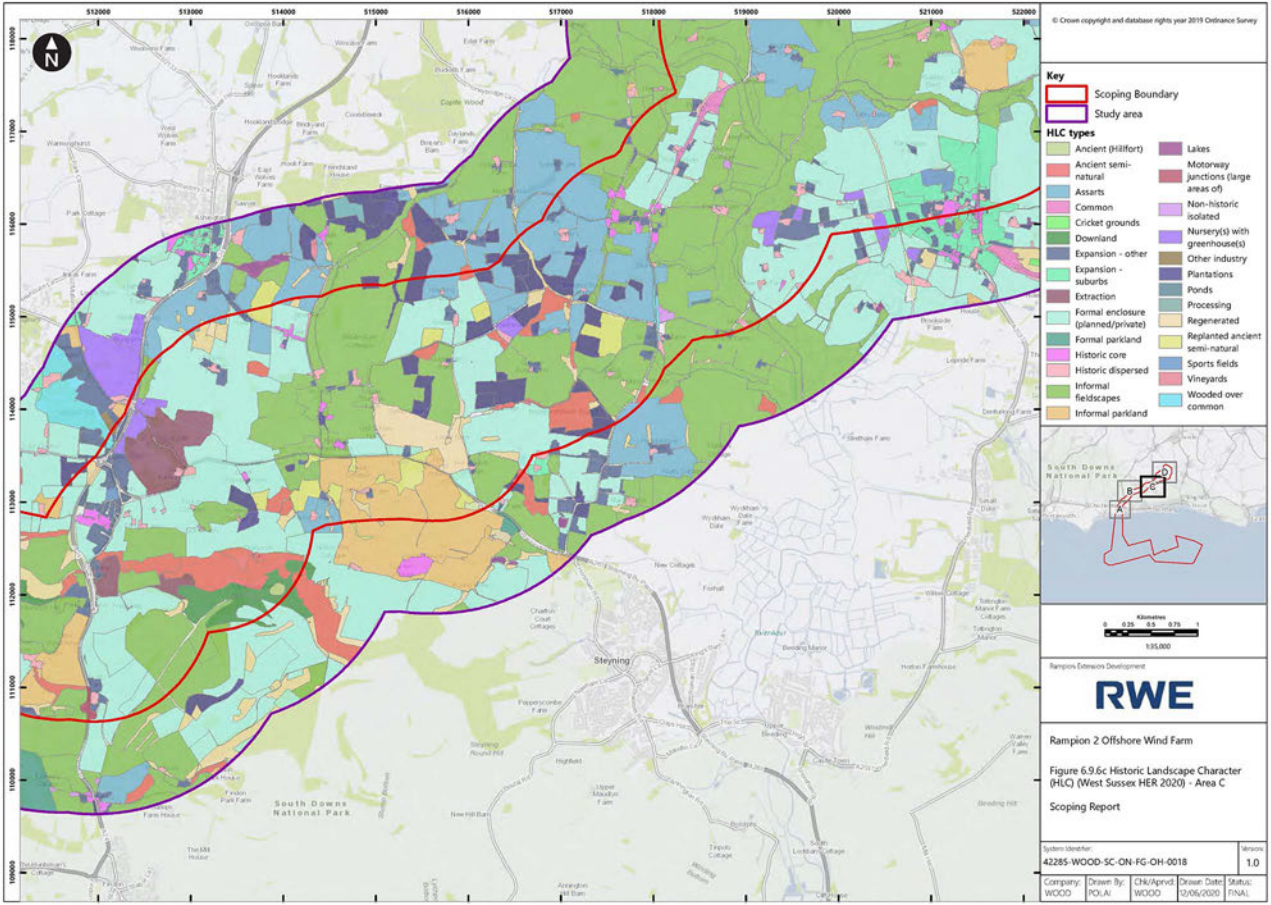
Rampion 2 Offshore Wind Farm

Figure 6.9.6b Historic Landscape Character (HLC) (West Sussex HER 2020) - Area B

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0017				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	12/06/2020	FINAL

ISO A3 Landscape



Rampion Extension Development

RWE

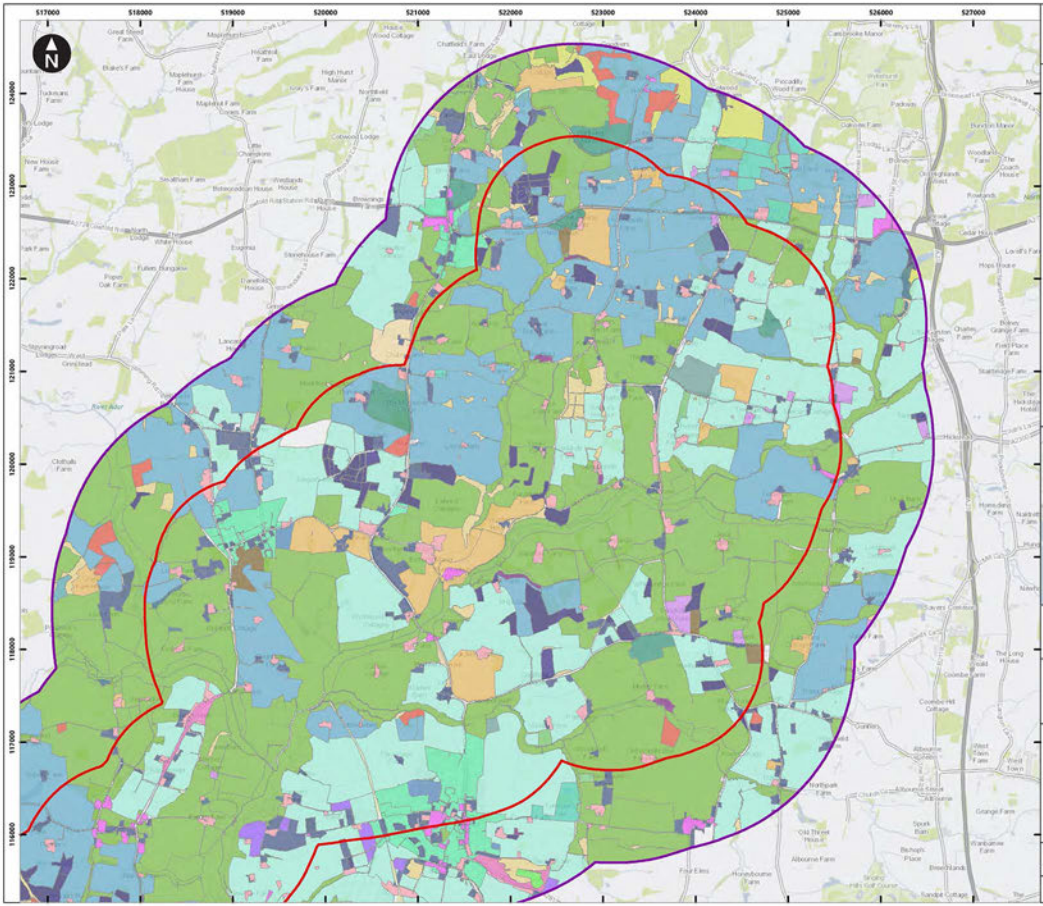
Rampion 2 Offshore Wind Farm

Figure 6.9.6c Historic Landscape Character (HLC) (West Sussex HER 2020) - Area C

Scoping Report

System Identifier:				Version
42285-WOOD-SC-ON-FG-OH-0018				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	12/06/2020	FINAL

ISO A3 Landscape



Key

- Scoping Boundary
- Study area

HLC types

- Ancient semi-natural
- Assarts
- Common
- Cricket grounds
- Expansion - other
- Expansion - suburbs
- Formal enclosure (planned/private)
- Formal parkland
- Historic core
- Historic dispersed
- Informal fieldscapes
- Informal parkland
- Lakes
- Non-historic isolated
- Nursery(s) with greenhouse(s)
- Orchard
- Other industry
- Other woodland
- Plantations
- Ponds
- Processing
- Racecourses
- Regenerated
- Replanted ancient semi-natural
- Sports fields
- Wooded over common

Kilometres
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1:35,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.9.6d Historic Landscape Character (HLC) (West Sussex HER 2020) - Area D

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OH-0019				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	12/06/2020	FINAL

ISO A3 Landscape

Basis for scoping assessment

6.9.48 The historic environment scoping assessment is based on the following key assumptions which are also set out in **Chapter 2: The Proposed Development**:

- the project and electrical infrastructure, including the temporary work areas, will be constructed inside the Scoping Boundary, as shown in **Figure 1.1;**
- that the export cable trench depth will be a target depth of approximately 1m, depending on cable burial risk assessment;
- up to four transition joint bays in the vicinity of landfall location;
- the onshore grid connection for Rampion 2 will be made via an underground cable along the entire length of the route;
- up to four onshore cable trenches, and jointing bays installed at regular intervals along the route;
- the cable construction corridor for surface trenching will be approximately 50m, though may also require widening beyond the standard width in predetermined locations to allow sufficient space for access at crossings, avoidance of obstacles, directional drilling, and the application of trenchless techniques. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects;
- on completion of construction, the construction corridor will be disassembled with the cables now buried and the haul road, any soil storage and stock fences removed. Access to the joint bays during operation will be maintained via agreements with landowners;
- the overall site footprint for the proposed onshore substation is anticipated to be up to 4.5 hectares (ha) and the exact location of the substation will be confirmed as the detailed design, the EIA process and landowner discussions progress;
- construction of the landfall is anticipated to be via a trenchless technique such as Horizontal Directional Drilling (HDD);
- the onshore construction compound associated with the landfall will be temporary in nature and reinstated after completion of the Proposed Development;
- up to 116 (10MW) or 75 (16MW) WTGs with a maximum tip height of up to 325m;
- up to three offshore substations; and
- the operational lifetime of Rampion 2 is assumed to be approximately 30 years. The decommissioning of the Proposed Development is anticipated to involve the removal of all offshore infrastructure above the seabed, and the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise environmental effects associated with removal.

Embedded environmental measures

6.9.49 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on historic environment (see **Table 6.9.5**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

6.9.50 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Table 6.9.5 Relevant historic environment embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length.	Development Consent Order (DCO) works plans, description of development and requirements.
C-2	Cables will be installed in ducting.	DCO works plans, description of development and requirements.
C-6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits.
C-21	Vegetation will be retained where possible. Where necessary vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas any vegetation removal will be undertaken under supervision and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally protected species is removed	Code of Construction Practice (COCP) and DCO articles / requirement.

ID	Environmental measure proposed	How the environmental measures will be secured
	sensitively and in a legally compliant way.	
C-24	Best practices air quality management measures will be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	COCP and DCO requirement.
C-33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users, and existing land users and will provide details of measures to protect environmental receptors.	COCP and DCO requirement.
C-79	Archaeological and paleoenvironmental mitigation will entail an agreed programme of archaeological recording and dissemination to mitigate any significant adverse effects during construction.	DCO requirement
C-80	Any loss of built heritage assets or historic landscape elements will be mitigated through an appropriate level of survey and recording, where avoidance or sensitive adaptation is not feasible.	DCO requirement
C-81	Loss or disturbance of historic landscape elements arising from temporary works will be mitigated, as far as possible, through sensitive design restoration and enhancements.	DCO requirement
C-82	Any significant effects on the settings of heritage assets will usually be mitigated as far as possible through sensitive design, landscape planting or screening.	DCO requirement

Likely significant effects

6.9.51 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and

available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.9.52 The likely significant effects on historic environment are summarised in **Table 6.9.6**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for historic environment effects, and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

6.9.53 This is a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, and therefore no longer considered is presented after the table, supported by evidence base.

Table 6.9.6 Likely significant historic environment effects

Activity (project phase)	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Construction					
Onshore land preparation (earthworks, excavation)	C-6	Potential effect from permanent loss of paleoenvironmental and archaeological remains.	**Scoped in. Detailed assessment.**	Non-designated heritage assets.	Onshore cable route corridor and substation location, detailed groundworks (footprint, method and associated activities relating to construction). National and local archive records. Historic mapping. Geotechnical information/data. Site visit. Possible archaeological investigations, scope of which to be confirmed through approved Written Scheme of Investigation (WSI).
Onshore land preparation (earthworks, excavation)	C-6 C-21	Potential loss of historic landscape elements. Further rationale provided in the section below.	**Scoped in. Simple assessment.**	Historic landscape character.	Onshore cable route corridor and substation location, detailed groundworks (footprint, method and associated activities relating to construction). National and local archive records. Historic

Activity (project phase)	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
					mapping. Geotechnical information / data. Site visit.
All construction phases	C-1 C-2 C-21 C-24 C-33	Potential for temporary change to setting caused during construction activities.	**Scoped in. Simple assessment.**	Heritage assets within the Scoping Boundary and extended study area.	Onshore cable route corridor and substation location, detailed groundworks (footprint, method and associated activities relating to construction). National and local archive records. Historic mapping. Site visit. Offshore WTG and substation design parameters.
Landfall construction phases and export cables (up to Mean High Water Springs)	C-6	Potential for impacts arising from change to coastal processes during construction.	**Scoped in. Detailed assessment.**	Heritage assets within the marine and intertidal zone.	Landfall and transition joint bay locations, detailed groundworks (footprint, method and associated activities relating to construction). National and local archive records. Historic mapping. Geotechnical information / data. Site visit. Possible archaeological investigations, scope of which to be confirmed through approved Written Scheme of Investigation (WSI).

Activity (project phase)	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Reinstatement	C-2 C-24 C-33	Potential for change to setting caused during reinstatement activities.	**Scoped in. Simple assessment.**	Heritage assets within extended study area.	Onshore cable route corridor location, detailed reinstatement works. National and local archive records. Historic mapping. Site visit.
Operation					
Onshore substation – all buildings and above ground infrastructure.	C-1 C-21 C-24	Potential for significant effect. Perceptual change to historic landscape.	**Scoped in. Simple assessment.**	Historic landscape character.	Substation location and design plans. National and local archive records. Historic mapping. Site visit.
Onshore substation – all buildings and above ground infrastructure, and offshore substation and WTGs.	C-1 C-21 C-24	Potential for change to setting caused during operation of the Project.	**Scoped in. Detailed assessment.**	Heritage assets within extended study area.	Substation location and design plans. National and local archive records. Historic mapping. Site visit.
Onshore landfall and cable route corridor.	None	**No likely significant effect.** Rationale	**Scoped out (paragraph 6.9.54)**	Heritage assets outwith 1km of the	N/A

Activity (project phase)	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		provided in the section below.		landfall and cable route corridor.	
Decommissioning					
Onshore substation – removal and reinstatement.	None	Potential for significant effect to setting caused during decommissioning of the Project.	**Scoped in. Detailed assessment**.	Heritage assets within 1km of substation.	Substation location and design plans. National and local archive records. Historic mapping. Site visit.
Onshore substation – removal and reinstatement.	None	**No likely significant effect.** Rationale provided in the section below.	**Scoped out (paragraph 6.9.54).**	Heritage assets outwith 1km of substation.	

Impacts scoped out of assessment

6.9.54 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out effect is considered in turn below.

6.9.55 The effects scoped out from further assessment in are presented in **Table 6.9.7**.

Table 6.9.7 Effects scoped out the assessment

Potential effect	Justification for scoping out
Adverse direct effects on heritage assets outwith the Scoping Boundary.	No direct disturbance, damage or alteration would arise to heritage assets within the Scoping Boundary.
Adverse effects arising through change to setting of heritage assets outwith the extended study area.	Perceptibility of the development in the setting of heritage assets located outwith the extended study area would be too limited for discernible adverse effects to arise.

Cumulative effects

6.9.56 Cumulative effects on historic environment resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been screened in as part of the CEA screening exercise.

6.9.57 The following impacts from Rampion 2 have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:

- effects on historic landscape character during construction and operation of onshore elements of the Proposed Development;
- effects on buried archaeological remains within construction footprint of onshore elements of the Proposed Development; and
- effects on significance of designated and non-designated heritage assets through changes to setting, both during construction and operation of the Proposed Development.

Transboundary effects

6.9.58 The potential effects from construction, operation (including maintenance) and decommissioning on historic environment receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

6.9.59 The study area will be revised following refinement of the onshore project components, the identification of additional impact pathways and in response to feedback from consultation, where appropriate.

6.9.60 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan process which as set out in **Section 4.3: Consultation and the evidence plan process**. Consultees are expected to include:

- Historic England;
- West Sussex County Archaeologist;
- Arun District Council Conservation Officer;
- Horsham District Council Conservation Officer; and
- South Downs National Park Authority.

6.9.61 Likely significant effects will be described, and the assessment will include consideration of potential significant cumulative effects as appropriate, as set out in **Section 4.4: Approach to the EIA.**

6.10 Water environment

Introduction

6.10.1 The water environment assessment will consider the potential likely significant effects on groundwater and surface water receptors, including flood risk receptors, that may arise from the construction, operation and decommissioning of the Proposed Development. This section of the Scoping Report presents information relevant to this assessment, namely a description of the methodology to be used within the EIA, an overview of the baseline conditions at the site based on publicly available baseline information, the datasets to be used to inform the EIA, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

6.10.2 The water environment aspect interfaces with many other aspects and as such should be considered alongside the following:

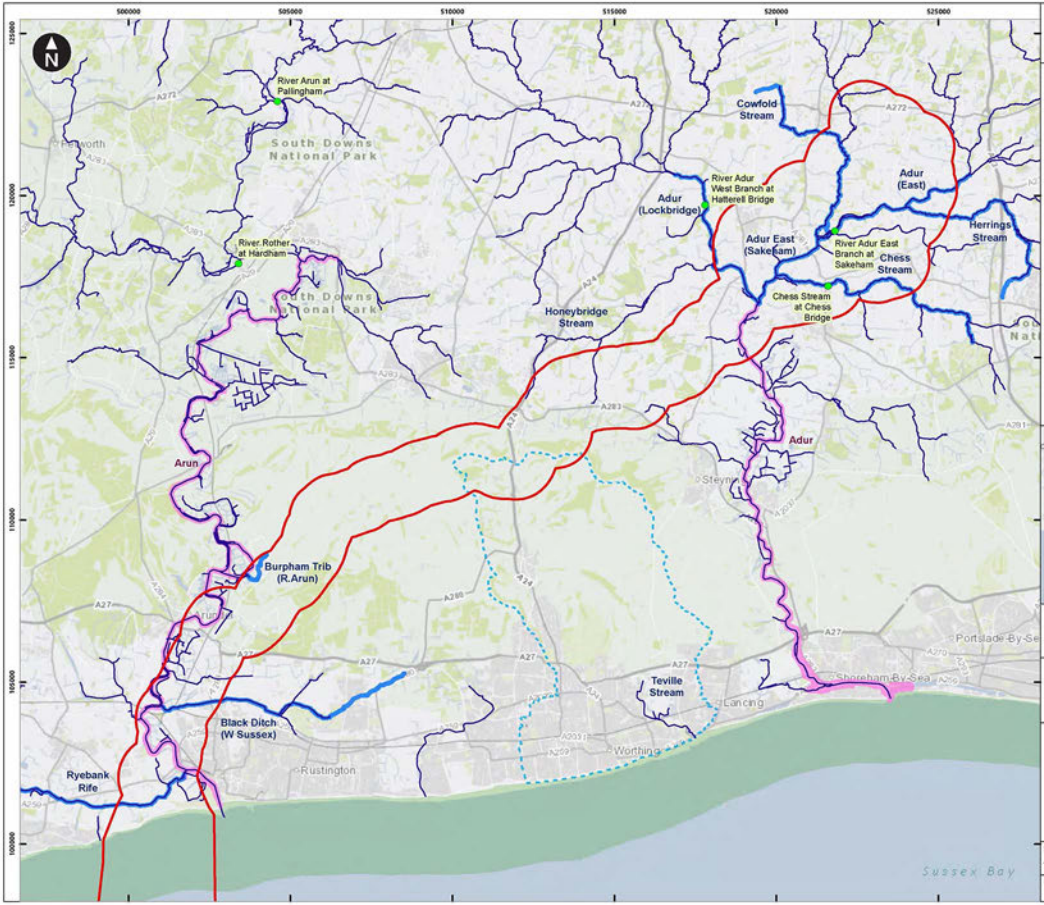
- **Section 6.6: Terrestrial ecology and nature conservation** which addresses impacts on designated sites and reach significance conclusions. It will be informed by the conclusions of the assessment on the water environment which supports these sites, and if required a specific water assessment of water-dependent sites will be undertaken to support the terrestrial ecology assessment; and
- **Section 6.8: Ground conditions** which addresses potential impacts on groundwater and surface water quality from the mobilisation of historical contamination and will reach conclusions on the significance of the introduction of new contaminants. The assessment will address the net impact on water quality.

Study area

6.10.3 The study area for the water environment assessment is defined as:

- The Water Framework Directive (WFD) surface water bodies (river and transitional) which are intersected by, and are downstream of, the Scoping Boundary (**Figure 6.10.1**); and
- the WFD groundwater bodies which the Scoping Boundary intersects (**Figure 6.10.2**).

6.10.4 The study area will be reviewed and amended in response to such matters as refinement of the onshore components and the identification of additional impact pathways, and also in response where appropriate to feedback from consultation.



Key

- Scoping Boundary
- WFD transitional waterbodies (Cycle 2)
- Coastal waterbodies
- Teville operational catchment boundary
- Rivers
- WFD river waterbodies (Cycle 2)
- River gauging locations

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

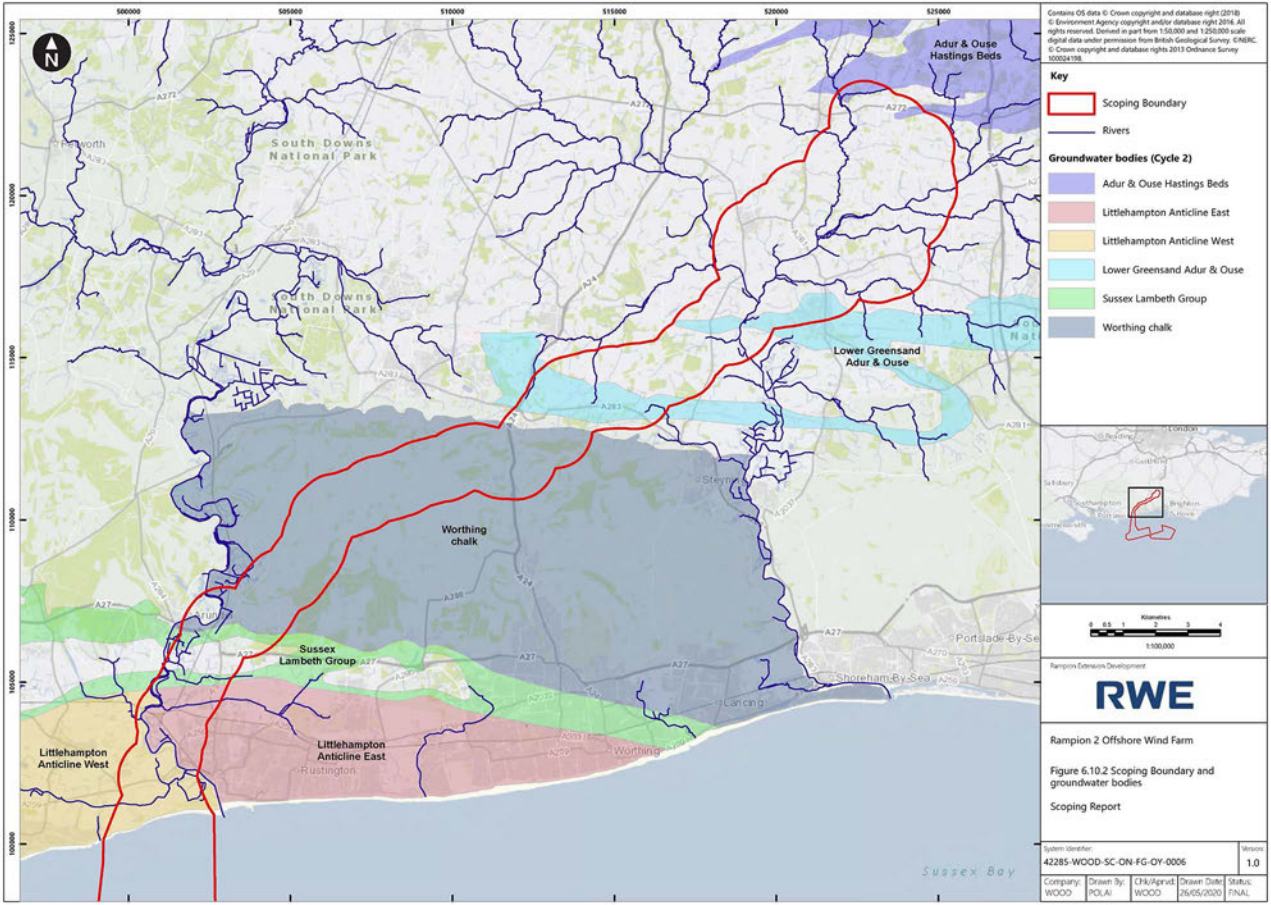
RWE

Rampion 2 Offshore Wind Farm

Figure 6.10.1 Scoping Boundary, WFD surface water bodies (river, transitional and coastal) and river flow gauging stations

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OY-0003				1.0
Company: WOOD	Drawn By: POLAI	Chk/Aprvd: WOOD	Drawn Date: 02/06/2020	Status: FINAL



Assessment methodology

Introduction

6.10.5 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4**, and specifically in **Section 4.4**. However, whilst this has informed the approach that has been used in this water environment section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the water environment assessment.

Significance evaluation methodology

6.10.6 The significance level attributed to each effect will be assessed based on the 'sensitivity' (value) of the affected receptor and the magnitude of change resulting from the development. The level of significance is then determined by the combination of sensitivity and magnitude.

6.10.7 Sensitivity is assessed on a scale of high, medium, low and very low, whilst magnitude is assessed on a scale of high, medium, low and negligible. The criteria for defining sensitivity and magnitude can be found in **Table 6.10.1** and **Table 6.10.2**, along with example applications. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including WFD, the National Planning Policy Framework (NPPF) and Design Manual for Roads and Bridges (DMRB), all of which represent good practice for water environment EIA.

Sensitivity of receptor

6.10.8 Definitions of receptor sensitivity used in the assessment are provided in **Table 6.10.1**, with examples of receptors that would be placed in each class.

Table 6.10.1 Definitions of receptor sensitivity

Sensitivity	Criteria	Examples
High	Features with a high yield, quality or rarity, with little potential for substitution.	Conditions supporting a site with an international conservation designation (for example, Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features.
	Water use supporting human health and economic activity at a regional scale.	Regionally important public surface water or groundwater supply (and associated catchment/Source Protection Zone (SPZ)/Groundwater Management Unit (GWMU)).
	Features with a high vulnerability to flooding.	Land use type defined as 'Essential Infrastructure' (for instance, critical national infrastructure, such as essential transport and

Sensitivity	Criteria	Examples
		utility infrastructure) and 'Highly Vulnerable' (for example, police / ambulance stations that are required to operate during flooding, mobile homes intended for permanent residential use) in the NPPF flood risk vulnerability classification.
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Conditions supporting a site with a national conservation designation (for example, Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. Water quality and hydro-morphology elements of WFD surface water body (or part thereof).
	Water use supporting human health and economic activity at a local scale.	Local public surface water and groundwater supply (and associated catchment/SPZ/GWMU) or permitted discharge. Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment / SPZ / GWMU) which is relatively large relative to available resource, or where raw water quality is a critical issue, for example: industrial process water, or permitted discharge.
	Features with a moderate vulnerability to flooding.	Land use type defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification (for example, hospitals and health centres, educational institutions, most types of residential development).
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Conditions supporting a site with a local conservation designation (for example, Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly / moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a Groundwater Dependent Terrestrial Ecosystem (GWDTE).
	Water use supporting human health and	Licensed non-public surface water and groundwater supply abstraction (and

Sensitivity	Criteria	Examples
	economic activity at household/individual business scale.	associated catchment / SPZ / GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, for example: cooling water, spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water and groundwater abstraction (and associated catchment) for example: private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Land use type defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (for example, most types of business premises, including land and buildings used for agriculture).
Very Low	Commonplace features with very low yield or quality with good potential for substitution.	Conditions supporting undesignated ecosystems or those with low sensitivity to water supply, such as a LWS, undesignated GWDTE or pond.
	Water use does not support human health, and of only limited economic benefit.	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) for example, livestock supply.
	Features that are resilient to flooding.	Land use type defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification (for example: flood control infrastructure; water transmission infrastructure), and undeveloped land.

Magnitude of change

6.10.9 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. **Table 6.10.2** provides examples of how various magnitudes of change could be determined with respect to water features.

6.10.10 Magnitude of change may be either positive or negative. The criteria and examples in **Table 6.10.2** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.

Table 6.10.2 Definitions of magnitude of change

Magnitude	Criteria	Examples
High	Results in complete loss or major change to feature, of sufficient magnitude to affect its use / integrity.	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs) or non-temporary downgrading (deterioration) of WFD surface water body status (including downgrading of individual WFD elements), or resulting in the inability of the surface water body to attain Good status by the relevant deadline in line with the measures identified in the River Basin Management Plan (RBMP). Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of WFD groundwater body status, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP. Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract. Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Medium	Results in partial loss or noticeable change to feature, of sufficient magnitude to affect its use / integrity in some circumstances.	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of surface water body status (including potential temporary downgrading of individual WFD elements), although not affecting the ability of the surface water body to achieve future WFD objectives. Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of WFD groundwater body status, although not affecting the ability of the groundwater body to achieve future WFD objectives. Moderate reduction in water availability and/or quality, which may compromise the

Magnitude	Criteria	Examples
		ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used. Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use / integrity in most circumstances.	Measurable effect on river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to WFD surface water body status (of overall status or element status). Measurable effect on groundwater levels, flows or water quality, but with no short-term or permanent downgrading of WFD groundwater body status. Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract. Change in flood risk resulting in potential for minor damage to property or infrastructure.
Negligible	Results in little or no change to feature, with insufficient magnitude to affect its use / integrity	No measurable effect on river flow regime, morphology or water quality, and no consequences in terms of COs or surface water body status. No measurable effect on groundwater levels, flows or water quality, and no consequences in terms of WFD groundwater body status. No measurable change in water availability or quality and no change in ability of the water user to exercise licensed rights. Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

6.10.11 During the assessment of effects for each identified receptor the sensitivity value in **Table 6.10.1** will be combined with the magnitude of change from **Table 6.10.2**

to produce an overall significance rating based on the evaluation matrix shown in **Table 6.10.3**. A 'significant' effect is assessed as a Major rating whereas a Moderate rating will be considered to be 'potentially significant' at this stage of the EIA process. The latter will be subject to further investigation as part of the PEIR and ES following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

Table 6.10.3 Significance evaluation matrix

		Magnitude of change			
		High	**Medium**	**Low**	**Negligible**
Sensitivity	**High**	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Significant/ Not Significant)	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Baseline conditions

Data sources

6.10.12 The sources of baseline information used in this Scoping Report are documented in **Table 6.10.4**.

Table 6.10.4 Key sources of water environment data

Source	Date	Summary	Coverage of study area
Aerial Photography	27/04/2020 - 01/05/2020	On-line maps and aerial photography, at: https://gridreferencefinder.com/ https://www.bing.com/maps	Full coverage of the Scoping Boundary
Ordnance Survey (OS)	27/04/2020 - 01/05/2020	OS topographic maps, 1:25,000 and 1:50,000 scale, and https://gridreferencefinder.com/ OS mapping.	Full coverage of the Scoping Boundary

Source	Date	Summary	Coverage of study area
		Identification of watercourses, springs, lakes and ponds and other water features.	
Meteorological Office (Met Office)	27/04/2020	Annual rainfall averages, at: https://www.metoffice.gov.uk/	Full coverage of the Scoping Boundary
Environment Agency	27/04/2020 - 01/05/2020	Environment Agency Flood Map for Planning map, at: https://flood-map-for-planning.service.gov.uk/ RBMP maps, aquifer vulnerability and status, WFD water body status, Nitrate Vulnerable Zones (NVZs) within the Environment Agency RBMP (2016 cycle 2) information, via the Environment Agency Catchment Data Explorer, at: http://environment.data.gov.uk/catchment-planning/ Summary of water availability at WFD water body scale from the Arun and Western Streams Abstraction Licensing Strategy (March 2019) and The Adur and Ouse Catchment Abstraction Management Strategy (March 2005). GWDTE dataset for England, at: https://data.gov.uk/dataset/72a149a2-1be7-441f-bc37-94a77f261e27/groundwater-dependent-terrestrial-ecosystems-england-only SPZ data.	Full coverage of the Scoping Boundary and downstream hydrological catchments
Centre for Ecology and Hydrology (CEH)	27/04/2020	Summary river flow statistics for Environment Agency flow gauges from the online National River Flow Archive (NRFA), at: http://www.ceh.ac.uk/data/nrfa/data/search.html Land-use maps (United Kingdom Centre for Ecology and Hydrology (UKCEH) Land Cover Map 2015 dataset), at: https://eip.ceh.ac.uk/hydrology/water-resources/	Full coverage of the Scoping Boundary

Source	Date	Summary	Coverage of study area
British Geological Survey (BGS)	29/04/2020	Geological mapping and observation borehole data from the BGS Geology of Britain Viewer, the BGS Onshore GeoIndex, BGS Memoirs and the 1:625 000 scale Hydrogeological Map of England and Wales. BGS Geology of Britain Viewer, at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html BGS Onshore GeoIndex, at: http://mapapps2.bgs.ac.uk/geoindex/home.html Hydrogeological mapping, at: http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=south-downs.jp2 http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=england-wales.jp2 Location of water wells and borehole and geological logs.	Full coverage of the Scoping Boundary
Department for Farming and Rural Affairs (Defra)	29/04/2020	Interactive maps from the MAGIC natural environment map viewer, at: http://www.magic.gov.uk/ Aquifer Designations. Statutory and non-statutory designated nature conservation sites.	Full coverage of the Scoping Boundary
Natural England	01/05/2020	Conservation sites and SSSI citations and information from the Natural England website, at: http://www.sssi.naturalengland.org.uk/	Full coverage of the Scoping Boundary
Cranfield University	01/05/2020	Soil types, at: http://www.landis.org.uk/soilscapes/	Full coverage of the Scoping Boundary

Baseline

Climate

6.10.13 The Met Office website holds the latest set of 30-year rainfall averages, covering the period 1981-2010. Average annual rainfall of 722.7mm/a and 725.1mm/a are recorded for climate stations at Shoreham Airport (10km southeast of the Scoping Boundary) and Bognor Regis (5km west of the Scoping Boundary) respectively. The Shoreham Airport climate station is located within the River Arun catchment, whilst the Bognor Regis climate station is located within the Arun and Western Streams Catchment. Overall values for the Southeast England and Central

Southern England areas are given on the Met Office website as 787.6mm/a, indicating that the Scoping Boundary is likely to have a lower-than-average rainfall for the area.

Topography and watercourses

6.10.14 The Scoping Boundary extends approximately 36km from landfall at Climping in the River Arun catchment to a substation in the proximity of Bolney in the River Adur catchment (**Figure 6.10.1**). The route covers a varied terrain, from a flat and low-lying coastal area from Climping to Arundel across the South Down hills to Washington, where elevations rise to Harrow Hill at 167 metres Above Ordnance Datum (mAOD). From Washington the cable corridor drops down into the River Adur valley where elevations are typically only between 10 to 30mAOD. Land-use within the Scoping Boundary is predominantly arable and improved grassland (from the UKCEH Land Cover Map 2015 dataset).

River Arun Catchment

6.10.15 The River Arun is tidal as it flows through the Scoping Boundary (**Figure 6.10.1**). Its freshwaters are derived from the series of small streams that form its source in the area of St Leonard's Forest in the Weald, to the northeast of the Scoping Boundary. The River Arun becomes tidally influenced approximately 3km upstream of the confluence with the River Rother at Pulborough. It then flows south through a gap in the South Downs to Arundel and on into the English Channel at Littlehampton. The southwestern part of the Scoping Boundary covers the meandering flood plain stretch of the River Arun from the coast to Arundel. This section of the cable corridor is also the most developed with commercial, industrial and public open space found alongside. The River Arun is joined by two tributaries in this area, namely Ryebank Rife which terminates at the dockside area in Littlehampton, and Black Ditch.

6.10.16 There are no river flow gauges on the tidal portion of the Arun that flows through the Scoping Boundary, however there are two gauges (on the Arun and Rother) just upstream of the tidal limit (**Figure 6.10.1**). The summary statistics for these are presented in **Table 6.10.5**.

Table 6.10.5 Selected river flow gauges in the Arun catchment

Gauge Reference	Gauge Name	Water-course	NGR	Catchment Area (km^2)	Mean flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of record
41009	Hardham	Rother (Arun Catchment)	TQ034179	346	4.451	10.3	1.083	0.64	1959 - 2018
41014	Pallingham	Arun	TQ046229	379	4.107	10.24	0.275	0.29	1970-2018

6.10.17 Rivers draining impervious clay catchments typically have baseflow indices (BFI) in the range 0.15 to 0.35, whereas most Chalk streams have a BFI greater than 0.9 as a consequence of the high groundwater component in the river discharge. The relatively low BFI in **Table 6.10.5** are a reflection of the mix of Chalk and clays in the upper Arun catchment. The tidal section which flows through the Scoping Boundary is likely to have a higher groundwater inflow component due to the presence of the Chalk in the lower catchment.

River Adur Catchment

6.10.18 The River Adur and its tributaries drain the Low Weald area through the South Downs, and the main river flows south, entering the English Channel at the urban centre of Shoreham-by-Sea, approximately 11.5km south of the Scoping Boundary. The entire catchment of the River Adur is extensive, in excess of 600km^2, and within its upper reaches is underlain by the Weald Clay and is largely rural with few built-up areas of population. Approximately 15% of the River Adur catchment lies within the Scoping Boundary, and this part of the catchment comprises low-lying rolling hills of arable land.

6.10.19 A number of rivers and tributaries of the River Adur converge to the northwest of Henfield within the Scoping Boundary, and the Adur is tidally influenced downstream of this confluence. The River Adur (East) and Herrings Stream and Cowfold Stream enter the north of the Scoping Boundary from the east and north of the area respectively. The Cowfold Stream bifurcates and joins the River Adur (East) around Shermanbury Place and recombines into one channel, the River Adur East (Sakeham), which flows southwest through the Scoping Boundary. Further downstream the tributaries of Chess Stream and the River Adur (Lockbridge) join the main River Adur channel northwest of Henfield before flowing south.

6.10.20 There are no river flow gauges on the tidal portion of the Adur that flows through the Scoping Boundary, however there are three gauges (on the two branches of the Adur and the Chess Stream) just upstream of the tidal limit (**Figure 6.10.1**). The summary statistics for these are presented in **Table 6.10.6**.

Table 6.10.6 Selected river flow gauges in the Adur catchment

Gauge Reference	Gauge Name	Water-course	NGR	Catchment Area (km^2)	Mean flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of record
41012	Sakeham	Adur East Branch	TQ218189	93	1.325	2.97	0.159	0.34	1967 – 2018
41010	Hatterell Bridge	Adur West Branch	TQ178197	109.1	1.16	3.468	0.025	0.3	1961-2005
41028	Chess Bridge	Chess Stream	TQ216172	24	0.273	0.633	0.021	0.39	1964 – 2018

Table notes:

Source: NRFA (Ref. https://nrfa.ceh.ac.uk/data/search)

[1]Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.

[2]Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.

[3]BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff.

Geology

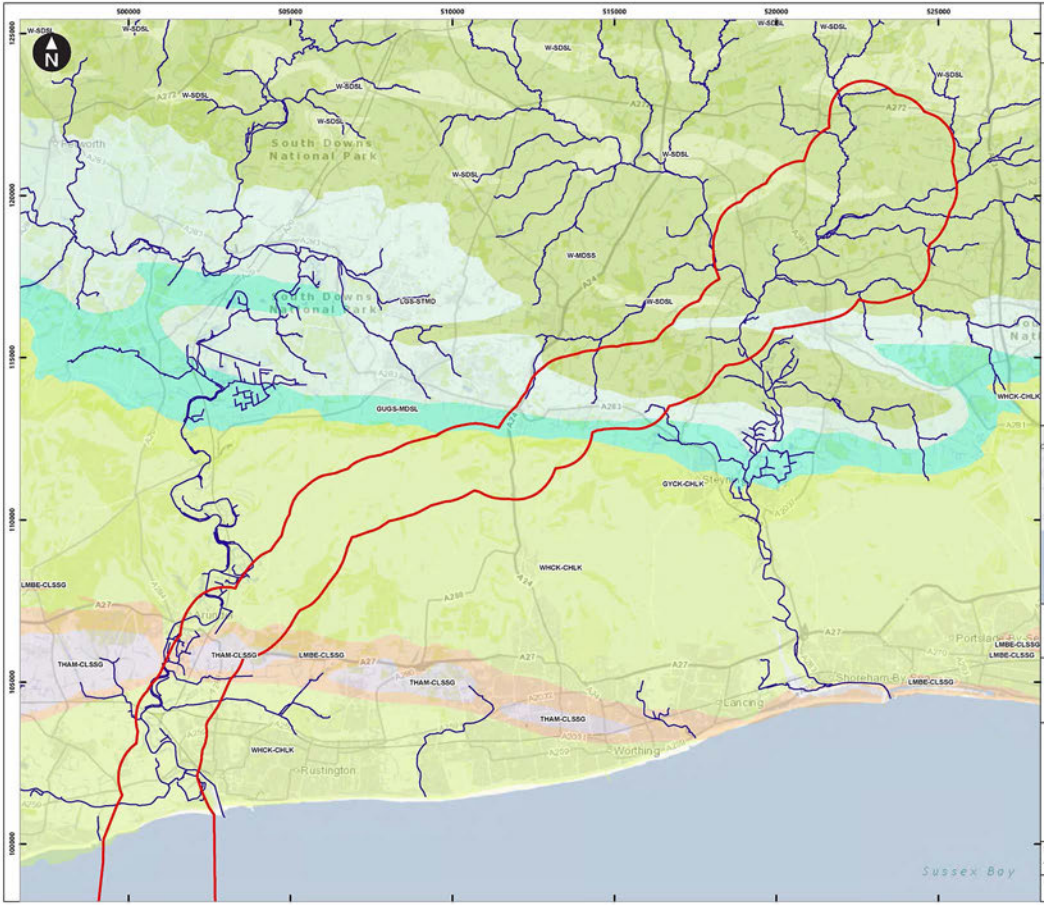
6.10.21 The solid geology (**Figure 6.10.3**) beneath the first few kilometres of the Scoping Boundary inland from the landfall comprises predominately Chalk overlain by a narrow band of Thames Group (London Clay Formation) and Lambeth Group strata just south of Arundel. The Thames Group is composed of clay, silt and sands, and along with the Chalk form low-lying land along the coast. The Lambeth Group comprises a complex of vertically and laterally varying gravels, sands, silts and clays.

6.10.22 The superficial deposits (**Figure 6.10.4**) are widespread within the coastal region and along the River Arun. The coastal deposits comprise beach, head and raised beach clay, silt, sand and gravels as well as blown sand deposits. Inland, Alluvium clay, silt, sand and peat and River Terrace sand and gravel deposits extend to Arundel. Significant areas of superficial thickening are indicated in boreholes up to 20 to 30m depth along the line of the River Arun.

6.10.23 The central section of the Scoping Boundary is underlain by Chalk forming the higher elevated topography of the South Downs between Arundel and Washington. Superficial deposits in this area are largely absent, with narrow bands of Head clay, silt, sand and gravel deposits occurring along the base of the valleys. Some larger patches of superficial Clay-with-Flints Formation and Head clay, silt, sand and gravel deposits are present 4km to the east of Arundel, on the slopes and at the base of the South Downs.

6.10.24 To the northeast of the Scoping Boundary area the Gault Formation, the Upper and Lower Greensand Formations and the Weald Clay Formation form the bedrock within the Weald. In this area superficial deposits comprise patches of clay, silt, sand and gravel Head deposits and Alluvium clay, silt, sand and peat and River Terrace sand and gravel deposits. The Alluvium deposits follow the route of the River Adur and its associated tributaries.

6.10.25 The bedrock across most of the north of the Scoping Boundary, including the South Downs Chalk, dips at a shallow angle to the south, and forms the southern limb of the so-called Weald Anticline. Within the south of the Scoping Boundary along the coast, the Chalk reappears due to an east to west trending synclinal fold just to the south of Arundel, with the Thames and Lambeth Group strata forming the ‘core’ of the structure. No major faulting is shown across the Scoping Boundary area on BGS mapping, apart from some east to west trending inferred minor faulting northeast of the South Downs.



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Key

- Scoping Boundary
- Rivers

Bedrock

THAM-CLSSG	Thames Group - Clay, silt, sand and gravel
LMBE-CLSSG	Lambeth Group - Clay, silt, sand and grave
GYCK-CHLK	Grey Chalk Subgroup-
WHCK-CHLK	White Chalk Subgroup -
GUGS-MDSL	Gault Formation And Upper Greensand Formation (undifferentiated) - Mudston, sandstone and limestone
LGS-STMD	Lower Greensand Group - Sandstone and mudstone
W-MDSS	Wealden Group - Mudstone, siltstone and sandstone
W-SDSL	Wealden Group - Sandstone and siltstone, interbedded

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

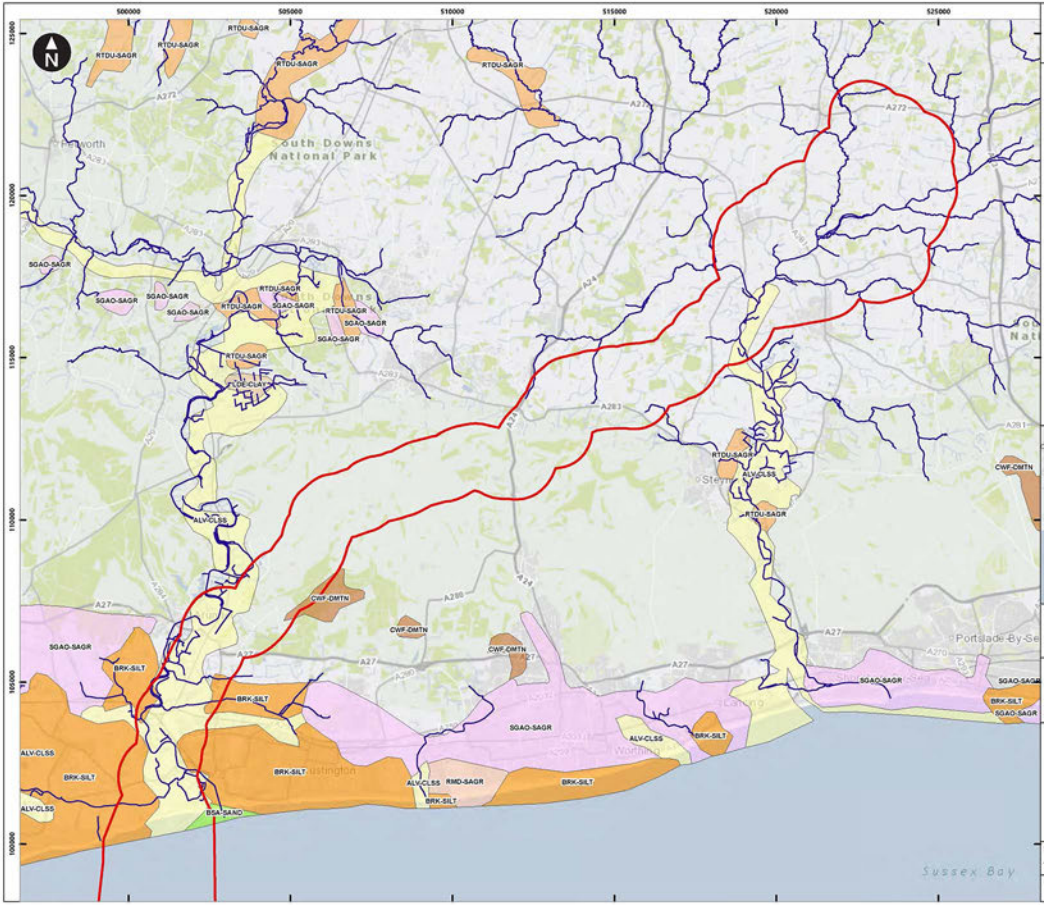
Rampion 2 Offshore Wind Farm

Figure 6.10.3 Scoping boundary and solid geology

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OY-0001				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	26/05/2020	FINAL

ISO A3 Landscape



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Based upon BGS 1:625000 scale SUPERFICIAL GEOLOGY UK (with)sion of the British Geological Survey

Key

- Scoping Boundary
- Rivers

Superficial geology

ALV-CLSS	Alluvium; Clay, silt and sand
BRK-SILT	Brickearth; Silt
BSA-SAND	Blown sand; Sand
CWF-DMTN	Clay with flints; Diamicton
LDE-CLAY	Lacustrine deposits (undifferentiated); Clay
RMD-SAGR	Raised marine deposits (undifferentiated); Sand and gravel
RTDU-SAGR	River terrace deposits (undifferentiated); Sand and gravel
SGAO-SAGR	Sand and gravel of uncertain age and origin; Sand and gravel

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.10.4 Scoping Boundary and superficial geology

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-ON-FG-OY-0002				1.0
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	POLAI	WOOD	26/05/2020	FINAL

ISO A3 Landscape

Aquifer status and hydraulic properties

6.10.26 The Defra MAGIC website Aquifer Designation Map identifies the Chalk as a Principal aquifer[41] and other predominantly sandstone strata within the Scoping Boundary, such as the Lambeth Group and Lower Greensand Formation as a Secondary A Aquifers[42]. The Lower Greensand Formation is also identified as a "highly productive and extensive aquifer" in which the flow is dominantly intergranular and can yield up to 50l/s. The Thames Group and the Gault Formation are indicated as unproductive strata. Within the River Adur catchment and in the northeast of the Scoping Boundary area the Weald Clay Formation (sandstone) and Weald Clay Formation (mudstone) are shown as a Secondary A Aquifer and unproductive strata respectively.

6.10.27 The 1:625,000 scale Hydrogeological map of England and Wales indicates that groundwater level fluctuation is common within the top 80m of the Chalk. The map shows groundwater levels as typically between 30 and 60mAOD on the South Downs (over 100 metres below ground level (mbgl) at higher elevations) trending to 0mAOD or below within the Chalk along the coastal area.

6.10.28 The Chalk forms a well-drained terrain with lime-dominated top soils that are often very shallow and can sustain limited vegetation cover. Rain can easily infiltrate through the thin soils to the underlying Chalk aquifer, with groundwater emerging along a scarp-slope spring line further downstream towards the lower reaches of the River Arun and River Adur catchments.

6.10.29 Groundwater flow lines on the 1:100,000 scale Hydrogeological map of the South Downs are indicated along the valleys, where higher Chalk transmissivity (permeability-dependent) is reported. Close to the River Adun and River Adur valleys the groundwater contours indicate flow towards the watercourse, but away from this influence groundwater flow is predominantly to the south towards the coast. Groundwater from the Chalk is likely to discharge into the river as baseflow at a relatively constant rate throughout much of the year. However, when groundwater levels rise groundwater flooding can occur, particularly in the broad Chalk valleys.

6.10.30 The 1:100,000 scale Hydrogeological map also shows the groundwater levels within the Lower Greensand Formation ranging from greater than 60mAOD within the southwest to below 0mAOD in the northeast (approximately between 100 to 20mbgl respectively) of the outcrop with groundwater flow to the north or northeast.

6.10.31 The online BGS GeoIndex Viewer describes the Weald Clay Formation in the northeast of the Scoping Boundary as being essentially impermeable and generally having no groundwater except at shallow depths. The predominantly

[41] These are layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
[42] These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

thick clayey sequence with subordinate sandstones may occasionally support domestic water supplies.

6.10.32 The Weald Clay retards infiltration and is further characterised by standing surface water features and higher rates of surface flow at times of heavy rainfall. Consequently, flow in the River Adur can respond rapidly to rainfall.

6.10.33 With respect to superficial deposits aquifer status, the MAGIC website identifies the Alluvium as a Secondary A Aquifer and the Clay-with-Flints Formation (clay, silt, sand and gravel) within the south of the Scoping Boundary as a Secondary (undifferentiated) Aquifer. Head (clay, silt, sand and gravel) and Alluvium / River Terrace deposits within the northeast of the Scoping Boundary area are designated as a Secondary (undifferentiated) Aquifer and Secondary A Aquifer respectively.

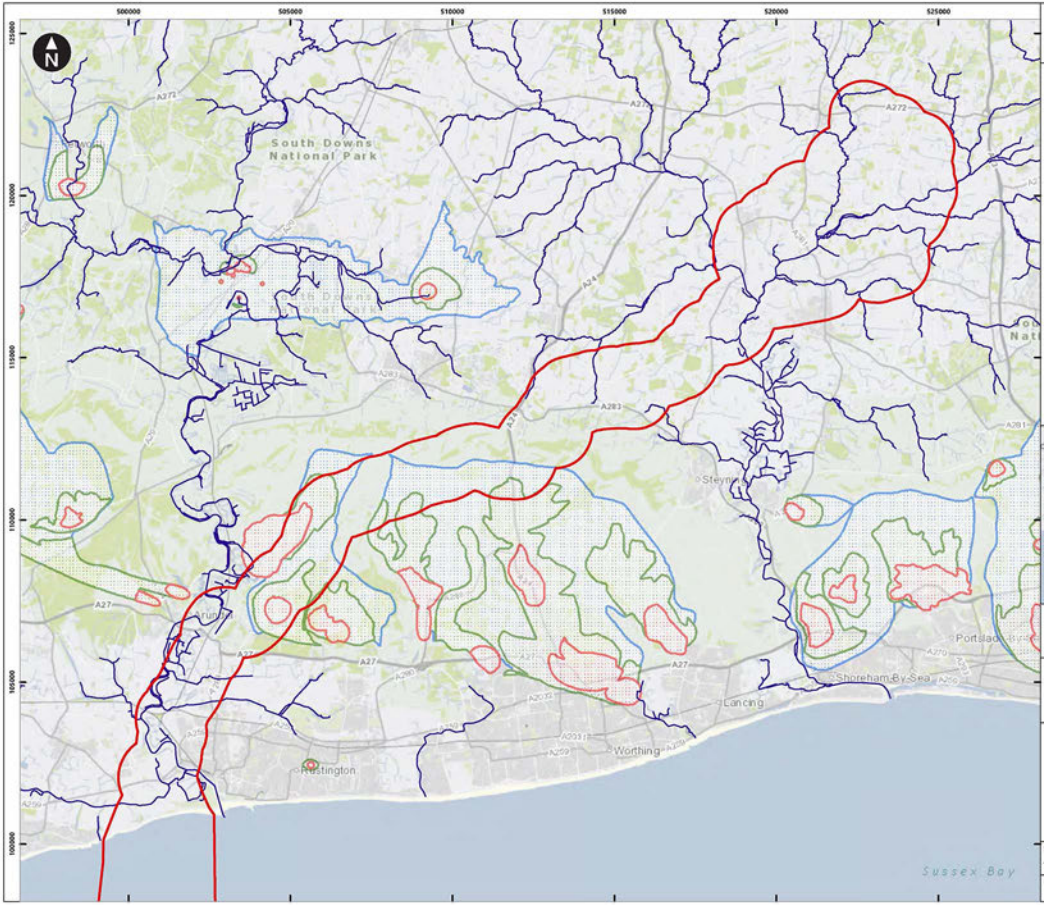
Abstractions and discharges

6.10.34 Abstraction licence and discharge consent details have been requested from the Environment Agency for based on the WFD surface water body areas and their intersection with the Scoping Boundary, whilst private water supply data have been requested from relevant Local Authorities. In addition, a list of historical and current abstractions and discharges will be obtained from an Envirocheck data check (2020) within the Scoping Boundary.

6.10.35 Historical water well locations are shown within BGS online mapping. A number of wells at a range of depths are identified within the River Arun valley in the south of the Scoping Boundary. The South Downs area covered by the Scoping Boundary has a number of water wells drilled to depths of greater than 30m, whilst a few wells within the Weald are shallow and likely to be sourcing water from the superficial deposits. Each of these sites are possible current abstraction wells.

6.10.36 The MAGIC website (**Figure 6.10.5**) identifies a number of SPZs (two - Inner Protection Zones, four Outer Protection Zones and two Total Catchment Zones[43]) truncated by the Scoping Boundary area, all within the South Downs and associated with Chalk abstractions. The two Inner Protection Zone areas are centred around Burpham and Warningcamp. These areas are also designated as drinking water safeguard zones. Details of the abstractions linked to these SPZs will be provided after responses to the Environment Agency data requests are obtained.

[43] SPZ protection zones are defined within: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/822402/Manual-for-the-production-of-Groundwater-Source-Protection-Zones.pdf



Key

- Scoping Boundary
- Rivers

Source Protection Zones (SPZ)

- Zone I - Inner protection zone
- Zone II - Outer protection zone
- Zone III - Total catchment
- Zone of special interest

Kilometres
0 0.5 1 2 3 4
1:100,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.10.5 Scoping Boundary and Source Protection Zones (SPZ)

Scoping Report

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Water quality

6.10.37 Surface water and groundwater quality data have been requested from the Environment Agency. The Scoping Boundary is situated in mainly rural catchments and groundwater quality pressures arise predominantly from diffuse pollution from rural sources. This is especially true for the area underlain by the Chalk within the South Downs and more permeable strata of the Weald, northeast of Henfield, all of which are categorised as NVZs. There are also localised pressures as a result of historical and current activities within more urban areas.

6.10.38 Further information on catchment water quality can be found with respect to WFD water body status, below.

WFD water body status

6.10.39 The current (2016) status of all WFD water bodies within the Scoping Boundary are presented in **Table 6.10.7**, together with an indication of which water bodies relate to which parts of the Scoping Boundary.

Table 6.10.7 Water Framework Directive water bodies across the Scoping Boundary

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
Ryebank Rife (GB107041006620) **Arun and western Streams**	River	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Dissolved oxygen	No data available	Southern coastal area
Black Ditch (West Sussex) GB107041012890 **Arun and western Streams**	River	Poor Status (2016): Poor Ecological Potential, Good Chemical Status	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Sediment and morphology	Southern coastal area
Burpham Tributary (River Arun) GB107041011990 **Arun and western Streams**	River	Moderate status (2016): Moderate Ecological Status, Good Chemical Status	Ecological: Dissolved oxygen - Poor	No data available	Southern coastal area

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
Littlehampton Anticline East GB40701G503400	Groundwater	Good status (2016): Good Quantitative Status, Good Chemical Status	n/a	n/a	Southern coastal area
Littlehampton Anticline West GB40701G504900	Groundwater	Poor status (2016): Poor Quantitative Status, Good Chemical Status	Quantitative Dependent Surface Water Body Status	No data available	Southern coastal area
Sussex Lambeth Group GB40701G505100	Groundwater	Poor status (2016): Poor Quantitative Status, Good Chemical Status	Quantitative Dependent Surface Water Body Status	No data available	Southern area
Worthing Chalk GB40701G505300	Groundwater	Poor Status (2016): Poor Quantitative Status, Poor Chemical Status	Quantitative Water Balance, Quantitative Dependent Surface Water Body Status Chemical Drinking Water Protected – fail, General Chemical Test – fail	Pollution from rural areas	Southern area

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
Honeybridge Stream GB107041012120 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Poor Chemical Status	Macrophytes and Phytobenthos Combined – Moderate, Fish – Poor, Phosphate - moderate	Pollution from rural areas; Pollution from waste water; Physical modifications	Central area
Adur Lockbridge GB107041012200 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Pollution from rural areas; Pollution from waste water; Physical modifications	Northeast area
Adur East (Sakeham) GB107041012900 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate, Phosphate - Moderate	Pollution from waste water; Physical modifications	Northeast area
Adur East, GB107041012180 **Adur and Ouse**	River	Poor status (2016): Moderate Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate, Dissolved	Pollution from waste water	Northeast area

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
			Oxygen – Moderate, Phosphate - Bad		
Chess Stream GB107041012110 Adur and Ouse	River	Moderate Status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate, Fish - Moderate	Pollution from waste water	Northeast area
Cowfold Stream GB107041012260 Adur and Ouse	River	Moderate Status (2016): Poor Ecological Status, Good Chemical Status	Ecological: Macrophytes and Phytobenthos Combined -Poor Chemical: Phosphate - Moderate	Pollution from rural areas Pollution from waste water	Northeast area
Herrings Stream GB107041012150 Adur and Ouse	River	Moderate Status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Poor, Phosphate - Moderate	Pollution from waste water; Physical modifications	Northeast area

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
Lower Greensand Adur and Ouse GB40701G502400	Groundwater	Good Status (2016): Good Quantitative Status, Good Chemical Status	n/a	n/a	Northeast area
Adur & Ouse Hastings Beds GB40702G502000	Groundwater	Good Status (2016): Good Quantitative Status, Good Chemical Status	n/a	n/a	Northeast area
Teville Stream GB107041011940 **Treville**	River (HMWB - Urbanisation)	Moderate Status (2016): Bad Ecological Status, Good Chemical Status	Mitigation Measures Assessment - Moderate or less, Fish – Bad, Ammonia (Physical-Chemical) – Moderate, Dissolved oxygen - Bad	Physical modifications; Pollution from towns, cities and transport; Non-native invasive species	Central Southern Area
Arun Lower GB540704105000 **South East TraC**	Transitional (HMWB – Flood Protection)	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Mitigation Measures Assessment – Moderate or less	Physical modifications	Southern area

Water Body ID / Management catchment	Water Body type	Status	Supporting Elements, less than Good Status / Potential	Issues Preventing the Attainment of Good Status	Area of Scoping Boundary
Adur GB540704116000 **South East TraC**	Transitional (HMWB – Flood Protection)	Moderate Status (2016): Moderate Ecological Potential, Fail Chemical Status	Mitigation Measures Assessment – Moderate or less, Angiosperms – Moderate, Fish – Moderate, Tributyltin Compounds - Fail	Physical modifications	Northeast area
Sussex GB640704540003 **South East TraC**	Coastal (HMWB – Coastal Protection)	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Ecological: Mitigation Measures Assessment – Moderate or less	Physical modifications	Southern boundary

6.10.40 The southern portion of the Scoping Boundary falls withing the Lower Arun Operational Catchment. In this location this comprises the following WFD water bodies:

- three surface water bodies, namely Black Ditch (West Sussex), Burpham Tributary (River Arun) and Ryebank Rife (**Figure 6.10.1**); and
- four groundwater bodies, namely the Littlehampton Anticline West and East, the Sussex Lambeth Group and the Worthing Chalk (**Figure 6.10.2**).

6.10.41 Most of these water bodies did not attain the WFD target of Good status (with the exception of the Littlehampton Anticline East groundwater body) as a result of issues associated with quantitative supply to surface water bodies and ecological and physico-chemical quality issues, such as dissolved oxygen. The Worthing Chalk groundwater body has an overall status of Poor due to both quantitative and chemical issues.

6.10.42 The Upper Adur Operational Catchment is coincident with the central and north eastern part of the Scoping Boundary. This catchment is associated with a number of WFD water bodies:

- Seven surface water bodies, namely Honeybridge Stream, Adur Lockbridge, Adur East (Sakeham), Adur East, Chess Stream and Cowfold Stream, and Herrings Stream (**Figure 6.10.1**); and
- Two groundwater bodies, namely the Lower Greensand Adur and Ouse, and Adur and Ouse Hastings Beds groundwater bodies (**Figure 6.10.2**).

6.10.43 None of the surface water bodies within these catchment areas are designated as artificial or Heavily Modified Water Bodies (HMWBs), indicating that their physical characteristics have not been substantially modified in order to accommodate human activities. However, it appears that they are subject to levels of water quality pressure that result in the current failure to attain Good ecological status, primarily from elevated phosphate impacting macrophytes, Phytobenthos and fish populations. The WFD Lower Greensand Adur and Ouse, and Adur and Ouse Hastings Beds groundwater bodies present a band beneath the central and extreme north eastern part of the Scoping Boundary respectively and both these bodies attained a Good overall status.

6.10.44 Parts of the Scoping Boundary coincide with land not associated with a specific WFD surface water body, due to these land parcels not being contained within a substantial river catchment i.e. they drain directly to the sea. One such area is within the Teville Operational Catchment (Teville Stream WFD surface water body). The stream east of Worthing has a catchment area that extends into the central south area of the Scoping Boundary.

6.10.45 Transitional and coastal water bodies also exist across some parts of the Scoping Boundary. The Arun transitional water body is part of the Lower Arun Operational Catchment and runs along the main River Arun channel from Arundel to the coast through the Scoping Boundary area. The Adur transitional water body is part of the Lower Adur Operational Catchment and runs along the main River Adur channel from west of Henfield to the coast. In addition, the southern end of the Scoping Boundary lies within the Sussex coastal water body. All of these water bodies are designated as HMWBs with an overall status of Moderate.

Conservation Sites

6.10.46 A number of statutory and non-statutory designated conservation sites are located within the Scoping Boundary (and within downstream surface water catchments) and are likely to be dependent on the freshwater environment. Detailed description of these ecological sites can be found within the **Section 6.6: Terrestrial ecology and nature conservation.**

6.10.47 In addition to these sites OS mapping shows the presence of numerous water features such as ponds, lakes and wetlands within the Scoping Boundary. These water features are most numerous in the northeast of the Scoping Boundary within the low-lying areas north and northeast of Henfield. The Scoping Boundary across the South Downs is well drained and generally lacks any water features. On the edge of the Downs the development of streams are seen at Burpham, northeast of Arundel, and within Wepham Wood, north of the A27 carriageway. To the north of the South Downs, a lake is identified at The Chantry, and a small feature called Well Bottom, west and southwest of Washington respectively. In addition, to the east of Washington, the source of a tributary and a lake is identified approximately 500m northeast of the town, associated with sand and gravel pit mining. Although these features are suggestive of springs they are not marked as such on the OS mapping.

Flood Risk

6.10.48 This section presents an overview of the baseline flood risk for the purposes of scoping. This will be updated for the PEIR flood Risk Assessment.

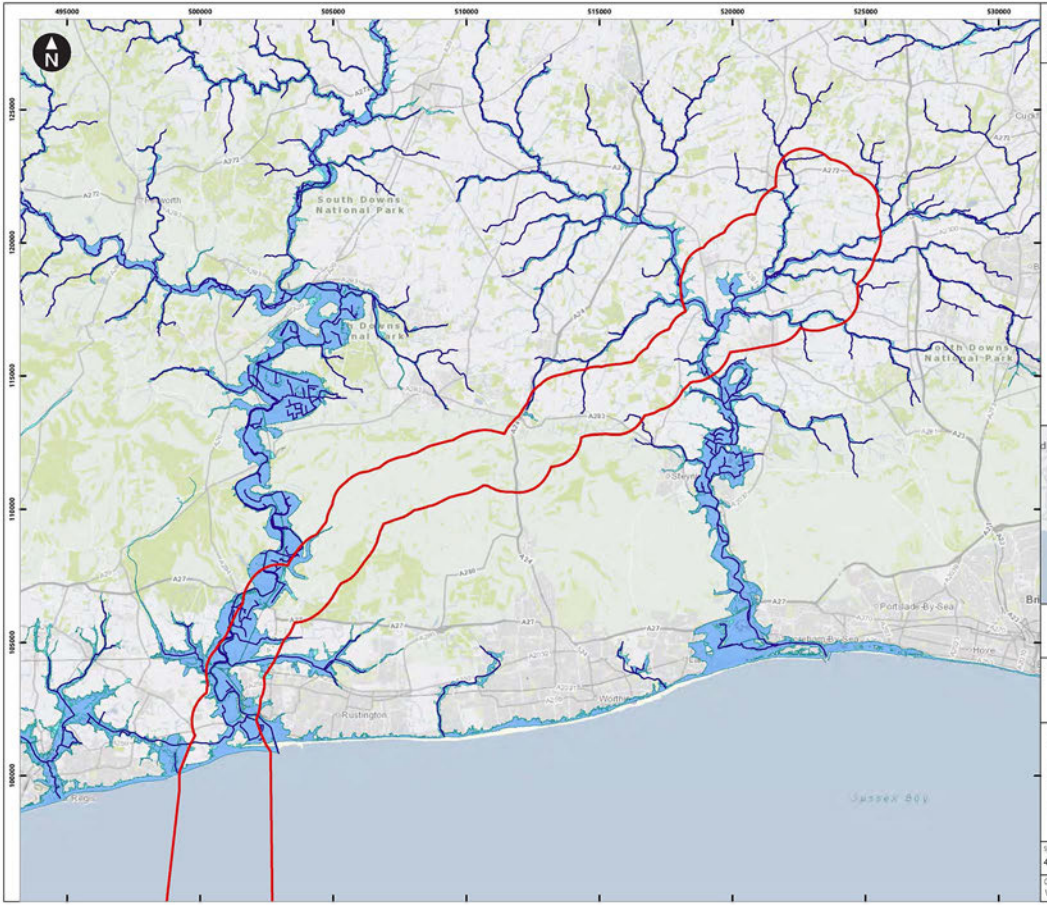
Fluvial and tidal flood risk

6.10.49 The Environment Agency Flood Risk map for planning was used to identify different flood zone areas and the extent of flooding possible within the Scoping Boundary area as well downstream catchments. The Environment Agency Flood Risk map is shown in **Figure 6.10.6**.

6.10.50 The Scoping Boundary south of Arundel and proposed landfall area is within the flood plain of the River Arun and much of the area is within Flood Zone 3[44], with the high to medium risk areas of flooding from rivers or the sea being located just to the southwest of Arundel and just north of the coast. There is a risk of coastal flooding along the beach to the south of Atherington. Flood defences are present on either side and along the length of the River Arun in this area and along the coast.

6.10.51 The coastline of West Sussex is heavily populated and sea defences mostly protect the area of low-lying land which is at risk of flooding. However, these defences can be overtopped or can breach, which can cause extensive flooding of the land with significant flood depths and high velocities.

[44] Defined as land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.



Key

- Scoping Boundary
- Rivers
- Flood zone 2
- Flood zone 3

Kilometres
0 0.5 1 2 3 4
1:121,705

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 6.10.6 Scoping Boundary and fluvial flood zones

Scoping Report

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WOOD	POLAI	WOOD	11/06/2020	FINAL

ISO A3 Landscape

6.10.53 Further inland some of the tributaries of the River Arun, in steep sided valleys on the southern edge of the South Downs just to the southwest of Wepham, are located within the Environment Agency Flood Zones 2[45] and 3.

6.10.54 Within the River Adur catchment Environment Agency Flood Zones 2 and 3 with high to medium risk of fluvial flooding are found along the main River Adur channels and associated tributaries. A large area of potential flooding is located at the confluence of a number of River Adur channels to the west of Henfield, even though these river channels have earth embankment flood defences. An area of low-lying land southeast of Partridge Green also lies within the Environment Agency Flood Zones 2 and 3.

6.10.55 The upper and eastern branch of the River Adur catchment flood plains are narrow in extent, often occurring within Environment Agency Flood Zone 3, whilst connecting tributaries are within Environment Agency Flood Zone 2. Within the lower reaches of the River Adur catchment, south of Henfield and the Scoping Boundary, Environment Agency Flood Zone 3 areas exist on either side of the channel in a flood plain that widens within the Shoreham-on Sea conurbation, albeit the risk of flooding is low.

Groundwater flood risk

6.10.56 The Arun 2016 Strategic Flood Risk Assessment (SFRA) update (page V) states that *significant groundwater flood events have been recorded across the district. This risk is supported by the Areas Susceptible to Groundwater Flooding mapping which suggests that susceptibility to groundwater flooding is generally high across the district*. This mapping (in Appendix F) indicates high levels of risk (>75%) along the Arun Valley between the landfall site and Arundel.

6.10.57 The Horsham District Council SFRA (Scott Wilson, 2010) indicates (page 10) that there are no records of groundwater flooding within the council area, which covers the area of the Adur catchment which falls within the Scoping Boundary. It further states (page 10) that *the chalk areas to the south of the study area are classified as major aquifers with a high permeability. Many of the streams overlying this area are predominantly fed by groundwater and are dry for parts of the year. The high values of Base Flow Index (BFI) of these streams, coupled with the fact that they overly major aquifers leads to a potential for groundwater flooding in the area.*

Surface water flood risk

6.10.58 The Environment Agency Flood Risk surface water flood map shows that low lying areas around river corridors, urban areas, localised depressions and areas of managed drainage are at risk of surface water (rain and runoff) flooding, in the Arun and Adur catchments.

6.10.59 The West Sussex County Council Local Flood Risk Management Strategy (LFRMS) (2014) notes that (page 23) surface water flooding is not restricted to urban areas and can occur in rural areas when drainage is prevented by blockages or saturated ground. The management of the land drainage network is vital in reducing flood risk. In rural areas, due to the landscape and topography of

[45] Defined as land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.

the South Downs, downland run-off can also cause flooding. Land management, such as the way farmers plough fields, the removal of hedgerows and infilling of ditches, can contribute to run-off rates.

6.10.1 *Artificial flood risk*

6.10.60 The Environment Agency's Long Term flood risk map indicates that there is some risk of reservoir flooding along the Arun around Arundel and along the Arun upstream and within the scoping area. Mapping indicates that the Arun risk is from Swanbourne Lake near Arundel and the Adur risk is derived from a number of small reservoirs along its valley. This initial baseline understanding will be confirmed with the Environment Agency and updated in the PEIR Flood Risk Assessment.

6.10.61 Records of sewer flooding within the Scoping Boundary will be requested from Southern Water.

Basis for scoping assessment

6.10.62 The water environment scoping assessment is based on the key assumptions presented in **Table 6.10.8**. These assumptions are also set out in **Chapter 2: The Proposed Development**.

Table 6.10.8 Basis for scoping assessment

Development element	Assumption
Landfall	• Cable landfall will be via a trenchless technique such as Horizontal Directional Drilling (HDD). • Transition joint bays will be underground.
Onshore Cable	• The onshore grid connection will be made via an underground cable along the entire length of the route. The cable route will be refined during the EIA process in order to identify a cable route corridor which is the most desirable from an environmental, economic and engineering perspective. • The onshore cable system will be installed in trenches. Other methods for cable installation such as HDD will be used as required to avoid or minimise potential effects where constraints are identified, including watercourse crossings. • It is expected that the width of the cable construction corridor for surface trenching will be approximately 50m. At any sensitive points identified along the route, the working width of the temporary construction corridor will be reduced as far as practicable to avoid or minimise potential effects.

Development element	Assumption
Substation	• The overall site footprint for the proposed substation is anticipated to be up to 4.5 hectares (ha), and the exact location of the substation will be refined through the EIA process.
Operation and Maintenance	• Maintenance activities will be undertaken for both preventive and corrective maintenance requirements. • The operational lifetime is assumed to be a minimum of 30 years.
Decommissioning	• The decommissioning of the wind farm is anticipated to be restricted to the removal and reinstatement of the onshore substation site. Electrical cables will be left in-situ onshore to minimise environmental impacts associated with removal.

Embedded environmental measures

6.10.63 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on the water environment (see **Table 6.10.9**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

Table 6.10.9 Relevant water environment embedded environmental measures

ID	Environmental measure proposed	How the environmental measures will be secured
C–1	The onshore cable route will be completely buried underground for its entire length.	Development Consent Order (DCO) works plans, description of development and requirements
C–3	At sensitive crossing locations the working width will be reduced as far as practicable.	DCO works plans, description of development and requirements

ID	Environmental measure proposed	How the environmental measures will be secured
C–5	Main watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environmental solution and is financially and technically feasible (see commitment C – 17).	DCO works plans and order limits
C–6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint, including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits
C–7	Post-construction the work area will be reinstated to pre-existing condition as far as reasonably practical in line with Defra 2009 Code of Construction Practice (COCP) for the Sustainable Use of Soils on Construction Sites PB13298.	COCP and DCO requirement
C–8	During construction and operation, refuelling of machinery will be undertaken within a designated area where spillages can be easily contained. Any tanks and pipework will be double-skinned and provided with intermediate leak detection equipment. Areas at risk of spillage will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or local watercourses.	COCP and DCO requirement
C–10	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	COCP and DCO requirement
C–11	During construction topsoil and subsoil will be stored within the temporary working corridor of the onshore cable corridor. The topsoil and subsoil will be stored in separate stockpiles in line with Defra 2009 COCP for the Sustainable Use of Soils on Construction Sites PB13298. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	COCP and DCO requirement
C–13	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bog-matting and geotextiles will be	COCP and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
	considered by the principal contractor for sensitive sections of the route to reduce impact habitats.	
C–17	Where HDD techniques are not required or are not practical, the crossing of drainage ditches or engineered channels maybe crossed by open cut techniques or the installation of culverts or bridges to allow water to continue flowing. Where this is the case this will be done in accordance with advice notes, guidance documents and Environment Agency Pollution Prevention Guidelines (PPGs). Appropriate environmental permits or land drainage consents will be applied for works from the Environment Agency (e.g. for Main Rivers, works on or near sea defences / flood defence structures or in a flood plain) or from the Lead Local Flood Authority (for ordinary watercourse crossings).	COCP and DCO requirement
C–18	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, public right of way and watercourse.	COCP and DCO requirement
C–19	The onshore cable will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced. At regular intervals (typically 600m – 1,000m) along the corridor joint bays / pits will be installed to enable the cable installation and connection process.	COCP and DCO requirement
C–20	The typical construction working area will be 50m along the onshore cable route to minimise the construction footprint. At other discrete locations this may be expanded to accommodate working areas for example for HDD.	COCP and DCO articles / requirement
C–21	Vegetation will be retained where possible. Where necessary vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas any vegetation removal will be undertaken under supervision and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally	COCP and DCO articles / requirement

ID	Environmental measure proposed	How the environmental measures will be secured
	protected species is removed sensitively and in a legally compliant way.	
C–23	Where possible micro-siting will be undertaken during detailed design to avoid ponds.	COCP and DCO requirement
C–25	All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.	COCP and DCO requirement
C–27	Following construction, construction compounds will be returned to the standard stipulated by the landowner and the relevant local authority.	COCP and DCO requirement
C–28	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	COCP and DCO requirement
C–29	A target depth of 1.65m to the base of the trench is assumed. Deeper trenches may be required at specific crossing locations (such as watercourses). In sensitive areas such as Chalk grassland that cannot be ploughed, the trench will only be approximately 1m deep. In sensitive areas, the amount of topsoil removed will be the width of the trenches only rather than across the entire temporary construction corridor.	COCP and DCO requirement
C–30	Geotextiles or other membranes may be used to temporarily control and minimise erosion or transport of sediment from construction sites in areas that are considered unprotected.	COCP and DCO requirement
C–33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users, and existing land users and will provide details of measures to protect environmental receptors.	COCP and DCO requirement
C–73	Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of	COCP and DCO requirement

ID	Environmental measure proposed	How the environmental measures will be secured
	temporary and permanent infrastructure. Drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design.	
C–74	All subsurface infrastructure will be designed to facilitate subsurface flow pathways to avoid any localised increases in groundwater flooding.	COCP and DCO requirement
C–75	Construction and permanent development in flood plains will be avoided wherever possible. Where this is not possible (for example, the landfall location) mitigation will be developed to ensure the works are NPPF compliant. Any works in fluvial floodplains will only be undertaken in line with the NPPF exception and sequential tests.	COCP and DCO requirement
C–76	In line with good practice, pollution prevention plans will be drawn up to detail how ground and surface waters will be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning. These will include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	COCP and DCO requirement
C–77	Dewatering of excavations will be undertaken in line with good practice. Effects of dewatering on potential receptors will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment will be installed before discharge to surface or groundwater; this will include the use of siltbusters (or similar) before discharge to surface waters. Appropriate licences and permits will be applied for if required.	COCP and DCO requirement
C–78	Licensed and private water supplies will be avoided where practicable; if any impacts are anticipated then appropriate measures will be put in place to avoid impact on the quantity and quality of the supply.	COCP and DCO requirement

6.10.64 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and have, therefore, been considered in the scoping assessment.

Likely significant effects

6.10.65 In line with the EIA Regulations 2017, the EIA for Rampion 2 will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is 'scoped out' from assessment.

6.10.66 The likely significant effects on the water environment are summarised in **Table 6.10.**. The scoping assessment is based on a combination of the project definition of Rampion 2 at the scoping stage, current understanding of the baseline conditions, embedded environmental measures, the evidence base for water environment effects and professional judgement.

6.10.67 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for 'scoping out' certain effects, and therefore no longer considered, is presented after the table, supported by evidence base.

Table 6.10.10 Likely significant water environment effects

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
Landfall – cable and associated earthworks resulting in potential impacts on water quality or flood risk (Construction)	C-3,11,13,25,30, 33,75,76	Works within a tidal flood plain and WFD coastal / transitional waterbody. Potential for water quality impacts and short-term displacement of flood waters. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	**Scoped in** as Flood Risk Assessment (FRA) and WFD assessment is required. Anticipated to be a **simple assessment** unless flood modelling is required.	Flood risk receptors; WFD coastal / transitional WFD water body.	Further information on tidal flood levels and local Water Environment from Environment Agency and LLFA.
Landfall – cable and associated earthworks resulting in potential impacts on groundwater levels (Construction)	N/A	**No likely significant effect** anticipated as works will be limited to the coastal area and the local water table will be connected to the sea levels, therefore no impact on freshwater groundwater levels.	**Scoped out (paragraph 6.10.70)**.	N/A	N/A
Onshore route – cable route construction (including watercourse crossings) and associated earthworks resulting in a potential impact on water quality, hydromorphology, groundwater levels and flood risk (Construction)	C-1, 3, 5, 6, 8, 10, 11,13,17,18,19,20, 21,23,25,27,28,29, 30,33,75,76,77,78	Subsurface works, surface works within fluvial and tidal floodplains, use of fuels oils and other chemicals on site. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	**Scoped in** as FRA and WFD assessment is required. Anticipated to be a **simple assessment** unless flood modelling is required.	Flood risk receptors; transitional/surface water/ groundwater WFD water bodies containing main rivers and ordinary watercourses and associated private and licensed abstractions (and associated groundwater SPZs).	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses at proposed crossings points from Environment Agency/Local Authority and site walkover.
Substation – construction and associated earthworks resulting in a potential impact on water quality, groundwater levels and flood risk (Construction)	C-6,8,11,13,21,23, 25,27,28,30,33,75, 76,77,78	Subsurface works, surface works potentially within fluvial and tidal floodplains, use of fuels oils and other chemicals on site. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures	**Scoped in** as FRA and WFD assessment is required. Anticipated to be a **simple assessment** unless flood modelling is required.	Flood risk receptors; transitional / surface water / groundwater WFD water bodies containing main rivers and ordinary watercourses and associated private and licensed abstractions (and associated groundwater SPZs).	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses at proposed crossings points from

Activity and impact	Embedded measures	Effect	Proposed approach to assessment (scoped in or scoped out)	Receptor	Further data baseline requirements
		as required. To be determined through further assessment.			Environment Agency / Local Authority and site walkover.
Operation and maintenance activities resulting in a potential impact on water quality, hydromorphology and flood risk (Operation)	C-7,8,73,74,75,76	Surface works potentially within fluvial or tidal floodplains, use of fuels, oils or other chemicals. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	**Scoped in** as FRA and WFD assessment is required. Anticipated to be a **simple assessment** unless flood modelling is required.	Flood risk receptors; transitional/surface water/ groundwater WFD water bodies containing main rivers and ordinary watercourses and associated private and licensed abstractions (and associated groundwater SPZs).	Further information on historical flooding, flood and flow levels, groundwater levels, water quality, abstractions and hydromorphology of watercourses at proposed crossings points from Environment Agency / Local Authority and site walkover.
Operation and maintenance activities resulting in a potential impact on groundwater levels (Operation)	N/A	**No likely significant effects** anticipated as no dewatering will be associated with operation and maintenance activities.	**Scoped out (paragraph 6.10.70)**.	N/A	N/A
Decommissioning activities (including the potential removal of watercourse crossings) resulting in a potential impact on water quality, hydromorphology and flood risk (Decommissioning)	C-33,76	Surface works potentially within fluvial or tidal floodplains, use of fuels, oils or other chemicals. Effect anticipated to be not significant upon assessment of effects associated with specific infrastructure locations and development of environmental measures as required. To be determined through further assessment.	**Scoped in** as FRA and WFD assessment is required. Anticipated to be a **simple assessment** unless flood modelling is required.	Flood risk receptors; transitional / surface water / groundwater WFD water bodies containing main rivers and ordinary watercourses and associated private and licensed abstractions (and associated groundwater SPZs).	Further information on historical flooding, flood levels, water quality, abstractions and hydromorphology of watercourses at proposed crossings points from Environment Agency/Local Authority and site walkover.
Decommissioning activities resulting in a potential impact on groundwater levels (Decommissioning)	N/A	**No likely significant effects** anticipated as no dewatering will be associated with decommissioning activities.	**Scoped out (paragraph 6.10.70)**.	N/A	N/A

6.10.68 As can be seen from **Table 6.10.**, the nature of the development, once the specific infrastructure locations are known and taking into account the embedded environmental measures, is not anticipated to give rise to any significant effects on the water environment. This initial conclusion will be reassessed at PEIR and ES stage, however in the absence of these details a number of impacts have not been 'scoped out' at this stage.

6.10.69 It is anticipated that the subsequent assessments will be simple unless flood modelling is required for specific areas of the Proposed Development, in which case a detailed assessment will be produced for those areas to support the FRA.

Impacts scoped out of assessment

6.10.70 A number of potential effects have been 'scoped out' from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice.

6.10.71 **Table 6.10.11** lists those impacts which are proposed to be 'scoped out' of further assessment and the justification for this decision. All other effects will be considered for further assessment.

Table 6.10.11 Impacts scoped out of further assessment

Activity and impact	Justification for 'scoping out'
Landfall – cable and associated earthworks resulting in potential impacts on groundwater levels	Subsurface works will be limited to the coastal area and the local water table will be connected to the sea levels, therefore no impact on freshwater groundwater levels is anticipated.
Operation and maintenance activities resulting in a potential impact on groundwater levels	Operation and maintenance activities will not involve dewatering works and therefore no impact on groundwater levels is anticipated.
Decommissioning activities resulting in a potential impact on groundwater levels	Sub-surface infrastructure will be left in place in the decommissioning phase and there will be no dewatering works and therefore no impacts on groundwater levels are anticipated.

Cumulative effects

6.10.72 Cumulative effects on the water environment resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4** and considering the other developments that have been 'screened in' as part of the CEA screening exercise.

6.10.73 In the absence of a development list the following bullet points list examples of impacts from Rampion 2 have the potential to act together with impacts from other developments to contribute to cumulative effects on associated receptors:

- Impacts on water quality in rivers and groundwater from construction and maintenance activities;
- Impacts on groundwater levels from dewatering activities in construction;
- Impacts on flood risk from construction, maintenance and permanent development; and
- Impacts on hydro-morphology from construction and maintenance activities.

Transboundary effects

6.10.74 The potential effects from construction, operation (including maintenance) and decommissioning on water environment receptors are considered in **Appendix B**.

Proposed approach to PEIR and ES

Introduction

6.10.75 The proposed water environment approach for PEIR and ES has been set out under the headings below.

Further baseline data collation

6.10.76 The desk-study baseline collated for scoping will be augmented at PEIR stage by further data collections as detailed in **Table 6.10.12**.

Table 6.10.12 Further third-party baseline information collection for PEIR

Data owner	Data to be requested
Environment Agency	Site climate and rainfall data. Available river flow data and river level data. Surface water and groundwater discharge consents. Licensed abstractions. Hydrogeology groundwater level data and other available hydrogeological parameter data. Surface water and groundwater quality data. WFD measures for all water bodies.
Local Authority / Lead Local Flood Authorities (West Sussex County Council, Arun District	Private water supply data in including available hydrogeological data (groundwater levels and water quality).

Data owner	Data to be requested
Council, Horsham District Council, Mid Sussex District Council)	Records of historical flooding.

6.10.77 In addition, a site walkover of the proposed route(s) and substation location will be undertaken to understand hydromorphology at key crossing points and to support the FRA.

6.10.78 It is not currently anticipated that further data collection will be required to support the ES in addition to that undertaken for PEIR.

Stakeholder engagement

6.10.79 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the Evidence Plan Process or the wider stakeholder engagement programme which is set out in **Section 4.3: Consultation and the evidence plan process**. This will include the Environment Agency and LLFAs, and other local authorities as appropriate (see **Table 6.10.12**). Support will also be given to consultation lead by other Aspects as required, for example this could include supporting terrestrial ecology consultation with Natural England.

6.10.80 It is anticipated that this consultation will be ongoing to support both the PEIR and ES submissions.

Development of site-specific environmental measures

6.10.81 The selection of the potential route(s) and substation location at PEIR stage will involve the translation of some of the embedded environmental measures into site-specific measures associated with the micro-siting of infrastructure around flood plains, watercourses and abstractions (including groundwater SPZs). These measures will be developed in consultation with the wider environment team to ensure that the best environmental and technically feasible option for the proposed infrastructure is selected.

6.10.82 This exercise will result in the refinement of the proposed embedded environmental measures and the potential development of some location-specific measures as required to demonstrate how particularly sensitive receptors will be protected.

6.10.83 No significant additional work on this element is anticipated on these assessments between PEIR and ES.

Undertaking further assessments

6.10.84 The PEIR will contain assessments which address specific impacts on receptors and demonstrate how the development will comply with relevant legislation and guidance. These will include the following.

- A FRA which will discuss the potential risk from all sources of flooding and demonstrate how the Proposed Development will be compliant with the NPPF,

including taking into account climate change allowances and explaining how the development satisfies the sequential and exception tests;

- An assessment of the potential impacts on WFD status and supporting elements (including hydromorphology ecology, water quality and groundwater tests) for all WFD water bodies in the zone of influence to demonstrate how Rampion 2 will satisfy the requirements of the WFD and not cause derogation in status or prevent the achievement of good status objectives;
- An assessment of the potential impacts on surface and groundwater abstractions (including groundwater SPZs and private water supplies) and GWDTEs, to demonstrate how Proposed Development has been designed to avoid any significant effects on these receptors; and
- Assessment of in-combination and cumulative effects on receptors.

6.10.85 No significant work is anticipated on these assessments between PEIR and ES, assuming that the Proposed Development does not change significantly and the PEIR consultation feedback does not substantively query its conclusions.

7. Summary and next steps

7.1 Introduction

7.1.1 The information included in this Scoping Report is provided to support RED's request for a Scoping Opinion from the SoS in relation to the development of Rampion 2.

7.1.2 The main aspects of the offshore and onshore environment likely to be significantly affected by the construction, operation and decommissioning of Rampion 2 have been identified. For each of these identified aspects, the Scoping Report has identified the extent of relevant environmental studies to be undertaken as part of an EIA. The ES will outline the full EIA and will be submitted alongside the application for Development Consent.

7.2 Scope of the assessment

7.2.1 Likely significant effects of Rampion 2 have been identified according to each EIA aspect. For some of these, further data collection and an assessment will be required in order to determine the significance of the effects. These have been scoped-in and an appropriate level of assessment (i.e. simple or detailed) has been proposed.

7.2.2 For other potential effects it is proposed that they be scoped out of the EIA (i.e. no further data collection or assessment is proposed. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely.

7.2.3 **Table 7.1** below provides a summary confirmation of the aspects and matters that are proposed to be scoped out of the EIA.

7.2.4 Cumulative effects resulting from the effects of Rampion 2 and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4**. In this Scoping Report, for each aspect, potential impacts of Rampion 2 that may contribute to cumulative effects on resources and receptors are set out in **Chapters 5** and **6**.

7.2.5 **Appendix B** presents a Transboundary Screening Matrix for Rampion 2.

Table 7.1 Summary of activities and impacts to be scoped out of the EIA

Aspect	Phase	Activities and impacts scoped out
Environmental aspects offshore		
Coastal processes		None
Other marine users	Construction	Increased vessel traffic – oil and gas, other offshore energy, military activity and munitions. Physical presence of infrastructure and temporary Exclusion areas – oil and gas, other offshore energy, military activity and munitions. Temporary increase suspended sediments and deposition – oil and gas, other offshore energy, military activity and munitions, recreational boating and sailing, recreational fishing and seaweed farming. Increased subsea noise – aggregate extraction, disposal sites, oil and gas, offshore wind, other offshore energy, military activity and munitions, subsea cables and pipelines, recreational boating and sailing.
	Operation	Physical presence of infrastructure and temporary Exclusion areas – oil and gas, other offshore energy, military activity and munitions. Alteration in wave energy direction and period – some receptors.
	Decommissioning	Increased vessel traffic – oil and gas, other offshore energy, military activity and munitions.

Aspect	Phase	Activities and impacts scoped out
		Physical presence of infrastructure and temporary Exclusion areas – oil and gas, other offshore energy, military activity and munitions. Temporary increase suspended sediments and deposition – oil and gas, other offshore energy, military activity and munitions, recreational boating and sailing, recreational fishing and seaweed farming. Increased subsea noise – aggregate extraction, disposal sites, oil and gas, offshore wind, other offshore energy, military activity and munitions, subsea cables and pipelines, recreational boating and sailing.
Fish and shellfish ecology	Construction and Decommissioning	Accidental pollution impacts during the construction phase resulting in potential effects on fish and shellfish receptors. Direct and indirect seabed disturbances leading to the release of sediment contaminants. Direct disturbance resulting from construction within the array.
	Operation	Electromagnetic field (EMF) impacts arising from cables. Underwater noise as a result of operational WTGs. Direct disturbance resulting from maintenance within the array area during operation and maintenance. Direct disturbance resulting from maintenance within the offshore cable corridor during operation and maintenance.

Aspect	Phase	Activities and impacts scoped out
		Potentially reduced fishing pressure within the Rampion 2 array area and increased fishing pressure outside the array area due to displacement.
Benthic and Intertidal	Construction	Accidental pollution events. Noise pollution during construction related activities.
	Operation	Accidental pollution events. EMF generated by inter-array and export cables.
	Decommissioning	Accidental pollution events.
Commercial fisheries	Construction, Operation and Decommissioning	Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the Rampion 2 area.
Marine mammals	Construction	TTS risk. Other project related noise (e.g. cable laying, ground clearance, dredging etc). Reduction in prey availability. Accidental pollution. Disturbance to seal haul out sites at landfall.

Aspect	Phase	Activities and impacts scoped out
	Operation	Reduction in prey availability. Accidental pollution. EMF.
	Decommissioning	Other project related noise (e.g. cable laying, ground clearance, dredging etc). Reduction in prey availability. Accidental pollution. Disturbance to seal haul out sites at landfall.
Offshore ornithology	Operation	Disturbance and displacement: Offshore export cable. Disturbance and displacement: Intertidal export cable. Barrier effect: Array.
	Decommissioning	Disturbance and displacement: Array.
Shipping and navigation	-	None
Nature conservations	Construction, Maintenance and Decommissioning	Direct impact to other designated features.

Aspect	Phase	Activities and impacts scoped out
Civil and military aviation	Construction and Decommissioning	Installation of the export cables offshore affecting aviation receptors. Construction and decommissioning of the WTGs leading to impacts on civil and military radar systems.
	Operation	Physical presence and operation of the WTGs leading to impacts on Licensed Airfields with surveillance radar. Physical presence and operation of the WTGs leading to impacts on Non radar licensed aerodromes. Physical presence and operation of the WTGs leading to impacts on Licensed aerodromes where WTGS would be within airspace with published Instrument Flight Procedures. Physical presence and operation of the WTGs leading to impacts on other civil aviation activities. Physical presence and operation of the WTGs leading to impacts on SAR flight operations. Physical presence and operation of the WTGs leading to impacts on MoD facilities (airfields, Air Defence Radars (ADRs) and danger areas). Physical presence and operation of the WTGs leading to impacts on Meteorological radar. Physical presence and operation of the WTGs, together with construction and decommissioning activities affecting civil and military flight operations.

Aspect	Phase	Activities and impacts scoped out
Seascape, landscape and visual	Construction and Decommissioning	Effects (daytime) on seascape character – MCA09, MCA12, MCA14. Effects (daytime) on landscape character – Landscape Character Areas (LCAs): within Surrey and Kent. Landscape Designations and Defined Areas: New Forest National Park (NFNP), Surrey Hills AONB, Hamstead Heritage Coast and Tennyson Heritage Coast. Effects (daytime) on visual receptors / viewpoints outside ZTV. Effects (daytime) on Special Qualities of the South Downs National Park (SDNP) – some qualities. Cumulative seascape, landscape and visual effects with other operational, consented and application stage offshore wind farm projects (with the exception of the existing Rampion 1 project). Seascape, landscape and visual effects outside the 50km radius SLVIA study area.
	Operation	Effects (daytime) on seascape character – MCA09, MCA12, MCA14. Effects (daytime) on landscape character – LCAs: within Surrey and Kent. Landscape Designations and Defined Areas: New Forest National Park (NFNP), Surrey Hills AONB, Hamstead Heritage Coast and Tennyson Heritage Coast. Effects (daytime) on Special Qualities of the South Downs National Park (SDNP) – some qualities. Effects (daytime) on visual receptors / viewpoints outside ZTV.

Aspect	Phase	Activities and impacts scoped out
		Cumulative seascape, landscape and visual effects with other operational, consented and application stage offshore wind farm projects (with the exception of the existing Rampion 1 project).
		Seascape, landscape and visual effects outside the 50km radius SLVIA study area.
Archaeology and cultural heritage	Construction	Removal of sediment containing undisturbed archaeological contexts during seabed preparation for WTG and offshore substation foundations leading to total or partial loss of the receptor.
		Penetration of piling foundations resulting in total or partial loss of the receptor.
		Compression of stratigraphic contexts containing archaeological material from combined weight of foundation, transition piece, tower and WTG.
		Disturbance of sediment containing potential archaeological receptors (material and contexts) during the laying of inter-array cables.
		Disturbance of sediment containing potential archaeological receptors (material and contexts) during export cable laying operations.
		Penetration and compression effects of jack-up barges and anchoring of construction vessels during WTG, sub-station or cable installation leading to total or partial loss of archaeological receptors (material or contexts).
	Operation	Penetration and compression effects of seabed caused by corrective and preventative operation and maintenance activities (via jack-up vessels).

Aspect	Phase	Activities and impacts scoped out
Socio-economics	Construction	Impact on population structure due to increased demand for labour. Impact on the demand for housing, accommodation and local services.
	Operation	Impact on population structure due to demand for labour. Impact on the demand for housing, accommodation and local services. Impact on offshore and inshore recreation activity. Inshore recreation activity.
	Decommissioning	Impact on population structure due to increased demand for labour. Impact on the demand for housing, accommodation and local services.
Environmental aspects onshore		
Landscape and visual impact	Operation	Operation of the cable corridor and landfall.
Air quality	Construction	Emissions of air pollutants from construction equipment on site. Emissions of odour from construction.
	Operation	Emissions of air pollutants during operation.

Aspect	Phase	Activities and impacts scoped out
		Emissions of dust during operation. Emissions of odour during operation.
	Decommissioning	Emissions of air pollutants from decommissioning equipment on site. Emissions of odour from decommissioning.
Agriculture and soils	Operation	Loss of agricultural land due to operational and maintenance activities. Loss of soil due to operational and maintenance activities.
	Decommissioning	Loss of agricultural land due to decommissioning activities.
Noise and vibration	Operation	Increases in noise from site traffic for substation and wind farm maintenance. Noise disturbance as a result of the offshore substations. Vibration disturbance from the operation of the onshore and offshore substations and offshore WTGs.
	Decommissioning	Noise and vibration disturbance from removal of equipment and reinstating sites, including associated traffic noise and vibration effects

Aspect	Phase	Activities and impacts scoped out
Terrestrial ecology and nature conservation	Construction, operation and decommissioning	European sites: Land take / land cover change, fragmentation of habitats for some SPAs, pollution events, emissions events, and introduction of invasive non-native species. SSSIs: fragmentation of habitats for some SSSIs, increase noise and vibration for some SSSIs, increased light levels, changes in hydrology (all SSSIs outside of the ZOI), pollution events (all SSSIs outside of the ZOI), emission events, and introduction of invasive non-native species (all SSSIs outside of the Scoping Boundary). LWSs/LNRs: Land take / land cover change (all LWS outside of Scoping Boundary), fragmentation of habitats (all LWS outside of the Scoping Boundary), increased light levels, changes to hydrology (all LWSs outside of the ZOI), pollution events (all LWSs outside of the ZOI), and introduction of invasive non-native species (all LWSs outside of the Scoping Boundary).
Transport	Construction	Hazardous Loads.
	Operation	Operation and maintenance activities resulting in potential impact on roads, Public Rights of Way (ProW) and users of these routes. Hazardous Loads.
	Decommissioning	Decommissioning activities resulting in a potential impact on local roads, ProW and the users of these routes. Hazardous Loads.

Aspect	Phase	Activities and impacts scoped out
Ground conditions	Construction	Construction activities located on, or adjacent to landfills and other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities (exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts resulting in health effects). Construction vehicle and equipment maintenance and storage of fuels/oils for construction vehicles and equipment (accidental spillages and leaks resulting in ground contamination and risks to human health).
	Operation	Operational vehicle and equipment maintenance and storage of fuels/oils for operational vehicles and equipment (accidental spillages and leaks resulting in ground contamination and risks to human health).
	Decommissioning	Decommissioning activities including removal and reinstatement of the onshore substation (exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts resulting in health effects). Decommissioning activities including removal and reinstatement of the onshore substation (accidental spillages and leaks resulting in ground contamination and risks to human health).
Historic environment	Operation	Direct disturbance, damage or alteration from operation and maintenance activities on heritage assets outwith 1km of the landfall and cable route corridor.
	Decommissioning	Direct disturbance, damage or alteration from activities associated with the removal and reinstatement of the onshore substation on heritage assets outwith 1km of substation.

Aspect	Phase	Activities and impacts scoped out
Water environment	Construction	Earthworks associated with the landfall and cable installation resulting in potential impacts on groundwater levels.
	Operation	Operation and maintenance activities resulting in a potential impact on groundwater levels.
	Decommissioning	Decommissioning activities resulting in a potential impact on groundwater levels.

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Appendix A
Commitments register

Appendix A

Rampion 2 Scoping Commitments Register

#	Commitment	How will the measure be secured
C - 1	The onshore cable route will be completely buried underground for its entire length where practicable.	DCO works plans, description of development and requirements
C - 2	Cables will be installed in ducting.	DCO works plans, description of development and requirements
C - 3	At sensitive crossing locations the working width will be reduced as far as practicable.	DCO works plans, description of development and requirements
C - 4	Horizontal Directional Drill (HDD) technique will be used at the landfall location.	DCO works plans, description of development and requirements
C - 5	Main watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see commitment C-17).	DCO works plans and order limits
C - 6	Where practical sensitive sites will be avoided by the temporary and permanent onshore project footprint including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	DCO works plans and order limits
C - 7	Post construction the work area will be reinstated to pre-existing condition as far as reasonably practical in line with Defra 2009 Code of Construciton Practice (COCP) for the Sustainable Use of Soils on Construction Sites PB13298.	COCP and DCO requirement

C - 8	During construction and operation refuelling of machinery will be undertaken in line with good practice within a designated area where spillages can be easily contained. Any tanks and pipework will be double skinned and provided with intermediate leak detection equipment. Areas at risk of spillage will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or local watercourses.	COCP and DCO requirement
C - 9	Joint bays will be completely buried with the land above reinstated with the exception of link box chambers where access will be required from ground level (via manholes).	DCO works plans, description of development and requirements
C - 10	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	COCP and DCO requirement
C - 11	During construction topsoil and subsoil will be stored within the temporary working corridor of the onshore cable. The topsoil and subsoil will be stored in separate stockpiles in line with Defra 2009 COCP for the Sustainable Use of Soils on Construction Sitres PB13298. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	COCP and DCO requirement
C - 12	During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.	COCP and DCO requirement
C - 13	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bogmatting and geotextiles will be considered by the principal contractor for sensitive sections of the route to reduce impact.	COCP and DCO requirement
C - 14	Potential risks to human health from any unexpected ground contamination will be avoided by the use of Personal Protective Equipment (PPE) and by adopting appropriate working practices.	COCP and DCO requirement
C - 15	Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development.	COCP and DCO requirement

C - 16	Cable protection tiles will be fitted above the cables in each trench, featuring indented lettering warning of the danger of electricity below. Between the protection tiles and the ground surface will be underground plastic warning tape containing a warning text to warn future excavators of the danger of the cable below.	DCO works plans
C - 17	Where HDD techniques are not required or are not practical, the crossing of drainage ditches or engineered channels maybe crossed by open cut techniques or the installation of culverts or bridges to allow water to continue flowing. Where this is the case this will be done in accordance with advice notes, guidance documents and Environment Agency Pollution Prevention Guidelines (PPGs). Appropriate environmental permits or land drainage consents will be applied for works from the Environment Agency (e.g. for Main Rivers, works on or near sea defences/flood defence structures or in a flood plain) or from the Lead Local Flood Authority (LLFA) (for ordinary watercourse crossings).	COCP and DCO requirement
C - 18	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, PRoW and watercourse.	COCP and DCO requirement
C - 19	The onshore cable will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches backfilled and the reinstatement process commenced in as short a timeframe as practicable. At regular intervals (typically 600m – 1,000m) along the route joint bays/pits will be installed to enable the cable installation and connection process.	COCP and DCO requirement
C - 20	The typical construction working area will be 50m along the onshore cable corridor to minimise the construction footprint. At other discrete locations this maybe expanded to accommodate working area for example for HDD.	COCP and DCO articles/ requirement
C - 21	Vegetation will be retained where possible. Where necessary vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas any vegetation removal will be undertaken under supervision and appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally protected species is removed sensitively and in a legally compliant way.	COCP and DCO articles/ requirement

C - 22	Core working hours for construction of the onshore components will be 0700 - 1900 Monday to Friday, and 0800 - 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the COCP.	COCP and DCO requirement
C - 23	Where possible micrositing will be undertaken during detailed design to avoid ponds.	COCP and DCO requirement
C - 24	Best practices air quality management measures will be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	COCP and DCO requirement
C - 25	All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.	COCP and DCO requirement
C - 26	Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers and other suitable solutions will be applied.	COCP and DCO requirement
C - 27	Following construction, construction compounds will be returned to the standard stipulated by the landowner and the relevant local authority.	COCP and DCO requirement
C - 28	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	COCP and DCO requirement
C - 29	A target depth of 1.65m to the base of the trench is assumed. Deeper trenches may be required at specific crossing locations (such as watercourses). In sensitive areas such as Chalk grassland that cannot be ploughed, the trench will only be approximately 1m deep. In senstive areas, the amount of topsoil removed will be the width of the trenches only rather than across the entire temporary construction corridor.	COCP and DCO requirement
C - 30	Geotextiles or other membranes may be used to temporarily control and minimise erosion or transport of sediment from construction sites in areas that are considered unprotected.	COCP and DCO requirement

C - 31	Any disposal off-site of excavated material will be undertaken in consultation with the landowner/occupier and in accordance with the Waste Management Regulations.	COCP and DCO requirement
C - 32	Signage and/or temporary PRoW/footpath diversions will be provided during construction.	COCP and DCO requirement
C - 33	A COCP will be adopted to minimise temporary disturbance to residential properties, recreational users and existing land users. It will provide details of measures to protect environmental receptors.	COCP and DCO requirement
C - 34	RED will identify opportunities for companies based or operating in the region to access supply chain for the Proposed Development.	COCP and DCO requirement
C - 35	RED will work with local partners and seek to maximise the ability of local people to access employment opportunities associated with the construction and operation of the Proposed Development.	COCP and DCO requirement
C - 36	The number of turbines will not excede that of the existing Rampion 1 project.	DCO requirements or DML conditions.
C - 37	Maximum blade tip height is 325m from LAT and rotor diameter of 275m.	DCO requirements or DML conditions.
C - 38	The selection of the foundation type will primarily be based upon the site conditions combined with the turbine that is selected. The following foundation types are being considered: Monopile and Jacket.	DCO requirements or DML conditions.
C - 39	To maintain suitable operational conditions for the combined foundation and wind turbine structure, scour protection (typically consisting of rock aggregate or stone/ concrete mattresses) may need to be installed. The method of scour protection will generally be to use rock armour or other large size aggregate placed around the periphery of the foundation at the sea bed. However, other methods of scour protection may also be used.	DCO requirements or DML conditions.
C - 40	There will be up to three offshore substations installed to serve the Proposed Development. The exact locations, design and visual appearance will be subject to a structural study and electrical design, which is expected to be completed post consen t.The offshore substations will be installed on jacket, monopile foundations, similar to those described for the turbines themselves.	DCO requirements or DML conditions.

C - 41	The interarray cables will typically be buried at a target burial depth of 1m below the s eabed surface. The final depth of the cables will be dependent on the seabed geological conditions and the risks to the cable (e.g. from anchor drag damage).	DCO requirements or DML conditions.
C - 42	The inter-array cables and the subsea export cables will be installed using one or a combination of the three methods: ploughing, trenching or jetting. It is likely that a combination of these methods will be adopted for localised areas depending on seabed conditions. The installation methods will be selected during detailed design and tendering phases.	DCO requirements or DML conditions.
C - 43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	DCO requirements or DML conditions.
C - 44	A Scour Protection Management Plan will be developed. It will include details of the need, type, quantity and installation methods for scour protection.	DCO requirements or DML conditions.
C - 45	Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	DCO requirements or DML conditions.
C - 46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins. The undertaker must ensure that a local notice to mariners is issued at least 14 days prior to the commencement of the authorised project or any part thereof advising of the start date of each activity and the expected vessel routes from the construction ports to the relevant location.	DCO requirements or DML conditions.
C - 47	Ongoing liaison with fishing fleets will be maintained during construction, maintenance and decommissioning operations via an appointed Fisheries Liaison Officer and Fishing Industry Representative.	DCO requirements or DML conditions.
C - 48	Monitoring of vessel traffic will be undertaken for the duration of the construction period.	DCO requirements or DML conditions.

C - 49	Relevant regulatory bodies will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of construction and the maximum height of any construction equipment to be used, prior to the start of construction, to allow inclusion on Aviation Charts.	DCO requirements or DML conditions.
C - 50	Crossing and proximity agreements with known existing pipeline and cables operators will be sought.	DCO requirements or DML conditions.
C - 51	A Vessel Management Plan (VMP) will be developed pre-construction.	DCO requirements or DML conditions.
C - 52	A piling Marine Mammal Mitigation Protocol (MMMP), will be implemented during construction and will be developed in accordance with JNCC (2010) guidance. The piling MMMP will include details of soft starts to be used during piling operations with lower hammer energies used at the beginning of the piling sequence before increasing energies to the higher levels.	DCO requirements or DML conditions.
C - 53	A Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details	DCO requirements or DML conditions.
C - 54	A Decommissioning Marine Mammal Mitigation Protocol (MMMP) will be implemented during decommissioning. The Decommissioning MMMP will be in line with the latest relevant available guidance.	DCO requirements or DML conditions.
C - 56	RED will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	Electricity application procedures (Section 95 of Energy Act 2004)

C - 57	A Marine Written Scheme of Archaeological Investigation (WSI) will be developed in accordance with the Outline Marine WSI. The Marine WSI will include the implementation of a protocol for Archaeological Discoveries in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects' (The Crown Estate, 2014).	DCO requirements or DML conditions.
C - 58	A offshore geophysical survey (including a UXO survey) will be undertaken prior to construction and will be subject to a full archaeological review in consultation with Historic England.	DCO requirements or DML conditions.
C - 59	A offshore geotechnical survey will be undertaken prior to construction, including a staged geoarchaeological assessment and analysis of geotechnical data inclusive of publication, in consultation with Historic England.	DCO requirements or DML conditions.
C - 60	The offshore export cable corridor and the array will be routed to avoid any identified archaeological receptors pre construction, with buffers as detailed in the Marine Written Scheme of Investigation WSI.	DCO requirements or DML conditions.
C - 61	Regard to Princliples held in Rampion 1 design Plan and Landscape constraints to be developed for Rampion 2, for consideration of SLVIA impacts to the South Downs National Park/Sussex Heritage Coast	DCO requirements or DML conditions.
C - 62	RED will comply with legal requirements with regards to shipping, navigation and aviation marking and lighting.	DCO requirements or DML conditions.
C - 63	Development of, and adherence to, a Code of Construction Practice (CoCP) to reduce direct and indirect disturbance and displacement effects to ornithological features.	DCO requirements or DML conditions.
C - 64	**COMMITMENT UNDER CONSIDERATION.**	
C - 65	The proposed offshore cable corridor and cable landfall (below MHWS) will avoid all statutory marine designated areas.	DCO requirements or DML conditions.
C - 66	The Proposed Development will aim to minimise effects on the special qualities of the South Downs National Park and High Weald AONB through careful design consideration in terms of scale, size and location, and taking account of the relevant policy and guidance.	DCO works plans, description of development and requirements
C - 67	The onshore cable route will avoid the brows of hills as far as is reasonably practical, and is likely to follow the established pattern of the landscape i.e. routed to closely follow the line of existing field boundaries as far as is practicable.	DCO works plans, description of development and requirements

C - 68	The final form of the substation will be finished to a high standard of design, using quality materials and integrated into the surrounding environment through the adoption of a robust, sustainable landscape planting strategy, taking account of the West Sussex Landscape Land Management Guidelines.	DCO works plans, description of development and requirements
C - 69	Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials from the onshore cable construction corridor where practicable and feasible. Prior to construction, at Materials Management Plan (MMP) will be prepared that outlines where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practise is being followed.	CoCP and DCO requirement
C - 70	An emergency response plan in accordance with 'Unexploded ordnance, A guide for the construction industry CIRIA C681' will be developed prior to construction. Site inductions, toolbox talks and appropriate training on the risks from UXO will also be undertaken as part of the construction approach for Rampion 2. In areas with a moderate UXO hazard level and above, a detailed UXO desk study will be undertaken prior to construction to identify where additional mitigation such as non-intrusive geophysical clearance or supervision by an explosive ordnance clearance (EOC) operative is required.	CoCP and DCO requirement
C - 71	RED will ensure that the land used for the development is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, where necessary, risk-based remediation is undertaken in line with statutory guidance (Land Contamination: Risk Management). The precise design of any remediation strategy will be confirmed in the detailed design after DCO grant.	DCO and UK legislation requirement
C - 72	Prior to construction, an unexpected contamination protocol will be produced in line with UK statutory guidance (LCRM) to minimise the potential risks to human health and controlled waters from any unexpected ground contamination. The protocol will take into account the requirements for the use of Personal Protective Equipment (PPE) and adoption of best practice methods during construction.	COCP and DCO requirement

C - 73	Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of temporary and permanent infrastructure. Drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design.	COCP and DCO requirement
C - 74	All subsurface infrastructure will be designed to facilitate subsurface flow pathways to avoid any localised increases in groundwater flooding.	COCP and DCO requirement
C - 75	Construction and permanent development in flood plains will be avoided wherever possible. Where this is not possible (for example, the landfall location) environmental measures will be developed to ensure the works are NPPF compliant. Any works in fluvial floodplains will only be undertaken in line with the NPPF exception and sequential tests.	COCP and DCO requirement
C - 76	In line with good practice pollution prevention plans will be drawn up to detail how ground and surface waters will be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning. These will include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.	COCP and DCO requirement
C - 77	Dewatering of excavations will be undertaken in line with good practise. Effects of dewatering on potential receptors will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment will be installed before discharge to surface or groundwater, this will include the use of siltbusters (or similar) before discharge to surface waters. Appropriate licences and permits will be applied for if required.	COCP and DCO requirement
C - 78	Licensed and private water supplies will be avoided where practicable; if any impacts are anticipated then appropriate measures will be put in place to avoid impact on the quantity and quality of the supply.	COCP and DCO requirement
C - 79	Archaeological and paleoenvironmental mitigation will entail an agreed programme of archaeological recording and dissemination to mitigate any significant adverse effects during construction.	DCO requirement

C - 80	Any loss of built heritage assets or historic landscape elements will be mitigated through an appropriate level of survey and recording, where avoidance or sensitive adaptation is not feasible.	DCO requirement
C - 81	Loss or disturbance of historic landscape elements arising from temporary works will be mitigated, as far as possible, through sensitive design restoration and enhancements.	DCO requirement
C - 82	Any significant effects on the settings of heritage assets will usually be mitigated as far as possible through sensitive design, landscape planting or screening.	DCO requirement
C - 83	Where scour protection is required, MGN 543 (or latest relevant available guidance) will be adhered to with respect to changes greater than 5% to the under-keel clearance in consultation with the MCA and Trinity House.	DML conditions
C - 84	RED will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA. This will include a buoyed construction area around the Rampion 2 array.	DML conditions
C - 85	RED will ensure that local notice to mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operations and maintenance works and supplemented with VHF radio broadcasts agreed with the MCA in accordance with the construction and monitoring programme approved under deemed marine licence condition.	DML conditions
C - 86	A layout plan (including cables) will be agreed with the MMO following appropriate consultation with Trinity House and the MCA setting out proposed details of the authorised Proposed Development.	DML conditions
C - 87	No part of the authorised Proposed Development may commence until the MMO, in consultation with the MCA, has confirmed in writing that the undertaker has taken into account and, so far as is applicable to that stage of the Proposed Development, adequately addressed all MCA recommendations as appropriate to the authorised Proposed Development contained within MGN543 "Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response Issues" and its annexes.	DML conditions
C - 88	Marine coordination will be implemented to manage project vessels throughout construction and maintenance periods.	Secured in the description of the development

C - 89	There will be a minimum blade tip clearance of at least 22m above HAT.	Secured in the description of the development
C - 90	RED is committed to ongoing liaison with fishermen throughout all stages of the Proposed Development, based upon FLOWW (2014, 2015) guidance.	DCO requirements or DML conditions.
C - 91	Appointment of a company Fisheries Liaison Officer (FLO) will be undertaken to maintain effective communications between the project and fishermen.	DCO requirements or DML conditions.
C - 92	Appropriate liaison will be undertaken with relevant fishing interests to ensure that they are fully informed of development planning and any offshore activities and works.	DCO requirements or DML conditions.
C - 93	Timely issue of notifications including Notice to Mariners (NtMs), Kingfisher Bulletin notifications and other navigational warnings to the fishing community will be undertaken to provide advance warning of Proposed Development activities and associated safety zones and advisory safety distances.	DCO requirements or DML conditions.
C - 94	Marking and lighting the Proposed Development will be undertaken in accordance with relevant industry guidance and as advised by relevant stakeholders.	DCO requirements or DML conditions.
C - 95	The assessment will take into consideration the mitigation and control of invasive species measures that will be incorporated into a Project Environmental Monitoring Programme (PEMP).	DCO requirements or DML conditions.
C - 96	Array and export cables will be installed via either ploughing, jetting, trenching, or post-lay burial techniques, to a target burial depth of 1m.	DCO requirements or DML conditions.
C - 97	Commitments to undertake a full review of high-resolution geophysical survey data with 100% coverage of the final design plan, supported by a comprehensive programme of geotechnical survey data review and assessment, will be documented and agreed with Historic England through the development of an archaeological Written Scheme of Investigation (WSI). This will also include a project specific Protocol for Archaeological Discoveries (PAD) which together will form the basis of tertiary mitigation and the implementation of best practice.	DCO requirements or DML conditions.

C - 98	Marine navigational lights will be fitted at the platform level on significant peripheral structures, synchronised to display IALA ‘special mark’ characteristic, flashing yellow, with a range not less than five nautical miles.	DCO requirements or DML conditions.
C - 99	The risk of primary (life-threatening physical injury, or fatality) or secondary (non-life-threatening damage) injury to humans will be managed, by recommending an advisory exclusion zone around all piling operations within which no-one (including construction personnel) is recommended to enter the water.	DCO requirements or DML conditions.
C - 100	The soft-start programme will be determined in discussion with the Diving Liaison Officer. Consideration will be given to the potential for divers to be in the water outside of the advisory exclusion zone at the start of pile driving. This consideration will also include diving activities that could result in divers drifting into the advisory exclusion zone as part of their dive (i.e. tide and wind conditions will be assessed as part of the programme).	DCO requirements or DML conditions.
C - 101	To limit potential exposure to hazardous levels of underwater noise, a comprehensive awareness and communications strategy (a Diver Communication Plan) will be developed by RED in agreement with regulatory authorities to notify the diving/spearfishing community of the timing and duration of proposed works. This will include but not be limited to the appointment of a Diving Liaison Officer (who will be the main point of contact) to work with dive centres, diving clubs (including education establishments), boat operators, Coast Guard, and facilities within jetties and marinas etc. The strategy will include widely publicising (e.g. on the internet) details of the nature, location and timing of pile driving works and the extent of any relevant advisory exclusion zones. The ‘startle’ reaction to underwater noise is anticipated as being less likely to occur in divers/spearfishers who have prior knowledge of the possibility of piling noise occurring.	DCO requirements or DML conditions.
C - 102	The implementation of a UXO MMMP, in consultation with Natural England will be undertaken to appropriately manage the risk to marine mammals during UXO clearance.	DCO requirements or DML conditions.

C - 103	Areas of temporary habitat loss will be reinstated wherever practicable following the completion of construction in each area. Wherever possible reinstatement will be back to the type of habitat crossed.	COCP and DCO requirement
C - 104	Enhancements to terrestrial ecology will be achieved as part of the Proposed Development through the delivery of new or improved habitats or measures to boost populations of certain species. Opportunities for these enhancements will be identified following further evolution of the Proposed Development design and through engagement with stakeholders. These enhancements may be delivered directly by RED within or close to the DCO boundary or via collaboration with independent organisations.	DCO works plans, description of development and requirements
C - 105	A lighting design of all temporary and permanent lighting will be developed once contractors are appointed; however the principles of lighting design will be detailed at the time of application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals (2018). The lighting design will account for the potential effects on biodiversity by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations – this is to decrease the potential displacement effects on light sensitive fauna such as bats.	COCP and DCO requirement
C - 106	Speed limits will be imposed on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna such as badgers, otters, bats and barn owls.	COCP and DCO requirement
C - 107	The use of tried and tested invasive species control and biosecurity measures to avoid the spread of infested materials will be applied.	COCP and DCO requirement
C - 108	Development of Emergency Response and Cooperation Plan (ERCOP)	DCO requirements or DML conditions.
C - 109	Notification to aviation stakeholders of the location and height of all wind energy development and associated construction activities (all structures over 150 ft).	DCO requirements or DML conditions.
C - 110	RED will agree a lighting scheme for the aviation lighting of structures (turbines and offshore support platforms) above 60m in height with the relevant authorities.	DCO requirements or DML conditions.

Appendix B
Transboundary screening matrix

Contents

Tables

1. Transboundary screening matrix

1.1 Introduction

1.1.1 This Appendix identifies the transboundary receptors of relevance to Rampion 2 and considers the potential significant effects from construction, operation (including maintenance) and decommissioning of the offshore and onshore components of the project on transboundary receptors.

1.2 Legislative context

1.2.1 Transboundary effects arise when impacts from a development within other European Economic Area (EEA) Member States ('EEA States') affects the environment of another EEA state(s).

1.2.2 The UK is a signatory to the United Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context. The Convention was adopted in 1991 in the Finnish city of Espoo and is therefore known as the 'Espoo Convention'. It was established negotiated to enhance the cooperation between EEA states in assessing environmental effects in a transboundary context.

1.2.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 transpose the requirements of the EIA Directive governing statutory notification and consultation in respect of transboundary impacts of development on other EEA States.

1.2.4 EIA Regulation 14 requires that an application for an order granting development consent for 'EIA development' must be accompanied by an environmental statement (ES). The ES must include the information stipulated by Regulation 14 including any additional information specified in Schedule 4 (where relevant). Schedule 4 requires that the description of likely significant effects should include those which are of a transboundary nature.

1.2.5 Regulation 32 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 establishes the procedural duties necessary where the Secretary of State (SoS) is of the view that a Nationally Significant Infrastructure Project (NSIP) is likely to have significant effects on the environmental in another EEA State; or where another EEA State is of the view that its environment is likely to be significant affected by an NSIP.

1.2.6 Planning Inspectorate (PINS) Advice Note Twelve: Transboundary Impacts sets out the procedures for consultation in association with an application for a Development Consent Order, where such development may have significant transboundary impacts. The remainder of this Appendix is set out in line with the guidance provided to aid review.

1.2.7 The screening for likely significant effects on the environment of another EEA State may take place at any time when new relevant information becomes available. Where a likely significant effect on the environment of any other EEA

State(s) is identified, the role of the Planning Inspectorate includes the identification of EEA State(s) to be notified, notification of these states, consultation with EEA States, and notification to the EEA State(s) of the outcome of the application for Development Consent Order (DCO).

1.3 Screening considerations

Characteristics of the development

1.3.1 The Proposed Development comprises a new offshore wind project (**Rampion 2**) adjacent to the existing Rampion 1 project in the English Channel, off the south coast of England. The nearest coastal ports to the offshore elements of the project are Littlehampton, Worthing, Shoreham-by-Sea, Brighton and Newhaven.

1.3.2 The design of the Proposed Development has sought to limited to use of natural resources where possible. The Proposed Development comprises both onshore and offshore infrastructure associated with an offshore wind farm including:

- offshore wind turbine generators and associated inter-array cables with an installed capacity of up to 1200MW, maximum indicative range of up to 116 (10MW) or 75 (16MW) wind turbines but not exceeding the number of turbines installed at Rampion 1;
- a maximum proposed wind turbine generator (WTGs) of 325m Max tip height and maximum rotor diameter of 275m;
- the WTGs will be installed on foundations, the range of which comprises monopile, jacket and suction caissons;
- up to three offshore substations (on monopile or jacket foundations);
- up to four offshore export cables for both the WTG array, offshore substations and export cabling, which will connect the WTG array to the onshore export cabling (and then on to the grid) via a landfall at Climping;
- a single landfall site using Horizontal Directional drilling installation techniques;
- buried onshore cables in a single corridor approximately 36km in length from the Landfall at Climping to a proposed substation connection point at Bolney; and
- a new onshore substation to enable connection to the electricity transmission network.

1.3.3 The construction of the Proposed Development will also potentially include associated seabed preparation and, where necessary, scour protection.

1.3.4 The Scoping Boundary is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas. Further details are provided in **Chapter 2: The Proposed Development**.

1.3.5 RED will adopt good construction and management practices to ensure waste is minimised as far as possible and that the storage, transport and eventual disposal of waste have no significant environmental effects. The management and

collection of waste arisings will be carried out under the requirements of the UK waste regulatory regime.

1.3.6 Any effects and risks associated with pollution, nuisances and accidents have been considered within the Scoping Report in **Section 5.3: Other marine users, Section 5.10: Shipping and navigation, Section 6.3: Air quality, Section 6.5: Noise, Section 6.8: Ground conditions and Section 6.10: Water environment**.

1.3.7 The EIA Regulations 2017 requires the environmental assessment to identify, describe and assess major accidents and/or disasters. It is not anticipated that Rampion 2 will use hazardous material that could be released in the event of a natural disaster.

1.3.8 No technologies are proposed that have the potential for transboundary effects.

Location of development and geographical area

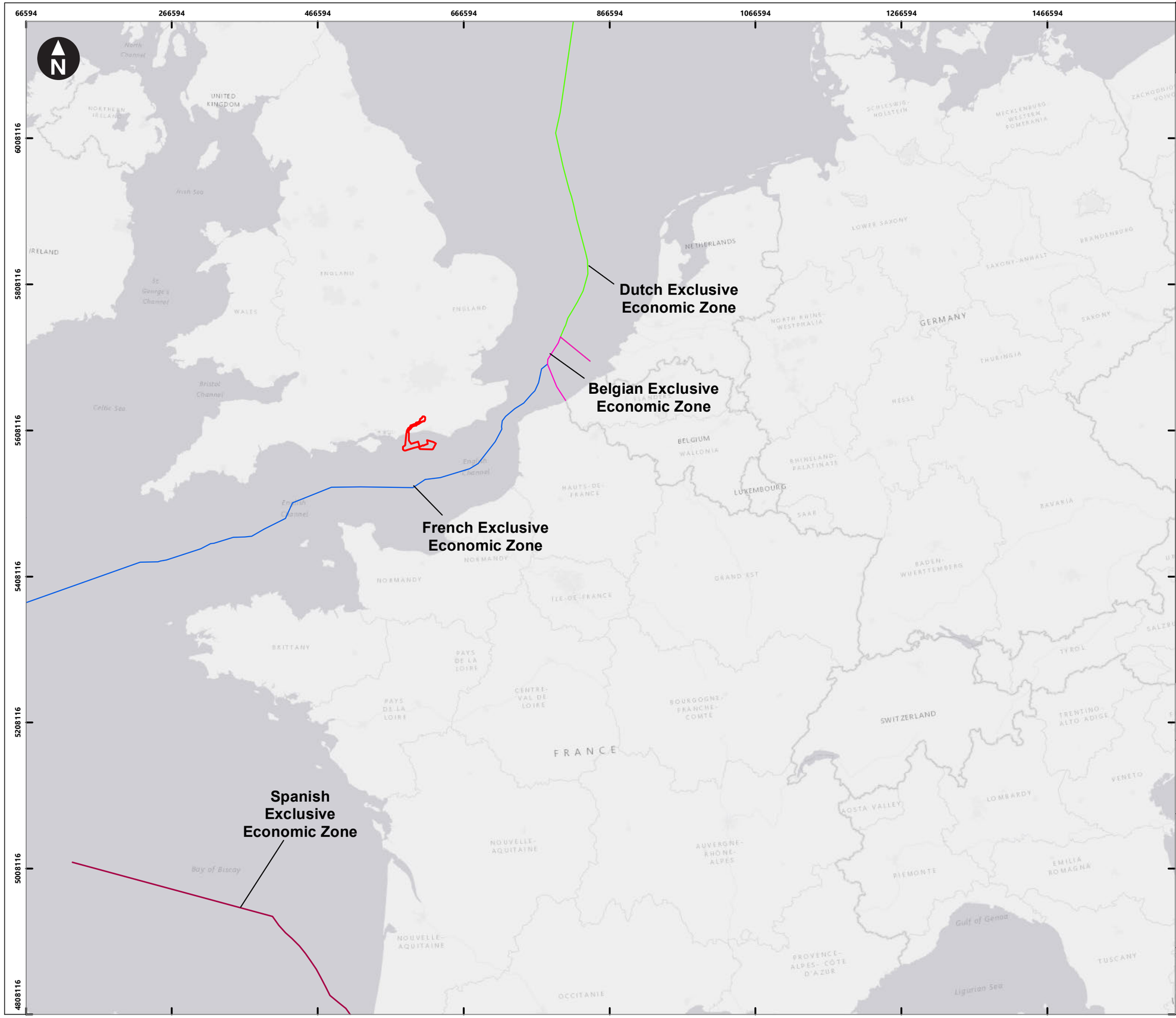
Existing use

1.3.9 The offshore elements of the Proposed Development are situated within an Area of Search adjacent to the south east and west of the existing Rampion 1 project, approximately 13km to 25km offshore, occupying an irregular elongated area in the English Channel. The Proposed Development is located within the area comprising both an extension area afforded an Agreement for Lease by The Crown Estate and extending across part of residual Round 3 Zone 6 offshore wind farm zone.

1.3.10 The wind farm array Area of Search has an approximate area of 315km^2 The Scoping Boundary for the offshore export cables to connect the offshore wind farm area to the shore is approximately 74km^2.

1.3.11 The onshore cable corridor is approximately 36km in length and largely comprises arable and pasture farmland. The onshore scoping area includes the landfall area, cable route corridor and an area to identify a new substation within. The onshore Scoping Boundary is approximately 2km wide along the cable corridor including a 1km buffer either side of the indicative potential cable centreline. It is also approximately 5.7km wide in the area being considered for the substation at the north eastern extent of the cable route corridor as a preferred location is yet to be identified.

1.3.12 The Scoping Boundary will be further refined as ongoing engineering and environmental information is gathered and incorporated into the design of the Proposed Development.



Key

- Rampion Boundary
- Belgian Exclusive Economic Zone
- Dutch Exclusive Economic Zone
- French Exclusive Economic Zone
- Spanish Exclusive Economic Zone

Kilometres
0 25 50 100 150 200
1:5,000,000

Rampion Extension Development

RWE

Rampion 2 Offshore Wind Farm

Figure 1.1 Transboundary screening matrix: Exclusive Economic Zones

Scoping Report

System Identifier:				Version:
42285-WOOD-SC-OF-FG-SA-0002				1.0
Company: WOOD	Drawn By: ILOTJ	Chk/Aprvd: WOOD	Drawn Date: 6/22/2020	Status: FINAL

Distance to other EEA states

1.3.13 The Scoping Boundary includes areas outside of the 12nm UK limit; however, the Proposed Development is located entirely within the UK Exclusive Economic Zone (EEZ).

1.3.14 Given the nature of the Proposed Development, it has been considered that Rampion 2 may potentially have transboundary interactions with other EEA States. These, and their respective distances from the Proposed Development, are outlined in **Table 1.1**.

Table 1.1 Distance from EEZ

EEZ	Distance from Scoping Boundary (km)
Spain	664
France	39
Belgium	182
Netherlands	215

1.3.15 The extent of the area likely to affect a jurisdiction of another EEA state is considered in **Table 1.3** and **Table 1.4** below.

1.4 Environmental importance

Environmental values likely to be affected

1.4.1 **Table 1.2** sets out the key environmental designations considered as part of the assessment on likely significant transboundary effects.

Table 1.2 Key European designations considered

Topic	Constraint	Designated feature	Approximate Distance from Scoping Boundary
Biodiversity (terrestrial, ornithological and intertidal).	Arun Valley Ramsar site (overlaps with Arun Valley SAC, Arun Valley SPA, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)	Qualifies under Ramsar criterion 2 for seven wetland invertebrate species listed on the British Red Data Book, four nationally rare and four nationally scarce plant species. Qualifies under Ramsar criterion 3 for a diverse and rich ditch flora. Qualifies under Ramsar criterion 5 for its assemblage of wintering waterfowl.	2.8km North
	Arun Valley SAC (overlaps with Arun Valley Ramsar site, Arun Valley SPA, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)	Ramshorn snail *Anisus vorticulus*	2.8km North
	Arun Valley SPA (overlaps with Arun Valley SAC, Arun Valley Ramsar site, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)	Bewick's swan (non-breeding) Waterfowl assemblage (non-breeding): including shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas Penelope* and Bewick's swan	2.8km North
	The Mens SAC	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) Barbastelle *Barbastella barbastellus*	11.0km North-west
	Duncton to Bignor Escarpment	Asperulo-Fagetum beech forests	6.5km North-west
	Pagham Harbour Ramsar site (overlaps with Pagham Harbour SPA)	Qualifies under Ramsar criterion 6 for non-breeding population of dark-bellied brent goose	10.0km West
	Pagham Harbour SPA (overlaps with Pagham Harbour Ramsar site and Solent and Dorset Coast SPA)	The site is designated for supporting breeding colonies of: Common tern *Sterna hirundo* Little tern *Sterna albifrons* . During the non-breeding period it supports populations of: Dark-bellied brent goose Ruff *Calidris pugnax* This site is also designated as the estuarine basin is made up of an extensive central area of saltmarsh and intertidal mudflats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mudflats are rich in invertebrates and algae and provide important feeding areas for the many bird species that use the site.	10.0km West
	Solent and Dorset Coast SPA (overlaps with Pagham Harbour Ramsar site and SPA)	The site has been designated to protect international important breeding populations of: Sandwich tern *(Sterna sandvicensis)* (breeding) Common tern (*Sterna hirundo*) Little tern (*Sternula albifrons*)	0.7km West
Biodiversity (marine)	Solent Maritime SAC	Annex I habitats that are the primary reason for selection of this site include: estuaries	22km

Topic	Constraint	Designated feature	Approximate Distance from Scoping Boundary
		Spartina swards *(Spartinion maritimae)* Atlantic salt meadows *(Glauco-Puccinellietalia maritimae).* Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site include: sandbanks which are slightly covered by sea water all the time mudflats and sandflats not covered by seawater at low tide coastal lagoons annual vegetation of drift lines, perennial vegetation of stony banks Salicornia and other annuals colonizing mud and sand Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")	
	South Wight Maritime SAC	This site is protected for three Annex I habitats: reefs, vegetated sea cliffs of the Atlantic and Baltic coasts submerged or partially submerged sea caves This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs.	20km west
	Solent and Isle of Wight lagoons SAC	Annex I habitats that are the primary reason for selection of this site include coastal lagoons.	20km
	Wight-Barfleur Reef SAC	This site is designated for benthic features ‘bedrock and stony reef’. As the benthic secondary impact is expected to be the tidal excursion extent, which was modelled as extending to 15km for Rampion 1, this site is not included in the assessment on account of it distance from the Scoping Boundary.	>36km
	Chichester and Langstone Harbours SPA	Both Chichester and Langstone Harbours contain extensive intertidal mudflats and sandflats with areas of seagrass beds, saltmarsh, shallow coastal waters, coastal lagoons, coastal grazing marsh and shingle ridges and islands. These habitats support internationally and nationally important numbers of overwintering and breeding bird species, which are the primary qualifying features for this site.	23km
	Dungeness, Romney Marsh and Rye Bay potential SPA	This site was designated to protect its important breeding and wintering waterbirds, birds of prey, passage warblers and breeding seabirds. It is also selected for the site’s complex network of wetland types and habitats that support rich and diverse groups of bryophytes, vascular plants, invertebrates and vulnerable, endangered and critically endangered wetland species.	46km
	Solent and Southampton Water SPA	This site has been designated to protect internationally important breeding and non-breeding birds and waterbird assemblage.	28km
	Portsmouth Harbour SPA	This site has been designated to protect internationally important breeding and non-breeding birds.	35km

Topic	Constraint	Designated feature	Approximate Distance from Scoping Boundary
	Pevensey Levels Ramsar	This site is of ornithological interest.	32km

1.4.2 RED have completed a transboundary screening matrix for potential effects for the physical, biological and human environments both onshore and offshore that could arise from the Proposed Development. The conclusions presented have been drawn from the assessment undertaken to date through the scoping process. Any potential significant transboundary effects identified at this stage will be accounted for in the EIA and HRA.

1.4.3 The transboundary screening matrices are set out in **Table 1.3**, **Table 1.4** and **Table 1.5** below.

Table 1.3 Offshore transboundary screening matrix: physical and biological environment

Screening criteria	Coastal processes	Benthic Subtidal and intertidal ecology	Fish and shellfish ecology	Marine mammals	Ornithology
Characteristics of the development	**See section 1.2.**				
Geographical area	**See section 1.2.**				
Location of development (including existing use)	**See section 1.2.**				
Cumulative impacts	See Scoping Report **Section 5.2 Cumulative effects**	See Scoping Report **Section 5.5 Cumulative effects**	See Scoping Report **Section 5.4 Cumulative effects**	See Scoping Report **Section 5.7 Cumulative effects**	See Scoping Report **Section 5.8 Cumulative effects**
Potential impacts and carrier **Environmental importance** **Extent**	No significant transboundary impacts are predicted as the extent of any predicted impacts effects upon coastal process receptors are considered likely to be limited in extent to the Proposed Development footprint for direct effects and one tidal excursion for indirect effects such as sediment transport and deposition.	No significant transboundary impacts are predicted as the extent of any predicted impacts upon benthic and intertidal ecological receptors are likely to be limited in extent, and localised in nature being limited to the Proposed Development footprint for direct effects and one tidal excursion for indirect effects such as sediment transport and deposition.	The main potential impact is considered to arise from the effects of underwater noise exposure to fish during construction (piling), with additional potential impacts on spawning and nursery ground arising from habitat disturbance/ loss during all project phases. These impacts could have the potential to affect species of importance, such as the Downs herring spawning stock stretching across the channel to EEA States.	The main direct impact is considered to be due to noise generated from piling during construction, with additional indirect impacts arising from disturbance. Such impacts could affect EEA States with marine mammals as Qualifying Features at European Sites. Full consideration of connectivity of European Sites (SACs) (**Table 1.2**) will be provided in a separate HRA Screening report, which will cover in more detail matters associated with European designations and will also be	The main impact on birds from the Proposed Development is considered likely to be related to the operational phase, comprising collision risk, disturbance and displacement, which may affect species of importance as qualifying features of European Sites in other EEA States. Indirect effects on prey species availability are also possible during construction. Full consideration of connectivity of European Sites (SPAs and Ramsar sites) (**Table 1.2**) will be provided in a separate HRA Screening report, which will cover in more detail matters associated with European

Screening criteria	Coastal processes	Benthic Subtidal and intertidal ecology	Fish and shellfish ecology	Marine mammals	Ornithology
				discussed with SNCBs as part of the Application process	designations and will also be discussed with SNCBs as part of the Application process
Magnitude	For potential Transboundary impacts scoped in at this stage it is not yet possible to ascertain magnitude, this will however be determined through the EIA process				
Probability **Duration** **Frequency** **Reversibility**	No significant transboundary impacts are predicted	No significant transboundary impacts are predicted	There is a high probability of temporary impacts arising from underwater noise during construction activities (piling). Modelling of underwater noise is not yet available but will be completed for the EIA. There is also potential for habitat loss of short-term temporary duration during construction/ decommissioning; long-term temporary during operation; and reversible.	There is a high probability of impacts arising from underwater noise during construction activities (piling), however modelling of underwater noise is not yet available but will be completed for the EIA. Impacts will be short term temporary (during construction) and would be considered reversible.	There is a high probability of impacts arising to bird species during operation, however detailed assessment and modelling will be undertaken to determine the significance of these effects. Construction phase effects are less certain but will be informed by the EIA on fish, as informed by the underwater noise modelling. Impacts would be anticipated to be temporary (short and long term) and reversible following decommissioning.
Screened in / out	**Screened out**	**Screened out**	**Screened in**	**Screened in**	**Screened in**

Table 1.4 Offshore transboundary screening matrix: human environment

Screening criteria	Commercial fisheries	Shipping and navigation	Other marine users	Civil and military aviation	Socio-economics and tourism	Marine archaeology	Seascape, landscape, and visual
Characteristics of the development	**See section 1.2**						
Geographical area	**See section 1.2**						
Location of development (including existing use)	**See section 1.2**						
Cumulative impacts	See Scoping Report **Section 5.6 Cumulative effects**	See Scoping Report **Section 5.10 Cumulative effects**	See Scoping Report **Section 5.3 Cumulative effects**	See Scoping Report **Section 5.12 Cumulative effects**	See Scoping Report **Section 5.15 Cumulative effects**	See Scoping Report **Section 5.14 Cumulative effects**	See Scoping Report **Section 5.13 Cumulative effects**
Potential impacts and carrier **Environmental importance** **Extent**	There is potential for impact on UK and European commercial fleets due to the presence of the wind farm (operation) and from construction activities affecting access to grounds. There are also potential impacts on fish stocks of importance to fishing fleets from European Member States, principally French and Belgian fleets due to underwater noise during construction (piling), with additional impacts arising from habitat disturbance/loss during all project phases.	There is the potential for impacts to arise on shipping routes which transit to/from other EEA countries including the potential effects of shipping routes to/from transboundary ports. Transboundary issues could also arise from impacts upon international ports and international shipping routes	Whilst impacts would not extend beyond the development boundary, there is the potential for impacts to arise on recreational boat users from EEA states (principally France) transiting to and from UK harbours/marinas on the Sussex coast.	No significant transboundary impacts are predicted as the any predicted impacts effects upon civil or military aviation receptors are likely to be limited in extent, being related primarily to the Pease Pottage radar. There is therefore no pathway by which direct or indirect effects arising from Rampion 2 could significantly affect the civil or military aviation receptors of another EEA State.	No significant transboundary impacts are predicted as in general, the majority of socio-economic effects generated by the Proposed Development will be localised and relevant to the study area. It is noted, however, that the Proposed Development will result in supply chain expenditure abroad, in addition to demand for specialist skills which may not be available locally. This will, in turn lead to socio-economic benefits to areas outside the UK in the form of job creation and contribution to GVA/ GDP growth.	No significant transboundary impacts are predicted due to the localised nature of any potential impacts on marine archaeological receptors; any predicted impacts being limited to the Rampion 2 development footprint for direct effects and one tidal excursion for indirect effects. There is considered to be no potential pathway for impacts or effects to arise on EEA State assets or interests.	No significant transboundary impacts are predicted as any predicted impacts effects upon SLVIA receptors are likely to be limited in extent, being related primarily to the localised area of sight. The Proposed Development will be approximately 50km from the nearest French coast, there is therefore no pathway by which direct or indirect effects arising from Rampion 2 could significantly affect the SLVIA receptors of another EEA State.
Magnitude	For potential Transboundary impacts scoped in at this stage it is not yet possible to ascertain magnitude, this will however be determined through the EIA process						
Probability **Duration** **Frequency**	There is a high probability of impacts to commercial fishing, although more detailed information on both	Although there is potential for impacts on international shipping to arise,	Although there is potential for impacts on cross Channel sailing routes to	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.	No significant transboundary impacts are predicted.

Screening criteria	Commercial fisheries	Shipping and navigation	Other marine users	Civil and military aviation	Socio-economics and tourism	Marine archaeology	Seascape, landscape, and visual
Reversibility	fishing activity and final project design is required to assess the significance of effects to fleets, which will be undertaken as part of the EIA. The effects are potentially long term temporary (for the duration of the Project), however these are also likely to be reversible on decommissioning.	particularly as a result of the presence of the Proposed Development, the significance of these effects cannot at this stage be determined and will be subject to assessment within the EIA. Impacts may be long term temporary (for the duration of the Project), but reversible since the infrastructure will be removed on decommissioning.	arise, particularly as a result of the presence of the Proposed Development, the significance of these effects cannot at this stage be determined and will be subject to assessment within the EIA. Impacts may be long term temporary (for the duration of the Project), but reversible since the infrastructure will be removed on decommissioning.				
Screened in/ out	**Screened in**	**Screened in**	**Screened in**	**Screened out**	**Screened out**	**Screened out**	**Screened out**

Table 1.5 Onshore transboundary screening matrix

	Landscape and visual impact	Air quality	Agriculture and soils	Noise and vibration	Terrestrial ecology and nature conservation	Transport	Ground conditions	Historic environment	Water environment
Environmental importance:	There are no European designations for onshore landscape and visual impact within the study area.	No European ecological designated sites nearby likely to be affected by air quality. Emissions from traffic from construction vehicles are generally limited to within 200 m of the road network. Limited to construction and demolition phases where the main impact is dust which only has an impact within approximately 350m.	There are no European agriculture or soil designations within the onshore part of the study area.	There nearest EEA landmass to the Proposed Development is France at 94.6 km away. As such, there are no onshore noise sensitive receptors beyond the jurisdiction to the UK.	Any transboundary impact to terrestrial ecology and nature conservation are limited to the disturbance of functionally linked habitat used by designated features for feeding (e.g. grazing marsh, arable fields etc.). There is no direct land take within European designations listed in **Table 1.2**, although some temporary and geographically restricted disturbance within functionally linked habitats could be realised. However, given the extent of functional habitat and the distance between European sites and the scoping boundary any effect would be negligible and therefore no disturbance that would challenge the conservation objectives of European sites in other jurisdictions is anticipated. Additionally, there will be no disturbance to flight paths associated with the species using these habitats.	The predicted volume of traffic on the major transport routes is considered to be small and as such, not affect the international strategic road network.	There are no European designations for ground conditions within the onshore study area.	There are no world heritage sites, registered battlefields, protected wreck sites or protected military sites within the onshore part of the study area.	There are no freshwater European designations within the onshore study area. Please see coastal processes (above) for coastal water transboundary impact.

	Landscape and visual impact	Air quality	Agriculture and soils	Noise and vibration	Terrestrial ecology and nature conservation	Transport	Ground conditions	Historic environment	Water environment
Potential impacts and carrier: By what means could impacts be spread (i.e. what pathways)?	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.	No impacts are likely to extend beyond the jurisdiction of the UK.
Extent: What is the likely extent of the impact (geographical area and size of the affected population)?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Magnitude: What will the likely magnitude of the change in relevant variables relative to the status quo, taking into account the sensitivity of the variable?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Probability: What is the degree of probability of the impact? Is the impact likely to occur as a consequence of normal conditions or exceptional situations, such as accidents?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Duration: Is the impact likely to be temporary, short-term or long term? Is the impact likely to relate to the construction, operation or decommissioning phase of the activity?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frequency: What is likely to be the temporal pattern of the impact?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Landscape and visual impact	Air quality	Agriculture and soils	Noise and vibration	Terrestrial ecology and nature conservation	Transport	Ground conditions	Historic environment	Water environment
Reversibility: Is the impact likely to be reversible?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative impacts: Are other major developments close by?	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.	No anticipated transboundary cumulative impact.
Transboundary impacts Screened in / out of the ES	**Screened out**	**Screened out**	**Screened out**	**Screened out**	**Screened out**	**Screened out**	**Screened out**	**Screened out**	**Screened out**

1.5 Consultation

1.5.1 Under Regulation 32 of the EIA Regulations 2017 where there is the potential for a proposed development to have significant effects on the environment of another EEA State(s) (or where the Secretary of State (SoS) receives a request for involvement from an EEA State), the SoS is required to undertake a consultation and notification process. This is reflected in the PINS Advice Note Twelve, which details the process to be undertaken by PINS and the other EEA States.

1.5.2 Rampion 2 has followed the guidance provided within Advice Note Twelve in undertaking the screening of potential transboundary effects in order to identify likely significant effects on the environment in other EEA States, thereby informing this consultation process.

1.6 Summary

1.6.1 This transboundary screening matrix has been prepared in accordance with PINS Advice Note 12. The primary purpose of this note is to provide a screening assessment of potential transboundary impacts which have the potential to affect EEA States.

1.6.2 On the basis of current information, there is the potential for significant effects arising from the Proposed Development on the interests of EEA States and as such transboundary effects may arise. Those impacts for which a transboundary effect may arise, and which are therefore screened into the EIA, are as follows:

- fish and shellfish ecology;
- marine mammals;
- ornithology;
- commercial fisheries;
- shipping and navigation; and
- other marine users.

Appendix C
SLVIA Methodology

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1. SLVIA methodology

1.1 Introduction

1.1.1 The Rampion 2 approach to the assessment methodology is set out in **Chapter 4: The EIA Process.** This appendix describes the methodology to be used within the seascape, landscape and visual impact assessment (SLVIA) of the EIA for the offshore elements of Rampion 2.

1.1.2 The offshore elements of Rampion 2 are situated to the east and west of the existing Rampion project, within the 'array area' of the Scoping Boundary **Scoping Report Section 5.13** (**Figure 5.13.1**), located approximately 13km to 25km offshore. Wind turbines to be located within the array area are expected to range from 10MW to 16MW, with an indicative number of turbines between 116 (10MW turbines) and 75 (16MW turbines) (generating capacity of up to 1,200MW), with a maximum wind turbine height of 325m blade tip and 275m rotor diameter (16MW) (above LAT). An offshore cable corridor will contain the offshore export cables between the array area and landfall, where there will be cable laying vessels visible during the construction phase.

1.1.3 The methodology presented here as part of the scoping process may be subject to change, as a result of consultation and further development of the assessment process.

1.1.4 This SLVIA methodology appendix has been structured as follows:

- overview of SLVIA methodology;
- iterative assessment and design;
- guidance, data sources and site surveys;
- assessing seascape/landscape Effects;
- assessing visual effects;
- assessing cumulative seascape, landscape and visual effects;
- evaluation of significance;
- nature of effects; and
- visual representations.

1.2 Overview of the SLVIA methodology

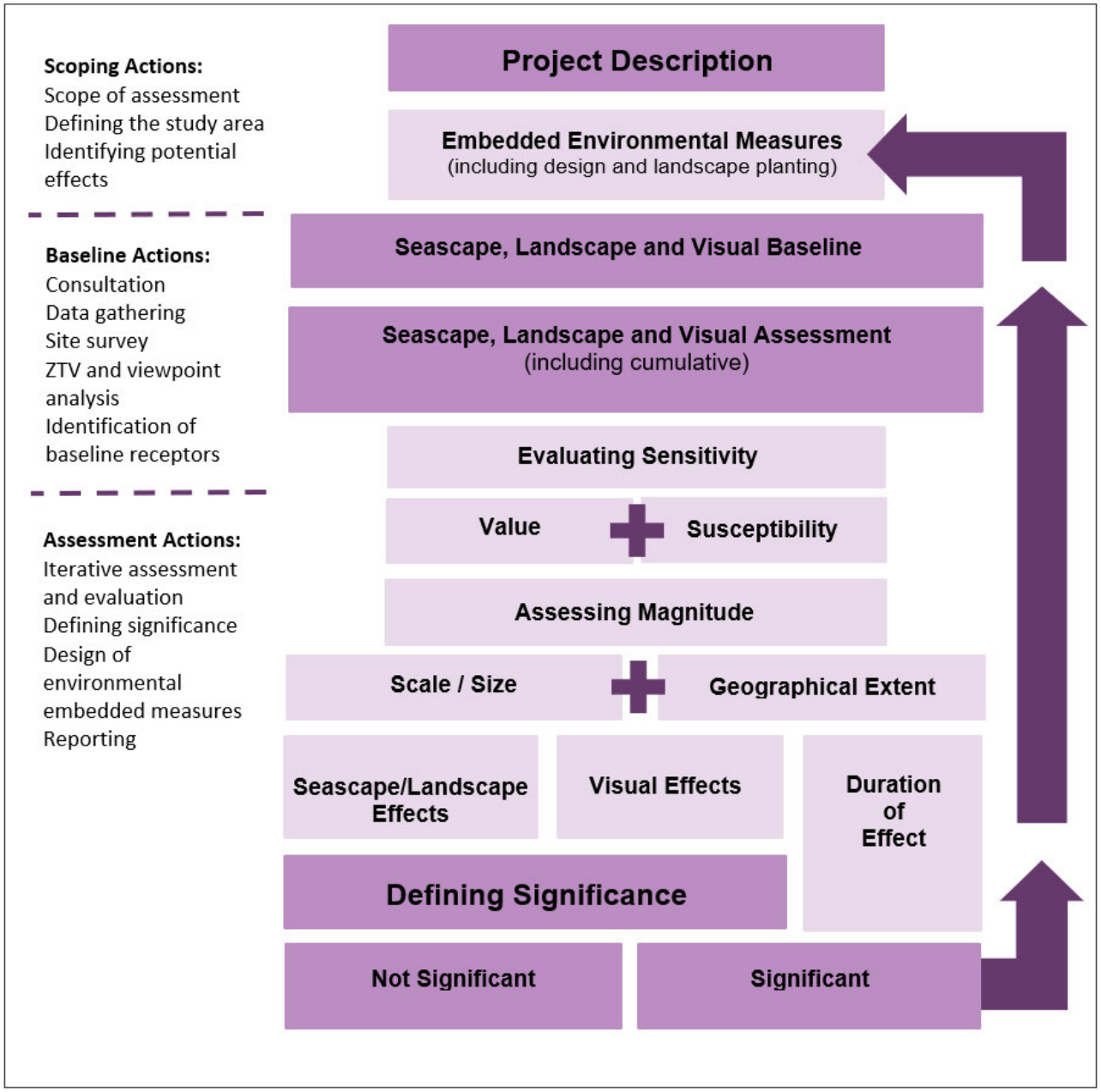
1.2.1 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3), and other best practice guidance. An overview or summary of the SLVIA process is provided here and illustrated, diagrammatically in **Plate 1**.

1.2.2 The SLVIA will assesses the likely effects that the construction and operation of the offshore elements of Rampion 2 on the seascape, landscape and visual

resource, encompassing effects on seascape/landscape character, designated landscapes, visual effects and cumulative effects.

1.2.3 Essentially, the seascape, landscape and visual effects (and whether they are significant) is determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the offshore elements of Rampion 2. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the offshore elements of Rampion 2. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change, the geographical extent and the duration of that change. By combining assessments of sensitivity and magnitude of change, a level of seascape, landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

Plate 1 Overview of approach to Seascape, Landscape and Visual Impact Assessment



1.2.4 The assessment has also considered the whole project or combined effects of the offshore and offshore elements of Rampion 2, as well as the cumulative effects likely to result from the offshore elements of Rampion 2 and other similar proposed developments.

1.2.5 In each case an appropriate and proportionate level of assessment has been undertaken and agreed through consultation at the scoping stage. The level of assessment may be 'simple' (requiring desk-based data analysis) or 'detailed' (requiring site surveys and investigations in addition to desk-based analysis).

1.2.6 The seascape, landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal

peer review, and the adoption of a systematic, impartial, and professional approach.

Interface between seascape and landscape assessment

1.2.7 Together, the SLVIA and the onshore Landscape and Visual Impact Assessment (LVIA) provide a whole project assessment of the effects of Rampion 2. The offshore elements of Rampion 2 (the wind farm, offshore platforms and offshore export cable corridor) are assessed in the SLVIA and the offshore elements of Rampion 2 (the onshore substation, onshore cable corridor, and landfall location) are assessed in the LVIA. Both the SLVIA and the LVIA follow a broadly similar assessment methodology that uses the same glossary and terminology.

1.2.8 The SLVIA will also refer to potential interrelated effects likely to result from any areas where the construction, operation and decommissioning of the offshore and offshore elements combine, or inter-relate to affect receptors within the SLVIA study area. An example could include effects on views where both offshore and offshore elements are visible, potentially resulting in whole project landscape and visual effects as a result of the construction, operation and decommissioning of the onshore and offshore elements. In those instances, the SLVIA will provide whole project assessment focusing on the offshore development that will be referenced for consistency in the LVIA.

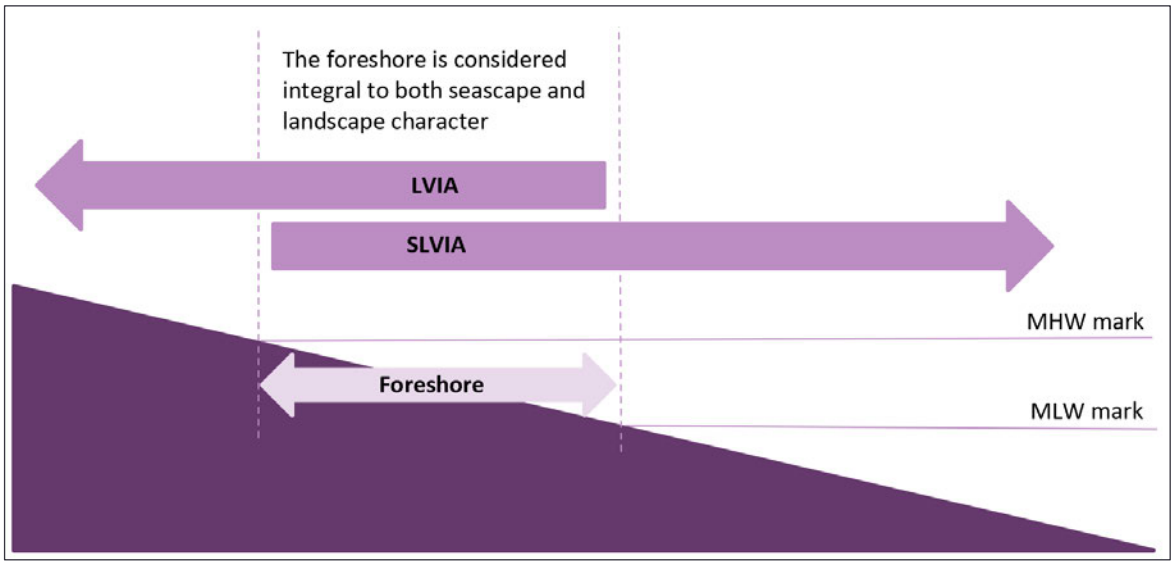
Assessment of the foreshore

1.2.9 The SLVIA will seek to take account for the definition of 'seascape', as set out in the UK Marine Policy Statement (UK Government, 2011) which states that *'…references to seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other'.*

1.2.10 The majority of the southern half of the SLVIA study area consists of sea. In England, seascape character *'principally applies to coastal and marine areas seaward of the low-water mark'* and landscape character '*principally applies to terrestrial areas lying to the landward side of the high-water mark'* (Natural England, 2012, p7, Box 1). Although these definitions are clear in the guidance, the importance of the interaction of sea, coastline and land as perceived by people is also highlighted in subsequent definitions of seascape in the guidance (Natural England, 2012), indicating a subtler transition between seascape and landscape than defined in the guidance.

1.2.11 In order to address this and avoid under-valuing the inter-tidal area between the mean low and high-water mark, the SLVIA will assess 'offshore' seascape effects on Marine Character Areas (MCAs) where they are seaward of the mean high water mark (MWH); and the effect on terrestrial landscape character will be assessed on landscape character areas (LCAs) lying to the landward side of the mean low-water mark (MWL).

Plate 2 Extent of SLVIA and LVIA assessment of landscape and seascape along the coastline



1.2.12 This approach means that the 'foreshore', which includes beaches, inter-tidal areas and coastlines between MWH and MLW, will be considered in both the landscape and seascape character assessments. This ensures adequate consideration will be given to assessing the relationship between terrestrial and marine areas and interactions across the land/sea interface. This is consistent with the published MMO Seascape Assessment (MMO, 2014) which extends to the mean high water mark; and published landscape character assessments.

Defining the study area

1.2.13 The study area for the SLVIA is defined as the Scoping Boundary together with the Zone of Theoretical Visibility (ZTV) of the offshore elements of Rampion 2.

1.2.14 The SLVIA study area will cover a radius of 50 km from the offshore component of the Scoping Boundary (defined by MHW), as illustrated in **Scoping Report Section 5.13, Figure 5.13.1**. Broadly, the SLVIA study area is defined by a northern terrestrial area, including the Counties of East Sussex, West Sussex, Isle of Wight, Hampshire, Surrey and Kent; as well as the City of Brighton and Hove; and a southern offshore area defined by waters of the English Channel.

1.2.15 The SLVIA study area is defined to extend far enough to include all areas within which significant effects could occur, using professional judgement. It is an outer limit to where significant effects could occur.

1.2.16 IEMA Guidance (IEMA, 2015 and 2017) recommends a proportionate ES focused on the significant effects and a proportionate ES topic chapter. An overly large SLVIA study area may be considered disproportionate if it makes the understanding the key impacts of the offshore elements of Rampion 2 more difficult.

1.2.17 This is supported by LVIA Guidance produced by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (para 3.16). This guidance recommends that *'The level of detail provided should be that which is reasonably required to assess the likely significant effects'.*

1.2.18 Para 5.2 and p70 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner'.*

1.2.19 Other wind farm specific guidance, such as SNH's Visual Representation of Wind Farms Guidance (SNH, 2017) recommends that ZTV distances are used for defining study area based on wind turbine height. This guidance recommends a 45km radius for wind turbines greater than 150m to blade tip (para 48, p12), however it does not go beyond turbines above 150m in height. The height of current offshore wind turbine models has now exceeded the heights covered in this guidance. The SNH guidance recognises that greater distances may need to be considered for larger wind turbines used offshore, as is the case for the SLVIA study area for the offshore elements of Rampion 2.

1.2.20 Beyond the Scoping Boundary, the SLVIA will generally focus on locations from where it may be possible to see the offshore elements of Rampion 2, as defined by the Blade Tip ZTV, **Scoping Report Section 5.13,** (**Figure 5.13.2**).

1.2.21 The ZTV shown in **Scoping Report Section 5.13, Figure 5.13.2** (and **Figure 5.13.6a-b**) are based on turbines of 325m to tip (above LAT) located around the perimeter of the array area and represents the Maximum Development Scenario (MDS) considered in the scoping assessment. The ZTV illustrates where there would be no visibility of these wind turbines, as well as areas where there would be lower or higher numbers of wind turbines visible.

1.2.22 Consideration of the blade tip ZTV, **Scoping Report Section 5.13,** (**Figure 5.13.2**) indicates that theoretical visibility of the offshore elements of Rampion 2 mainly occurs within 50km and that beyond 50km, the geographic extent of visibility will become very restricted. At distances over 50km, the lateral (or horizontal) spread of the offshore elements of Rampion 2 will also occupy a small portion of available views and the apparent height (or 'vertical angle') of the wind turbines would also appear very small, therefore significant visual effects are unlikely to arise at greater than this distance, even if the wind turbines are visible.

1.2.23 The influence of earth curvature begins to limit the apparent height and visual influence of the wind turbines visible at long distance (such as over 50km), as the lower parts of the turbines would be partially hidden behind the apparent horizon, leaving only the upper parts visible above the skyline.

1.2.24 The variation of weather conditions influencing visibility off the English coast has also informed the SLVAI study area. Based on initial review of Met Office visibility data presented in the MMO Seascape Assessment for the South Marine Plan Areas (MMO, 2014) (Figure 16, p26) *'visibility beyond 50km is very unlikely'.*

1.2.25 This is supported by the visibility analysis in the Offshore Energy SEA (White Consultants, March 2020), which considered Met Office visibility data for eight coastal stations. Averaging all coastal stations, the visual range recorded was just under 24km around 50% of the time, just under 30km 33% of the time, around 34km for 20% of the time, and 40km 10% of the time.

1.2.26 In considering the SLVIA study area, the sensitivity of the receiving seascape, landscape and visual receptors has also been reviewed, taking particular account of the landscape designations shown in **Scoping Report Section 5.12, Figure 5.13.3**, and other principal visual receptors. It is clear that the principal issues for

the SLVIA are the location of the offshore elements of Rampion 2 off the Sussex coast and therefore its exposure to and visibility from settlements along the coast; the South Downs National Park (SDNP) and the Sussex Heritage Coast, which are primarily within 13-30km of the offshore elements of Rampion 2.

1.2.27 Potential cumulative effect interactions with other offshore wind farms have also influenced the definition of the SLVIA study area. Other offshore wind farms within the SLVIA study area are shown in the **Scoping Report Section 5.13, Figure 5.13.1**.

1.2.28 The study area will be reviewed and amended in response to such matters as refinement of the offshore components, the identification of additional impact pathways and in response where appropriate to feedback from consultation. Feedback is requested specifically on the SLVIA study area from stakeholders.

1.3 Iterative assessment and design

1.3.1 The SLVIA is part of an iterative EIA process which aims to 'design out' significant effects via a range of environmental measures including avoidance and design that aim to reduce or eliminate significant effects. Design is an integrated part of the SLVIA process and environmental measures related to landscape design and management can be an important tool to mitigate significant effects. The EIA process can also call on a range of environmental and technical specialists that contribute other forms of mitigation that may also bring a range of benefits. Potentially significant seascape, landscape and visual effects and the constraints and opportunities connected with their resolution are identified through the SLVIA process. Where possible embedded environmental measures are incorporated into the offshore elements of Rampion 2 in order to mitigate seascape, landscape and visual effects.

1.3.2 Embedded environmental measures are recorded in the Commitments Register (**Appendix A**) which details how the measures will be secured as well as documenting the design evolution of the offshore elements of Rampion 2.

Potential effects during construction and decommissioning

1.3.3 Potential effects on the seascape, landscape and visual resource are likely during the construction and decommissioning of the offshore elements of Rampion 2 during the construction and decommissioning periods, including:

- Seascape effects:
  - Effects on perceived seascape character, arising as a result of the construction and decommissioning activities (including laying new offshore export cables to shore) and structures located within the array area, which may alter the seascape character of the array area itself and the perceived character of the wider seascape through visibility of these changes.
- Landscape effects:
  - Effects on perceived landscape character, arising as a result of the construction and decommissioning activities and structures, including laying

new offshore export cables to shore, which will be visible from the coast and may therefore affect the perceived character of the landscape.

  - Effects on the special landscape qualities and integrity of designated landscapes as a result of the above construction and decommissioning activities.

- Visual Effects:
  - Effects on views and visual amenity experienced by people from principal visual receptors and representative viewpoints, arising as a result of the construction and decommissioning activities and structures, including laying new offshore export cables to shore, which will be visible from the coast.
- Whole project effects:
  - Whole project effects could occur as a result of multiple construction and decommissioning activities related to the onshore and/or the offshore elements of Rampion 2 affecting a seascape, landscape or visual receptor. Effects will be influenced by the construction phasing of the offshore and offshore elements of Rampion 2, the geographic location of receptors an visibility of the onshore and offshore elements.

Potential effects during operation

1.3.4 Potential effects on the seascape, landscape and visual resource are likely during the operation of the offshore elements of Rampion 2 over its operational lifetime, including:

- Seascape effects:
  - Effects on perceived seascape character (MCAs), arising as a result of the operational wind turbines, substations and maintenance activities located within the array area, which may alter the seascape character of the array area itself and the perceived character of the wider seascape.
- Landscape effects:
  - Effects on perceived landscape character (LCAs and Designations), arising as a result of the operational wind turbines, substations and maintenance activities, which will be visible from the coast and may therefore affect the perceived character of the landscape. Effects on defined special qualities of designated landscapes.
- Visual effects:
  - Effects on views and visual amenity experienced by people as principal visual receptors and representative viewpoints, arising as a result of the operational wind turbines, substations and maintenance activities, marine navigation and aviation lighting.
- Cumulative effects:
  - Effects of operation of the offshore elements of Rampion 2 that have the potential to contribute to cumulative seascape, landscape and visual effects

including effects on seascape, landscape and visual amenity due to inter-visibility with other planned projects.

1.4 Guidance, data sources and site surveys

Guidance on methodology

1.4.1 This methodology accords with Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3). Where it diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.

- GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. It is considered that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of wind farm development. For example, a high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a potentially significant effect will be overlooked if effects are diluted down due to their limited geographical extents and/or duration or reversibility.
- The consideration of the size or scale of the effect, its geographical extent and its duration and reversibility are kept separate, by basing the magnitude of change primarily on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing together conclusions about significance and combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether an each effect is significant or not significant.
- OPEN's assessment methodology utilises six word scales of magnitude of change – high, medium-high, medium, medium-low, low and negligible; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (3.27), as a means of clearly defining and summarising magnitude of change judgements.

1.4.2 These are not new diversions and follow practice established on other Nationally Significant Infrastructure Projects (NSIP) such as East Anglia TWO, East Anglia THREE, Norfolk Vanguard and Thanet Extension.

1.4.3 A full list of references can be found in **Chapter 8**, guidance on methodology can be found in **Chapter 5** and a glossary is provided at the front of the Scoping Report.

1.4.4 Whilst many of these guidance documents will be prepared by SNH for projects in Scotland, in the absence of alternative guidelines they have become best practice

across the UK. The preparation of visual representations that accord with this SNH guidance will be agreed with consultees.

Data Sources

1.4.5 A list of the data sources used for this assessment is provided in **Section 5.13** of the Scoping Report.

Desk-based and site survey work

1.4.6 The SLVIA undertaken as part of the PEIR and ES will be informed by desk-based studies and field survey work undertaken within the SLVIA study area. The landscape, seascape and visual baseline will be informed by desk-based review of landscape and seascape character assessments, and the ZTV, to identify receptors that may be affected by the offshore elements of Rampion 2 and produce written descriptions of their key characteristics and value.

1.4.7 A preliminary desk-based assessment will be undertaken of seascape, landscape and visual receptors using ZTV analysis, to identify which landscape and visual receptors are unlikely to be significantly affected, which will be subject to a simple assessment, and those that are more likely to be significantly affected by the offshore elements of Rampion 2, which require a detailed assessment.

1.4.8 Interactions will be identified between the offshore elements of Rampion 2 and seascape, landscape and visual receptors, to predict potentially significant effects arising and measures are proposed to mitigate effects.

1.4.9 For those receptors where a detailed assessment is required, primary data acquisition will be undertaken through a series of surveys. These surveys will include field survey verification of the ZTV from terrestrial landscape character areas (LCAs), micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from all representative viewpoints. These viewpoint photography and visual assessment surveys are planned to be undertaken during Summer 2020. Further visual assessment surveys are then likely to be undertaken prior to the PEIR submission, expected to be in September-October 2020, using the photomontage visualisations to undertake field survey assessment of visual effects from each representative viewpoint. Sea-based offshore surveys are not proposed to be undertaken as part of the SLVIA.

1.4.10 Detailed assessment methods will be based on quantifying impacts through modelling to enable prediction of seascape, landscape and visual impacts. Assessment of the sensitivity of seascape, landscape and visual receptors will be undertaken, together with an assessment of the magnitude of change arising as a result of the offshore elements of Rampion 2. Judgements on sensitivity and magnitude will be combined to arrive at an overall assessment as to whether the offshore elements of Rampion 2 will have an effect that is significant or not significant on each seascape, landscape and visual receptor.

1.5 Assessing seascape/landscape effects

1.5.1 Landscape effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character."

1.5.2 In accordance with GLVIA 3 the term 'landscape' encompasses areas of 'townscape' and coastal areas of 'seascape'. Areas of landscape and seascape are relevant to this assessment and they are described as follows.

Landscape character

1.5.3 GLVIA 3, paragraph 5.4, advises that Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:

- "*the elements that make up the landscape in the study area including:*
  - *physical influences – geology, soils, landform, drainage and water bodies;*
  - *landcover, including different types of vegetation and patterns and types of tree cover; and*
  - *the influence of human activity, including landuse and management, the character of settlements and buildings, and pattern and type of fields and enclosure.*
- *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness;*
- *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape*."

Seascape character

1.5.4 GLVIA 3 paragraph 5.6, advises that where LVIA is carried out in coastal or marine locations baseline studies must take account of seascape. Seascape is defined in the UK Marine Policy Statement, (UK Government, 2011) as "*landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other*."

1.5.5 GLVIA 3 paragraph 5.6, identifies the following different factors which together determine seascape character:

- "*coastal features;*
- *views to and from the sea;*
- *particular qualities of the open sea;*
- *the importance of dynamic changes due to weather and tides;*
- *changes in seascapes due to coastal processes;*

- *cultural associations; and*
- *contributions of coastal features to orientation and navigation at sea."*

Seascape/landscape effects

1.5.6 In respect of the offshore elements of Rampion 2, the potential seascape/landscape effects, occurring during the construction, operation and decommissioning periods of the offshore elements of Rampion 2 may therefore include, but are not restricted to the following:

- changes to seascape/landscape character and qualities: seascape/landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall seascape/landscape character within a particular area;
- changes to the perceived character of designated landscapes, including the South Downs National Park (SDNP) and High Weald Area of Outstanding Natural Beauty (AONB) that would affect the special landscape qualities underpinning the designation and its integrity; and
- cumulative seascape/landscape effects: where more than one development of a similar type may lead to a cumulative effect.

1.5.7 Development may have a direct effect on the seascape, however all landscape effects arising from the offshore elements of Rampion 2 on landscape character will be indirect effects, which would be perceived from the wider landscape, outside the Scoping Boundary and its seascape/landscape.

Evaluating seascape/landscape sensitivity to change

1.5.8 The assessment of sensitivity takes account of the seascape/landscape value and the susceptibility of the receptor to the offshore elements of Rampion 2.

1.5.9 Seascape/landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that sensitivity needs to be considered on a case by case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less susceptible (and therefore sensitive) to a particular development. The susceptibility of seascape/landscape receptors will be assessed in relation to change arising from the specific development proposed, including the specific offshore elements of Rampion 2.

Sensitivity of seascape/landscape receptor

Introduction

1.5.10 The sensitivity of a seascape/landscape character receptor is an expression of the combination of the judgements made about the susceptibility of the receptor to the

specific type of change or the development proposed and the value related to that receptor.

Value of the seascape/landscape receptor

1.5.11 The value of a seascape/landscape character receptor is a reflection of the value that society attaches to that seascape/landscape. The assessment of the seascape/landscape value will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following range of factors.

- Seascape/landscape designations - A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is affected and the level of importance of the designation which may be international, national, regional or local. The absence of designations does not however preclude value, as an undesignated landscape character receptor may be valued as a resource in the local or immediate environment.
- Seascape/landscape quality - The quality of a seascape/landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A seascape/landscape with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character.
- Seascape/landscape experience - The experiential qualities that can be evoked by a landscape receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the seascape/landscape in its own right, the recreational value of the seascape/landscape, and the contribution of other values relating to the nature conservation or archaeology of the area.

Seascape/landscape susceptibility to change

1.5.12 The susceptibility of a seascape/landscape character receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the offshore elements of Rampion 2 without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Some landscape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or not also be special landscape qualities that underpin designated landscapes.

1.5.13 The assessment of the susceptibility of the seascape/landscape receptor to change will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement. Indicators of landscape susceptibility to the type of development proposed (construction, operation and decommissioning of the offshore elements of Rampion 2) are based on the following criteria.

- Overall strength and robustness: Collectively the overall characteristics and qualities of a particular seascape/landscape result in a strong and robust landscape that is capable of reasonably accommodating the influence of the offshore elements of Rampion 2 without undue adverse effects on the special landscape qualities (in the case of a designated landscape) or the key characteristics for which an area of seascape/landscape character or a particular element it is valued.
- Landscape scale and topography: The scale and topography are large enough to physically accommodate the influence of the offshore elements of Rampion 2. Topographical features such as more complex, distinctive or small-scale coastal landforms are likely to be more susceptible than simple, broad and homogenous coastal landforms.
- Openness and enclosure: Openness in the seascape/landscape may increase susceptibility to change because it can result in wider visibility, however open seascape/landscape may also be larger scale and simple, which would decrease susceptibility. Conversely, enclosed seascape/landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility. In general, large scale, simple and open seascapes/coastlines are likely to be less susceptible to the offshore elements of Rampion 2 than more enclosed, complex seascapes/coasts (such as indented bays, headlands etc).
- Skyline: Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape character assessment, are generally considered to be more susceptible to development in comparison to broad, simple skylines which lack landmark features or contain other infrastructure features.
- Relationship with other development and landmarks: Contemporary landscapes where there are existing similar developments (wind turbines or energy developments) or other forms of development (industry, mineral extraction, masts, urban fringe/large settlement, major transport routes) that already have a characterising influence result in a lower susceptible to development in comparison to areas characterised by smaller scale, historic development and landmarks.
- Perceptual qualities: Notable landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated or farmed/developed landscapes where perceptions of ‘wildness’ and tranquillity are less tangible. Landscapes which are either remote or appear natural may vary in their susceptibility to development.
- Landscape context and association: the extent to which the offshore elements of Rampion 2 will influence the character of seascape/landscape receptors across the study area relates to the associations that exist between the seascape/landscape receptor within which the offshore elements of Rampion 2 are located and the seascape/landscape receptor from which the offshore elements of Rampion 2 is being experienced. In some situations, this association will be strong, where the seascapes/landscapes are directly related, and in other situations weak where the landscape association is weak.

The context and visual connection to areas of adjacent seascape/landscape character or designations has a bearing on the susceptibility to development.

Seascape/landscape sensitivity rating

1.5.14 An overall sensitivity assessment of the seascape/landscape receptor will be made by combining the assessment of the value of the seascape/landscape character receptor and its susceptibility to change. The evaluation of seascape/landscape sensitivity will be applied for each seascape/landscape receptor - high, medium-high, medium, medium-low and low - by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments will be made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 1.1** below.

Table 1.1 Seascape/landscape sensitivity to change

Value	Higher	Lower
	Designation: Designated seascape/landscapes with national policy level protection or defined for their natural beauty.	Seascape/landscapes without formal designation. Despoiled or degraded seascape/landscape with little or no evidence of being valued by the community.
	Quality: Higher quality seascape/landscapes with consistent, intact and well-defined, distinctive attributes.	Lower quality seascape/landscapes with indistinct elements or features that detract from its inherent attributes.
	Rarity: Rare or unique seascape/landscape character types, features or elements.	Widespread or 'common' seascape/landscape character types, features or elements.
	Aesthetic/scenic: Aesthetic/scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to seascape/landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to seascape/landscape character.
	Perceptual qualities: Seascape/landscape with perceptual qualities of wildness, remoteness or tranquillity.	Limited or no evidence that the seascape/landscape is used for recreational activity.
	Cultural associations: Seascape/landscape with strong cultural associations that contributes to scenic quality.	Seascape/landscape with few cultural associations.

Value	Higher	Lower
Susceptibility to change	**Higher**	**Lower**
	Strength and robustness: Fragile seascape/landscape vulnerable and lacking the ability to accommodate change.	Robust landscape that is capable of reasonably accommodating change without undue adverse effects.
	Landscape scale: A seascape/landscape of a suitably large enough scale to accommodate the development, with simple, broad and homogenous coastal landforms.	A smaller scale seascape/landscape, with complex, distinctive or small-scale coastal landforms.
	Openness/enclosure: Enclosed seascape/landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility.	Openness may increase susceptibility if there is wider visibility, however open seascape/landscape may also be larger scale and simple which would decrease susceptibility.
	Skyline: Distinctive undeveloped skylines with landmark features.	Developed, non-distinctive skylines without landmark features.
	Relationship with other development: Little association with other contemporary development, or strong associations occur with smaller scale or historic development.	Strong or direct association with other similar contemporary developments and seascape/landscape character influenced by development.
	Perceptual qualities: Perceptual qualities associated with particular scenic qualities, wildness or tranquillity.	Contemporary, cultivated/settled or developed landscapes with fewer perceptual qualities are likely to have a lower susceptibility.
	Seascape/landscape association: Adjacent seascape/landscape character context connected by associated character and views.	Host landscape character is separate from surrounding/adjacent seascape/landscape character with weak association.
Sensitivity to change	**High** ⟷ **Medium** ⟷ **Low**	

Seascape/landscape magnitude of change

Introduction

1.5.15 The magnitude of change affecting seascape/landscape receptors is an expression of the scale of the change that will result from the offshore elements of Rampion 2 and is dependent on a number of variables regarding the size or scale of the change and the geographical extent over which the change would be experienced.

Size or scale of change

1.5.16 This criterion relates to the size or scale of change to the seascape/landscape that will arise as a result of the offshore elements of Rampion 2, based on the following factors.

- Seascape/landscape elements: The degree to which the pattern of elements that makes up the seascape/landscape character will be altered by the offshore elements of Rampion 2, by removal or addition of elements in the seascape/landscape. The magnitude of change will generally be higher if the features that make up the seascape/landscape character are extensively removed or altered, and/or if many new offshore elements are added to the seascape/landscape.
- Seascape/landscape characteristics: The extent to which the effect of the offshore elements of Rampion 2 changes, physically or perceptually, the key characteristics of the seascape/landscape that may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity or irregularity, the nature of the seascape/landscape context, the grain or orientation of the seascape/landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the offshore elements of Rampion 2 in relation to these key characteristics. If the offshore elements of Rampion 2 are located in a seascape/landscape receptor that is already affected by other similar development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the seascape/landscape.
- Seascape/landscape designation: In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape receptors and their overall integrity.
- Distance: The size and scale of change is also strongly influenced by the proximity of the offshore elements of Rampion 2 to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the offshore elements of Rampion 2 and/or screened by intervening landform, vegetation

and built form to the extent that the scale of their influence on landscape receptors is small or limited. Conversely, landscapes closest to the development are likely to be most affected. Host landscapes (where the development is located within a 'host' landscape character unit) would be directly affected whilst adjacent areas of landscape character would be indirectly affected.

- Amount and nature of change: The amount of Rampion 2 that will be seen. Visibility of the offshore elements of Rampion 2 may range from one wind turbine blade tip to all of the wind turbines; generally, the greater the amount of the offshore elements of Rampion 2 that can be seen, the higher the scale of change. The degree to which Rampion 2 is perceived to be on the horizon or 'within' the seascape/landscape. Generally, the magnitude of change is likely to be lower if Rampion 2 is largely perceived to be on the horizon at distance, rather than 'within' the seascape/landscape.

Geographical extent

1.5.17 The geographic extent over which the seascape/landscape effects will be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude, but instead expresses the extent of the receptor that will experience a particular magnitude of change and therefore the geographical extents of the significant and non-significant effects.

1.5.18 The extent of the effects will vary depending on the specific nature of the offshore elements of Rampion 2 and is principally assessed through analysis of the extent of perceived changes to the seascape/landscape character through visibility of the offshore elements of Rampion 2.

1.5.19 Landscape effects are described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the seascape/landscape effect is described for different seascape/landscape receptors is explained as follows:

- Seascape/landscape character: The extent of the effects on seascape/landscape character will vary depending on the specific nature of the offshore elements of Rampion 2. This is not simply an expression of visibility or the extent of the ZTV, but also includes a specific assessment of the extent of landscape character that would be changed by the offshore elements of Rampion 2 in terms of its character, key characteristics and elements.
- Landscape Designations: In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively through professional judgement (with the support of an expert topic group and/or peer review) and whether the integrity of the designation is affected.

Duration and reversibility

1.5.20 The duration and reversibility of seascape/landscape effects will be based on the period over which offshore elements of Rampion 2 are likely to exist (during construction and operation) and the extent to which these elements will be removed (during decommissioning) and its effects reversed at the end of that period. Long-term, medium-term and short-term seascape/landscape effects are defined as follows:

- long-term – more than 10 years (may be defined as permanent or reversible);
- medium-term – 6 to 10 years; and
- short-term – 1 to 5 years.

Seascape/landscape magnitude of change rating

1.5.21 The 'magnitude' or 'degree of change' resulting from the offshore elements of Rampion 2 is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' or 'Negligible'. In assessing magnitude of change, the assessment will focus on the size or scale of change and it geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined in **Table 1.2**.

Table 1.2 Seascape/landscape magnitude of change ratings

Magnitude of change	Description/reason
High	• Size/Scale: A large-scale change and major loss of key landscape elements/characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that would affect the seascape/landscape character and the special landscape qualities/integrity of a landscape designation. Directly affecting a host seascape/landscape receptor or indirectly affecting a nearby receptor. • Geographical extent: The size or scale of change would typically, but not always affect a large geographical extent or area and may be close to the offshore elements of Rampion 2.
Medium-high	Intermediate rating with combination of criteria from high or medium magnitude.
Medium	• Size/Scale: A medium scale change and moderate loss of some key landscape elements/characteristics or the addition of some new medium scale

Magnitude of change	Description/reason
	uncharacteristic features or elements that could partially affect the seascape/landscape character and the special landscape qualities/integrity of a landscape designation. Directly affecting a host seascape/landscape receptor or indirectly affecting a nearby receptor. • Geographical extent: The size or scale of seascape/landscape change would typically, but not always affect a more localised geographical extent at an intermediate distance from the offshore elements of Rampion 2.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude.
Low	• Size/Scale: A small-scale change and minor loss of a few landscape elements/non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on seascape/landscape character/designations. • Geographical extent: There may be a small partial change in seascape/landscape character, typically, but not always affecting a localised geographical extent at some distance from the offshore elements of Rampion 2.
Negligible	• Size/Scale: A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The seascape/landscape characteristics and character would be unaffected. • Geographical extent: Typically affecting a very small geographical extent at greater distance from the offshore elements of Rampion 2.

Evaluating seascape/landscape effects and significance

1.5.22 The level of seascape/landscape effect is evaluated through the combination of seascape/landscape sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in **Table 1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the offshore elements of Rampion 2 and their conclusion, will be presented in a comprehensive, clear and transparent manner.

1.5.23 Further information is also provided about the nature of the effects (whether these would be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).

Significant seascape/landscape effects

1.5.24 A significant effect would occur where the combination of the variables results in the offshore elements of Rampion 2 having a defining effect on the seascape/landscape receptor, or where changes of a lower magnitude affect a seascape/landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or seascape/landscape character, affecting landscape elements, characteristics and/or perceptual aspects that are key to a nationally valued landscape are likely to be significant.

Non-Significant Landscape Effects

1.5.25 A non-significant effect would occur where the effect of the offshore elements of Rampion 2 is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant.

1.6 Assessing visual effects

1.6.1 Visual Effects are concerned wholly with the effect of the offshore elements of Rampion 2 on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

1.6.2 Visual effects are identified for different receptors (people) who would experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view;
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

1.6.3 The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that would be brought about by the construction, operation and decommissioning of the offshore elements of Rampion 2.

Zone of Theoretical Visibility (ZTV)

1.6.4 Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of the offshore elements of Rampion 2, across the study area and to assist with viewpoint selection. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the study area which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.

1.6.5 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'maximum scenario' or greatest calculation of the theoretical visibility.

Viewpoint analysis

1.6.6 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the study area. The purpose of this is to assess both the level of visual effect for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which significant effects would be unlikely.

1.6.7 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

1.6.8 The SLVIA therefore includes viewpoint analysis prepared for each viewpoint and presented as supporting assessment in the SLVIA. A summary table of the findings will also be provided in order of distance from the offshore elements of Rampion 2. This summary table will assist in defining the direction, elevation, geographical spread and nature of the potential visual effects and identify areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood.

1.6.9 The viewpoint analysis is used to assist the visual assessment of visual receptor locations reported in the PEIR and ES.

Evaluating visual sensitivity to change

Introduction

1.6.10 In accordance with paragraphs 6.31-6.37 of GLVIA3, the sensitivity of visual receptors will be determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the offshore elements of Rampion 2 on the view and visual amenity.

Value of the view

1.6.11 The value of a view or series of views reflects the recognition and the importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following criteria.

- Formal recognition - The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view will be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape.
- Informal recognition - Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited or appreciated by a large number of people will generally have greater importance than one gained by very few people.

Susceptibility to change

1.6.12 Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the offshore elements of Rampion 2. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, medium-high, medium, medium-low or low and based on the following criteria:

- Nature of the viewer - The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on trains will tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views.
- Experience of the viewer - The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the offshore elements of Rampion 2 may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory

position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a settlement is aligned directly towards the offshore elements of Rampion 2, the experience of the visual receptor will be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the offshore elements of Rampion 2.

Visual sensitivity rating

1.6.13 An overall level of sensitivity will be applied for each visual receptor or view – high, medium-high, medium, medium-low or low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments will be made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 1.3** below.

Table 1.3 Visual sensitivity to change

Value	Higher	Lower
	Specific viewpoint identified in OS maps and/or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
	Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
	View afforded protection in planning policy.	View is not afforded protection in planning policy.
	View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
	View has informal recognition and well- known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
	View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
	View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.

Susceptibility to change	**Higher**	**Lower**
	Viewer who is likely or liable to be influenced by the offshore elements of Rampion 2.	Viewer who is unlikely or not liable to be influenced by the offshore elements of Rampion 2.
	Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation.
	Residents that gain static, long-term views of the offshore elements of Rampion 2 in their principal outlook.	Viewers who are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration.
	Viewpoint is visited or used by a large number of people.	View is visited or gained by very few people.
	A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest.
	Viewers are focused on the experience of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities.	The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case.
Sensitivity to change	**High** ⟷	**Medium** ⟷ **Low**

Visual magnitude of change

Introduciton

1.6.14 The visual magnitude of change is an expression of the scale of the change that will result from the offshore elements of Rampion 2 and is dependent on a number of variables regarding the size or scale of the change and the geographical extent over which the change would be experienced. A separate assessment will also be made of the duration and reversibility of visual effects.

Size or scale of change

1.6.15 An assessment will be made about the size or scale of change in the view that is likely to be experienced as a result of the offshore elements of Rampion 2, based on the following criteria:

- Distance: the distance between the visual receptor/viewpoint and the offshore elements of Rampion 2. Generally, the greater the distance, the lower the magnitude of change, as the offshore elements of Rampion 2 will constitute a smaller scale component of the view.
- Size: the amount and size of the offshore elements of Rampion 2 that will be seen. Visibility may range from small or partial visibility of the offshore elements of Rampion 2, to all of the offshore elements being visible. Generally, the larger and greater number of the offshore elements of Rampion 2 that appear in the view, the higher the magnitude of change. This is also related to the degree to which the offshore elements of Rampion 2 may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely open views are likely to reveal more of the offshore elements of Rampion 2, particularly where this is a key characteristic of the landscape.
- Scale: the scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The scale of the offshore elements of Rampion 2 may appear larger or smaller relative to the scale of the receiving seascape/landscape.
- Field of view: the vertical/horizontal field of view (FoV) and the proportion of the view that is affected by the offshore elements of Rampion 2. Generally, the more of the proportion of a view that is affected, the higher the magnitude of change will be. If the offshore elements of Rampion 2 extend across the whole of the open part of the outlook, the magnitude of change will generally be higher as the full view will be affected. Conversely, if the offshore elements of Rampion 2 cover just a narrow part of an open, expansive and wide view, the magnitude of change is likely to be reduced they will not affect the whole open part of the outlook. This can in part be described objectively by reference to the horizontal/vertical FoV affected, relative to the extent and proportion of the available view.
- Contrast: the character and context within which the offshore elements of Rampion 2 will be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, luminance and motion. Contrasts and changes may arise particularly as a result of the rotation movement of the wind turbine blades, as a characteristic that gives rise to effects. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change.
- Consistency of image: the consistency of image of the offshore elements of Rampion 2 in relation to other developments. The magnitude of change of offshore elements of Rampion 2 is likely to be lower if its wind turbine height, arrangement and layout design are broadly similar to other developments in the seascape, in terms of its scale, form and general appearance. New development is more likely to appear as logical components of the landscape with a strong rationale for their location.
- Skyline/background: Whether the offshore elements of Rampion 2 would be viewed against the skyline or a background seascape may affect the level of contrast and magnitude. If the offshore elements of Rampion 2 add to an already developed skyline the magnitude of change would tend to be lower.

- Number: generally, the greater the number of separate offshore elements of Rampion 2 seen simultaneously or sequentially, the higher the magnitude of change. Further effects would occur in the case of separate developments and their spatial relationship to each other would affect the magnitude of change. For example, development that appears as an extension to an existing development would tend to result in a lower magnitude of change than a separate, new development.
- Nature of visibility: the nature of visibility is a further factor for consideration. The offshore elements of Rampion 2 may be subject to various phases of development change and the manner in which the offshore elements of Rampion 2 may be viewed could be intermittent or continuous and/or seasonally, due to periodic management or leaf fall.

Geographical extent

1.6.16 The geographic extent over which the visual effects will be experienced will also be assessed, which is distinct from the size or scale of effect and is described in terms of the physical area or location over which it would be experienced (described as a linear or area measurement). The extent of the effects will vary according to the specific nature of the offshore elements of Rampion 2 and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experience by visual receptors. The geographical extent of visual effects is described as per the following examples:

- The geographical extent can be described as an area measurement or proportion of the total area of the receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of an area of common land or defined recreational area.
- The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route.
- The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open or restricted view exists.

Duration and reversibility

1.6.17 The duration and reversibility of visual effects are based on the period over which the offshore elements of Rampion 2 is likely to exist (during construction and operation) and the extent to which the offshore elements of Rampion 2 will be removed (during decommissioning) and the effects reversed at the end of that period.

1.6.18 Long-term, medium-term and short-term visual effects are defined as follows:

- long-term – more than 10 years (may be defined as permanent or reversible);
- medium-term – 6 to 10 years; and
- short-term – 1 to 5 years.

Visual magnitude of change rating

1.6.19 The 'magnitude' or 'degree of change' resulting from the offshore elements of Rampion 2 is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' and 'Negligible' as defined in **Table 1.4**. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement. Examples of criteria that tend towards higher or lower magnitude of change that can occur on views and visual receptors are set out in **Table 1.4.**

Table 1.4 Visual magnitude of change ratings

Magnitude of change	Magnitude of change definition	Examples of visual magnitude of change
High	The offshore elements of Rampion 2 will result in a high level of alteration to the existing view, forming the prevailing influence and/or introducing elements that are substantially uncharacteristic in the baseline view. The addition of the offshore elements of Rampion 2 will result in a major	• Size and Scale: A very large - large and dominant change to the view. • Number: Involving the loss/addition of a large number of features/elements. • Distance: Typically appearing closer to the viewer in the fore to middle ground. • FoV: Affecting a large vertical angle and wide horizontal FoV. • Nature of Visibility: Multiple phase development, continuously and sequentially visible. • Contrast: Strong degree of contrast with surroundings with little or no screening. • Skyline: Visible on the skyline as a new feature. • Consistency of Image: Contrasting with other developments, lacking in visual rationale. • Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to

Magnitude of change	Magnitude of change definition	Examples of visual magnitude of change
	incremental change, loss or addition to the baseline view.	the activity, affecting a large area or length/proportion of route. May also be experienced from a specific viewpoint.
Medium-high		Intermediate rating with combination of criteria from high or medium magnitude of change category.
Medium	The offshore elements of Rampion 2 will result in a medium level of alteration to the baseline view, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the receiving view. The addition of the offshore elements of Rampion 2 will result in a moderate incremental change, loss or addition to the baseline view.	• Size and Scale: A medium and prominent change to the view. • Number: Involving the loss/addition of a number of features/elements. • Distance: Typically appearing in the middle ground. • FoV: Affecting a medium vertical angle and moderate horizontal FoV. • Nature of Visibility: Multiple phase development, intermittently and sequentially visible. • Contrast: Contrast with surroundings and may benefit from some screening. • Skyline: Visible on the skyline along with other features. • Consistency of Image: Different from other developments, some visual rationale. • Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the activity, affecting a medium area or length/proportion of route. May also be experienced from a specific viewpoint.
Medium-low		Intermediate rating with combination of criteria from medium or low magnitude of change category.
Low	The offshore elements of Rampion 2 will result in a low level of alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving view.	• Size and Scale: A small and noticeable change, could being missed by the casual observer. • Number: Involving the loss/addition of a small number of features/elements. • Distance: Typically appearing in the background. • FoV:Affecting a small vertical angle and narrow horizontal FoV. • Nature of Visibility: Simple, single development, intermittently and infrequently visible. • Contrast: Some parity/'fits' with surroundings and may benefit from screening.

Magnitude of change	Magnitude of change definition	Examples of visual magnitude of change
	The addition of the offshore elements of Rampion 2 will result in a low incremental change, loss or addition to the baseline view.	• Skyline: Partly visible on a developed skyline or not visible on the skyline. • Consistency of Image: Similar from other developments with visual rationale, appearing reasonably well accommodated within its surroundings. • Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length/proportion of route. May also be experienced from a specific viewpoint.
Negligible	The offshore elements of Rampion 2 will result in a negligible alteration to the existing view. If visible it may, form a barely discernible influence and/or introduce elements that are substantially characteristic in the baseline view. The addition of the offshore elements of Rampion 2 will result in negligible incremental change, loss or addition to the baseline view.	• Size and Scale: A small or negligible change, need to 'look for it'. • Number: Involving the loss/addition of a small number of features/elements. • Distance: Typically appearing in the far distance. • FoV: Affecting a very small vertical and narrowest horizontal FoV. • Nature of Visibility: Simple, single development, intermittently and infrequently visible. • Contrast: Blends with surroundings and/or is well screened. • Skyline: Partly visible on a developed skyline or not visible on the skyline. • Consistency of Image: Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings. • Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length/proportion of route. May also be experienced from a specific viewpoint.

Evaluating visual effects and significance

1.6.20 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in **Table 1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change

resulting from the offshore elements of Rampion 2 and their conclusion, will be presented in a comprehensive, clear and transparent manner.

1.6.21 Further information is also provided about the nature of the effects (whether these would be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).

Significant Visual Effects

1.6.22 A significant effect is more likely to occur where a combination of the variables results in the offshore elements of Rampion 2 having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.

Non-Significant Visual Effects

1.6.23 A non-significant effect is more likely to occur where a combination of the variables results in the offshore elements of Rampion 2 having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

Weather conditions

1.6.24 The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a maximum effect assessment of the likely visual effects. The same viewpoint may be experienced under less optimal viewing conditions resulting in a significant effect appearing as non-significant, due to the change in the variable weather conditions. Due to the conditions of the assessment the reverse (a non-significant effect appearing as significant) is unlikely to occur.

1.7 Assessing cumulative seascape, landscape and visual effects

1.7.1 SNH's guidance, *Assessing the Cumulative Impact of Onshore Wind Energy Developments* (2012) is widely used across the UK to inform the specific assessment of the cumulative effects of both on and offshore windfarms. Both GLVIA3 and SNH's guidance provides the basis for the methodology for the cumulative SLVIA and LVIA undertaken in the PEIR and ES. The SNH (2012) guidance defines:

- "*Cumulative effects as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments taken together* (SNH, 2012: p4);
- *Cumulative landscape effects are those effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it'* (SNH, 2012, p10); *and*
- *Cumulative visual effects are those effects that can be caused by combined visibility, which occurs where the observer is able to see two or more developments from one viewpoint and/or sequential effects which occur when*

the observer has to move to another viewpoint to see different developments" (SNH, 2012, p11).

1.7.2 As of May 2020, and with the exception of the existing Rampion 1 project, there are no other existing, consented or proposed offshore windfarms within the 50 km radius SLVIA study area, see **Scoping Report Section 5.13,** (**Figure 5.13.1**), nor within UK waters within approximately 140km of the offshore elements of Rampion 2. The closest being the Thanet Offshore Wind Farm Extension, located some 143km distant. The closest offshore wind farms within French waters are located approximately 70km to the south. Further, whilst it is currently unknown, it is unlikely that there will be any other similar developments to the offshore elements of Rampion 2 within the study area once this is confirmed.

1.7.3 For this reason, the potential cumulative effects of the offshore elements of Rampion 2 with other existing, consented or proposed wind farm development are likely to be limited and described as follows.

- 'Whole project' effects resulting from the combined effects of the onshore and offshore elements of Rampion 2. These effects are assessed as part of the main SLVIA/LVIA.
- The cumulative effects of the offshore elements of Rampion 2 in addition to and in combination with the existing Rampion 1 project.
- The cumulative effects of the offshore elements of Rampion 2 in addition to and in combination with other similar development (onshore and offshore wind farms) that is either consented/under construction; the subject of a valid planning application; or proposed as part of relevant plans and programmes (the PINS Programme of Projects and MMO 'Marine Case Management System' being the source most relevant for this assessment).

1.7.4 The cumulative assessment methodology for SLVIA/LVIA will be described once the scope of any cumulative assessment is confirmed and agreed through the consultation process.

1.8 Evaluation of significance

1.8.1 The matrix presented in **Table 1.5** is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.

1.8.2 The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references will be made to objective evidence, baseline figures and/or to photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case by case basis. The matrix as presented in **Table 1.5**

1.8.3 should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment.

1.8.4 Significant landscape and visual effects are highlighted in bold and shaded dark purple in **Table 1.5**. They relate to all those effects that result in a '**Major**' or a '**Major/Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded light purple) also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold in the text and will be explained as part of the assessment, where they occur. White or un-shaded boxes in **Table 1.5** indicate a non-significant effect.

1.8.5 In those instances where there would be no effect, the magnitude will be recorded as 'Zero' and the level of effect as 'None'.

Table 1.5 Evaluation of seascape, landscape and visual effects

Sensitivity	Magnitude of change					
	High	**Medium-high**	**Medium**	**Medium-low**	**Low**	**Negligible**
High	**Major** (Significant)	**Major** (Significant)	**Major/Moderate** (Significant)	**Moderate***	Moderate/Minor	Minor
Medium-high	**Major** (Significant)	**Major/Moderate** (Significant)	**Moderate***	**Moderate***	Moderate/Minor	Minor
Medium	**Major/Moderate** (Significant)	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible
Medium-low	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible	Negligible
Low	Moderate/Minor	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible

*Note: Moderate levels of effect may be significant or not significant subject to the assessor's opinion which shall be clearly explained.

1.9 Nature of effects

Introduction

1.9.1 The nature of effects refers to whether the landscape and/or visual effect of the offshore elements of Rampion 2 is positive or negative (herein referred to as 'beneficial' and 'adverse').

1.9.2 The EIA Regulations 2017 state that the ES should define *'the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development'*.

1.9.3 Cumulative effects have been described in **Section 1.7**, and *'short-term, medium-term and long-term, permanent and temporary'* effects are described in **Section 1.5** and **Section 1.6** under the heading 'Duration of Effect'. Transboundary effects only to the SLVIA and concern the overlap of the SLVIA 50km study area with French maritime waters.

1.9.4 The definition of the remaining terms used in this assessment is defined here.

Direct and indirect effects

1.9.5 Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor.

1.9.6 Indirect landscape effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.

1.9.7 Visual effects are considered as direct effects, as the view itself may be directly altered by the proposed development.

Positive and Negative Effects

1.9.8 Guidance provided by the in GLVIA3 on the nature of effect (i.e. beneficial or adverse) states that 'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity', but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

1.9.9 In this assessment the nature of effects refers to whether the landscape and/or visual effect of the offshore elements of Rampion 2 is positive or negative (herein referred to as 'beneficial'/'neutral' or 'adverse').

1.9.10 In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of wind farms are difficult to categorise in either of

these brackets as, unlike other disciplines, there are no definitive criteria by which the effects of wind farms can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect of a wind farm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.

1.9.11 Generally, in the development of 'new' wind farms, a precautionary approach is adopted by OPEN, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment will be considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions.

- Beneficial effects - contribute to the seascape, landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.
- Neutral effects - occur where the development fits with the existing seascape/landscape character or visual amenity. The development neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, nor where the effects are so limited that the change is hardly noticeable. A change to the seascape, landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.
- Adverse effects - are those that detract from the seascape/landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the seascape, landscape and visual resource, or through the removal of elements that are key in its characterisation.

Frequency and likelihood of visual effects – weather conditions

1.9.12 The judgements made in the SLVIA are based on optimum 'very good' to 'excellent' visibility of the offshore elements of Rampion 2. This assumption is assessed as the worst-case scenario, but in reality, the degree and extent of visual effects arising from the construction and operation of the offshore infrastructure is a combination of several different factors, including the prevailing weather conditions. The prevailing weather can determine changes in character and visibility, with varied wind, light and tidal movements and the clarity or otherwise of the atmosphere. Collectively, these will combine to reduce the number of days upon which views of the offshore elements of Rampion 2 will be available from the coastline and hinterland, or to inhibit views, rendering them more visually recessive within the wider seascape. Viewing conditions and visibility will be found to vary in the study area, and the effects of the wind farm will vary greatly

according to the weather. This means that effects that are assessed to be significant may be not-significant under different, less clear conditions.

1.9.13 Although the SLVIA is based on 'very good' to 'excellent' visibility conditions, a description of visibility frequency is provided using METAR visibility data from the nearest Met Office stations that record visibility (Thorney Island), to highlight potential trends in the visibility conditions of the study area. Both GLVIA3 (8.15) and SNH guidance (SNH 2017, para 39) refer to use of Met Office visibility data to assess typical visibility conditions within an area. Most synoptic observing stations have sensors which provide a measurement of visibility. Visibility sensors measure the meteorological optical range which is defined as the length of atmosphere over which a beam of light travels before its luminous flux is reduced to 5% of its original value. The use of light within the visible spectrum allows the sensor to most accurately simulate human perception of visibility. Reasonably accurate measurements are possible over a range of visibility extending from a few tens of metres to a few tens of kilometres.

1.9.14 Although there are limitations to how this data can be applied to judgements about wind farm visibility, the visibility data provides some understanding and evidence basis for evaluating the visibility of the wind turbines against their background.

1.9.15 Met Office visibility data will be assessed from the nearest weather station that records visibility, at Thorney Island (located to the west of the SLVIA study area). Visibility is categorised into distance ranges, such as <1km, 1 to 2km, 2 to 3km etc and a frequency table will be compiled revealing the total number of observations within each distance category at hourly intervals for each month. The data will be summarised and mapped to highlight trends in the visibility conditions of the study area, such as the distance category which has the most visibility observations recorded, and approximate number of viewing days lost to low visibility weather conditions. Visibility data is then assessed to set out the frequency of visibility (over a 10 year period) at different distance ranges, based on Met Office visibility definitions: < 1km Very Poor; 1 - 4km Poor; 4 -10km Moderate; 10 - 20km Good; 20 - 40km Very Good; 40km > Excellent.

1.9.16 The Met Office visibility data is then interpreted to allow more specific quantification of the likely frequency of visibility of the offshore elements of Rampion 2 from the coastal viewpoints (as a % and average number of days per year), based on the distance of each viewpoint location from the array area. The Met Office visibility frequency data is used to inform an assessment of the 'likelihood of effect' from each viewpoint, in order to qualify any significant effects assessed in optimum visibility conditions with how likely they are to actually occur given the prevailing weather/visibility conditions.

1.9.17 Visibility data from sea-faring vessels will be obtained from the Met Office to supplement the Met Office visibility data from Thorney Island onshore. This is used to further inform the assessments of potential likelihood of the offshore elements of Rampion 2 being visible from the coast.

1.10 Visual representations

Introduction

1.10.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the SLVIA and the cumulative assessment. The methodology use for viewpoint photography and photomontages will be produced in accordance with the SNH guidance on Visual Representation of Wind Farms, Version 2.2 (2017), the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3) (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (2019).

Zone of theoretical visibility (ZTV)

1.10.2 The ZTVs will be calculated using computer software to generate a ZTV of the offshore elements of Rampion 2, to demonstrate the theoretical extent of visibility from any point in the study area.

1.10.3 A 3D computer model will be developed of the existing landscape and key reference using digital terrain data as follows:

- Ordnance Survey Terrain 50: Used to produce the main or standard ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model (DTM) at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the offshore elements. The computer model will include the entire study area and takes account of the effects caused by atmospheric refraction and the Earth's curvature; and
- Ordnance Survey Terrain 5 or LIDAR Composite 2m: Used to produce more detailed ZTV plots where required to assess particular effects, such as along the coastline, or within a detailed part of the study area. LIDAR data takes into account the screening effects of vegetation, buildings or other surface features that may prevent or reduce visibility (insofar as they are represented in the LIDAR data). The computer model will include the entire study area and takes account of atmospheric refraction and the Earth's curvature.

1.10.4 The resulting ZTV plots will be overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.

1.10.5 Cumulative ZTV plots based on the intervisibility of the offshore elements of Rampion 2 and other relevant developments within the study area will also be produced.

1.10.6 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV as follows.

- Where the ZTV has been calculated using Ordnance Survey Terrain 50 or Terrain 5 digital terrain data, this will not account for the screening effects of vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on the figure.

- The 50km radius ZTVs are based on a 50m data grid OS Digital Terrain Model (DTM). Several ZTVs will also be produced at an enlarged A1 scale utilising 5m data grid (OS Terrain 5).
- The ZTVs are based on theoretical visibility from 2m above ground level.
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the array area. The nature of what is visible from 3km away will differ markedly from what is visible from 10km away, although both are indicated on the Blade Tip ZTV as having the same level of visibility.
- There is a wide range of variation within the visibility shown on the ZTV, for example, an area shown on the blade tip ZTV as having visibility of 75 wind turbines may gain views of the smallest extremity of blade tips, or of 75 full wind turbines. This can make a considerable difference in the effects of the offshore elements of Rampion 2 on that area. The hub height ZTV will be used in conjunction with the blade tip ZTV to provide an indication of the degree to which the wind turbines are visible.

1.10.7 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the offshore elements of Rampion 2 will be theoretically visible and tending to present a worst-case or over-estimate the actual visibility. The information drawn from the ZTV is checked by field survey observation.

1.10.8 The SLVIA will include a Horizontal Angle ZTV to show the horizontal field of view (in degrees) that may be affected by views of the wind turbines.

Methodology for baseline photography

1.8.1 Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.

1.8.2 The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10m;
- GPS recorded Above Ordnance Datum (AOD) height data;
- Use of a fixed 50 mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site.

1.10.9 The photographs used to produce the photomontages will be taken at the times of day and locations agreed with the consultees using Canon EOS 5D and 6D Digital SLR cameras, with a fixed lens and a full-frame (35 mm negative size) complementary metal oxide semiconductor (CMOS) sensor. The photographs are

taken on a tripod with a pano-head at a height of approximately 1.5m above ground.

1.10.10 All the resulting visualisations will be prepared to indicate other cumulative development in order that they may assist the cumulative assessment as well as the LVIA.

1.10.11 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the offshore elements, based on current information and photomontage methodology.

Weather conditions

1.10.12 Guidelines for LVIA (GLVIA3) para 8.22 state – *'In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*

- *representative of those generally prevailing in the area; or*
- *taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible'.*

1.10.13 In preparing photomontages for the SLVIA, photographs will be taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, been taken during periods of 'very good' or 'excellent' visibility conditions, during summer and in the afternoon or evening - seeking to represent a maximum visibility scenario when the developments may be highly visible.

Methodology for production of visualisations

1.10.14 Photomontages will be produced in accordance with SNH Visual Representation of Windfarms Guidance (SNH 2017) and the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3) (Landscape Institute and IEMA, 2013).

1.10.15 A photomontage is a visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.

1.10.16 To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree view but appears essentially as a flat plane.

1.10.17 Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined. A slight alteration will be made to the colour of the sea shown in the baseline photograph and visualisation in Viewpoint 2 as the light on the sea surface may otherwise will be confused for a sandbar, which could will be misleading. In Viewpoint 3 recognisable bathers will be removed from

the photographs and in other viewpoint photographs faces and car registrations will be made indistinguishable.

1.10.18 The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5 degree field of view photomontages.

1.10.19 Daytime visualisations and wirelines show a wind turbine model which represents the maximum development scenario of the offshore elements of Rampion 2 in the array area and allow the potential proportions of the wind turbines to be appreciated from the visualisations.

1.10.20 Wireline representations that illustrate the offshore elements of Rampion 2 and set within a computer-generated image of the landform are used in the assessment to predict theoretical appearance of the wind turbines. These are produced with Resoft WindFarm software and are based on a terrain model with a 50m data grid (OS Panorama) with a more detailed area of terrain modelling (OS terrain 5) used for the coastal parts of the study area, which includes the majority of viewpoints used in the SLVIA. There are limitations in the accuracy of digital terrain model (DTM) data so that landform may not be picked up precisely and may result in wind turbines being more or less visible than is shown, however, the use of OS Terrain 5 minimises these limitations. Where descriptions within the assessment identify the numbers of wind turbines visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions.

1.10.21 Fully rendered photomontages will be produced for the agreed viewpoints using Resoft WindFarm software, to provide a photorealistic image of the appearance of the offshore elements of Rampion 2. In the daytime photomontages modelled representations are combined with the baseline view photographs to create a photorealistic rendered photomontage image of the development.

1.10.22 The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree field of view (or in some cases, up to 360-degree), which accords with SNH guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

1.10.23 The 53.5 degree field of view wirelines and photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These images are each printed on paper 841 x 297mm (half A1) which provides for a relatively large scale image.

1.10.24 In the wirelines, the wind turbines are shown with the central wind turbines facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the wind turbine rotors are shown with a random appearance with the central wind turbines facing the viewer directly.

1.10.25 Rendering of the wind turbines in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There is some variation in the appearance and visibility of the wind turbines between the viewpoints, as they are rendered to suit the conditions shown in each of the different viewpoint photographs, which have some unavoidable degree of variation in terms of lighting and weather conditions. The key requirement is that the wind turbines will be rendered with sufficient contrast against the skyline backdrop to

illustrate their maximum visibility scenario in each image. Photomontages will be prepared to depict how the offshore elements of Rampion 2 would appear in excellent visibility conditions to illustrate the worst-case. The full suite of viewpoint photomontages should be viewed to gain an impression of the likely visual effects of the offshore elements of Rampion 2.

Night-time visualisations

1.10.26 Night-time visualisations will be produced from several key viewpoints, to visually represent aviation and marine navigation lighting at night. Lighting intensity scenarios will be portrayed to illustrate the maximum lighting intensity and minimum lighting intensity proposed.

1.10.27 Night-time visualisations will be produced using a combination of using Resoft's WindFarm software's aviation module software for positioning of the lights, 3D modelling software that can simulate lighting conditions, referencing existing lighting imagery/atmospheric conditions from the baseline photographs and professional judgement using photoshop.

1.10.28 The appearance of the lights in the night-time photomontages emulates how lights appear in the other parts of the baseline photographs. A light shown in a photograph tends to have a slight 'halo' (or bokeh) around it due to the way a camera lens renders out-of-focus points of light. This is not the way lights are seen in reality, as they tend to much more defined as point sources. However, the proposed lighting will be shown in this way for consistency with the lights in the baseline photographs.

Information on limitations of visualisations

1.10.29 The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs. Limitations of photomontages are set out further below.

1.10.30 The photomontage visualisations of the offshore elements of Rampion 2 (and any wind farm proposal) have a number of limitations when using them to form a judgement on visual impact. These include the following.

- A visualisation can never show exactly what the offshore elements of Rampion 2 will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image.
- The images provided give a reasonable impression of the scale of the wind turbines and the distance to the wind turbines but can never be 100% accurate.
- A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.
- The viewpoints illustrated are representative of views in the area, but cannot represent visibility at all locations.

- To form the best impression of the impacts of the offshore elements of Rampion 2 proposal these images are best viewed at the viewpoint location shown.
- The images must be printed and viewed at the correct size (260mm by 820mm).
- Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression.
- It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression.
- There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day. The photographs shown in the visualisations show the most favourable weather conditions available during photographic survey work.

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Appendix D
Landscape and Visual Impact Assessment (LVIA) methodology

Contents

1. LVIA methodology

1.1 Introduction

1.1.1 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. This appendix describes the methodology used within the landscape and visual impact assessment (LVIA) of the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES) for the onshore elements of the Proposed Development.

1.1.2 The onshore elements of the Proposed Development relate to the landfall located at Climping in West Sussex; approximately 36km of cable corridor containing transmission cables; and a new substation that will connect to National Grid's substation at Bolney, Mid Sussex. The time period for the assessment covers the construction period of the onshore elements of the Proposed Development (up to five years in total) which will include the implementation and establishment of embedded environmental measures (e.g. landscape planting). The operational period is approximately 30 years, beyond which the onshore substation would be decommissioned and reinstated with electrical cables left in-situ to minimise environmental effects associated with removal.

1.1.3 The methodology presented here as part of the scoping process may be subject to change as a result of consultation and further development of the assessment process.

1.1.4 This appendix has been structured as follows:

- overview of LVIA methodology;
- iterative assessment and design;
- guidance, data sources and site surveys;
- assessing landscape effects;
- assessing visual effects;
- assessing cumulative landscape and visual effects;
- evaluation of significance;
- nature of effect; and
- visual representations.

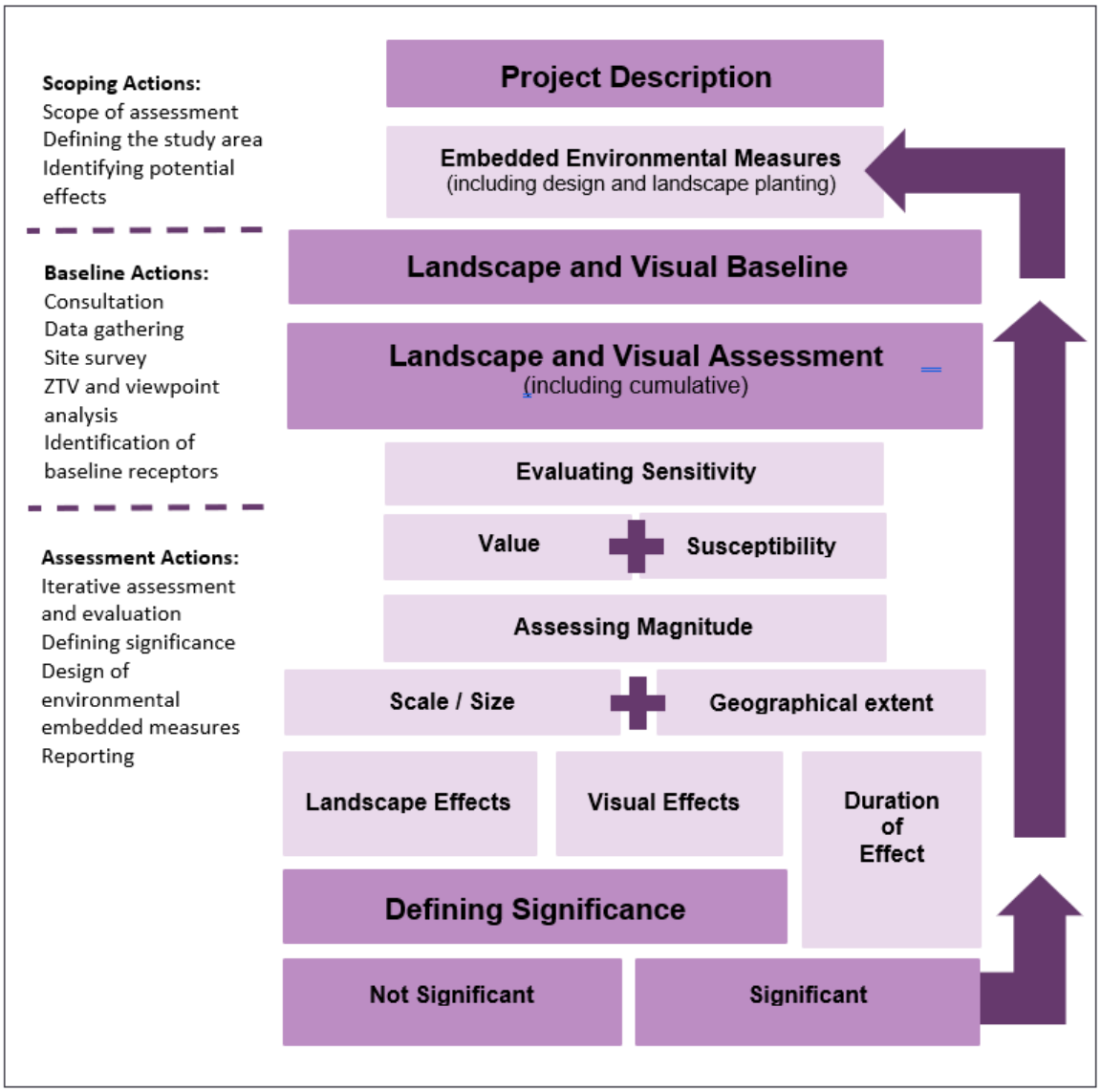
1.2 Overview of the LVIA methodology

1.2.1 The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA3), and other best practice guidance listed in **paragraph 1.1.23**. An overview or summary of the LVIA process is provided here and illustrated, diagrammatically in **Plate 1**.

1.2.2 The LVIA will assesses the likely effects that the onshore elements of the Proposed Development on the landscape and visual resource, encompassing effects on landscape elements, characteristics and landscape character, designated landscapes, visual effects and cumulative effects.

1.2.3 Essentially, the landscape and visual effects (and whether they are significant) is determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the onshore elements of the Proposed Development. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the onshore elements of the Proposed Development. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change, the geographical extent and the duration of that change. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

Plate 1: Overview of approach to landscape and visual impact assessment



1.2.4 The assessment has also considered the whole project or combined effects of the offshore and onshore elements of the Proposed Development, as well as the cumulative effects likely to result from the Proposed Development and other similar Proposed Development.

1.2.5 In each case an appropriate and proportionate level of assessment has been undertaken and agreed through consultation at the scoping stage. The level of assessment may be 'simple' (requiring desk-based data analysis) or 'detailed' (requiring site surveys and investigations in addition to desk-based analysis). Because of the nature of landscape and visual assessment the LVIA will be subject to detailed assessment with only the operation of the underground cable and landfall elements of the onshore Proposed Development scoped out. The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

Interface between seascape and landscape assessment

Introduction

1.2.6 Together, the LVIA and the offshore Seascape, Landscape and Visual Impact Assessment (SLVIA) provide a whole project assessment of the effects of Rampion 2 (the Proposed Development). The offshore elements of the Proposed Development (the wind farm, offshore platforms and offshore export cable corridor) are assessed in the SLVIA and the onshore elements of the Proposed Development (the onshore substation, onshore cable corridor, and landfall location) are assessed in the LVIA. Both the SLVIA and the LVIA follow a broadly similar assessment methodology that uses the same glossary and terminology.

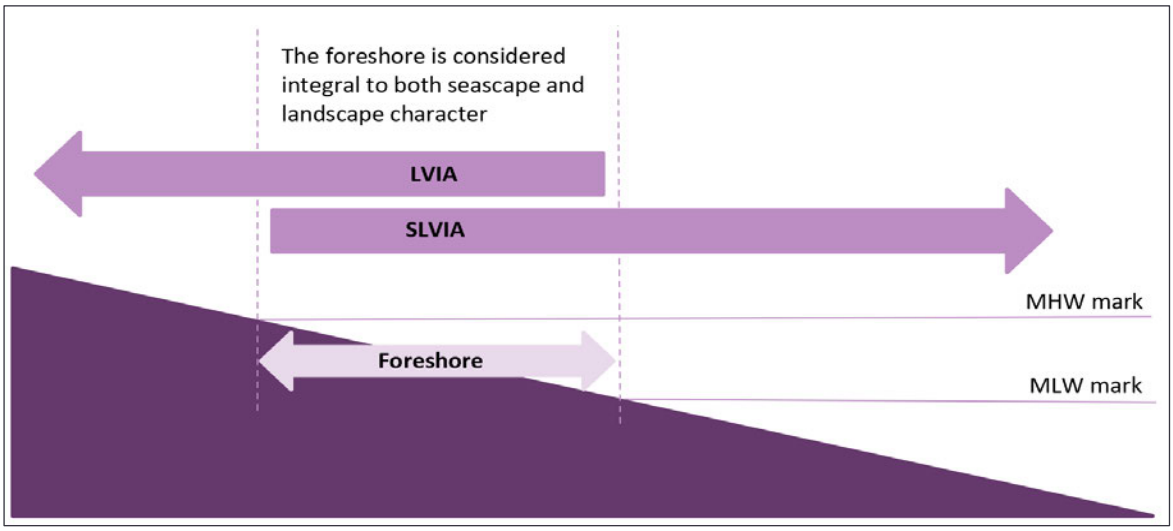
1.2.7 The LVIA will also refer to potential interrelated effects likely to result from any areas where the construction, operation and decommissioning of the offshore and onshore elements combine, or inter-relate to affect receptors within the LVIA study area. An example could include effects on views where both offshore and onshore elements are visible, potentially resulting in whole project landscape and visual effects as a result of the construction, operation and decommissioning of the onshore and offshore elements. In those instances, the LVIA will provide whole project assessment focusing on the onshore development that will be referenced for consistency in the SLVIA. The SLVIA will also provide a whole project assessment focusing on the offshore development.

Assessment of the foreshore

1.2.8 In England, landscape character '*principally applies to terrestrial areas lying to the landward side of the high-water mark'* and seascape character *'principally applies to coastal and marine areas seaward of the low-water mark'* (Natural England, 2012, p7, Box 1). Although these definitions are clear in the guidance, the importance of the interaction of sea, coastline and land as perceived by people is also highlighted in subsequent definitions of seascape in the guidance (Natural England, 2012), indicating a subtler transition between seascape and landscape than defined in the guidance.

1.2.9 **Plate 2** illustrates the foreshore area between the mean high water mark (MHW) and the mean low water mark (MLW) and overlap of the LVIA / SLVIA assessments.

Plate 2: Extent of SLVIA and LVIA assessment of landscape and seascape along the coastline



1.2.10 In order to avoid under-valuing the inter-tidal area between the high and low-water mark, the LVIA will assess landscape character areas (LCAs) lying to the landward side of the MLW and the SLVIA will assess offshore seascape effects on Marine Character Areas (MCAs) where they are seaward of the MHW; and the effect on terrestrial landscape character, assessed as part of the SLVIA, will be assessed on landscape character areas (LCAs) lying to the landward side of the MLW.

1.2.11 This approach means that the 'foreshore', which includes beaches, inter-tidal areas and coastlines between the MLW and the MHW, will be considered in both the landscape and seascape character assessments. This ensures adequate consideration will be given to assessing the relationship between terrestrial and marine areas and interactions across the land/sea interface. This is consistent with the published MMO Seascape Assessment (MMO, 2014) which extends to the MHWS mark; and published landscape character assessments.

Defining the study area

1.2.12 The study area for the LVIA is illustrated in **Figure 6.2.1** of the Scoping Report and extends to a 2km buffer beyond the Scoping Boundary and is likely to be supported by a small number of elevated, long-distance panoramic viewpoint locations within the wider landscape. The extent of the study area will be informed by further desk based and site survey analysis.

1.2.13 IEMA Guidance (IEMA, 2015[1] and 2017[2]) recommends a proportionate Environmental Statement (ES) focused on the likely significant effects of a development, and a proportionate ES topic chapter. The LVIA study area must therefore be large enough to capture all likely significant effects. However, an overly large LVIA study area may be considered disproportionate if it makes understanding the key impacts of the development more difficult by including

[1] IEMA (2015) Environmental Impact Assessment *Guidance to Shaping Quality Development*
[2] IEMA (2017) *Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice*

extraneous baseline information, and hence receptors which are unlikely to be significantly affected by the Proposed Development.

1.2.14 This is supported by the Landscape Institute (GLVIA3) (Landscape Institute, 2013[3]) (para 3.16) which recommends that *'The level of detail provided should be that which is reasonably required to assess the likely significant effects'.* Para 5.2 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner'.*

1.2.15 The study area therefore is based on professional judgement which aims to include those areas which are potentially and likely to be significantly affected by the onshore elements of the Proposed Development. This judgement is based on our early understanding of the local landscape character and the scale of the construction and development proposed within the Scoping Boundary as well as a review of study areas used for similar projects including East Anglia TWO and THREE, Norfolk Vanguard and Thanet Extension offshore wind farms. A 2km study area was also considered to be appropriate by consultees for the existing Rampion 1 project LVIA.

1.2.16 The study area will be reviewed and amended in response to the maturing design and assessment process and where appropriate responses to consultation. This will result in the confirmation of an onshore LVIA study area that will be the focus of the onshore LVIA.

1.3 Iterative assessment and design

Introduction

1.3.1 The LVIA is part of an iterative EIA process which aims to 'design out' significant effects via a range of environmental measures including avoidance and design that aim to reduce or eliminate significant effects. Design is an integrated part of the LVIA process and environmental measures related to landscape design and management can be an important tool to mitigate significant effects. The EIA process can also call on a range of environmental and technical specialists that contribute other forms of mitigation that may also bring a range of benefits to the Proposed Development. Potentially significant landscape and visual effects and the constraints and opportunities connected with their resolution are identified through the LVIA process. Where possible embedded environmental measures such as design modification or landscape planting schemes are incorporated into the onshore elements of the Proposed Development in order to mitigate landscape and visual effects.

1.3.2 Embedded environmental measures are recorded in the Commitments Register (**Appendix A** of the Scoping Report) which details how the measures will be secured as well as documenting the design evolution of the onshore elements of the Proposed Development.

[3] Landscape Institute and IEMA (2013). *Guidelines for Landscape and Visual Impact Assessment*: Third Edition (GLVIA3). Routledge;

Potential effects during construction

1.3.3 A range of potential effects on the landscape and visual resource are likely during the construction of the onshore elements of the Proposed Development over a period of up to five years. This appraisal of the potential effects helps define the scope and nature of the LVIA methodology. The potential effects likely to result from construction are described below.

- Landscape effects:
  - Effects on landscape elements, features and patterns (including, but not limited to soils, landform, ground vegetation, hedgerows/field boundaries, trees, woodland and buildings) as a result of land preparation including site clearance and earthworks.
  - Effects on landscape character and key characteristics, including perceptual characteristics and qualities as a result of construction activities. The construction activities are likely to include the presence of construction staff and machinery, cranes, vehicle movements, contractors' facilities and site access associated with the onshore substation and cable corridor. Landscape works to implement the landscape design strategy for the onshore substation and reinstatement works along the cable corridor will also need to be accounted for in the assessment.
  - Effects on the special landscape qualities and integrity of designated landscapes as a result of the above construction activities.
- Visual effects:
  - Effects on the views and visual amenity experienced by people undertaking various activities at various locations, distances and directions from the proposed land preparation and construction activities. These visual effects could be experienced from one location or sequentially as part of a route through the landscape such as a National Trail or long-distance footpath.
- Whole project effects:
  - Whole project effects could occur as a result of multiple construction activities related to the onshore and/or the offshore elements of the Proposed Development collectively affecting a landscape or visual receptor.
  - Whole project effects could also result from the construction phasing of the onshore elements of the Proposed Development and influence the nature and type of effect. For example, construction works on the cable corridor are likely to occur sequentially, resulting in relatively short bursts of construction activity and reinstatement occurring at different locations along the cable corridor. Construction activity at the landfall and/or substation may also be programmed to occur sequentially or concurrently with other onshore elements of the Proposed Development.

Potential effects during operation

1.3.4 The potential effects during operation relate principally to the presence of the onshore substation, its on-going maintenance and the establishment of planting

associated with the landscape design strategy, which forms part of the embedded environmental measures to mitigate significant landscape and visual effects.

1.3.5 The operational period of the onshore substation is 30 years resulting in a long-term (reversable) effect on landscape and visual receptors. These effects would be partly and increasingly mitigated by the implementation and establishment of the landscape design strategy which will be assessed during Years one to five (implementation and establishment) and Years five to 15 to allow for the growth of vegetation and the prediction of any alteration to the operational effects on landscape and visual receptors.

1.3.6 The cable corridor and landfall are underground with landscape reinstatement effects assessed as part of the construction phase. As such these items have been scoped out from further assessment.

Potential effects during decommissioning

1.3.7 The onshore substation would be decommissioning and the land reinstated. Electrical cables associated with the cable corridor and the landfall would be left in-situ to minimise environmental effects associated with removal. This would lead to a reversal of the landscape and visual effects.

1.4 Guidance data sources and site surveys

Guidance on methodology

1.4.1 This methodology accords with the guidance set out in the GLVIA3. Where it clarifies or diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.

- GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. The assessors consider that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of wind farm development. For example, a high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a potentially significant effect will be overlooked if effects are diluted down due to their limited geographical extents and/ or duration or reversibility.
- The assessors have chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent) and are considered as part of drawing together conclusions about significance and combining with

other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether an effect is significant or not significant.

- The assessment methodology utilises six word scales to describe the magnitude of change – high, medium-high, medium, medium-low, low and negligible-zero; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (3.27), as a means of clearly defining and summarising magnitude of change judgements.

1.4.2 These are not new deviations from GLVIA3 and follow practice established on other similar Nationally Significant Infrastructure Projects (NSIP) such as East Anglia TWO, East Anglia THREE, Norfolk Vanguard and Thanet Extension.

1.4.3 A full list of references is provided in **Chapter 8**, guidance on methodology is provided in **Section 6.2** and a glossary is provided at the front of the Scoping Report.

1.4.4 Whilst many of these guidance documents will be prepared by SNH for projects in Scotland, in the absence of alternative guidelines they have become best practice across the UK. The preparation of visual representations that accord with this SNH guidance will be agreed with consultees.

Data sources

1.4.5 A list of the data sources used for this assessment is provided in **Section 6.2** of the Scoping Report.

Desk-based and site survey work

1.4.6 The LVIA undertaken as part of the PEIR and ES will be informed by desk-based studies and site and field survey work undertaken within the proposed sites for the onshore elements of the Proposed Development and LVIA study area.

1.4.7 A preliminary desk-based assessment will be undertaken of landscape and visual receptors using a range of map based data and related computer and digital analysis including Zone of Theoretical Visibility (ZTV), digital and/or surface terrain modelling and wireframe and street view software. This information will be used to inform initial assessments and focus the site survey work and likely locations for viewpoint photography and sequential route assessment.

1.4.8 A series of site surveys will be undertaken to verify the initial desk-based assessments which may only require simple assessment techniques to complete. This may be due to receptors falling outside the ZTV or confirmation of screening from vegetation and/or built form that means there would be no view of the onshore elements of the Proposed Development.

1.4.9 Site and field survey activities are likely to include the following.

- Field survey verification of landscape elements within the onshore substation site and cable corridor and recommendations for embedded environmental measures where potentially significant effects are identified.
- Field survey verification of the ZTV from landscape and visual receptor locations and transport and recreational routes through the LVIA study area.

- Micro-siting of viewpoint locations and recording of panoramic baseline photography and subsequent visual assessment from the assessment viewpoints.
- Identification of interactions between onshore and offshore elements of the Proposed Development such as whole project visibility or landscape and seascape effects.

1.4.10 The viewpoint photography and visual assessment surveys are planned during the Summer 2020 (Covid-19 restrictions permitting). Further visual assessment verification surveys are then likely to be undertaken prior to the PEIR submission during the late Summer/Autumn 2020, using visualisations for each relevant viewpoint or particular receptor location.

1.4.11 All site survey work will be undertaken in fair weather conditions with good to excellent visibility.

1.5 Assessing landscape effects

Introduction

1.5.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character."

1.5.2 In accordance with GLVIA 3 the term 'landscape' encompasses areas of 'townscape' and coastal areas of 'seascape'. In this assessment, the term 'landscape' is used to describe landscape and seascape unless otherwise noted. Areas of landscape and seascape are relevant to this assessment and they are described as follows:

Landscape character

1.5.3 GLVIA 3, paragraph 5.4, advises that Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:

- "*the elements that make up the landscape in the study area including:*
  - *physical influences – geology, soils, landform, drainage and water bodies;*
  - *landcover, including different types of vegetation and patterns and types of tree cover; and*
  - *the influence of human activity, including landuse and management, the character of settlements and buildings, and pattern and type of fields and enclosure.*
- *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness;*

- *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape*."

Seascape character

1.5.4 GLVIA 3 paragraph 5.6, advises that where LVIA is carried out in coastal or marine locations baseline studies must take account of seascape. Seascape is defined in the UK Marine Policy Statement, (HM Government, Northern Ireland Executive, Scottish Government and Welsh Assembly Government, March 2011) as "*landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other*."

1.5.5 GLVIA 3 paragraph 5.6, identifies the following different factors which together determine seascape character:

- "*coastal features;*
- *views to and from the sea;*
- *particular qualities of the open sea;*
- *the importance of dynamic changes due to weather and tides;*
- *changes in seascapes due to coastal processes;*
- *cultural associations; and*
- *contributions of coastal features to orientation and navigation at sea."*

Landscape effects

1.5.6 The potential landscape effects, occurring during the construction, operation and decommissioning periods of the Proposed Development may therefore include, but are not restricted to the following.

- Changes to landscape elements: the addition of new elements (onshore substation, landfall and cable corridor) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements or valued features of the landscape character;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of the landscape character or contribute to the landscape value;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within a particular area;

- Changes to designated landscapes, including the South Downs National Park (SDNP) and High Weald Area of Outstanding Natural Beauty (AONB) that would affect the special landscape qualities underpinning the designation and its integrity; and
- Cumulative landscape effects: where more than one development of a similar type may lead to a cumulative landscape effect.

1.5.7 Development may have a direct effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, outside the immediate site area and its associated landscape character.

Evaluating landscape sensitivity to change

Introduction

1.5.8 The assessment of sensitivity takes account of the landscape value and the susceptibility of the receptor to the onshore elements of the Proposed Development.

1.5.9 Landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that landscape sensitivity needs to be considered on a case by case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less sensitive or susceptible to particular development, and of variable sensitivity across its geographical area. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

Value of the landscape receptor

1.5.10 The value of a landscape receptor is a reflection of the value that society attaches to that landscape. The assessment of the landscape value will be classified as high, high-medium, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following range of factors:

- Landscape designations - A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is affected and the level of importance of the designation which may be international, national, regional or local. The absence of designation does not however preclude value, as an undesignated landscape receptor may be valued as a resource in the local or immediate environment.
- Landscape quality - The quality of a landscape receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A landscape with consistent, intact, well-defined and distinctive attributes is considered to be

of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character; and

- Landscape experience - The experiential qualities that can be evoked by a landscape receptor can add to its value. These responses relate to a number of factors including cultural associations that may exist in art, literature or history; the recreational value of the landscape, or the iconic status of the landscape in its own right; and its contribution of other values such as nature conservation or archaeology.

Landscape susceptibility to change

1.5.11 The susceptibility of a landscape receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the onshore elements of the Proposed Development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Some landscape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or not also be special landscape qualities that underpin designated landscapes.

1.5.12 The assessment of the susceptibility of the landscape receptor to change will be classified as high, high-medium, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement. Indicators of landscape susceptibility to the type of development proposed (construction, operation and decommissioning of the onshore substation, landfall and cable corridor) are based on the following criteria:

- Overall Strength and Robustness - Collectively the overall characteristics and qualities of a particular landscape result in a strong and robust landscape that is capable of reasonably accommodating the onshore elements of the Proposed Development without undue adverse effects on the special landscape qualities (in the case of a designated landscape) or the key characteristics for which an area of landscape character or a particular element it is valued.
- Landscape Scale and Topography - The scale and topography are large enough to physically accommodate the development footprint without the requirement of invasive earthworks or drainage. Topographical features such as narrow valleys or more complex and small-scale landforms such as drumlins, incised river valleys/gorges, cliffs or rock outcrops are likely to be more susceptible to this type of development than broad, homogenous topography.
- Openness in the landscape may increase susceptibility to change because it can result in wider visibility of the Proposed Development, however open landscape may also be larger scale and simple which would decrease susceptibility. Conversely enclosed landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility. In general, landscapes with greater enclosure are likely to be less susceptible to the onshore elements of the Proposed Development, than more open landscapes

which may be less able to accommodate the onshore substation and landscape mitigation in the form of planting schemes.

- Land Cover Pattern - Ancient and mature or long-established vegetation such as mature trees, woodland and protected hedgerows are likely to be more susceptible to the proposed development, particularly where these elements form part of a valued characteristic landscape pattern or feature. Conversely grassland/or arable crops and field boundaries comprising post and wire fencing, small, gappy hedges or young pioneer trees are likely to be less susceptible because they can be readily reinstated in the case of the cable corridor and are likely to be of lower landscape value.
- Skyline - Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape character assessment, are generally considered to be more susceptible to development such as the onshore substation in comparison to broad, simple skylines which lack landmark features or contain other infrastructure features.
- Relationship with other Development and Landmarks - Contemporary landscapes where there are existing similar developments (substations and pylons) or other forms of development (industry, mineral extraction, masts urban fringe/large settlement, major transport routes) that already have a characterising influence result in a lower susceptible to development in comparison to areas characterised by smaller scale, historic development and landmarks (historic villages with dense settlement patterns and associated buildings such as church towers).
- Rationale - Some site locations have an obvious visual rationale for the proposed development in terms of the available space, access, simplicity and relationship to other similar forms of development. The design quality and embedded environmental measures will be high. Conversely a site may appear overly constrainted and require greater engineering or additional construction activity to accommodate the proposed development with lower design quality and few embedded environmental measures.
- Remoteness, Naturalness, Wildness / Tranquillity - Notably landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated or farmed / developed landscapes where perceptions of ‘wildness’ and tranquillity are less tangible. Landscapes which are either remote or appear natural may vary in their susceptibility to development.
- Landscape Context and Adjacent Landscapes - The extent to which the Proposed Development will influence landscape receptors across the study area relates to the associations that exist between the landscape receptor within which the Proposed Development is located and the landscape receptor from which the onshore elements of the Proposed Development are being experienced. In some situations, this association will be strong, where the landscapes are directly related. For example, adjacent areas of landscape character may share or ‘borrow’ a high number of common characteristics. Landscape elements may be linked to or associated with wider landscape patterns such as individual trees forming part of an avenue or pattern of woodland copses, for example. In other situations, the association between

adjacent landscapes will be weak. The context and visual connection to areas of adjacent landscape character or designations has a bearing on the susceptibility to development.

Landscape sensitivity rating

1.5.13 An overall sensitivity assessment of the landscape receptor will be made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. The evaluation of landscape sensitivity is described as 'High', 'High-medium' 'Medium' 'Medium-low' or 'Low' and is drawn from the consideration of a range of criteria that indicate landscape value and susceptibility. The basis for the assessment will be made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 1.1**.

Table 1.1 Landscape sensitivity to change

Value	Higher	Lower
	Designation: Designated landscapes / elements with national policy level protection or defined for their natural beauty. Evidence that the landscape / element is valued or used substantially for recreational activity.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Elements that are uncharacteristic such as non-natives or self-seeded vegetation that may need to be cleared.
	Quality: Higher quality landscapes / elements with consistent, intact and well-defined, distinctive attributes.	Lower quality landscapes / elements with indistinct elements or features that detract from its inherent attributes.
	Rarity: Rare or unique landscape character types, features or elements.	Widespread or 'common' landscape character types, features or elements.
	Aesthetic / scenic: Aesthetic / scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to landscape character.
	Perceptual qualities: Landscape with perceptual qualities of wildness, remoteness or tranquillity.	Limited or no evidence that the landscape is used for recreational activity.

Value	Higher	Lower
	Cultural associations: Landscape with strong cultural associations that contributes to scenic quality.	Landscape with few cultural associations.
Susceptibility to change	**Higher**	**Lower**
	Strength and robustness: Fragile landscape vulnerable and lacking the ability to accommodate change.	Robust landscape, able to accommodate change or loss of features without undue adverse effects.
	Landscape Scale: A landscape of a suitably large enough scale to accommodate the development.	A smaller scale landscape that may require further engineering to accommodate the development.
	Openness / Enclosure: An open landscape with limited screening or potential may be of higher susceptibility to the onshore elements of the Proposed Development.	An enclosed landscape with screening or potential for mitigation may be of lower susceptibility to the onshore elements of the Proposed Development.
	Reinstatement: Lower value, non-characteristic landcover and elements capable of rapid reinstatement.	Higher value, characteristic landcover and elements that cannot be easily reinstated or replaced.
	Skyline: Distinctive undeveloped skylines with landmark features.	Developed, nondistinctive skylines.
	Association: Weak and indirect association. Other development may be of a smaller scale or historic.	Strong or direct association other similar contemporary developments/landscape character.
	Rationale: Strong landscape rationale and opportunity with high degree of design quality and/or embedded environmental measures.	Landscape with numerous environmental and technical constraints with lower design quality and/or embedded environmental measures.
	Perceptual Qualities: Perceptual qualities associated with particular scenic qualities, wildness or tranquillity.	Contemporary, cultivated/settled or developed landscapes are likely to have a lower susceptibility.

Susceptibility to change	Higher	Lower
	Landscape Context: Adjacent landscape character context connected by borrowed character and views.	Host landscape character is separate from surrounding/adjacent landscape character
Sensitivity to change	**High** ⟷ **Medium** ⟷ **Low**	

Landscape magnitude of change

Introduction

1.5.14 The magnitude of change affecting landscape receptors is an expression of the scale of change that would result from the onshore elements of the Proposed Development. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent).

Size or scale of change

1.5.15 This criterion relates to the size or scale of change to the landscape that would arise as a result of the onshore elements of the Proposed Development, based on the following factors.

- Landscape Elements: -The degree to which the landscape elements or pattern of elements that makes up the landscape character would be altered by the onshore elements of the Proposed Development, through the loss, alteration or addition of elements in the landscape. The magnitude of change would generally be higher if the features that make up the landscape character are extensively removed or altered, and/or if many new components are added to the landscape.
- Landscape Characteristics - The extent to which the effect of the onshore elements of the Proposed Development change, (physically or perceptually) the key characteristics of the landscape which may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity, complexity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the onshore elements of the Proposed Development in relation to these key characteristics.
- Landscape Character / Designation - The degree to which landscape character receptors would be changed by the addition of the onshore elements of the Proposed Development. If the onshore elements of the Proposed Development are located in a landscape receptor that is already affected by other similar development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the

landscape. In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation.

All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity

- Distance - The size and scale of change is also strongly influenced by the proximity of the proposed development to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the onshore elements of the Proposed Development and/or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on landscape receptors is small or limited. Conversely, landscapes closest to the development are likely to be most affected. Host landscapes (where the development is located within a 'host' landscape character unit) would be directly affected whilst adjacent areas of landscape character would be indirectly affected.

Geographical extent

1.5.16 Landscape effects are described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the landscape effect is described for different landscape receptors is explained as follows.

- Landscape Elements:
  The geographical extent of landscape elements may be objectively measured in terms of numbers, area or linear measurement. For example, the number of trees, area of woodland or length of hedgerow affected may be recorded.
- Landscape Character / Characteristics:
  The extent of the effects on landscape character will vary depending on the specific nature of the onshore elements of the Proposed Development. This is not simply an expression of visibility or the extent of the ZTV. It is a specific assessment of the extent of landscape character that would be changed by the proposed development in terms of its character, key characteristics and elements.
- Landscape Designations:
  In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively (with the support of panel and/or peer review) and whether the integrity of the designation is affected.

Duration and reversibility

1.5.17 The duration and reversibility of landscape effects would be based on the period over which the onshore elements of the Proposed Development are likely to exist (during construction and operation) and the extent to which these elements would be removed (during decommissioning) and the effects reversed at the end of that period. Long-term, medium-term and short-term landscape effects are defined as follows:

- Long-term – more than 10 years (may be defined as permanent or reversible);
- Medium-term – 6 to 10 years; and
- Short-term – 1 to 5 years.

Landscape magnitude of change rating

1.5.18 The 'magnitude' or 'degree of change' resulting from the onshore elements of the Proposed Development is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' or 'Negligible-Zero'. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement.

1.5.19 The levels of magnitude of change that can occur are defined in **Table 1.2**.

Table 1.2 Landscape magnitude of change ratings

Magnitude of landscape change	**Examples of Landscape Magnitude**
High	• Size / Scale: A large-scale change and major loss of key landscape elements/characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that would affect the landscape character and the special landscape qualities/integrity of a landscape designation. Directly affecting a host landscape receptor or indirectly affecting a nearby receptor. • Geographical extent: The size or scale of change would typically, but not always affect a large geographical extent or area and may be close to the proposed development.
High-medium	Intermediate rating with combination of criteria from high or medium magnitude.

Magnitude of landscape change	Examples of Landscape Magnitude
Medium	• Size / Scale: A medium scale change and moderate loss of some key landscape elements / characteristics or the addition of some new medium scale uncharacteristic features or elements that could partially affect the landscape character and the special landscape qualities / integrity of a landscape designation. Directly affecting a host landscape receptor or indirectly affecting a nearby receptor. • Geographical extent: The size or scale of landscape change would typically, but not always affect a more localised geographical extent at an intermediate distance from the proposed development.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude.
Low	• Size / Scale: A small-scale change and minor loss of a few landscape elements/non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on landscape character / designations. • Geographical extent: There may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent at some distance from the proposed development.
Negligible - Zero	• Size / Scale: A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected. • Geographical extent: Typically affecting a very small geographical extent at greater distance from the proposed development.

Evaluating landscape effects and significance

Introduction

1.5.20 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is ‘significant’ or ‘not

significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in **Section 6.2** in the Scoping Report which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the onshore elements of the Proposed Development and their conclusion, will be presented in a comprehensive, clear and transparent manner.

1.5.21 Further information is also provided about the nature of the effects (whether these would be direct / indirect; temporary / permanent / reversible; beneficial / neutral / adverse or cumulative).

Significant landscape effects

1.5.22 A significant effect would occur where the combination of the variables results in the onshore elements of the Proposed Development having a defining effect on the landscape receptor, or where changes of a lower magnitude affect a landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or landscape character, affecting landscape elements, characteristics and/or perceptual aspects that are key to a nationally valued landscape are likely to be significant.

Non-significant landscape effects

1.5.23 A non-significant effect would occur where the effect of the onshore elements of the Proposed Development is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant.

1.6 Assessing visual effects

Introduction

1.6.1 Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

1.6.2 Visual effects are identified for different receptors (people) who would experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and

- cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

1.6.3 The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that would be brought about by the construction, operation and decommissioning of the onshore elements of the Proposed Development.

Zone of Theoretical Visibility (ZTV)

1.6.4 Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of development or part of a development, across the study area and to assist with viewpoint selection. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the study area which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.

1.6.5 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Viewpoint analysis

1.6.6 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the study area. The purpose of this is to assess both the level of visual effect for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which significant effects would be unlikely.

1.6.7 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

1.6.8 The LVIA therefore includes viewpoint analysis prepared for each viewpoint and presented as supporting evidence in an appendix to the LVIA. A summary table of the findings will also be provided in order of distance from the development site. This summary table will assist in defining the direction, elevation, geographical spread and nature of the potential visual effects and identify areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood.

1.6.9 Two sets of viewpoints will be used, one set for the onshore LVIA study area and another set for the offshore elements of the Proposed Development which has a wider study area.

1.6.10 The viewpoint analysis is used to assist the visual assessment of visual receptor locations reported in the PEIR and ES.

Evaluating visual sensitivity to change

Introduction

1.6.11 In accordance with paragraphs 6.31-6.37 of GLVIA3, the sensitivity of visual receptors will be determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the onshore elements of the Proposed Development on the view and visual amenity.

Value of the view

1.6.12 The value of a view or series of views reflects the recognition and importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view will be classified as high, high-medium, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following criteria.

- Formal recognition - The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view would be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape.
- Informal recognition - Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited and appreciated by a large number of people would generally have greater importance than one gained by very few people.

Susceptibility to change

1.6.13 Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the onshore elements of the Proposed Development. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, high-medium, medium, medium-low or low and based on the following criteria.

- Nature of the viewer - The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on

trains would tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views.

- Experience of the viewer - The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the onshore elements of the Proposed Development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a settlement is aligned directly towards the onshore elements of the Proposed Development, the experience of the visual receptor would be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the onshore elements of the Proposed Development.

Visual sensitivity rating

1.6.14 An overall level of sensitivity will be applied for each visual receptor or view – High, High-medium, Medium, Medium-low, or Low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments will be made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 1.3**.

Table 1.3 Visual sensitivity to change

Value	Higher	Lower
	Specific viewpoint identified in OS maps and/or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
	Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
	View afforded protection in planning policy.	View is not afforded protection in planning policy.
	View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
	View has informal recognition and well- known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
	View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
	View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility to change	**Higher**	**Lower**
	Viewer who is likely or liable to be influenced by the onshore elements of the Proposed Development.	Viewer who is unlikely or not liable to be influenced by the onshore elements of the Proposed Development.
	Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation.
	Residents that gain static, long-term views of the onshore elements of the Proposed Development in their principal outlook.	Viewers who are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration.

Susceptibility to change	Higher	Lower
	Viewpoint is visited or used by a large number of people.	View is visited or gained by very few people.
	A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest.
	Viewers are focused on the experience of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities.	The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case.
Sensitivity to change	**High** ⟷ **Medium** ⟷ **Low**	

Visual magnitude of change

1.6.15 The visual magnitude of change is an expression of the scale of change that would result from the visibility of the onshore elements of the Proposed Development. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent).

Size or scale of change

1.6.16 An assessment will be made of the size or scale of change in the view that is likely to be experienced as a result of the onshore elements of the Proposed Development, based on the following criteria.

- Distance -The distance between the visual receptor / viewpoint and the onshore elements of the Proposed Development. Generally, the greater the distance, the lower the magnitude of change, as the onshore elements of the Proposed Development would constitute a smaller-scale component of the view.
- Size - The amount and size of the onshore elements of the Proposed Development that would be seen. Visibility may range from a small or partial visibility of the onshore elements of the Proposed Development to all of the onshore elements of the Proposed Development being visible. Generally, the larger and greater number of the onshore elements of the Proposed Development that appear in the view, the higher the magnitude of change.
- This is also related to the degree to which development may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely

open views are likely to reveal more of a development, particularly where this is a key characteristic of the landscape.

- Scale - The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The scale of the onshore elements of the Proposed Development may appear larger or smaller relative to the scale of the receiving landscape.
- Field of View - The vertical / horizontal field of view (FoV) and the proportion of view that is affected by the onshore elements of the Proposed Development. Generally, the more of the proportion of a view that is affected, the higher the magnitude of change would be. If the onshore elements of the Proposed Development extend across the whole of the open outlook, the magnitude of change would generally be higher as the full view would be affected. Conversely, if the onshore elements of the Proposed Development extent over a narrow part of an open view, the magnitude of change is likely to be reduced as the onshore elements of the Proposed Development would not affect the whole view or outlook. This can in part be described objectively by reference to the horizontal / vertical FoV affected, relative to the extent and proportion of the available view.
- Contrast - The character and context within which the onshore elements of the Proposed Development would be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour, luminance and motion. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change.
- Consistency of image - The consistency of image of the onshore elements of the Proposed Development in relation to other developments. The magnitude of change for the onshore elements of the Proposed Development is likely to be lower if it appears broadly similar to other developments in the landscape in terms of its scale, form and general appearance. New development is more likely to appear as logical components of the landscape with a strong rationale for their location.
- Skyline / Background - Whether the onshore elements of the Proposed Development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude. For example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted or undeveloped horizons. Conversely, development may also appear more noticeable when viewed against a darker background landscape, such as forestry. In these cases, the magnitude of change would tend to be higher.

  If the onshore elements of the Proposed Development add to an already developed skyline the magnitude of change would tend to be lower.
- Number - Generally, the greater the number of separate development components seen simultaneously or sequentially, the higher the magnitude of change and this may lead to whole project effect. Further cumulative effects would occur in the case of separate developments and their spatial relationship to each other would affect the magnitude of change. For example,

development that appears as an extension to an existing development would tend to result in a lower magnitude of change than a separate, new development.

- Nature of Visibility - The nature of visibility is a further factor for consideration. The onshore elements of the proposed Development may be subject to various phases of development change and the manner in which the development may be viewed could be intermittent or continuous and/or seasonally, due to periodic management or leaf fall.

Geographical extent

1.6.17 The geographic extent over which the visual effects would be experienced is also be assessed. This is distinct from the size or scale of effect and is described in terms of the physical area or location over which it would be experienced (described as a linear or area measurement). The extent of the effects would vary according to the specific nature of the onshore elements of the Proposed Development and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experienced by visual receptors. The geographical extent of visual effects is described as per the following examples:

- The geographical extent can be described as an area measurement or proportion of the total receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of the common land or a golf course area.
- The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route.
- The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. (An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open view exists).

Duration and reversibility

1.6.18 The duration and reversibility of visual effects would be based on the period over which the onshore elements of the Proposed Development are likely to exist (during construction and operation) and the extent to which these elements would be removed (during decommissioning) and the effects reversed at the end of that period. Long-term, medium-term and short-term visual effects are defined as follows:

- long-term – more than 10 years (may be defined as permanent of reversible);
- medium-term – 6 to 10 years; and
- short-term – 1 to 5 years.

Visual magnitude of change rating

1.6.19 The 'magnitude' or 'degree of change' resulting from the onshore elements of the Proposed Development is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' and 'Negligible-Zero'. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent). The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement and some examples of the levels of magnitude of change that can occur on views are defined in **Table 1.4**.

Table 1.4 Visual Magnitude of change

Magnitude of landscape change	Examples of Visual Magnitude
High	• Size and Scale: A very large - large and dominant change to the view. • Number: Involving the loss/addition of a large number of features / elements. • Distance: Typically appearing closer to the viewer in the fore to middle ground. • FoV: Affecting a large vertical and wide horizontal FoV. • Nature of Visibility: Multiple phase development, continuously and sequentially visible. • Contrast: Strong degree of contrast with surroundings with little or no screening. • Skyline: Visible on the skyline as a new feature. • Consistency of Image: Contrasting with other developments, lacking in visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to the activity, affecting a large area or length / proportion of route. May also be experienced from a specific viewpoint.
High-medium	Intermediate rating with combination of criteria from high or medium magnitude of change category.
Medium	• Size and Scale: A medium and prominent change to the view. • Number: Involving the loss/addition of a number of features / elements. • Distance: Typically appearing in the middle ground.

Magnitude of landscape change	Examples of Visual Magnitude
	• FoV: Affecting a medium vertical and a medium horizontal FoV. • Nature of Visibility: Multiple phase development, intermittently and sequentially visible. • Contrast: Contrast with surroundings and may benefit from some screening. • Skyline: Visible on the skyline along with other features. • Consistency of Image: Different from other developments, some visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the activity, affecting a medium area or length / proportion of route. May also be experienced from a specific viewpoint.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude of change category.
Low	• Size and Scale: A small and noticeable change, could being missed by the casual observer. • Number: Involving the loss/addition of a small number of features / elements. • Distance: Typically appearing in the background. • FoV: Affecting a small vertical and a narrow horizontal FoV. • Nature of Visibility: Simple, single development, intermittently and infrequently visible. • Contrast: Some parity / 'fits' with surroundings and may benefit from screening. • Skyline: Partly visible on a developed skyline or not visible on the skyline. • Consistency of Image: Similar from other developments with visual rationale, appearing reasonably well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length/proportion of route. May also be experienced from a specific viewpoint.
Negligible - Zero	• Size and Scale: A small or negligible change, need to 'look for it'. • Number: Involving the loss / addition of a small number of features / elements. • Distance: Typically appearing in the far distance. • FoV: Affecting a small vertical and a very narrow horizontal FoV. • Nature of Visibility: Simple, single development, intermittently and infrequently visible. • Contrast: Blends with surroundings and/or is well screened.

Magnitude of landscape change	Examples of Visual Magnitude
	• Skyline: Partly visible on a developed skyline or not visible on the skyline. • Consistency of Image: Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.

Evaluating visual effects and significance

Introduction

1.6.20 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in **Table 1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the onshore elements of the Proposed Development and their conclusion, will be presented in a comprehensive, clear and transparent manner.

1.6.21 Further information is also provided about the nature of the effects (whether these would be direct / indirect; temporary / permanent / reversible; beneficial / neutral / adverse or cumulative).

Significant visual effects

1.6.22 A significant effect is more likely to occur where a combination of the variables results in the onshore elements of the Proposed Development having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.

Non-significant visual effects

1.6.23 A non-significant effect is more likely to occur where a combination of the variables results in the onshore elements of the Proposed Development having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

Weather conditions

1.6.24 The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a maximum or fair assessment of the likely visual effects. The same viewpoint may

be experienced under less optimal viewing conditions resulting in a significant effect appearing as non-significant, due to the change in the variable weather conditions. Due to the conditions of the assessment the reverse (a non-significant effect appearing as significant) is unlikely to occur.

1.7 Assessing cumulative landscape and visual effects

1.7.1 SNH's guidance, *Assessing the Cumulative Impact of Onshore Wind Energy Developments* (2012) is widely used across the UK to inform the specific assessment of the cumulative effects of both on and offshore windfarms. Both GLVIA3 and SNH's guidance provides the basis for the methodology for the cumulative SLVIA and LVIA undertaken in the PEIR and ES. The SNH (2012) guidance defines:

- "*Cumulative effects as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments taken together* (SNH, 2012: p4);
- *Cumulative landscape effects are those effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it'* (SNH, 2012, p10); *and*
- *Cumulative visual effects are those effects that can be caused by combined visibility, which occurs where the observer is able to see two or more developments from one viewpoint and/or sequential effects which occur when the observer has to move to another viewpoint to see different developments"* (SNH, 2012, p11).

1.7.2 As of May 2020, and with the exception of the existing Rampion 1 project, there are no other existing, consented or proposed offshore windfarms within the 50km radius SLVIA study area, nor within UK waters within approximately 140km of Rampion 2. The closest being the Thanet Offshore Wind Farm Extension, located some 143km distant. The closest offshore wind farms within French waters are located approximately 80km to the south. Further, whilst it is currently unknown, it is unlikely that there will be any other similar developments to the onshore elements of the Proposed Development within the onshore study area once this is confirmed.

1.7.3 For this reason, the potential cumulative effects of Rampion 2 with other existing, consented or proposed wind farm development are likely to be limited and described as follows.

- 'Whole project' effects resulting from the combined effects of the onshore and offshore elements of the Proposed Development. These effects are assessed as part of the main SLVIA/LVIA.
- The cumulative effects of Rampion 2 in addition to and in combination with the existing Rampion 1 project.
- The cumulative effects of Rampion 2 in addition to and in combination with other similar development (wind farms) that is either consented/under construction; the subject of a valid planning application; or proposed as part of relevant plans and programmes (the PINS Programme of Projects and MMO

'Marine Case Management System' being the source most relevant for this assessment).

1.7.4 The cumulative assessment methodology for SLVIA/LVIA will be described once the scope of any cumulative assessment is confirmed and agreed through the consultation process.

1.8 Evaluation of significance

1.8.1 The matrix presented in **Table 1.5** is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.

1.8.2 The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references will be made to objective evidence, baseline figures and/or to photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case by case basis. The matrix as presented in **Table 1.5** should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment.

1.8.3 Significant landscape and visual effects are highlighted in bold and shaded dark purple in **Table 1.5**. They relate to all those effects that result in a '**Major**' or a '**Major / Moderate**' level of effect. In some circumstances, '**Moderate**' levels of effect (shaded light purple) also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold in the text and will be explained as part of the assessment, where they occur. White or un-shaded boxes in **Table 1.5** indicate a non-significant effect.

1.8.4 In those instances where there would be no effect, the magnitude has been recorded as 'Zero' and the level of effect as 'None'.

Table 1.5 Evaluation of landscape and visual effects

Sensitivity	Magnitude of change					
	High	**Medium-high**	**Medium**	**Medium-low**	**Low**	**Negligible-Zero**
High	**Major** (Significant)	**Major** (Significant)	**Major/Moderate** (Significant)	**Moderate***	**Moderate***	Minor
High - medium-	**Major** (Significant)	**Major/Moderate** (Significant)	**Moderate***	**Moderate***	Moderate/Minor	Minor
Medium	**Major/Moderate** (Significant)	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible
Medium-low	**Moderate***	**Moderate***	Moderate/Minor	Minor	Minor/Negligible	Negligible
Low	Moderate/Slight	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible

*Note: Moderate levels of effect may/may not be significant subject to the assessor's opinion which shall be clearly explained.

1.9 Nature of effects

1.9.1 The EIA Regulations 2017 state that the ES should define *'the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development*'.

1.9.2 Cumulative effects have been described in **Section 1.7**, and '*short-term, medium-term and long-term, permanent and temporary'* are described in **Sections 1.5 and 1.6** under the heading 'Duration of Effect'. Transboundary effects apply only to the SLVIA and concern the overlap of the SLVIA 50km study area with French maritime waters.

1.9.3 The definition of the remaining terms used in this assessment is defined here.

Direct and indirect effects

1.9.4 Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor.

1.9.5 Indirect landscape effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.

1.9.6 Visual effects are generally all considered as direct effects. An indirect visual effect may however be used to define a visual effect on a view that is not in the direction of the main view of the viewer as described by the following examples.

- Road users generally face the road directly ahead in the direction of travel and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of travel they may be described as indirect.
- Designed landscapes and vistas/viewpoints may be orientated in a particular direction and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of the designed or main/primary view they may be described as indirect.

1.9.7 Secondary effects (or effects subsequent to an initial effect) are covered in this assessment by indirect effects.

Positive and negative effects

1.9.8 Guidance provided by the in GLVIA3 on the nature of effect (i.e. beneficial or adverse) states *that 'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity'*, but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

1.9.9 In this assessment the nature of effects refers to whether the landscape and/or visual effect of the onshore elements of the Proposed Development is positive or negative (herein referred to as 'beneficial' / 'neutral' or 'adverse').

1.9.10 In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of large-scale infrastructure are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.

1.9.11 Generally, in the development of 'new' energy infrastructure, a precautionary approach is adopted, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment will be considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions.

- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.
- Neutral effects occur where the development fits with the existing landscape character or visual amenity. The development neither contributes to or detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.
- Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

1.10 Visual representations

Introduction

1.10.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. The methodology use for viewpoint photography and photomontages will be produced in accordance with the SNH guidance on

Visual Representation of Wind Farms, Version 2.2 (2017), the *Guidelines for Landscape and Visual Impact Assessment*, Third Edition (GLVIA 3) (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on *Visual Representation of Development Proposals* (2019).

Methodology for production of ZTVs

1.10.2 The ZTVs will be calculated using computer software to generate a ZTV of the onshore elements of the Proposed Development, to demonstrate the theoretical extent of visibility from any point in the study area.

1.10.3 A 3D computer model will be developed of the existing landscape and key reference using digital terrain data as follows.

- Ordnance Survey Terrain 50: Used to produce the main or standard ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model (DTM) at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the onshore elements. The computer model will include the entire study area and takes account of the effects caused by atmospheric refraction and the Earth's curvature.
- Ordnance Survey LIDAR Composite 2m: Used to produce a more detailed ZTV plots using 2m grid squares with surface features. It therefore takes into account the screening effects of vegetation, buildings or other surface features that may prevent or reduce visibility (insofar as they are represented in the LIDAR data). The computer model will include the entire study area and takes account of atmospheric refraction and the Earth's curvature.

1.10.4 The resulting ZTV plots will be overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.

1.10.5 Cumulative ZTV plots based on the intervisibility of the onshore elements of the Proposed Development and other relevant developments within the study area will also be produced.

1.10.6 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV as follows.

- Where the ZTV has been calculated using Ordnance Survey Terrain 50 this will not account for vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on the figure.
- Where the ZTV has been calculated using Ordnance Survey LIDAR Composite only those surface features picked up by LIDAR data will be represented.
- The ZTVs are based on theoretical visibility from 2m above ground level;
- The ZTV shows higher to lower visibility based on the amount of the onfshore elements of the Proposed Development visible as represented by a grid of data points representing the 3D envelope, model or annotation of the onshore elements of the Proposed Development;

- The ZTV does not indicate the decrease in visibility that occurs with increased distance from the offshore elements of the Proposed Development. The nature of what is visible from 2km away will differ markedly from what is visible from 500m away, although both could be indicated in the ZTV as having the same level of visibility; and

1.10.7 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the onshore elements of the Proposed Development would be theoretically be visible and tending to present a 'worst case' or over estimate of the theoretical visibility. The information drawn from the ZTV is checked by field survey observation.

Methodology for baseline photography

1.10.8 Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.

1.10.9 The following photographic information is recorded:

- date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10m;
- GPS recorded Above Ordnance Datum (AOD) height data;
- use of a fixed 50mm focal length lens is confirmed;
- horizontal field of view (in degrees); and
- bearing to Target Site.

1.10.10 The photographs used to produce the photomontages will be taken with a digital SLR camera set to produce photographs equivalent to that of a manual 35mm SLR camera with a fixed 50mm focal length lens. The photographs will be taken on a tripod with a pano-head at a height of approximately 1.5m above ground.

1.10.11 All the resulting visualisations will be prepared to indicate other cumulative development in order that they may assist the cumulative assessment as well as the LVIA.

1.10.12 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the onshore elements, based on current information and photomontage methodology.

Weather conditions

1.10.13 GLVIA3 para 8.22 state – *'In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*

- *representative of those generally prevailing in the area; or*
- *taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible'.*

1.10.14 In preparing photomontages for the LVIA, photographs will be taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, will be taken during periods of 'very good' or 'excellent' visibility conditions, seeking to represent a maximum visibility scenario when the developments may be highly visible.

Methodology for production of visualisations

1.10.15 A photomontage is a visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.

1.10.16 To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360° view but appears essentially as a flat plane. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.

1.10.17 The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5° field of view (FoV) photomontages. In some views, more than one 53.5° FoV panorama may be shown to accommodate the full width of the onshore elements of the Proposed Development.

1.10.18 Visualisations that illustrate the onshore elements of the Proposed Development, set within a computer-generated image of the landform will be used in the assessment to predict its theoretical appearance. This will be produced with a combination of Resoft WindFarm and 3D AutoCAD and will be based on a terrain model with a 2m data grid (2m Lidar data). There are limitations in the accuracy of DTM data so that landform may not be represented precisely and may result in differences in visibility, however, the use of 2m Lidar data minimises these limitations.

1.10.19 Rendering of the onshore substation in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There is some variation in the appearance and visibility between the viewpoints, as they are rendered to suit the conditions shown in each of the different viewpoint photographs, which have some unavoidable degree of variation in terms of lighting and weather conditions. The key requirement is that the onshore substation will be rendered with sufficient contrast against the skyline backdrop to illustrate its maximum visibility scenario in each image. Photomontages will be prepared to depict how the onshore substation would appear in excellent visibility conditions to illustrate the worst- case. The full suite of viewpoint photomontages should be viewed to gain an impression of the likely visual effects of the onshore substation.

1.10.20 Visualisations will be produced for the agreed viewpoints identified in the LVIA and photomontages will aim to provide a photorealistic image of the appearance of the

onshore elements of the Proposed Development. 3D model representations are combined with the baseline view photographs to create a photorealistic rendered photomontage image of the development.

1.10.21 The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90° field of view (or in some cases, up to 360°), which accords with SNH guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

1.10.22 The 53.5° field of view wirelines and photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These images are each printed on paper 841 x 297mm (half A1) which provides for a relatively large-scale image.

1.10.23 Visualisations of the onshore elements of the Proposed Development will show, from each viewpoint, the existing baseline panorama and a wireframe or annotated panorama or photomontage.

1.10.24 The completed set of visualisations and accompanying data are then presented as figures using desktop publishing/graphic design software.

1.10.25 The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.

Illustration of landscape planting strategy

1.10.26 Visualisations will be prepared to illustrate the landscape design strategy which is proposed as an embedded environmental measure within the onshore elements of the Proposed Development. This is likely to include landscaping illustrated in Year 1 (implementation) and at a later date during the establishment (between Years 5-15).

Limitations of visualisations

1.10.27 The photomontage visualisations used in the LVIA are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.

1.10.28 The photomontage visualisations of the onshore substation (and any development proposal) have a number of limitations when using them to form a judgement on visual effect. These include:

- a visualisation can never show exactly what a development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;

- the images provided give a reasonable impression of the scale and the distance to the onshore elements of the Proposed Development but can never be 100% accurate to the as constructed effect;
- a static image cannot convey movement or reflection from the sun;
- the viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations;
- to form the best impression of the effects, these images are best viewed at the viewpoint location shown;
- the images must be printed and viewed at the correct size (841mm x 297mm);
- images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression;
- it is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression; and
- there are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day.

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Appendix E
Terrestrial ecology desk study report

Contents

1. Introduction

1.1.1 The “Biodiversity and Geological Conservation” section of Overarching National Policy Statement for Energy (EN 1) outlines the expectations of the UK Government regarding the consideration of biodiversity. Paragraph 5.3.3 recommends that the applicant should ensure that details of “*internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity*” are provided to inform a proportionate assessment of the effects of Rampion 2.

1.1.2 The purpose of this report is to present the results of a desk study undertaken to identify statutory and non-statutory sites designated for their nature conservation importance, Habitats and Species of Principal Importance in England, and other legally protected, notable and controlled species relevant to Rampion 2.

1.1.3 The results of this desk study will be used to support the Environmental Impact Assessment (EIA) process and the Habitats Regulations Assessment (HRA) for Rampion 2.

2. Study area

2.1.1 This desk study is based on the onshore elements of the Scoping Boundary as described in **Section 1.1** of the Scoping Report[1]. This area provides a design envelope that allows for all foreseeable possible scenarios that may be covered within the evolving design. This means that the extent of the Scoping Boundary is considerably larger than the area within which construction or operation of infrastructure will take place; meaning that the coverage of the desk study is large and likely to remain suitable for informing all assessment of ecological features going forward.

2.1.2 The 'study area' for this desk study comprises:

- land within the Scoping Boundary, as shown on **Figure 6.6.1, Section 6.6** of the Scoping Report;
- areas of search (measured from the Scoping Boundary) for sites designated for their nature conservation interest at the international, European, national and local levels;
- an area of search for legally protected and notable ecological features; and
- an area of search for any legally controlled species

2.1.3 The extent of the areas of search (see **Table 6.6.3** of the Scoping Report) were determined based on best practice guidance and a high-level overview of the types of ecological features present, and the potential effects that could occur (see **Figure 6.6.1, Section 6.6** of the Scoping Report).

[1] All use of the term Scoping Boundary in this report refer to the onshore elements of the Proposed Development only. This is defined as habitats above Mean High Water Springs (MHWS).

3. Methodology

3.1.1 Data on internationally, nationally and locally designated sites for nature conservation, legally protected, notable and controlled species and habitats (see **Table 3.1** and **Table 3.2** for details) were obtained through data requests to a range of nature conservation organisations and interrogation of publicly available databases. These data sources[2] are:

- Sussex Biodiversity Records Centre (through data request);
- Sussex Ornithological Society (through data request);
- RSPB (through data request);
- MAGIC (database interrogated May 2020);
- National Biodiversity Network Gateway (database interrogated May 2020); and
- British Trust for Ornithology – Wetland Bird Survey (WeBS) information (database interrogated May 2020).

Table 3.1 Key sources of biodiversity data

Ecological Feature	Example / Definition	Coverage of study area
Statutory sites designated under international conventions or European Directives[3]	Sites of Community Importance (SCI), Special Areas of Conservation (SAC), candidate SAC, Special Protection Areas (SPA), proposed SPA, Ramsar sites and proposed Ramsar sites.	Special Areas of Conservation (SAC) and possible[4] SAC searched for inside and within 12km of the Scoping Boundary to reflect recommendations in the Draft Sussex Bat Special Area of Conservation: Planning and Landscape Enhancement Protocol (also known as the "Draft Sussex Bat SAC Protocol) (2018). Special Protection Areas (SPA), proposed SPA, Ramsar sites and proposed Ramsar sites searched for inside and within 10km of the Scoping Boundary reflecting the upper foraging distances of dark-bellied brent geese *Branta bernicla bernicla* (Summers &

[2] South Downs National Park Authority have agreed to provide data, however this was not available to inform this report at the time of writing.
[3] These statutory sites are defined collectively as "European sites" within Advice Note 10 Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate 2017 (version 8)).
[4] Magic.gov.uk identifies possible SACs as a category, as opposed to candidate SACs. Possible SACs are sites that have been identified but have not been submitted to the European Commission for designation (cSACs are the same except they have been submitted are but are not yet designated). There are no candidate SACs currently for the UK – possible SACs were included to ensure completeness.

Ecological Feature	Example / Definition	Coverage of study area
		Critchley, 1990) and Bewick's swan *Cygnus columbianus bewickii* (Robinson *et al*. 2004) from roost locations. These species being identified as the species with the largest foraging distances for terrestrial habitats for any SPA features within the wider area.
Statutory sites designated under national legislation	Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs)).	SSSIs and NNRs searched for inside and within 5km of the Scoping Boundary following precedent for other large infrastructure projects and LNRs within 1km reflecting the purpose of their designation.
Locally designated sites	In Sussex these are termed as LWS and notable road verges (NRV)	LWS and NRV searched for inside and within 5km of the Scoping Boundary.
HPI and SPI, Red listed species and Legally protected species.	HPIs and SPIs, species recorded on The IUCN Red List of Threatened Species and/or local Red Lists for the UK or relevant sub-units (e.g. regions or counties) and legally protected habitats and species include those listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended), those included on Schedules 2 and 5 of the Habitats Regulations. Badger and Hedgerows are provided protection under the Protection of Badgers Act 1992 and the Hedgerows Regulations 1997 respectively.	HPI and SPI, Red listed species and Legally protected species searched for inside and within 5km of the Scoping Boundary unless otherwise specified. Ornithological data provided by Sussex Ornithological Society is supplied by tetrad (a square containing four Ordnance Survey 1km grid squares). Data for all tetrads that are within or overlap with the Scoping Boundary have been obtained. Data on stone curlew *Burhinus oedicnemus* and lapwing *Vanellus vanellus* nesting locations and habitat creation measures (e.g. stone curlew plots) supplied by the RSPB within the Scoping Boundary and within 500m of it. Summary Wetland Bird Survey (WeBS) data available from the British Trust for Ornithology (BTO) was obtained for all count sectors within the

Ecological Feature	Example / Definition	Coverage of study area
		Scoping Boundary or within 1km of it at the closest point.
Legally controlled species	Legally controlled species include those listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	Legally controlled species searched for within the Scoping Boundary.
Bat roosting locations	Bat roost locations are considered separately from other species records in accordance with guidance.	Bat roosting locations were searched for within 5km of the Scoping Boundary.
Water body locations	Water bodies may support species within the groups listed above (for example legally protected great crested newts).	Water body locations were searched for in the Scoping Boundary and within 500m of it.

Table 3.2 Sources of desk study data

Source	Summary of information provided
Sussex Biodiversity Records Centre	Data on sites designated for nature conservation, priority habitats and legally protected and notable flora and fauna.
Sussex Ornithological Society	Data on species listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) and notable bird species within tetrads that overlap with the Scoping Boundary. Additional information requested on lapwing nesting habitat and Bewick's swan foraging habitat locations.
RSPB	Data on stone curlew and lapwing breeding within the Scoping Boundary and within 500m of it and location of habitat creation (e.g. stone curlew plots) within this area.
Magic.gov.uk	Data on the location of statutorily designated sites, data from the Ancient Woodland and Priority Habitat Inventories, granted European Protected Species Licence locations (2010 to 2020) and great crested newt eDNA survey outcomes from 2017-2019 effort by Natural England for district licensing purposes.
National Biodiversity Network Gateway	Information on legally protected and notable flora and fauna was interrogated in the Scoping Boundary and within 500m of it.
BTO Wetland Bird Survey Reports	Core count data (yearly peaks) for WeBS count sites within the Scoping Boundary and within 1km of it.

4. Results

4.1 Statutorily designated sites

4.1.1 Statutorily designated sites were identified from datasets available from Magic.gov.uk (a service managed by Natural England).

4.1.2 A total of eight European sites are present within the areas of search identified in **Table 4.1**. There are a number of overlapping designations (i.e. the same geographic area is both a Ramsar site and a Special Protection Area) meaning that these eight sites equate to five distinct geographical locations. None of these European sites are within the Scoping Boundary.

4.1.3 In addition, there are seventeen SSSIs and one LNR identified within the relevant areas of search identified in **Table 4.1.** Four of the SSSIs and the LNR are within the Scoping Boundary.

4.1.4 **Figure 6.6.4** of the Scoping Report illustrates the locations of the sites designated through international convention and European directives, whilst **Figure 6.6.5** shows the locations of sites designated via national legislation.

Table 4.1 Details of statutorily designated sites

Site name	Designated features	Distance and direction from the Scoping Boundary
International/European sites		
Arun Valley Ramsar site **(overlaps with Arun Valley SAC, Arun Valley SPA, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)**	• Qualifies under Ramsar criterion 2 for seven wetland invertebrate species listed on the British Red Data Book, four nationally rare and four nationally scarce plant species. • Qualifies under Ramsar criterion 3 for a diverse and rich ditch flora. • Qualifies under Ramsar criterion 5 for its assemblage of wintering waterfowl.	2.8km North
Arun Valley SAC **(overlaps with Arun Valley Ramsar site, Arun Valley SPA, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)**	• Ramshorn snail *Anisus vorticulus*	2.8km North

Site name	Designated features	Distance and direction from the Scoping Boundary
Arun Valley SPA **(overlaps with Arun Valley SAC, Arun Valley Ramsar site, Amberley Wild Brooks SSSI, Waltham Brooks SSSI and Pulborough Brooks SSSI)**	• Bewick's swan (non-breeding) • Waterfowl assemblage (non-breeding): including shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas penelope* and Bewick's swan	2.8km North
The Mens SAC	• Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) • Barbastelle *Barbastella barbastellus*	11.0km North-west
Duncton to Bignor Escarpment	• Asperulo-Fagetum beech forests	6.5km North-west
Pagham Harbour Ramsar site **(overlaps with Pagham Harbour SPA)**	• Qualifies under Ramsar criterion 6 for non-breeding population of dark-bellied brent goose	10.0km West
Pagham Harbour SPA **(overlaps with Pagham Harbour Ramsar site and Solent and Dorset Coast SPA)**	• Common tern *Sterna hirundo* (breeding) • Dark-bellied brent goose (non-breeding) • Little tern *Sterna albifrons* (breeding) • Ruff *Calidris pugnax* (non-breeding)	10.0km West
Solent and Dorset Coast SPA **(overlaps with Pagham Harbour Ramsar site and SPA)**	• Sandwich tern *Sterna sandvicensis* (breeding) • Common tern • Little tern	0.7km West

Site name	Designated features	Distance and direction from the Scoping Boundary
National sites		
Amberley Mount to Sullington Hill SSSI[5]	• CG2 – *Festuca ovina – Avenula pratensis* lowland calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • Juniper *Juniperus communis* • Fly honeysuckle *Lonicera xylosteum* • Adonis blue butterfly *Polyommatus bellargus*	Within Scoping Boundary
Amberley Wild Brooks SSSI	• Redshank *Tringa tetanus* (breeding) • Bewick's swan (non-breeding) • Shoveler (non-breeding) • Teal (non-breeding) • Breeding bird assemblage – mixed lowland damp grassland, woodland • Invertebrate assemblage • Lowland ditch system • Outstanding dragonfly assemblage • True fox-sedge *Carex vulpine* • Cut-grass *Leersia oryzoides* • S3 – *Carex paniculate* swamp • S5 – *Glyceria maxima* swamp • S7 *Carex acutiformis* swamp • Variety of wintering bird species • Vascular plant assemblage	2.8km North
Arun Banks SSSI	• *Schoenoplectus lacustris* sub-species *tabernaemontani x triqueter* • W5 – *Alnus glutinosa – Carex paniculate* woodland • W6 – *Alnus glutinosa – Urtica dioica* woodland	1.2km North

[5] Amberley Mount to Sullington Hill SSSI and Arundel Park SSSI are also identified as groundwater dependent terrestrial ecosystems in **Section 6.10: Water environment**. This aspect of the SSSI will be considered alongside the designated features in all future assessment.

Site name	Designated features	Distance and direction from the Scoping Boundary
Arundel Park SSSI	• Breeding bird assemblage – mixed: scrub, woodland • CG2 *Festuca ovina – Avenula pratensis* lowland calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • Invertebrate assemblage • Field cricket *Gryllus campestris* • Cut-grass	Within the Scoping Boundary
Beeding Hill to Newtimber Hill SSSI	• CG2 – *Festuca ovina – Avenula pratensis* calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • Great crested newt *Triturus cristatus* • IK – Karst • IS – quaternary of South-East England • Red star-thistle *Centaurea calcitrapa* • Adonis blue butterfly • W12 – *Fagus sylvatica – Mercurialis perennis* woodland • W21d – *Crataegus monogyna – Hedera helix* scrub Viburnum lantana sub community	4.7km East
Cissbury Ring SSSI	• Breeding bird assemblage – mixed: scrub, woodland • CG1 – *Festuca ovina – Carlina vulgaris* lowland calcareous grassland • CG2 – *Festuca ovina – Avenula pratensis* lowland calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • CG4 – *Brachypodium pinnatum* lowland calcareous grassland • Adonis blue butterfly	2.7km East

Site name	Designated features	Distance and direction from the Scoping Boundary
Chanctonbury Hill SSSI	• Breeding bird assemblage – mixed: lowland damp grassland, woodland • CG2 – *Festuca ovina – Avenula pratensis* lowland calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • Great crested newt • W12 – *Fagus sylvatica – Mercurialis perennis* woodland	Within the Scoping Boundary
Chantry Mill SSSI	• EA – Aptian - Albian	0.9km North
Climping Beach SSSI **(overlaps with West Beach LNR)**	• Sanderling *Calidris alba* • SD1 – *Rumex crispus – Glaucium flavum* shingle community • SD7 – *Ammophila Arenaria – Festuca rubra* semi-fixed dune community • SD8 – *Festuca rubra – Galium verum* fixed dune grassland	Within the Scoping Boundary
Fairmile Bottom SSSI	• Silver-washed fritillary *Argynnis paphia* • CG2 – *Festuca ovina – Avenula pratensis* lowland calcareous grassland • W13 – *Taxus baccata* woodland	3.3km North-west
Horton Clay Pit SSSI	• ED – Aptian - Albian	3.1km East
Felpham SSSI	• EC – Tertiary palaeobotany	4.3km West
Hurston Warren SSSI	• H2 – *Calluna vulgaris – Ulex minor* heath • M1 – *Sphagnum auriculatum* bog pool community • M16 – *Erica tetralix – Sphagnum compactum* wet heath	4.3km North
Pulborough Brooks SSSI	• Pintail *Anas actua* (non-breeding) • Ruff (non-breeding) • Shoveler (non-breeding) • Teal (non-breeding) • Wigeon (non-breeding) • Breeding bird assemblage – lowland damp grasslands • Invertebrate assemblage • Vascular plant assemblage	4.6km North

Site name	Designated features	Distance and direction from the Scoping Boundary
Parham Park SSSI	• Combinations of species – lichens • Invertebrate assemblage • W10 – *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland • W14 – *Fagus sylvatica – Rubus fruticosus* woodland • W15 – *Fagus sylvatica – Deschampsia flexuosa* woodland	1.8km North
Sullington Warren SSSI	• Breeding bird assemblage – mixed; scrub, woodland • H2 – *Calluna vulgaris – Ulex minor* heath	1.2km North
Wolstonbury Hill SSSI	• CG1 – *Festuca ovina – Carlina vulgaris* lowland calcareous grassland • CG3 – *Bromus erectus* lowland calcareous grassland • CG4 – *Brachypodium pinnatum* lowland calcareous grassland • CG5 – *Bromus erectus – Brachypodium pinnatum* lowland calcareous grassland	4.6km East
West Beach LNR **(overlaps with Climping Beach SSSI)**	• Sand flats, tide line, shingle, sand dunes and related fauna (part of Climping Beach SSSI)	Within the Scoping Boundary

4.2 Non-statutorily designated sites

4.2.1 Non-statutorily designated sites were identified within data provided by SxBRC.

4.2.2 **Table 4.2** provides the details of the Local Wildlife Sites that are within the Scoping Boundary and associated area of search. There are a total of 9 within the Scoping Boundary and further 32 within 5km of it (see **Figure 6.6.6**).

Table 4.2 Details of non-statutorily designated sites within the Scoping Boundary

Site name	Description[6]	In or Outside of Scoping Boundary
Arun Valley, Watersfield to Arundel LWS	• This section of the River Arun and its floodplain forms an extensive tract of wetland, a nationally declining habitat. • Although many of the flood meadows have been improved, the wet grassland is important for breeding and wintering waders and wildfowl. There is a good network of ditches, some of which are very important botanically. • The site is important for birds, dragonflies, water beetles, snails and plants, and supports many rare and declining species. The unimproved meadows of Watersfield Brooks are of great botanical interest.	In
Bines Green LWS	• Bines Green is an area of common land that straddles the B2135 road. It is damp, unimproved, neutral grassland of considerable botanical interest with a small, overgrown pond to the west of the road.	In
Conyers Bank LWS	• Conyers Bank is a small, isolated field of unimproved chalk grassland on a steep, north-facing hillside. Situated above the floodplain of the River Arun, it is surrounded by semi-natural woodland and improved water meadows. The site has a rich flora.	In
Elmer Rocks LWS	• Elmer beach is a fine example of vegetated shingle, an internationally rare habitat. The intertidal area supports a diverse community including intertidal sand and eight 'rock islands' constructed in the early 1990s in the mid-tide zone to form a coastal defence against the eroding coastline. The rock islands have provided a habitat type that is very rare, if not unique, in West Sussex. The rock pools are probably the best in the county.	In

[6] Description is copied from the summary provided on the designation information provided for each site by SxBRC

Site name	Description[6]	In or Outside of Scoping Boundary
Littlehampton Golf Course & Atherington Beach LWS	• Littlehampton Golf Course is of outstanding importance botanically. Although much of its grassland has been improved there are patches of species-rich turf. The southern edge of the golf links includes an area of dry dune grassland, adjacent to the sand dune system of Climping Beach SSSI. The site also includes an area of vegetated shingle beach, a nationally uncommon habitat.	In
Poling Copse LWS	• Poling Copse is a large block of ancient, semi-natural woodland on the Coastal Plain south of the South Downs, just to the east of Arundel. It consists predominantly of Oak-Hazel woodland, a type typical of base-poor soils in the area. Sycamore woodland dominates on South Fields – a section which has probably regenerated on an old field.	In
Sullington Hill LWS	• This stretch of the South Downs escarpment supports moderately species-rich chalk grassland on north and east-facing slopes. Some areas are maintained by grazing while others are no longer grazed and have become heavily scrub-invaded. The site includes small areas of semi-natural woodland.	In
Warningcamp Hill and New Down LWS	• The steep, north-west facing slope of New Down supports herb-rich chalk grassland with extensive patches of Burnet Rose *Rosa pimpinellifolia*, an uncommon plant in West Sussex. Warningcamp Hill supports a very large population of the rare Small-flowered Buttercup *Ranunculus parviflorus*. The site also includes an old chalk pit and a small area of ancient, semi-natural woodland.	In
Washington Chalk Quarry LWS	• This area of open downland and scattered scrub lies at the western end of Chanctonbury Hill. It includes a collection of disused chalk pits which now support species-rich grassland. The flora and butterflies are both of great interest. Part of the site has recently been fenced and sheep grazing reinstated. The South Downs Way runs through the site.	In

Site name	Description[6]	In or Outside of Scoping Boundary
Amberley Chalkpits & Hacketts Copse LWS	• Amberley Chalkpits and the adjoining woodland contain a huge variety of habitats spanning the succession from bare chalk and spoil heaps to deciduous woodland. The varied aspects of the chalk pits add to the range of microhabitats present. The site has an extremely rich flora and fauna including typical chalk downland species and many rarities. The site is also of geological importance.	Out
America & Gratwicke's Wood LWS	• An oak, ash, hazel woodland lying on the Weald Clay with wet areas supporting alder and aspen. The managed coppice provides a varied structure and together with paths and rides provides good habitats for birds and insects. The ground flora is rich and the trees and shrubs include wild service and Midland hawthorn.	Out
Applesham Farm Bank LWS	• This is an isolated remnant of unimproved chalk grassland situated on the west-facing slope of Steep Down. The moderately steep slope supports a mosaic of short herb-rich grassland, rank grassland and scrub. The site supports many plants and butterflies characteristic of unimproved downland	Out
Binsted Wood Complex LWS	• Binsted Wood is a complex of woodland sites which includes Hundredhouse Copse in the west and Stewards Copse to the east. There is a mixture of ancient woodland, recent woodland, conifer plantation, species rich pasture and old tracks and shaws. The mix of habitats and geology gives rise to a very rich and diverse flora. The paths and rides are especially species rich and Scotland Lane supports an outstanding wet ride flora that includes at least 11 species of sedge including Long-stalked Yellow-sedge *Carex viridula* ssp.*brachyrhyncha*, a county rarity at its only recorded West Sussex location. This is the largest block of ancient semi-natural woodland south of the South Downs in Sussex.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Boyds Wood & Furzefield Copse LWS	• Boyds Wood and Furzefield Copse are two botanically rich woodlands just outside the village of Nuthurst. They encompass a range of woodland types, both ancient semi-natural and more recent broadleaved plantation. Boyds Wood includes a particularly interesting stream valley or gill woodland.	Out
Broadmare Common LWS	• The site is a registered common, located just south of Henfield. It is predominantly poor fen and scrub, with several ponds and an area of woodland. It represents a rather scarce habitat which, although somewhat degraded, is now managed for wildlife. The location of the site amongst intensively farmed countryside and close to a small town increases its value for nature conservation.	Out
Capite Wood LWS	• This is a large area of very diverse woodland comprising both broadleaved ancient semi-natural woodland and re-planted areas of coniferous and deciduous trees. The woodland has two small streams, species rich rides, wet flushes, banks, ditches and a varied topography. It has suffered extensive storm damage and there is abundant deadwood. The woodland is rich in bryophytes.	Out
Clapham Wood LWS	• Clapham Wood is an extensive, ancient semi-natural woodland on the undulating dip slope of the South Downs. The ground flora is rich and includes a number of interesting species. The wood was moderately affected by the storm of October 1987 and unfortunately several large blocks of woodland were subsequently cleared for pasture. Much of the wood is not managed but some areas are still coppiced. Clapham Woods is an ancient woodland of County-wide importance.	Out
Coombe Wood LWS	• Coombe Wood is an ancient semi-natural woodland situated in an east-facing coombe on the escarpment of the South Downs. It has a rich mollusc fauna which includes the nationally rare snail *Helicodonta obvoluta*. The presence of an old Large-leaved Lime *Tilia platyphyllos* coppice stool is also of great interest.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Great Wood & Copyhold Hanger LWS	• This site consists mostly of a wooded gill valley which is ancient in origin, and several old abandoned water meadows. The ground flora is generally quite species-rich and well-developed, becoming increasingly so nearer the streams. The site also has particularly good fern and bryophyte communities.	Out
Heath Common LWS	• This site has moderately rich remnants of wet and dry heath, several ponds and some relics of ancient base-rich woodland rich in lichens and ferns. In recent years, the Sandgate Conservation Society has done excellent work in the management of this area as a nature reserve.	Out
Henfield Common LWS	• The site is a registered common; one of three commons around Henfield. It is of great importance for wildlife as it encompasses a mosaic of species-rich grassland, woodland and a reedbed, together with small areas of marshy grassland and heath. The site is being actively managed to enhance its value for wildlife.	Out
Highdown Hill and the Miller's Tomb LWS	• The Miller's Tomb SNCI, identified in 1992, comprises a small area of species-rich chalk grassland. The SNCI was extended in 1997 to include Highdown Hill. The whole site comprises relatively unimproved chalk grassland and scrub on the south facing scarp of a small outlier of the South Downs near Worthing. Although heavily used for informal recreation, the site supports several uncommon plants and animals.	Out
Hoe Wood LWS	• This ancient woodland is dominated by Oak, with frequent ash and birch over hazel coppice. It has a good assemblage of woodland plants and supports a diverse community of birds. The site includes a lake which boasts significant numbers of dragonfly and damselfly species as well as providing for good populations of amphibians. Also include is an unimproved meadow.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Hooklands Farm Meadow LWS	• Hooklands Farm meadow is an excellent example of unimproved, damp grassland. It is very species-rich and supports plants typical of damp and slightly acidic soils. The site is surrounded by mature hedgerows and a stream runs through the meadow, creating a damp flush around an old pond in the south of the area.	Out
Horsham Common, Alder Copse, Coate's Furzefield & Constable's Furze LWS	• This diverse woodland complex includes semi-natural woodland, semi-mature Oak plantation, young broadleaved plantation, conifer plantation, streams and a small herb-rich meadow. The flora, butterflies, birds and mammals are all of great interest. The woodland is managed in the interests of both commercial forestry and nature conservation.	Out
Kithurst Hill LWS	• This site lies on the steep, north-facing escarpment of the South Downs. Most of it is wooded. The lower slopes consist of ancient semi-natural woodland, mostly of ash and hazel. It is of interest for its epiphytic bryophytes. There are small areas of open grassland with species-rich swards.	Out
Kneppmill Pond, the River Adur & Lancing Brook LWS	• The site is a registered common, located close to Henfield. It consists of herb-rich damp grassland with areas of tall herbs and some scrub and woodland. It has a small pond in the western corner.	Out
Long Furlong and Church Hill LWS	• Long Furlong is a steep north and west-facing slope between the A280 and Clapham Woods, supporting rich chalk grassland and scrub. Church Hill is a complex mosaic of chalk grassland, species-rich scrub and woodland. Long Furlong and Church Hill form a large piece of contiguous habitat, so have been included as one site.	Out
Middleton Shingle LWS	• The site consists of a strip of vegetated shingle along the seafront at Middleton-on-Sea with a large population of Sea Radish *Raphanus raphanistrum ssp. Maritimus*, a plant that occurs in only three other sites in Sussex. The strip of vegetated shingle is backed by regularly mown grass and then housing.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Mill Pond LWS	• The site consists of Slaugham Mill Pond, a large area of open water and reedbed which is of particular importance for birds, and a small woodland which adjoins it to the north. The site is located just to the south of Slaugham village.	Out
Monkmead Woods LWS	• This is an area of wet heath, dry heath and woodland on the south west edge of West Chiltington Common, between Storrington and Pulborough. The site has scarce plants, a rare fungus and nearby sites have a very rare dragonfly that could colonise this site if management was appropriate.	Out
Pond Lye LWS	• This site includes a pond with extensive areas of sedge swamp around the margins and a species-rich neutral grassland. A number of locally uncommon plants are found in the meadow. The pond is of great ornithological importance, particularly for its breeding birds.	Out
Offington Cemetery LWS	• This is the largest area of unimproved herb-rich calcareous grassland in urban Worthing. It is of great wildlife value to the Borough with cover for birds provided by scrub and large numbers of ant-hills scattered throughout it. It is also a fair-sized remnant of a nationally threatened habitat type.	Out
Old Deer Park LWS	• This site which lies in an old deer park, south of Leonardslee Gardens, is one of the best surviving relics of the formerly vast St. Leonard's Forest. In addition to moderately species-rich dry and wet heath, there is a very interesting bog. The ancient parkland trees have a fine assemblage of woodland epiphytic lichens. Today the park is grazed by a herd of wallabies.	Out
Oreham Common LWS	• The site is a registered common, located close to Henfield. It consists of herb-rich damp grassland with areas of tall herbs and some scrub and woodland. It has a small pond in the western corner.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Peppering Down LWS	• A species-rich strip of chalk grassland on a west-facing slope. There is a fair amount of scrub at the top of the slope in the south-east corner of the site.	Out
Peppering Farm Dew Pond LWS	• Peppering Farm dewpond is a small dried-up dewpond, situated adjacent to a main track on the Downs and surrounded by arable. The area supports an exceptionally rich downland flora, including many uncommon plants. It is maintained by a small band of volunteers with permission from the estate and farmer. The major task is the removal of scrub, mainly Gorse and Hawthorn.	Out
Rewell Wood Complex LWS	• Rewell Wood is a large ancient woodland complex. It has a diversity of habitats including ancient semi-natural woodland, worked Sweet Chestnut coppice, conifer plantation, Beech plantation and species-rich chalk grassland. Wide rides and glades support a rich flora and butterfly fauna. The disused gravel pits are of entomological importance.	Out
River Adur Water Meadows & Wyckham Wood LWS	• Wyckham Wood, one of the few woodlands on the floodplain of the River Adur is of particular importance on account of its heronry. The water meadows have mostly been improved but some of the ditches are of great botanical interest. This wetland area is also of importance to birds and dragonflies.	Out
Sedgwick Park LWS	• Within Sedgwick Park there are several areas of ecological interest, particularly the unimproved meadow, herb-rich parkland and ancient woodland. The meadow is cut annually for hay whilst the parkland is now managed for the benefit of wildlife after some years of neglect.	Out
Steep Down LWS	• This is an isolated remnant of unimproved chalk grassland situated on the west-facing slope of Steep Down. The moderately steep slope supports a mosaic of short herb-rich grassland, rank grassland and scrub. The site supports many plants and butterflies characteristic of unimproved downland.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
Steyning Coombe & Steyning Round Hill LWS	• Steyning Coombe and Steyning Round Hill are both important areas of unimproved downland on the escarpment above Steyning. Together these areas are extremely diverse, having steep slopes facing all directions, both short herb-rich sward and tall ungrazed sward, open grassland and grassland with scattered scrub. The rich flora and invertebrate fauna includes several rare plants, snails and butterflies.	Out
Tenants Hill & Reservoirs LWS	• Tenants Hill has a steep east-facing slope of species-rich unimproved chalk grassland. The two covered reservoirs have developed surprisingly rich chalk grassland floras. Small areas of species-rich grassland occur adjacent to both reservoirs. The flora immediately east of the southern reservoir is of exceptional interest. There are small herb-rich glades within the belt of scrub linking the two reservoirs.	Out
The Downs Link, Nutham Wood & Greatsteeds Farm Meadow LWS	• The Downs Link, a dismantled railway line, has developed into an interesting moderately species-rich belt of shrubs. This supports a large colony of the rare Brown Hairstreak butterfly. A number of important wildlife sites lie adjacent to the old railway, notably a small, herb-rich meadow and small, stream-side, ancient semi-natural woodlands. Nutham Wood, in particular, has a very rich ground flora.	Out
The Gallops & No Man's Land LWS	• This site consists of areas of calcareous grassland set within a mosaic of ranker grassland, scrub and secondary woodland. The species-rich chalk grassland forms valuable wildlife habitat as well as being a fragment of a much threatened habitat. The poorer habitats also present add to the diversity and thus the general wildlife interest of the site.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
The Hanger LWS	• Two main types of wood are present within this gill woodland site. Alder occurs along the streams and extends up the lower slopes in parts, with oak, hazel and ash on the upper slopes and the flat ground above. The wood supports a wide range of woodland plants, mosses and liverworts, a good bird community and a number of uncommon butterflies.	Out
The Sanctuary, High Salvington LWS	• The site consists of a south-facing coombe and slope, located on the edge of High Salvington. The north and west part of the site is a mosaic of species-rich scrub, secondary woodland and chalk grassland, which is managed bird sanctuary. The rest is open, herb-rich grassland. The site represents a scarce habitat in the Borough. Meadow Clary Salvia pratensis, a Red Data Book species, occur here in one of only two sites in West Sussex.	Out
Titnore & Goring Woods Complex LWS	• This woodland complex is the largest in Worthing Borough. Much of it is ancient in origin, although its structure and species composition vary considerably, due to management. The site is of outstanding importance as a large area of semi-natural habitat close to a heavily built-up area.	Out
Tottington Wood LWS	• This wood is situated just north of the South Downs. It consists typically of scattered Oak and Ash standards over mainly Hazel and some Ash coppice. It supports a very species-rich ground flora and a good number of bryophytes have been recorded. There are species-rich rides and several small streams.	Out
Walden Close Meadow LWS	• This site consists of a large meadow alongside the A272 and a small meadow to the north. Both fields are cut for hay and have species-rich swards. The smaller meadow is notably rich in invertebrates.	Out

Site name	Description[6]	In or Outside of Scoping Boundary
West Wantley Farm Meadow LWS	• This is a small, unimproved pasture just north of Storrington. This unimproved pasture is an excellent example of damp, unimproved grassland of a type that is both locally and nationally threatened. It is surrounded by a species-rich hedgerow and has damp flushes in the south west corner and a pond in the eastern part of the southern boundary. The site has a very large population of Meadow Thistle *Cirsium dissectum* which is very scarce in West Sussex.	Out
Wigginholt Common LWS	• The site is an area of heathland, and to a lesser extent, plantation and semi natural woodland, located to the north of Parham Park SSSI. It is crossed by paths and tracks and is used for recreation and nature conservation. The heathland component of the site is of principal importance as it is a rare habitat in West Sussex; it supports many rare and uncommon heathland specialist species.	Out
Wiston Ponds LWS	• This is a well-established pond within the grounds of Wiston Park. It is surrounded by trees and scrub and has well-developed marginal vegetation. Good populations of amphibians use this pond and also it supports a number of interesting bird species.	Out
Worthing & Hill Barn Golf Courses LWS	• Worthing and Hill Barn golf courses encompass significant areas of unimproved chalk grassland, neutral grassland, mixed chalk scrub and woodland. Many of the fairways and areas of rough are of botanical interest with chalk flora including Round-headed Rampion *Phyteuma orbiculare* and Juniper *Juniperus communis*. Invertebrates and birds of interest recorded on Worthing golf course including the Dark Green Fritillary, Green Hairstreak, Chalkhill Blue, Grey Partridge, Skylark, Stonechat and Corn Bunting.	Out

4.2.3 SxBRC also returned 33 records of notable road verges within the study area. **Figure 6.6.6** shows the location of the notable road verges identified.

4.3 Habitats

4.3.1 Habitats listed on the Ancient Woodland Inventory and the Priority Habitats Inventory were identified using datasets available on Magic.gov.uk.

4.3.2 Woodland listed on the Ancient Woodland Inventory is present within the Scoping Boundary (see **Figure 6.6.7**). Approximately186.4 ha of ancient semi-natural woodland is present, alongside178.6 ha of ancient replanted woodland. These habitats occur within a network of woodlands of various sizes and are often immediately adjacent to other woodland types. These habitats are relatively common across the area encompassed by the Scoping Boundary, with the exception being within the general area of the landfall (south of Arundel).

4.3.3 Habitats within the Scoping Boundary identified from the Priority Habitats Inventory are provided in **Table 4.3**.

Table 4.3 Priority Habitat Inventory information

Habitat type	Area within Scoping Boundary (ha)
Coastal and floodplain grazing marsh	462.4
Coastal saltmarsh	3.4
Coastal sand dunes	10.2
Coastal vegetated shingle	7.3
Deciduous woodland	843.7
Lowland calcareous grassland	109.3
Lowland fens	0.1
Maritime cliffs and slopes	4.4
Mudflats	4.0
Traditional orchard	4.7
No main habitat but additional habitats present	91.1

4.3.4 A total of 621 water bodies have been identified within the Scoping Boundary, with a further 56 within 500m of it. Water bodies become more common in areas north and east of Washington; shape and size vary, although there are no particularly large water bodies (for example, large drinking water reservoirs) with the vast majority being less than a hectare in extent. **Figure 6.6.8 A** and **B** show the distribution of the water bodies.

4.3.5 Within the Area of Search 89 plant species were recorded that were legally protected or notable (some at a county level only). Of these, there was a single species listed on Schedule 8 of the Wildlife & Countryside Act 1981 (as amended) within the Scoping Boundary (another two in the Area of Search). These were bluebell *Hyacynthoides non-scripta*, millimetre moss *Micromitrium tenerum* and small Alison *Alyssum alyssoides.* Within the Scoping Boundary there were a further 12 species listed as HPI; tubular water-dropwort *Oenanthe fistulosa*, frog orchid *Dactylorhiza viridis*, an eyebright *Euphrasia pseudokernei*, purple milk-vetch *Astragalus danicus*, juniper *Juniperus communis*, corn buttercup *Ranunculus arvensis*, musk orchid *Herminium monorchris*, sharp-leaved pondweed *Potamogeton acutifolius*, white helleborine *Cephalanthera damasonium* and wild candytuft *Iberis amara*.

4.4 Fauna (excluding birds)

4.4.1 Records of legally protected and notable species were provided directly by SxBRC. Further information was gathered from the NBN Gateway and Magic.gov.uk.

4.4.2 The area supports a wide range of flora and fauna of interest. Summary details of mammals, amphibians and reptiles within the Scoping Boundary[7] are provided in **Table 4.4**. The summary details are of records provided by SxBRC, these have been reconciled where possible with other data sources where a high degree of overlap can be recognised.

Table 4.4 Summary of legally protected and notable species (mammals, reptiles and amphibians)

Species	No. of records
Adder *Vipera berus*	1
Alcathoe bat *Myotis alcathoe*	1 (no records of roosts)
Barbastelle *Barbastella barbastellus*	1 (1 record of roost noted as "*hibernacula roost/unspecified roost*")
Badger *Meles meles*	Present – individual records not provided due to confidentiality
Bat (unspecified species)	10 (four roosts recorded, one "feeding roost", one "unspecified roost" and two "*hibernacula roost/unspecified roosts*")
Bechstein's bat *Myotis bechsteinii*	2 (no records of roosts)
Brown hare *Lepus europaeus*	8

[7] Due to the large number of records received due to the size of the areas of search only data within the Scoping Boundary is presented.

Species	No. of records
Brown long-eared bat *Plecotus auritus* (plus records of long-eared spp.)[8]	21 (12 records of roosts, including three confirmed maternity roosts)
Common lizard *Zootoca vivipara*	35
Common pipistrelle *Pipistrellus pipistrellus*	40 (8 roosts, all records are of "*unspecified*" type
Common toad *Bufo bufo*	30
Daubenton's bat *Myotis daubentonii*	16 (eight records of roosts, five specified as "*hibernacula roost/unspecified roost*" with the remainder being "*hibernacula roost*").
Grass snake *Natrix helvetica*	12
Great crested newt *Triturus cristatus*	95
Harvest mouse *Micromys minutus*	3
Hazel dormouse *Muscardinus avellanarius*	2
Hedgehog *Erinaceus europaeus*	50
Leisler's bat *Nyctalus leisleri*	1 (no records of roosts)
Myotis bat (unspecified species)	4 (no records of roosts)
Nathusius' pipistrelle *Pipistrellus nathusii*	5 (no records of roosts)
Natterer's bat *Myotis natereri*	26 (22 records of roosts, 13 specified as "*hibernacula roost/unspecified roost*" with the remainder being "*hibernacula roost*").
Noctule *Nyctalus noctula*	12 (two records of "*unspecified*" roosts)
Otter *Lutra lutra*	Otter records were not provided by SxBRC, although they are noted as present on the NBN Gateway.
Pipistrelle bats (species unspecified)	12 (ten roost records all noted as "unspecified roost")

[8] Grey long-eared bats may constitute some of the records (12 in total) for undetermined long-eared species. However, as this bat is relatively rare and restricted to a small number of colonies, whereas brown long-eared bat is well distributed and relatively common, these records are more likely to be attributable to the latter.

Species	No. of records
Polecat *Mustela putorius*	8
Sand lizard *Lacerta agilis*	Sand lizard records were not provided by SxBRC, although they are noted as present on the NBN Gateway.
Serotine *Eptesicus serotinus*	10 (two records of roosts, one "*unspecified*" roost and one "*feeding roost*")
Slow worm *Anguis fraglis*	25
Soprano pipistrelle *Pipistrellus pygmaeus*	34 (seven roost records, including two maternity roosts)
Water vole *Arvicola amphibius*	76
Whiskered bat *Myotis mystacinus*	2 (no records of roosts)
Whiskered bat / Brandt's bat *Myotis brandtii*	8 (five roosts, four specified as "*hibernacula roost/unspecified roost*" with the remainder being "*hibernacula roost*")

4.4.3 The data show that the majority of the protected and notable species listed in **Table 4.4** are widespread and occur in a number of locations. As would be expected from the area the majority of species identified are commonly associated with woodland, grassland or aquatic habitats. **Figure 6.6.9** provides the distribution of bat roost records provided by SxBRC, whilst **Figure 6.6.10** shows the distribution of records of other mammals. **Figure 6.6.11** provides the distribution of herptile records provided by SxBRC.

4.4.4 Large numbers of invertebrate records have been returned through the desk study, with particular emphasis on lepidoptera. Of the 45 species considered to be on the "Sussex list" (Sussex branch of Butterfly Conservation identify records of 52 species with 7 considered to be rare or occasional visitors only) records of 17 of these species were provided for the study area. Within the Scoping Boundary nine SPI were identified namely brown hairstreak *Thecla betulae*, dingy skipper *Erynnis tages*, Duke of Burgundy *Hamearis lucina*, grizzled skipper *Pyrgus malvae*, small blue *Cupido minimus*, small heath *Coenonympha pamphilus*, wall *Lasiommata megera*, white admiral *Limenitis camilla* and white letter hairstreak *Satyrium w-album*. In addition to butterflies there were a further 53 SPI of moth.

4.4.5 The other invertebrate noted within the Scoping Boundary of particular interest was stag beetle *Lucanus cervus* with 23 records in the last 10 years.

4.5 Ornithological records

4.5.1 Ornithology records were provided directly by SOS and RSPB. Further information was gathered from the BTO website.

4.5.2 **Table 4.5** provides details of breeding Schedule 1 bird records compiled by SOS in the last 10 years (2010-2020). Thirteen species were identified as breeding in the area, with some of these being relatively frequent and widespread, whilst others have only been noted occasionally.

Table 4.5 Schedule 1 bird records

Species	No. of records	Notes
Quail *Coturnix coturnix*	14	The majority of these records are from the area around Burpham and Warningcamp
Gargeney *Anas querquedula*	3	The locations were associated with the Arundel WWT reserve and the Henfield Levels.
Mediterranean gull *Larus melanocephalus*	11	The records are all reported from the Arundel WWT reserve.
Goshawk *Accipiter gentilis*	1	Record from woodland between Crabtree and Bolney
Marsh harrier *Circus aeruginosus*	4	The records are all reported from the Arundel WWT reserve.
Red kite *Milvus milvus*	56	Observations across a wide area including Angmering, Amberley and Burpham.
Barn owl *Tyto alba*	195	Observations across a wide area including Burpham, Partridge Green, Henfield, Steyning, Twineham Green and Sayers Common
Kingfisher *Alcedo atthis*	15	Observations all linked to the Arun Valley
Hobby *Falco Subbuteo*	15	Observations widely spread from Angmering, Burpham and Twineham Green.
Peregrine *Falco peregrinus*	48	Observations widely spread including around Washington, Storrington, Arundel, Wepham Down and Twineham
Woodlark *Lullula arborea*	8	Nine of ten records were from the area around Twineham
Cetti's warbler *Cettia cetti*	438	Widespread across the area within the Scoping Boundary

Species	No. of records	Notes
Firecrest *Regulus ignicapillus*	67	Records reported in the Arundel area, Chanctonbury Ring and woodland around Angmering

4.5.3 SOS also provided extensive records of birds listed as SPI (including breeding and non-breeding records) recorded between 2000 and 2020. A total of 39,452 records of 39 species were received; these records are summarised in **Table 4.6**.

Table 4.6 Records of species of principal importance from Sussex Ornithological Society

Species	Number of records
Bewick's swan	1,018
Bittern	48
Black-tailed godwit	151
Bullfinch	1,679
Common cuckoo	751
Common scoter	132
Corn bunting	888
Dark-bellied brent goose	411
Dunnock	4,279
Eurasian Curlew	198
European greater white-fronted goose	40
Grasshopper warbler	60
Greater scaup	10
Grey partridge	1,132
Hawfinch	201
Hen harrier	486
Herring gull	3,663
House sparrow	2,931
Lesser redpoll	293

Species	Number of records
Lesser spotted woodpecker	69
Linnet	2,038
Marsh tit	629
Nightjar	66
Northern lapwing	3,432
Reed bunting	2,357
Ring ouzel	129
Skylark	2,333
Song thrush	3,656
Spotted flycatcher	298
Starling	3,340
Stone curlew	7
Tree pipit	62
Tree sparrow	15
Turtle dove	287
Willow tit	19
Woodlark	28
Wood warbler	16
Yellow wagtail	292
Yellowhammer	1,918

4.5.4 RSPB supplied two records of displaying stone curlew recorded in the last 10 years, both within the Scoping Boundary. One of these records was in the area between Amberley and Burpham in arable habitat, whilst the other was between Washington and Steyning in an area that supports both downland and arable habitats.

4.5.5 RSPB supplied 309 records of breeding lapwing recorded in the last 10 years including adults nesting, displaying and feeding and chicks and juveniles. Birds were noted in both grassland and arable habitats and were widespread across the area. SOS provided a further 424 breeding records of lapwing in the last 10 years, many of these records are associated with the Wildfowl and Wetlands Trust

reserve at Arundel. The tetrads that are known to support breeding lapwing are shown on **Figure 6.6.12**.

4.5.6 The BTO have 5 WeBS count sites in the Scoping Boundary or within 1km of it that have been counted consistently between 2014/15 and 2018/19. These count sites support large numbers of birds over the winter and passage periods. Wildfowl including gadwall and shelduck, whilst waders such as lapwing, black-tailed godwit, grey plover, ringed plover and sanderling are common. The presence of certain species changes with the location and type of habitat present in each count site.

4.5.7 Of the species named in the designation material for Arun Valley SPA / Ramsar site and Pagham Harbour SPA / Ramsar site Bewick's swan.

Table 4.7 WeBS Records

Species	Count Site	Number
Bewick's swan	Climping	0
Dark-bellied brent goose	Climping	358
Shoveler	Climping	0
Teal	Climping	0
Wigeon	Climping	0
Bewick's swan	River Arun – Arundel to Littlehampton	4
Dark-bellied brent goose	River Arun – Arundel to Littlehampton	0
Shoveler	River Arun – Arundel to Littlehampton	2
Teal	River Arun – Arundel to Littlehampton	17
Wigeon	River Arun – Arundel to Littlehampton	93
Bewick's swan	Arun Valley	20
Dark-bellied brent goose	Arun Valley	0
Shoveler	Arun Valley	228
Teal	Arun Valley	2,157
Wigeon	Arun Valley	3,825
Bewick's swan	Henfield Rye Farm	0
Dark-bellied brent goose	Henfield Rye Farm	0
Shoveler	Henfield Rye Farm	10

Species	Count Site	Number
Teal	Henfield Rye Farm	112
Wigeon	Henfield Rye Farm	68
Bewick's swan	Henfield Brooks	2
Dark-bellied brent goose	Henfield Brooks	0
Shoveler	Henfield Brooks	4
Teal	Henfield Brooks	32
Wigeon	Henfield Brooks	183

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Appendix F
Habitat mapping using remote sensing

Contents

1. Introduction

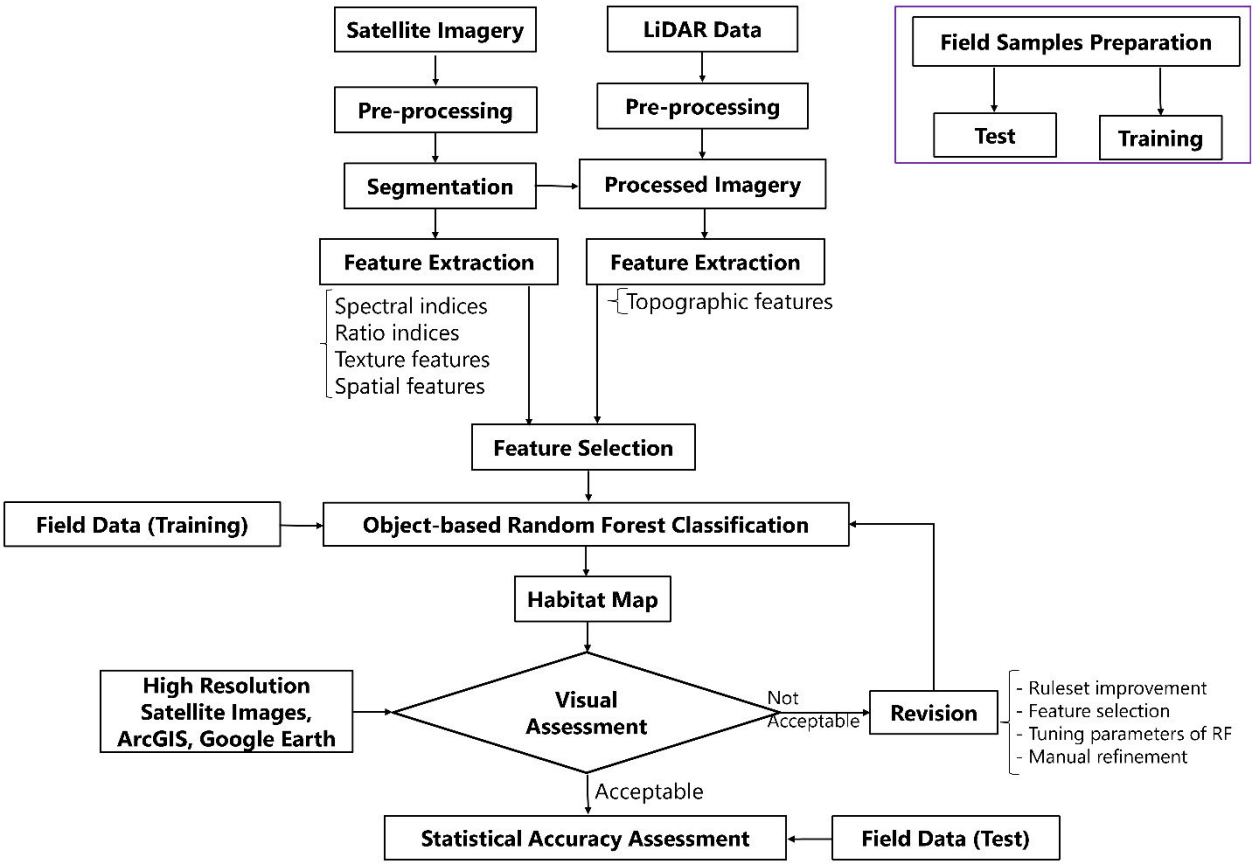
1.1.1 Remote sensing (RS) is the science of obtaining information about objects on the earth from sensors installed on a variety of remote platforms, such as drones, aircrafts and satellites. Each remote sensor measures electromagnetic radiation reflected, emitted, or backscattered from the earth. Through recording and analysing this electromagnetic energy, it is possible to produce valuable information from various objects on earth. For instance, the spectral information collected by a satellite can be effectively utilized for classification of habitat types.

1.1.2 RS has been used to provide information on the habitats along the potential route corridor options and substation locations for Rampion 2. The data provided is to be used to inform the evolving design of the Proposed Development, the Environmental Impact Assessment (EIA) scoping process and the determination of the scope and extent of future terrestrial ecology surveys. This information may also prove useful in establishment of a robust baseline, should survey access requests for some areas of privately owned land be refused.

2. Methodology

2.1.1 The most advanced RS and machine learning methods have been used to classify habitats over the RS study area (all route and substation options as of January 2020 plus a 500m buffer[1]). The flowchart of the RS method is illustrated in **Figure F2.1** and the detail of each step is discussed in the following subsections. Additionally, further detail about the RS method used for land cover/land use classification is discussed in Amani *et al*. (2020).

Figure F2.1 Flow chart of the remote sensing method to classify habitats



2.2 Field sample collection and preparation

2.2.1 Image classification algorithms are generally divided into two categories: supervised and unsupervised. It is widely argued that the supervised algorithms are significantly more accurate than the unsupervised classifiers. The supervised classification requires field samples for each land cover type. Due to the benefits in accuracy, supervised classification was used, for which samples (training and test datasets) were gathered. These field samples (for example, GPS points of the location of the classes) were collected during field surveys undertaken in late April 2020. Suitably qualified and experienced ecologists recorded broad habitat types

[1] The RS study area is not as large as the Scoping Boundary as it was specified prior to this being defined, although it is based on the same route and substation options.

from Public Rights of Way (PRoW) following the methods in the Handbook for Phase 1 habitat survey (JNCC, 2010). Approximately 2,294ha were broadly classified during the field survey across 38 categories. Of this sample approximately 923ha within 20 categories was used to train and test the model. This discrepancy is due to the following.

- Large areas of habitat classified outside of the area subject to remote sensing (500m either side of route corridors and substations) due to, for example, large arable fields being recorded although they only minorly overlapped with the area of interest.
- Some habitat types having too few or too small samples to allow the model to accurately predict occurrence (for example sea wall, introduced shrub and dune grassland).
- Initial results suggested that combining some categories of grassland was necessary due to the difficulties in discriminating between them using RS. Improved grassland, poor semi-improved grassland and neutral semi-improved grassland were combined as a single category. Amenity grassland, marsh/marshy grassland and calcareous grassland, the other grassland habitat types identified during the sampling field work, were retained as single categories.
- The number of collected samples for each category was different, and for some of the categories was significantly higher than the others. This could negatively affect the remote sensing model and, thus, the number of samples for some classes was reduced to have a balanced number of samples for all categories. For instance, after merging several grassland categories, approximately 30% of them were ingested into the classification.

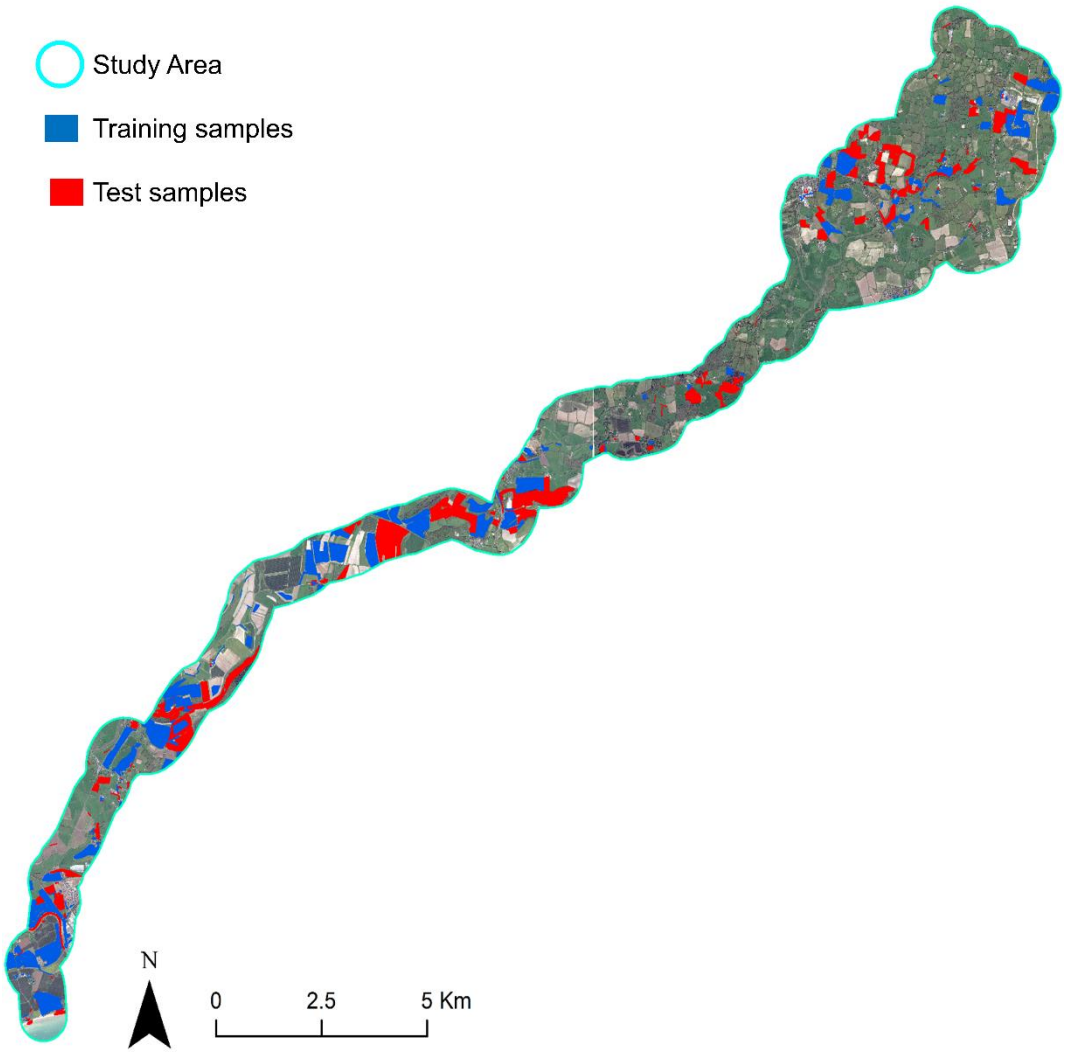
2.2.2 The samples were inserted into ArcGIS and were modified to make them suitable for the RS model. Finally, all the samples were randomly divided into two groups of training and test (see **Table F2.1**). As clear from **Table F2.1**, majority of samples were considered for the training to make the remote sensing model more robust and reliable. The training data were used for training the machine learning classification algorithm and the test data were used for statistical accuracy assessment of the final habitat map. **Table F2.1** provides the number and area of field data (training and test samples) and **Figure F2.2** illustrates the distribution of field samples which were used in the RS model.

Table F2.1 Field sample information

	Train – No. of samples	Train – Area (ha)	Test – No. of samples	Test – Area (ha)
Amenity grassland	11	6.30	10	1.93
Bare ground	6	0.68	5	0.5
Improved and semi-improved grassland	39	216.21	35	105.73

	Train – No. of samples	Train – Area (ha)	Test – No. of samples	Test – Area (ha)
Hedgerow	15	1.66	15	1.09
Arable	19	170.21	10	133.22
Scrub – scattered	4	2.47	2	1.67
Hardstanding	13	1.98	11	0.71
Calcareous grassland	10	34.90	9	28.45
Parkland and scattered trees – mixed	1	0.2	3	0.34
Scrub – dense/continuous	7	8.90	7	2.28
Mixed woodland	8	4.40	6	36.78
Intertidal – mud/sand	2	2.31	2	1.90
Buildings	21	1.18	16	0.60
Marsh/marshy grassland	6	0.96	4	0.84
Broadleaved woodland	14	45.48	13	87.14
Quarry	1	0.89	3	1.57
Standing water	9	1.50	3	0.27
Wet ditch	8	0.56	7	0.23
Running water	9	2.10	9	6.19
Coniferous woodland - plantation	9	4.86	4	3.38
TOTAL	**212**	**507.75**	**174**	**414.82**

Figure F2.2 The distribution of field samples within the RS study area



2.3 Remote sensing datasets

Multi-spectral satellite imagery

2.3.1 Multi-spectral satellite imagery contains spectral information collected in various ranges of the electromagnetic spectrum. Since different targets on the earth (e.g. different land cover types) have various ecological and environmental characteristics, they have different spectral responses which makes them distinguishable in in multi-spectral RS imagery.

2.3.2 For Rampion 2, Worldview-2 multi-spectral satellite images, as the main data source, were used to discriminate different types of habitats. Both spatial resolution (i.e., pixel size) and spectral resolution (i.e., the number of spectral bands) of multi-spectral images are important for RS analyses. Generally, higher spatial and spectral resolutions result in a higher accuracy in RS modelling, hence the use of Worldview-2 multi-spectral imagery with high spatial resolution (pixel size = 2m) was used for Rampion 2. These satellite images also contain spectral bands (e.g., red, blue, green, near infrared, and shortwave infrared) that are well-

suited to discriminate different habitat types. The characteristics of the Worldview-2 satellite imagery is provided in **Table F2.2**.

Table F2.2 The characteristics of the Worldview-2 multi-spectral satellites images

Spectral bands	Spatial resolution (m)
Panchromatic	0.5
Coastal	2
Bluet	2
Green	2
Yellow	2
Red	2
Red edge	2
Near infrared 1	2
Near infrared 2	2

LiDAR data

2.3.3 LiDAR data consists of a very high-resolution 3D point cloud of the earth's surface and surface features, and thus are the primary RS resource for height estimation and 3D map production. LiDAR sensors use light in the form of a pulsed laser to measure ranges (variable distances) to the Earth from an airborne platform. The laser pulses reflect off the ground and ground features, and a dense 3D point cloud is the result. The unique characteristics of LiDAR data make them suitable for height estimation. LiDAR data were used to improve the classification accuracy. For Rampion 2, the LiDAR data provided by UK Environment Agency (available through https://environment.data.gov.uk/DefraDataDownload/?Mode=survey) were utilised. The datasets include the raw LiDAR point cloud data along with different LiDAR products, such as Digital Elevation Model (DEM) and Digital Surface Model (DSM), with 1m spatial resolution.

Remote sensing datasets preparation

2.3.4 Although the Worldview-2 satellite images have already been partially processed and prepared, the geometric and radiometric accuracies, as well as orthorectification and co-registration of the images were investigated to make sure they were suitable to be used in the RS model. Cloud masking was also performed to remove the cloudy areas within the study area. Finally, pan-sharpening was applied to the image to improve the spatial resolution of the imagery (i.e. pixel size or the smallest object that can be detected on the ground). By this, the pixel size was reduced from 2m to 0.5m.

2.3.5 All the layers produced from satellite imagery and LiDAR datasets were layer-stacked to be ingested in the classification algorithm. It is also worth noting that ArcGIS, PCI-Geomatica, and several open-source software packages were used to process multi-spectral satellite and LiDAR datasets.

Segmentation

2.3.6 It is widely reported that an object-based classification method is superior to the pixel-based techniques, especially when high spatial resolution imagery are available. Considering this fact, an object-based image analysis was implemented to obtain an accurate habitat map from the RS study area. The first step in an object-based classification is segmentation. The 0.5m World-view-2 satellite imagery was used to segment the RS study area. The object-based segmentation was performed in eCognition software, which provides hundreds of valuable toolboxes to perform segmentation and increase classification accuracy compared to the commonly used software packages like ArcGIS.

Feature extraction and selection

2.3.7 It is important to include more features in a classification along with the main datasets for obtaining a higher mapping accuracy. Additionally, since object-based image analysis was employed, various spatial and textural features were also included in the classification to improve the classification accuracy. Some of the features which were extracted are provided below. These features were evaluated for each class and, finally, the most efficient features were ingested into the classification:

- main optical spectral bands: Blue, Green, Red, Infrared;
- ratio and spectral indices: $\frac{Blue}{Brightness}$, $\frac{Green}{Brightness}$, $\frac{Red}{Brightness}$, $\frac{Infrared}{Brightness}$, Normalized Difference Water Index= $\frac{\text{Green}-\text{NIR}}{\text{Green}+\text{NIR}}$ Normalized Difference Vegetation Index= $\frac{\text{NIR}-\text{Red}}{\text{NIR}+\text{Red}}$;
- main elevation: DTM, DSM;
- other elevation features: Slope, Aspect;
- texture features: Gray Level Co-occurrence Matrix (GLCM), standard deviation; and
- spatial features: Shape, Size, etc.

Classification

2.3.8 For Rampion 2, the Random Forest (RF) machine learning algorithm was used to produce the habitat map. The reason was this algorithm has provided higher accuracies compared to other common machine learning techniques. RF includes an ensemble of decision trees each of which possess several nodes dividing the input pixels into mutually exclusive groups, which contains the most homogeneous pixels. The division continues until each node is representative of one of the final

classes. of the samples (see **Table F2.1**) used in this step to train the RF algorithm.

Accuracy assessment

2.3.9 Both visual and statistical accuracy assessments were performed to report the level of habitat classification accuracy.

2.3.10 In terms of visual accuracy assessment, the high spatial resolution satellite images, Ordnance Survey MasterMap data, and high-resolution imagery within ArcGIS and Google Earth were visually used to see if the classes correspond to real objects. If the classification was not visually acceptable, several techniques, such as improving the remote sensing rulesets, changing the input features to the remote sensing model, and refining RF tuning parameters were applied. Additionally, the manual refinements were also applied where there were errors not corrected by the remote sensing model. For example, the following manual refinements were conducted:

- some bare soil outcrops in arable or grassland fields were wrongly classified as hardstanding and, thus, were manually corrected;
- several ditches and hedgerows interchangeably mapped were corrected; and
- some scrub or woodland areas were converted to hedgerows.

2.3.11 The statistical accuracy assessment was performed using the test data (see **Table F2.1**) to obtain the classification accuracy values through analysing the confusion matrix. Several accuracy indices, such as overall accuracy, producer accuracy, user accuracy, and kappa coefficient were analysed and reported. Overall accuracy is the proportion of correctly classified pixels/objects to the total pixels/objects. Kappa coefficient shows the agreement between actual and classified classes and can vary between 0 (no agreement) and 1 (perfect agreement). The producer accuracy shows how much of the areas which are actually class A, are accurately classified as class A. User accuracy shows how much of the areas classified as class A are actually class A. In fact, producer accuracy has a relationship with omission error which shows how much of a class has been omitted in the classification process. On the other hand, user accuracy has a relationship with commission error, which shows how much of the mapped class belongs to the other classes.

2.4 Results

Figure F2.3 shows the classified habitat map obtained from the object-based RF algorithm applied to a combination of optical and LiDAR imagery. The accuracy of this map was visually assessed by comparing it with high resolution optical images, and it was observed that the identified areas have a good match with the real habitat types in the RS study area. The areas of the habitat classes were also calculated from this classified map and the results are reported in **Table F2.3**. Based on the results, most areas are dominated by Improved/semi-improved grassland (2,408.34 ha), Arable (1,325.95 ha) and Broadleaved woodland (621.84 ha), respectively.

Figure F2.3 Habitat map generated using object-based Random Forest algorithm

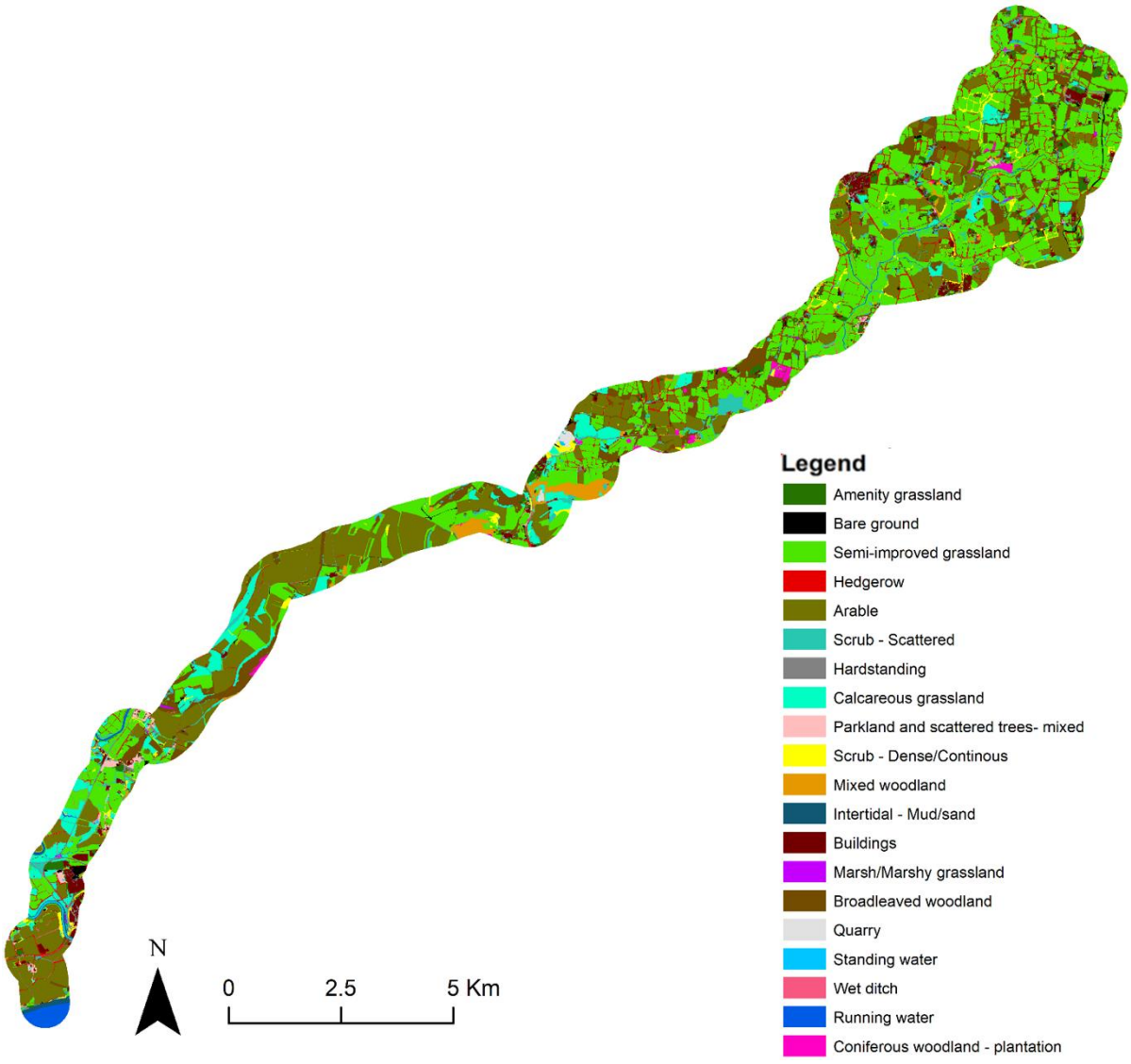


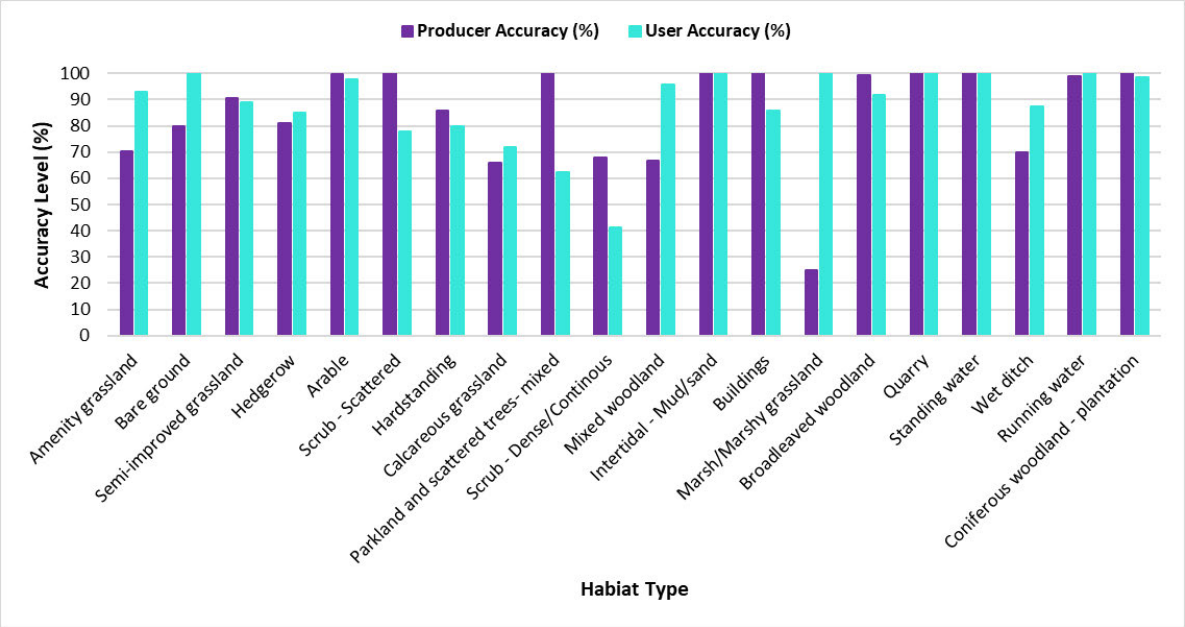
Table F2.3 Area of each habitat class obtained from the produced map for Rampion 2

Class	Area (ha)
Amenity grassland	134.62
Bare ground	24.45
Improved and semi-improved grassland	2,412.00
Hedgerow	222.98
Arable	1,338.87
Scrub – scattered	167.06

Class	Area (ha)
Hardstanding	96.01
Calcareous grassland	345.53
Parkland and scattered trees – mixed	36.16
Scrub – dense/continuous	102.00
Mixed woodland	119.91
Intertidal – mud/sand	18.39
Buildings	179.33
Marsh/marshy grassland	6.59
Broadleaved woodland	621.10
Quarry	11.41
Standing water	23.45
Wet ditch	15.54
Running water	58.85
Coniferous woodland - plantation	46.29

2.4.2 The accuracy of the produced habitat map was also statistically assessed using the confusion matrix. The overall classification accuracy was 91%, indicating the high potential of the developed RS method for habitat classification. This level of overall classification accuracy simply means that if 100 points were randomly select (each having a size of 0.5*0.5 m) considering all the habitat classes, 90 of them are correctly identified within this map. The producer and user accuracies for each class are also illustrated in **Figure F2.4**. As clear, the individual accuracies are also high for most of the habitat classes. For instance, both producer or user accuracies for the arable, intertidal-mud/sand, quarry, standing water, running water, and coniferous woodland – plantation classes were approximately 100%, indicating that nearly all the polygons for these habitat types were correctly classified in the final map according to the test data. The higher classification accuracies for these classes were because these classes have distinguishable spectral response in satellite imagery. The accuracies for the bare ground, buildings, and broadleaved woodland were also high. However, the accuracy levels for some of the classes were relatively low. For example, the producer accuracy for the Marsh/Marshy grassland class is low (25%). This was because most of the marsh lands were wrongly classified as semi-improved grassland. Similarly, but not to the same extent, since hedgerows can be open, scrubby, or treed, there is confusion between this class with scrub and woodlands in some cases.

Figure F2.4 The level of accuracy (i.e., producer and user accuracies) for each habitat class



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