DOGGER BANK D WIND FARM

Preliminary Environmental Information Report

Volume 2
Appendix 31.3 Climate Vulnerability Assessment

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Glossary

Term	Definition
Climate	The general weather conditions prevailing over a long period of time at a location.
Climate Change Impact	The resulting impact from a climate hazard which affects the ability of the receptor to achieve or maintain its functions or purpose.
Climate Change	A long-term change in global or regional climate patterns, such as seasonal averages and extremes.
Climate Hazard	A weather or climate-related event or trend in climate conditions, which has potential to do harm to receptors.
Climate Variable	A measurable, monitorable aspect of the weather or climate conditions.
Commitment	Refers to any embedded mitigation and additional mitigation, enhancement or monitoring measures identified through the EIA process and those identified outside the EIA process such as through stakeholder engagement and design evolution. All commitments adopted by the Project are provided in the Commitments Register.
Array Area	The area within which the wind turbines, inter-array cables and offshore platform(s) will be located.
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Embedded Mitigation	Embedded mitigation includes: • Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); and • Measures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). All embedded mitigation measures adopted by the Project are provided in the Commitments Register.

Term	Definition
Energy Storage and Balancing Infrastructure (ESBI)	A range of technologies such as battery banks to be co-located with the Onshore Converter Station, which provide valuable services to the electrical grid such as storing energy to meet periods of peak demand and improving overall reliability.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Inter-Array Cables	Cables which link the wind turbines to the offshore platform(s).
Jointing Bays	Underground structures constructed at regular intervals along the onshore export cable corridor to facilitate the joining of discrete lengths of the installation of cables.
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.
Link Boxes	Structures housing electrical equipment located alongside the jointing bays in the onshore export cable corridor and the transition joint bay at the landfall, which could be located above or below ground.
Mitigation	Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development. All mitigation measures adopted by the Project are provided in the Commitments Register.
Monitoring	Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur. All monitoring measures adopted by the Project are provided in the Commitments Register.
Offshore Development Area	The area in which all offshore infrastructure associated with the Project will be located, including any temporary works area during construction, which extends seaward of Mean High Water Springs. There is an overlap with the Onshore Development Area in the intertidal zone.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cables will be located, extending from the DBD Array Area to Mean High Water Springs at the landfall.

Term	Definition
Offshore Export Cables	Cables which bring electricity from the offshore platform(s) to the transition joint bay at landfall.
Offshore Platform(s)	Fixed structures located within the DBD Array Area that contain electrical equipment to aggregate and, where required, convert the power from the wind turbines, into a more suitable voltage for transmission through the export cables to the Onshore Converter Station. Such structures could include (but are not limited to): Offshore Converter Station(s) and an Offshore Switching Station.
Onshore Converter Station (OCS) Zone	The area within which the Onshore Converter Station and Energy Storage and Balancing Infrastructure will be located in vicinity of Birkhill Wood Substation.
Onshore Converter Station (OCS)	A compound containing electrical equipment required to stabilise and convert electricity generated by the wind turbines and transmitted by the export cables into a more suitable voltage for grid connection into Birkhill Wood Substation.
Onshore Development Area	The area in which all onshore infrastructure associated with the Project will be located, including any temporary works area required during construction and permanent land required for mitigation and enhancement areas, which extends landward of Mean Low Water Springs. There is an overlap with the Offshore Development Area in the intertidal zone.
Onshore Export Cable Corridor (ECC)	The area within which the onshore export cables will be located, extending from the landfall to the Onshore Converter Station zone and onwards to Birkhill Wood Substation.
Onshore Export Cables	Cables which bring electricity from the transition joint bay at landfall to the Onshore Converter Station zone (HVDC cables) and from the Onshore Converter Station zone onwards to Birkhill Wood Substation (HVAC cables).
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Representative Concentration Pathway (RCP)	Different possible trajectories of atmospheric concentrations based on socio-economic and policy assumptions used in climate change projection modelling.
Scour Protection	Protective materials used to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow.
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.

Term	Definition
Temporary Construction Compounds	Areas set aside to facilitate the construction works for the onshore infrastructure, which include the landfall construction compound, main and intermediate construction compounds for onshore export cable works and OCS and ESBI construction compounds.
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore Wind Farm Project 4 Projco Limited'.
The Project	Dogger Bank D (DBD) Offshore Wind Farm Project, also referred to as DBD in this PEIR.
Transition Joint Bay (TJB)	An underground structure at the landfall that houses the joints between the offshore and onshore export cables.
Weather	Meteorological conditions prevailing at a specific time and location such as temperature and precipitation.
Wind Turbines	Power generating devices located within the DBD Array Area that convert kinetic energy from wind into electricity.

31.3 Climate Vulnerability Assessment

1. This appendix to the Dogger Bank D Offshore Wind Farm (hereafter "the Project" or "DBD") Preliminary Environmental Information Report (PEIR) supports **Volume 1 Chapter 31 Climate Change**.

2. The purpose of this technical appendix is to present the climate vulnerability assessment, which forms Step 2 of the three-step Climate Change Resilience (CCR) assessment. The climate vulnerability assessment is used to determine the potential for climate change impacts (defined as 'the resulting impact from a climate hazard which affects the ability of the receptor to achieve or maintain its functions or purpose') to the Project's receptors (identified in Step 1 of the CCR assessment), and ensure that only impacts with a potential for likely significant effects are taken forward to the detailed climate risk assessment (Step 3).

3. The climate vulnerability assessment is presented for each phase of the Project, including:

    - Construction phase (**Table 31.3-1**);
    - Operation and maintenance (O&M) phase (**Table 31.3-2**); and
    - Decommissioning phase (**Table 31.3-3**).

4. A total of 59 potential climate change impacts have been identified and assessed in the climate vulnerability assessment.

5. In summary, 51 climate change impacts were determined to have a low vulnerability rating based on the implementation of embedded mitigation measures, which are listed in **Section 31.3.2.3** of **Volume 1, Chapter 31 Climate Change**, and therefore they were screened out from further assessment. A non-significant effect in EIA terms has been concluded for these impacts.

6. There are eight climate change impacts which were determined to have a moderate vulnerability rating and therefore were taken forward to a detailed climate risk assessment, as presented in **Section 31.3.5.3** of **Volume 1, Chapter 31 Climate Change**.

7. A breakdown of the potential climate change impacts is provided below:

    - 16 climate change impacts identified during the construction phase (12 onshore and four offshore impacts) – two impacts were taken forward for further assessment;
    - 26 climate change impacts identified during the O&M phase (18 onshore and eight offshore impacts) – one impact was taken forward for further assessment; and

- 17 climate change impacts identified during the decommissioning phase (13 onshore and four offshore impacts) – five impacts were taken forward for further assessment.

Table 31.3-1 Climate Change Vulnerability Assessment – Construction Phase

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
Climate Change Impacts from Marine Climate Hazards during Construction (CCR-C-04)							
• Increased frequency and severity of heatwaves • Increase in average temperatures	Offshore construction personnel	Heatwaves and increased average temperatures can lead to increased risk of heat stroke and exhaustion among the workforce.	CO7, CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Emergency Response and Cooperation Plan (ERoCP) and Outline Project Environmental Management (PEMP) will safeguard the occupational health and safety of personnel. Extreme high temperatures can be managed by altering shift patterns to cooler times during the day and providing additional rest breaks.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Increase in extreme wave height • Change in storm patterns, e.g. wind direction	Marine vessels and offshore plant and equipment	High winds and waves during extreme storm events can result in physical damage to marine vessels and plant and equipment.	CO7, CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the ERoCP and Outline PEMP will safeguard the occupational health and safety of personnel and prevent damage to vessels and plant and equipment. Extreme storm events can be managed by designating safe shelter on board vessels for personnel, securing loose equipment and stored materials during periods of high winds and waves and determining safe limits for working conditions above which vessel activities and crane and rig operations would be halted.	**Low**	**High**	**Low**	**Further assessment not required.** **(Not Significant)**
	Offshore construction personnel	Extreme storminess can lead to unsafe working conditions.		**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**
• Increased frequency and / or severity of all types of extreme weather event, including heatwaves, storms and wave heights	Offshore construction personnel, marine vessels and plant and equipment	Increased risk of disruption to offshore construction activities during extreme weather events can lead to programme delays and associated cost implications. Prolonged or successive disruptions can result in impacts on the Project's overall construction programme.	CO7, CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the ERoCP and Outline PEMP will ensure that construction activities are scheduled considering weather conditions and safe working limits. The ERoCP and Outline PEMP will enable construction activities to adapt to deal with extreme weather events and will require suitable contingencies are built into the programme to allow for unforeseen disruptions. Specific mitigation measures to manage direct impacts due to each type of extreme weather event on personnel, vessel, plant and equipment are discussed elsewhere in this table in relation to the relevant climate change impacts.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			Regular inspections should be undertaken to ensure that any damage due to extreme weather is identified and addressed as soon as possible. Real-time monitoring of weather conditions will enable activities to be adjusted as needed.				
Climate Change Impacts from Land-Based Climate Hazards during Construction (CCR-C-05)							
	Onshore construction personnel	Heatwaves and increased average temperatures can lead to increased risk of heat stroke and exhaustion among the workforce.	CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Outline Code of Construction Practice (CoCP) will safeguard the occupational health and safety of personnel. Extreme high temperatures can be managed by altering shift patterns to cooler times during the day and providing additional rest breaks.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and severity of heatwaves • Increase in average temperatures	Condition and performance of onshore permanent infrastructure during construction	High temperatures may reduce the strength and durability of poured concrete and asphalt may lose its profile during compaction.	CO96: Onshore infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Using concrete mixes with additives such as fly ash or slag to improve thermal stability and reduce cracking; • Using polymer-modified asphalt to maintain its profile and compaction properties at higher temperatures; • Designing structures to accommodate thermal expansion and contraction, including expansion joints in concrete; and • Applying heat-reflective coatings to surfaces exposed to direct sunlight to reduce heat absorption and minimise thermal stress.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures can increase dust creation risks	Onshore construction personnel	High temperatures and dry conditions can increase dust creation from construction activities and affect the health of the workforce.	CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Outline CoCP will safeguard the occupational health and safety of personnel and prevent damage to plant and equipment. In addition, the Outline CoCP will include dust management	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
	Onshore plant and equipment	Increased dust creation from construction activities can lead to physical damage to plant and equipment.	measures such as: • Using dust suppression equipment such as misting systems or dust collectors on plant and equipment to capture dust at the source; • Ensuring regular maintenance of plant and equipment to prevent dust-related failures; • Implementing real-time monitoring of dust levels to adjust control measures as needed; and • Regularly sprinkling water on the construction site to keep the ground moist and reduce dust generation.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in extreme river flows and levels (fluvial flooding) • Increase in extreme surface water flows and levels (pluvial flooding) • Increase in frequency and intensity of extreme precipitation events	Onshore construction personnel	Wet weather can increase the risk of slips, trips and falls incidents among the workforce. Flooding could also cause safety risks for construction personnel.	CO43: Implementation of the Construction Surface Water Drainage Plan will minimise entrapment of water within the construction site and mitigate the risk of overwhelming land drainage capacity during extreme precipitation events. CO45, CO93, CO94 and CO108: Implementation of standard climate change resilience measures and emergency response protocols in the Outline CoCP will safeguard the health and safety of personnel and protect plant and equipment, compounds and material storage areas from physical damage due to flooding. Flooding risks and extreme precipitation can be managed by: • Monitoring of short to medium-term flood warning services; • Implementation of a flood evacuation protocol; • Siting compounds and material storage areas outside of floodplains where possible; and • Protecting plant and equipment ahead of periods of heavy rainfall. Further details on mitigation measures against flooding are provided in **Appendix 21.3 Flood Risk Assessment**.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore plant and equipment and temporary construction facilities	Flooding of the construction site and access roads may prevent site access.		**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**
		Water ingress due to extreme precipitation events and flooding can lead to physical damage to plant and equipment and to temporary construction facilities such as compounds and material storage areas.		**Low**	**Moderate**	**Moderate**	**Further assessment not required.** **(Not Significant)**
	Onshore temporary construction facilities	Overwhelming of the construction drainage system from extreme precipitation events can lead to flooding of the construction site.		**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Change in storm patterns, e.g. wind direction	Onshore plant and equipment and temporary construction facilities	High winds during extreme storm events can result in physical damage to plant and equipment and to temporary construction facilities such as compounds and material storage areas.	CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Outline CoCP will safeguard the health and safety of personnel and protect plant and equipment, compounds and material storage areas from physical damage due to high winds. Extreme storminess can be managed by: • Scheduling construction activities involving cranes and other tall structures during periods of forecasted low wind speeds to minimise disruption and ensure safety; • Securing all loose equipment and stored materials to prevent movement or damage during unexpected wind gusts; and • Regularly inspecting all plant and equipment to identify and address wind-related damage early.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore construction personnel	Extreme storminess can lead to unsafe working conditions, e.g. working at height, risks from windblown debris.		**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and severity of drought conditions	Onshore temporary construction facilities	Drought conditions can limit water supply availability for use during construction such as for dust suppression.	CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Outline CoCP will ensure construction activities can adapt to drought conditions. It is not anticipated that there will be significant water demand for onshore construction activities. However, drought conditions can be managed by: • Storing backup water in on-site tanks; • Regularly monitoring water availability during periods of drought; and • Implementing water efficiency and recycling measures such as mud-recycling units for trenchless crossing techniques.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increased frequency and / or severity of all types of extreme weather event, including flooding, heatwaves and storms	Onshore construction personnel, plant and equipment and temporary construction facilities	Increased risk of disruption to onshore construction activities during extreme weather events can lead to delays and associated cost implications. Prolonged or successive disruptions can result in impacts on the Project's overall construction programme.	CO93 and CO94: Implementation of standard climate change resilience measures and emergency response protocols in the Outline CoCP will ensure that construction activities are scheduled considering weather conditions and safe working limits. The Outline CoCP will enable construction activities to adapt to deal with extreme weather events and will require suitable contingencies are built into the programme to allow for unforeseen disruptions. Specific mitigation measures to manage direct impacts due to each type of extreme weather event on personnel, plant and equipment and other temporary construction facilities are discussed elsewhere in this table in relation to the relevant climate change impacts. Regular inspections should be undertaken to ensure that any damage due to extreme weather is identified and addressed as soon as possible. Real-time monitoring of weather conditions and flood warnings will enable construction activities to be adjusted as needed.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**

Table 31.3-2 Climate Change Vulnerability Assessment – Operation and Maintenance Phase

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
Climate Change Impacts from Marine Climate Hazards during Operation (CCR-O-04)							
• Change in various environmental conditions, e.g. increase in average sea surface temperatures, salinity, strong waves and sea level rise can increase water damage and corrosion risks	Condition and performance of offshore foundations, inter-array and offshore export cables, scour and cable protection	Exposure to strong waves, increasing sea salinity and surface temperatures, compounded by sea level rise, storm surges and tidal changes, can increase the risk of water damage and saltwater corrosion to submerged structures. This may result in physical damage and deterioration and decline in operational performance.	CO96: Offshore infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Attaching sacrificial anodes to submerged structures to extend their lifespan; • Using impressed current cathodic protection systems to prevent corrosion; • Specifying materials such as stainless or galvanised steel that resist corrosion in marine environments; • Applying durable epoxy, polyurethane or other anti-corrosion coatings to metal surfaces to prevent saltwater corrosion; • Ensuring all joints, seams, and penetrations are properly sealed and waterproofed to prevent water ingress; • Employing concrete mixes with additives to enhance durability and resistance to chloride penetration; and • Incorporating climate change allowances into the design of offshore infrastructure such as accounting for rising sea level and increased storm intensity in the elevation of above-sea structures. CO97: O&M activities to ensure continued resilience of submerged structures may include: • Regularly cleaning submerged structures to remove marine growth and debris that can accelerate corrosion; • Scheduling regular inspections to reapply protective coatings and address any signs of corrosive damage; and	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			• Conducting underwater inspections and monitoring of installed scour and cable protection to detect and remediate physical damage and deterioration.				
• Increased frequency and severity of heatwaves • Increase in average temperatures	Condition and performance of offshore platform(s)	Overheating of electrical equipment in offshore platform(s) such as switchgears and transformers can result in physical damage and deterioration and decline in operational performance due to shutdowns.	CO96: Offshore platform(s) will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Implementing active cooling systems such as air conditioning or liquid cooling to maintain optimal operating temperatures for electrical equipment; • Ensuring proper ventilation in offshore electrical equipment to facilitate heat dissipation and prevent heat buildup; and • Designing systems with redundancy to allow uninterrupted operations in the event of failure of a component within the system. CO97: O&M activities to ensure continued resilience of offshore platform(s) may include: • Ensuring that cooling systems such as fans and air conditioning units are regularly maintained and functioning efficiently; • Distributing electrical loads evenly across equipment to prevent overloading and excessive heat generation and shifting peak loads to off-peak times to reduce strain during high-demand periods; and • Implementing a preventive maintenance schedule to ensure all components are functioning correctly, including cleaning, lubricating and replacing parts as needed to prevent overheating.	**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Change in frequency of ice conditions	Condition and performance of wind turbines	Cold weather can lead to ice accretion on wind turbines and therefore decreasing their operational performance.	CO97: O&M activities to ensure continued resilience of wind turbines may include: • Applying hydrophobic blade coatings ahead of the winter to prevent ice accumulation;	**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			• Implementing protocols for shutting down wind turbines when ice accumulation is detected to prevent damage; • Conducting regular visual inspections of wind turbines, especially after severe weather events to identify and address ice-related issues; • Continuously monitoring wind turbine performance to detect any efficiency losses due to ice accretion; and • Restricting access to areas around wind turbines during icy conditions to protect O&M personnel from falling ice.				
• Increase in frequency and intensity of extreme precipitation events	Condition and performance of wind turbines	Increased in precipitation and moisture can result in physical damage and deterioration of wind turbines due to blade edge erosion and decline in operational performance.	CO97: O&M activities to ensure continued resilience of wind turbines may include: • Scheduling regular inspections to reapply protective coatings to turbine blades and address any signs of blade edge erosion; and • Continuously monitoring of wind turbine performance to detect any efficiency losses due to blade edge erosion.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Change in storm patterns, e.g. wind direction	Condition and performance of wind turbines	Extreme storm events can result in physical damage and deterioration of wind turbines and decline in operational performance due to shutdowns.	CO96: Wind turbines will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as using aerodynamic design, reinforced structures and durable materials to withstand increased loading and ensure the structural integrity of wind turbines. CO97: O&M activities to ensure continued resilience of wind turbines may include: • Monitoring the operational health of wind turbines and adapting their operations to wind conditions; and • Adjusting wind turbine operations to minimise exposure to harsh weather, such as altering blade angles and, at wind speeds above the design load limit, temporarily shutting down wind turbines in an idle configuration to prevent structural damage during gusts or sustained high winds.	**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increase in storm intensity (wind speed) • Increase in extreme wave height • Increase in frequency of storm conditions • Change in storm patterns, e.g. wind direction	Offshore O&M personnel	Extreme storm events can lead to unsafe working conditions and disrupt O&M activities.	CO7 and CO95: Implementation of standard climate change resilience measures and emergency response protocols in O&M management plans will safeguard the occupational health and safety of personnel and ensure O&M activities can adapt to extreme storm events.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased tidal range • Increase in extreme wave height	Condition and performance of offshore foundations, inter-array and offshore export cables, scour and cable protection	Increased wave and tidal activities can increase loading and sediment transport across the seabed, resulting in physical damage and deterioration of submerged structures and decline in operational performance due to scour and erosion.	CO96: Offshore infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Installing scour protection around wind turbine and offshore platform foundations; • Installing cable protection around unburied cables, cable crossings and transition points where the inter-array and offshore export cables exit the seabed trench and connect into wind turbines and offshore platform(s); and • Accounting for resilience against scour and sediment transport in the design of offshore foundations and cables. CO97: O&M activities to ensure continued resilience of submerged structures may include: • Managing sediment transport through sediment traps or dredging to maintain seabed integrity; and • Conducting underwater inspections and monitoring of installed scour and cable protection to detect and remediate physical damage and deterioration.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increased frequency and / or severity of all types of extreme weather event or climate hazard, including heatwaves, storms, wave height, precipitation, lightning, tidal range, coastal erosion and changes in marine environmental conditions	Condition and performance of offshore platform(s), offshore foundations, wind turbines, inter-array and offshore export cables and scour and cable protection	Major damage and / or increased rate of deterioration in condition due to extreme weather events could require more frequent repairs and replacements, raising O&M costs and disrupting activities.	CO97: Regular and periodic inspections and maintenance will be undertaken over the O&M phase to identify and remediate any damage and deterioration and ensure good conditions and performance. Monitoring of exposure to climate hazards and performance during extreme weather events will inform the planning of maintenance and major repair and replacement requirements. Specific mitigation measures to manage the direct impacts of climate change on offshore infrastructure assets during the O&M phase are discussed elsewhere in this table in relation to the relevant climate change impacts.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
Climate Change Impacts from Land-Based Climate Hazards during Operation (CCR-O-05)							
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures increasing subsidence risks	Condition and performance of TJB, jointing bays, underground and above-ground link boxes, onshore export cables, OCS and ESBI	High temperatures and dry conditions can increase subsidence risks, which can lead to physical damage and deterioration of onshore infrastructure located in ground susceptible to volume change.	CO96: The structural design of onshore infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Adhering to design standards to minimise structural or geotechnical instability risks; • Accounting for ground conditions, potential ground movement and climate change allowances in the design of foundations, onshore export cables and other buried structures; • Using geosynthetics such as geotextiles and geomembranes to stabilise conditions and prevent erosion; and • Implementing ground stabilisation methods such as grouting or soil nailing to prevent or reduce subsidence. CO97: O&M activities to ensure continued resilience of onshore infrastructure may include conducting regular inspections of infrastructure and surrounding ground conditions to detect early signs of subsidence using visual inspections, ground surveys, and monitoring equipment such as inclinometers and settlement plates.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increased frequency and severity of heatwaves • Increase in average temperatures	Condition and performance of OCS and ESBI	Overheating of electrical equipment in OCS and ESBI such as switchgears and transformers can result in physical damage and deterioration and decline in operational performance due to shutdowns.	CO79 and CO96: Onshore electrical infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Implementing active cooling systems such as air conditioning or liquid cooling to maintain optimal operating temperatures for electrical equipment; • Ensuring proper ventilation in onshore electrical equipment to facilitate heat dissipation and prevent heat buildup; and • Designing systems with redundancy to allow uninterrupted operations in the event of failure of a component within the system. CO79 and CO97: O&M activities to ensure continued resilience of onshore electrical equipment may include: • Implementing a preventive maintenance schedule to ensure all components are functioning correctly, including cleaning, lubricating and replacing parts as needed to prevent overheating; and • Ensuring that cooling systems such as fans and air conditioning units are regularly maintained and functioning efficiently.	**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore O&M personnel	Heatwaves and increased average temperatures can lead to increased risk of heat stroke and exhaustion among the workforce.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in O&M management plans will safeguard the occupational health and safety of personnel and ensure O&M activities can adapt to heatwaves. Extreme high temperatures can be managed by altering shift patterns to cooler times during the day and providing additional rest breaks.	**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in average temperatures	Condition and performance of above-ground link boxes, OCS and ESBI	Increasing average temperatures can lead to extended growing seasons and encroachment of vegetation on above-ground infrastructure.	CO97: Regular and periodic inspections of above-ground onshore infrastructure undertaken over the O&M phase will include management of overgrown vegetation such as trimming and mowing to prevent the risk of damage.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures can increase wildfire risks	Condition and performance of above-ground link boxes, OCS and ESBI	High temperatures and dry conditions can increase the risk of wildfires, which can result in physical damage and deterioration of above-ground infrastructure and decline in operational performance due to shutdowns.	CO97: O&M activities to ensure continued resilience of onshore infrastructure may include: • Implementing a routine vegetation management programme, including trimming, mowing, and removing vegetation around electrical infrastructure to reduce fire fuel; • Conducting frequent inspections of electrical infrastructure to identify and address potential fire hazards, such as damaged equipment or vegetation encroachment; and • Monitoring wildfire alert services and developing an emergency response plan for wildfire incidents.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and severity of heatwaves • Increase in average temperatures	Condition and performance of ESBI	High temperatures can lead to thermal runaway or other fire incidents related to the battery units whereby the batteries overheat and can potentially combust or explode, which result in physical damage and deterioration and decline in operational performance due to shutdowns.	CO79 and CO96: ESBI infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Implementing active cooling systems such as air conditioning or liquid cooling to maintain optimal operating temperatures for battery units; • Ensuring proper ventilation in battery units to facilitate heat dissipation and prevent heat buildup; • Implementing a battery management system to manage battery temperature, prevent overheating and automatically isolate components that are determined to be above normal operating temperatures; • Using materials and designs that enhance thermal stability and reduce the risk of thermal runaway such as heat-resistant battery storage containers and incorporating sufficient separation distances between battery units in the facility layout; • Installing automatic fire and gas detection and fire suppression systems in battery units to quickly identify and respond to fire incidents;	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and severity of heatwaves • Increase in average temperatures	Condition and performance of ESBI	High temperatures can lower the efficiency of battery units and increase deterioration rates, which will require more frequent repair and replacement events and therefore increasing O&M costs.		**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			• Installing venting and exhaust systems in battery units to mitigate the risk of explosion and deflagration; • Ensuring, where appropriate, external fire suppression equipment are in place for firefighting operations such as firewater tanks; and • Ensuring safe and unobstructed access for fire rescue services in the layout design. CO79 and CO97: O&M activities to ensure continued resilience of ESBI may include: • Developing an emergency response plan for battery fire incidents; • Continuous monitoring of battery performance, especially during and following extreme high temperature events, to detect and address fire risks and battery deterioration early; • Implementing a preventive maintenance schedule to ensure all components are functioning correctly, including cleaning, lubricating and replacing parts as needed to prevent overheating; and • Ensuring that cooling systems such as fans and air conditioning units are regularly maintained and functioning efficiently.				
• Increase in extreme river flows and levels (fluvial flooding) • Increase in extreme surface water flows and levels (pluvial flooding) • Increase in frequency and intensity of extreme precipitation events	Condition and performance of above-ground link boxes, OCS and ESBI	Water ingress due to extreme precipitation events and flooding can lead to physical damage and deterioration of above-ground electrical infrastructure and decline in operational performance due to shutdowns.	CO44, CO79 and CO96: Implementation of the Operational Drainage Strategy will minimise entrapment of water within areas of permanent infrastructure and mitigate the risk of overwhelming land drainage capacity during extreme precipitation events. Critical electrical infrastructure will be raised above the predicted flood level as required to ensure protection from water ingress. Further details on mitigation measures against flooding are provided in **Appendix 21.3 Flood Risk Assessment**. CO97: O&M activities to ensure continued resilience of above-ground onshore infrastructure may include conducting regular inspections and maintenance of drainage systems to prevent water accumulation.	**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**
		Flooding of the areas of permanent infrastructure and access roads may prevent site access.		**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
	Condition and performance of ESBI	Increased in precipitation and moisture can lead to water damage and corrosion of battery units and short circuits, resulting in physical damage and deterioration and decline in operational performance due to shutdowns.	CO44, CO79 and CO96: Implementation of the Operational Drainage Strategy will minimise entrapment of water within areas of permanent infrastructure and mitigate the risk of overwhelming land drainage capacity during extreme precipitation events. Further details on mitigation measures against flooding are provided in **Appendix 21.3 Flood Risk Assessment**. In addition, corrosion-resistant materials and anti-corrosion coatings will be used in battery units. Battery storage containers will also be designed to be waterproofed. CO79 and CO97: O&M activities to ensure continued resilience of ESBI may include: • Conducting regular inspections and maintenance of drainage systems to prevent water accumulation; • Regularly monitoring and maintaining battery charge levels to prevent overarching or undercharging, which can contribute to corrosion risks; and • Continuous monitoring of battery performance, especially during and following extreme precipitation events, to detect and address corrosion risks and battery deterioration early.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Change in storm patterns, e.g. wind direction	Condition and performance of OCS and ESBI	Increased wind loading on OCS and ESBI buildings and outdoor equipment can result in physical damage and deterioration and decline in operational performance due to shutdowns.	CO79 and CO96: OCS and ESBI infrastructure will be designed and constructed in accordance with the Applicant's technical requirements and material specifications and based on industry best practice and engineering standards. These may include practices such as: • Installing protective barriers or windbreaks to reduce wind speed and pressure on critical structures and equipment; • Ensuring foundations are designed and constructed to provide adequate support against wind-induced forces; and • Ensuring buildings, battery storage container, fencing and other above-ground structures are designed to withstand high wind loads.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
	Condition and performance of ESBI	Extreme storm events can lead to power outages, which might disrupt the charging and discharging cycles of the battery units, affecting their operational performance.		**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			CO79 and CO97: O&M activities to ensure continued resilience of infrastructure may include continuous monitoring of electrical equipment and battery performance, especially during and following extreme storm events, to detect and address damage from wind loading and deterioration early.				
	Onshore O&M personnel	Extreme storm events can result in unsafe working conditions for operations and maintenance activities, e.g. working at height, or due to wind-blown debris.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in O&M management plans will safeguard the occupational health and safety of personnel and ensure O&M activities can adapt to extreme storm events. Extreme storminess can be managed by: • Scheduling O&M activities involving cranes and other tall structures during periods of forecasted safe wind speeds to minimise disruption and ensure safety; • Securing all loose equipment and stored materials to prevent movement or damage during unexpected wind gusts; and • Regularly inspecting all plant and equipment to identify and address wind-related damage early.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Change in the frequency of lightning events	Condition and performance of OCS and ESBI	Lightning strikes can result in physical damage to electrical equipment in the OCS and ESBI, increased fire risk and decline in operational performance due to power surges and shock waves.	CO79 and CO95: The OCS and ESBI will be designed in accordance with the Applicant's technical requirements and material specifications, which will be based on industry best practice and engineering standards. These may include practices such as installing lightning protection towers to safely dissipate lightning energy to the ground, and surge protection devices at critical points to protect electrical equipment from power surges. CO79 and CO97: O&M activities to ensure continued resilience of infrastructure may include continuous monitoring of electrical equipment and battery performance, especially during and following extreme storm events, to detect and address damage from lightning strikes and deterioration early.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Increased frequency and severity of drought conditions	Condition and performance of onshore export cables, OCS and ESBI	Changes in water content of soil can lead to reductions in cable ratings and effectiveness of electrical earthing systems and therefore decline in operational performance.	CO79 and CO95: Onshore export cables, OCS and ESBI will be designed in accordance with the Applicant's technical requirements and material specifications, which will be based on industry best practice and engineering standards. These may include practices such as: • Specifying corrosion-resistant materials for earthing systems such as galvanized steel or copper-clad steel to ensure long-term reliability; and • Accounting for soil resistivity and climate change allowances in the design of onshore export cables and earthing systems to ensure earthing effectiveness. CO79 and CO97: O&M activities to ensure continued resilience of infrastructure may include monitoring soil resistivity during regular inspections and regularly inspecting and maintaining earthing systems.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Tidal flooding • Increased tidal range • Increased coastal erosion	Condition and performance of TJB and underground link box, offshore and onshore export cables	Coastal erosion, compounded by increased tidal flooding, storm surges and tidal range, at the landfall can result in physical damage and deterioration of coastal infrastructure and decline in operational performance due to shutdowns.	CO95: Coastal infrastructure will be designed in accordance with the Applicant's technical requirements and material specifications, which will be based on industry best practice and engineering standards. These may include practices such as using trenchless installation techniques at the landfall and accounting for coastal erosion and climate change allowances in the siting of the TJB and underground link box to allow sufficient setback distance from the coast and prevent exposure of buried landfall infrastructure due to coastal erosion over the O&M phase. Further details on future baseline conditions with respect to coastal erosion at the landfall is provided in **Volume 1, Chapter 8 Marine Physical Processes** and **Appendix 31.4 Coastal Erosion Report**. CO97: O&M activities to ensure continued resilience of infrastructure may include monitoring coastal retreat and taking remedial actions once risk of damage to the installed TJB and underground link box or exposure of buried cables is identified.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures can affect vegetation health	Mitigation and enhancement planting associated with the Project	Long-term changes to climate conditions such as increasing average temperatures and dry spells can affect the establishment of mitigation and enhancement planting introduced by the Project.	CO59: The selection of planting material for habitat replacement and creation will account for local species characteristics and climate change resilience such as specifying drought-tolerant species.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and / or severity of all types of extreme weather event or climate hazard, including flooding, heatwaves, drought, storms, precipitation, lightning and coastal erosion	Condition and performance of TJB, underground and above-ground link boxes, OCS, ESBI and onshore export cables	Major damage and / or increased rate of deterioration in condition due to extreme weather events could require more frequent repairs and replacements, raising O&M costs and disrupting activities.	CO97: Regular and periodic inspections and maintenance will be undertaken over the O&M phase to identify and remediate any damage and deterioration and ensure good conditions and performance. Monitoring of exposure to climate hazards and performance during extreme weather events will inform the planning of maintenance and major repair and replacement requirements. Specific mitigation measures to manage the direct impacts of climate change on onshore infrastructure assets during the O&M phase are discussed elsewhere in this table in relation to the relevant climate change impacts.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**

Table 31.3-3 Climate Change Vulnerability Assessment – Decommissioning Phase

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
Climate Change Impacts from Marine Climate Hazards during Decommissioning (CCR-D-04)							
• Increased frequency and severity of heatwaves • Increase in average temperatures	Offshore decommissioning personnel	Heatwaves and increased average temperatures can lead to increased risk of heat stroke and exhaustion among the workforce.	CO7 and CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel. Extreme high temperatures can be managed by altering shift patterns to cooler times during the day and providing additional rest breaks.	**Low**	**High**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Increase in extreme wave height • Change in storm patterns, e.g. wind direction	Marine vessels and offshore plant and equipment	High winds and waves during extreme storm events can result in physical damage to marine vessels and plant and equipment.	CO7 and CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel and prevent damage to vessels and plant and equipment. Extreme storm events can be managed by designating safe shelter on board vessels for personnel, securing loose equipment and stored materials during periods of high winds and waves and determining safe limits for working conditions above which vessel activities and crane and rig operations would be halted.	**Moderate**	**High**	**Moderate**	**Further assessment required.**
	Offshore decommissioning personnel	Extreme storminess can lead to unsafe working conditions.		**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**
• Increased frequency and / or severity of all types of extreme weather event, including heatwaves, storms and wave heights	Offshore decommissioning personnel, marine vessels and plant and equipment	Increased risk of disruption to offshore decommissioning activities during extreme weather events can lead to programme delays and associated cost implications. Prolonged or successive disruptions can result in impacts on the Project's overall decommissioning programme.	CO7 and CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will ensure that decommissioning activities are scheduled considering weather conditions and safe working limits. The management plans will enable decommissioning activities to adapt to deal with extreme weather events and will require suitable contingencies are built into the programme to allow for unforeseen disruptions. Specific mitigation measures to manage direct impacts due to each type of extreme weather event on personnel, vessels, plant and equipment are discussed elsewhere in this table in relation to the relevant climate change impacts.	**Moderate**	**High**	**Moderate**	**Further assessment required.**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			Regular inspections should be undertaken to ensure that any damage due to extreme weather is identified and addressed as soon as possible. Real-time monitoring of weather conditions will enable activities to be adjusted as needed.				
Climate Change Impacts from Land-Based Climate Hazards during Decommissioning (CCR-D-05)							
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures can increase dust creation risks	Onshore decommissioning personnel	High temperatures and dry conditions can increase dust creation from decommissioning activities and affect the health of the workforce.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel and prevent damage to plant and equipment. In addition, decommissioning management plans will include dust management measures such as: • Using dust suppression equipment such as misting systems or dust collectors on plant and equipment to capture dust at the source; • Ensuring regular maintenance of plant and equipment to prevent dust-related failures; • Implementing real-time monitoring of dust levels to adjust control measures as needed; and • Regularly sprinkling water on the decommissioning site to keep the ground moist and reduce dust generation.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore plant and equipment	Increased dust creation from decommissioning activities can lead to physical damage to plant and equipment.		**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Combined change in environmental conditions, e.g. dry spells and increase in temperatures can increase wildfire risks	Onshore decommissioning personnel	High temperatures and dry conditions can increase the risk of wildfires, which harm the workforce.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel and prevent damage to plant and equipment. This will include monitoring wildfire alert services and developing an emergency response plan for wildfire incidents.	**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore plant and equipment	High temperatures and dry conditions can increase the risk of wildfires, which can lead to physical damage to plant and equipment.		**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and severity of heatwaves • Increase in average temperatures	Onshore decommissioning personnel	Heatwaves and increased average temperatures can lead to increased risk of heat stroke and exhaustion among the workforce.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel.	**Low**	**High**	**Moderate**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			Extreme high temperatures can be managed by altering shift patterns to cooler times during the day and providing additional rest breaks.				
• Increase in extreme river flows and levels (fluvial flooding) • Increase in extreme surface water flows and levels (pluvial flooding) • Increase in frequency and intensity of extreme precipitation events	Onshore decommissioning personnel	Wet weather can increase the risk of slips, trips and falls incidents among the workforce. Flooding could also cause safety risks for decommissioning personnel.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the occupational health and safety of personnel and protect plant and equipment, compounds and material storage areas from physical damage due to flooding. Flooding risks and extreme precipitation can be managed by: • Monitoring of short to medium-term flood warning services; • Implementation of a flood evacuation protocol; • Siting compounds and material storage areas outside of floodplains where possible; and • Waterproofing plant and equipment ahead of periods of heavy rainfall. Further details on mitigation measures against flooding are provided in **Appendix 21.3 Flood Risk Assessment**.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore plant and equipment and temporary decommissioning facilities	Flooding of the decommissioning site and access roads may prevent site access.		**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**
		Water ingress due to extreme precipitation events and flooding can lead to physical damage to plant and equipment and to temporary decommissioning facilities such as compounds and material storage areas.		**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore temporary decommissioning facilities	Overwhelming of the decommissioning drainage system from extreme precipitation events can lead to flooding of the decommissioning site.		**Moderate**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increase in storm intensity (wind speed) • Increase in frequency of storm conditions • Change in storm patterns, e.g. wind direction	Onshore plant and equipment and temporary decommissioning facilities	High winds during extreme storm events can result in physical damage to plant and equipment and to temporary decommissioning facilities such as compounds and material storage areas.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will safeguard the health and safety of personnel and protect plant and equipment, compounds and material storage areas from physical damage due to high winds. Extreme storminess can be managed by: • Scheduling decommissioning activities involving cranes and other tall structures during periods of forecasted low wind speeds to minimise disruption and ensure safety;	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
	Onshore decommissioning personnel	Extreme storminess can lead to unsafe working conditions.		**Low**	**Low**	**Low**	**Further assessment not required.** **(Not Significant)**

Climate Hazard	Receptor	Potential Climate Change Impact	Proposed Embedded Mitigation Measure	Exposure	Sensitivity	Vulnerability	Proposed Approach
			• Securing all loose equipment and stored materials to prevent movement or damage during unexpected wind gusts; and • Regularly inspecting all plant and equipment to identify and address wind-related damage early.				
• Increased frequency and severity of drought conditions	Onshore temporary decommissioning facilities	Drought conditions can limit water supply availability for use during decommissioning such as for dust suppression.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will ensure decommissioning activities can adapt to drought conditions. It is not anticipated that there will be significant water demand for onshore decommissioning activities. However, drought conditions can be managed by: • Storing backup water in on-site tanks; • Regularly monitoring water availability during periods of drought; and • Implementing water efficiency and recycling measures.	**Low**	**Moderate**	**Low**	**Further assessment not required.** **(Not Significant)**
• Increased frequency and / or severity of all types of extreme weather event, including flooding, heatwaves and storms	Onshore decommissioning personnel, plant and equipment and temporary decommissioning facilities	Increased risk of disruption to onshore decommissioning activities during extreme weather events can lead to delays and associated cost implications. Prolonged or successive disruptions can result in impacts on the Project's overall decommissioning programme.	CO95: Implementation of standard climate change resilience measures and emergency response protocols in decommissioning management plans will ensure that decommissioning activities are scheduled considering weather conditions and safe working limits. The management plans will enable decommissioning activities to adapt to deal with extreme weather events and will require suitable contingencies are built into the programme to allow for unforeseen disruptions. Specific mitigation measures to manage direct impacts due to each type of extreme weather event on personnel, plant and equipment and other temporary decommissioning facilities are discussed elsewhere in this table in relation to the relevant climate change impacts. Regular inspections should be undertaken to ensure that any damage due to extreme weather is identified and addressed as soon as possible. Real-time monitoring of weather conditions and flood warnings will enable construction activities to be adjusted as needed.	**Moderate**	**Moderate**	**Moderate**	**Further assessment required.**

List of Tables

List of Acronyms

Acronym	Definition
CCR	Climate Change Resilience
CoCP	Code of Construction Practice
DBD	Dogger Bank D
ERoCP	Emergency Response and Cooperation Plan
ESBI	Energy Storage and Balancing Infrastructure
O&M	Operation and Maintenance
OCS	Onshore Converter Station
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan