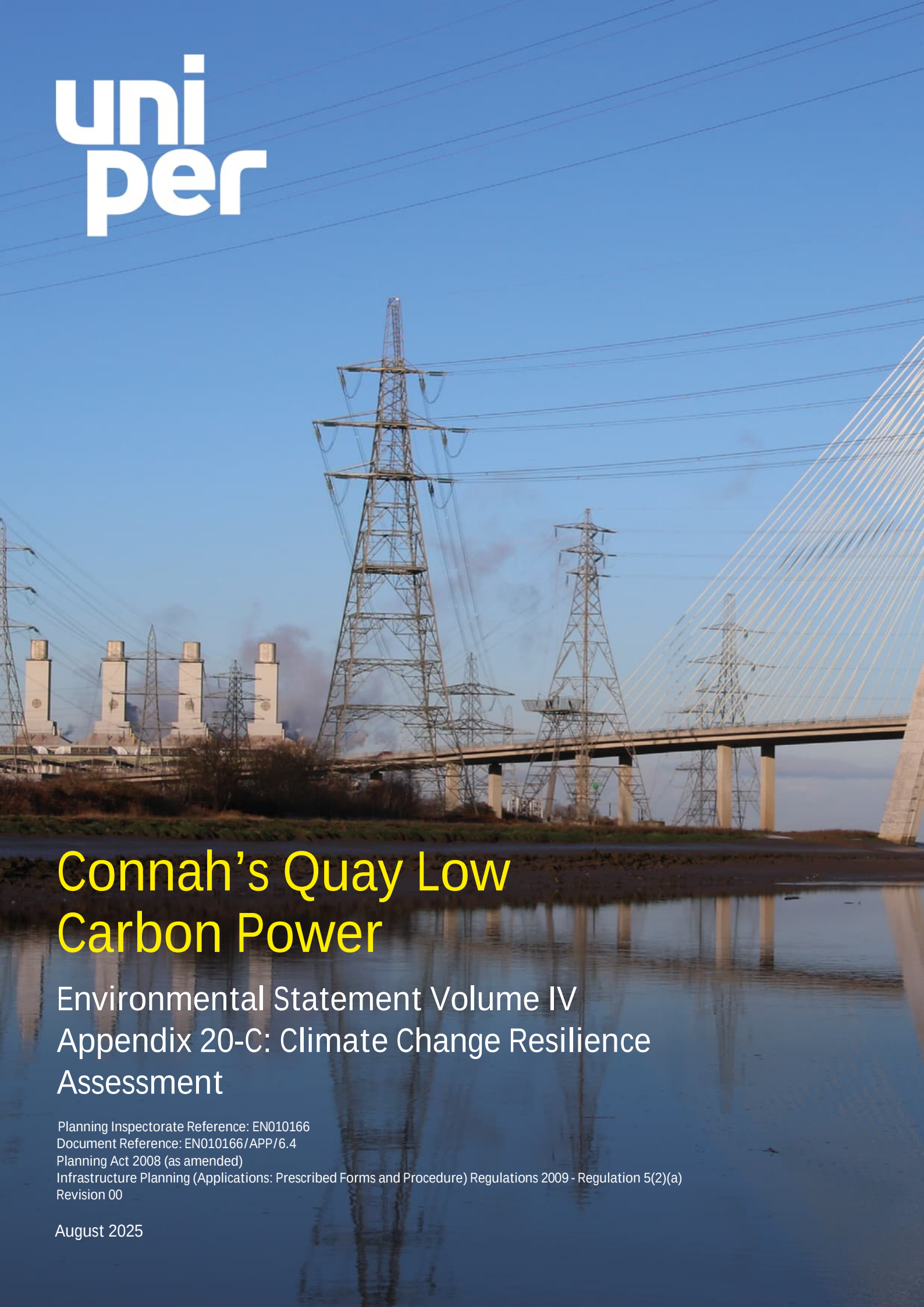

Connah's Quay Low Carbon Power

Environmental Statement Volume IV Appendix 20-C: Climate Change Resilience Assessment

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Planning Act 2008 (as amended)
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
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RISK IDENTIFICATION																	RISK ASSESSMENT							ADAPTATION MEASURES					
Risk ID	Climate variable	Risk statement															Planned Controls	Initial risk rating RCP4.5 (2020 - 2049)			Initial risk rating RCP8.5 (2040-2069)			Adaptation Measures	Residual risk rating RCP4.5 (2020 - 2049)			Residual risk rating RCP8.5 (2040 - 2069)		
		Description of impacts	Exhaust gas cooling and conditioning	CO_2 Cooling and compression plant	Cooling Towers	Effluent treatment plant	Chemical and waste storage tanks	Absorber tower(s) and associated	Ducting and pipework	Pylons	Construction Equipment	Internal access roads.	Parking areas (including electric)	Electrical control room, administration	Workforce		e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
CONSTRUCTION																														
1	Extreme temperatures (heat)	Extreme heat event causes overheating of construction assets for example electrical and other equipment and material storage, batch concrete facilities.									●						•Construction equipment used will be designed to operate in the temperatures expected in North Wales. •The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Insignificant	Low	*N/A*			•Construction materials and equipment with superior properties that offer increased tolerance to fluctuating temperatures will be used, where required. •Develop register of vulnerable construction assets and inspect after a hot day.	Rare	Insignificant	Low	*N/A*		
2	Extreme temperature (heat)	Health and safety risks to the construction workforce during severe weather events including sunstroke and dehydration.														●	•The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Minor	Low	*N/A*			•Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. •Cease outdoor and no essential work if working conditions are too dangerous, and could result in injury to workers.	Unlikely	Minor	Low	*N/A*		
3	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to the construction site. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	●														•The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Rare	Major	High	*N/A*			• Develop a fire management plan, and an early warning and detection system	Rare	Moderate	Medium	*N/A*		
4	Extreme temperatures (cold)	Prolonged periods of extreme cold can cause construction delays, as concrete may take longer to set, which can slow down foundation laying, brickwork, and slabs. Machines may be prone to malfunction in colder temperatures, and road accidents (and other health-related risks such as pneumonia) may occur, which can affect the health and safety of construction workers.									●	●	●			●	•Construction equipment used will be designed to operate in the temperatures expected in North Wales. The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Minor	Low	*N/A*			• As part of a wider Winter Service Plan a section will be prepared on freeze prevention for pipes, and snow and de-icing procedures for roads. Doing so will help prevent disruption and avoid possible health and safety incidences.	Rare	Minor	Low	*N/A*		
5	Extreme rainfall/ Fluvial Flooding	Extreme rainfall events over an extended period can cause surface water flooding of the construction site and local roads. This affects viability of and access to the site, causing potential delays to construction work and damage to equipment, as well as a hazard to driving.									●	●					•Risks have been considered within the **Appendix 13-C: Flood Consequence Assessment** (**EN010166/APP/6.4**)and summarised within **Chapter 13: Water, Environment and Flood Risk** (**EN010166/APP/6.2.13**). The **Framework Construction Environmental Management Plan** (**CEMP**) (**EN010166/APP/6.5**) requries the final CEMP(s) to include a Construction Drainage Management Strategy to demonstrate management of surface water run-off from the Proposed Development during construction.	Unlikely	Minor	Low	*N/A*			•Install a water pump for the areas with critical infrastructure and a key part of construction operations. This will help increase the Main Development Area's surface drainage capacity. •Raise critical infrastructure to be above PMF (Probable maximum flood). •Construction materials with superior properties that offer increased tolerance to heavy precipitation and other extreme weather events such as storms, will be used, where feasible. •Install additional attenuation features at key locations or identified flood risk areas, to increase the Proposed Development's drainage capacity	Unlikely	Minor	Low	*N/A*		
6	Tidal/coastal flooding	Sea level rise and storm surges may result in coastal flooding from the Dee Estuary to occur proximal to the plant. This may cause asset damage during construction, and limit access to the site.	●	●	●	●	●	●	●	●	●	●	●	●	●		•Construction phase impacts will likely be mitigated through the implementation of standard construction techniques and mitigation measures, as are described in a wide range of good practice publications which will be listed in the ES (e.g. C811 Environmental Good Practice on site (fifth edition)). This involves flood consultations with local flood authorities, in particular in the approach to existing defences.	Moderate	Moderate	High	*N/A*				Unlikely	Moderate	Medium	*N/A*		
7	Storm events (wind)	Storm events (including high winds) make work environments and the use of construction equipment and machinery unsafe resulting in damage to construction equipment and/ or temporary building facilities causing delays or safety risks.	●								●			●	●		•The Contractor will monitor weather forecasts and receive Cyfoeth Naturiol Cymru (Natural Re-sources Wales) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms and flooding.	Unlikely	Moderate	Medium	*N/A*			•If applicable undertake regular monitoring of trees and vegetation in the area, pruning as necessary to avoid damage to the construction site or blocking access roads, in the event of a storm with high wind speed.	Unlikely	Moderate	Medium	*N/A*		

8	Storm events (wind)	Inaccessible construction site(s) due to severe weather events associated with storms restricting working hours, delaying delivery of construction materials and equipment, preventing access of construction operatives onto site and delaying operations.	●									●			●	•The Contractor will monitor weather forecasts and receive Cyfoeth Naturiol Cymru (Natural Resources Wales) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms and flooding. •Wind patterns will be monitored and an early warning system will be in place to allow contingency plans to be in place in advance of predicted windy conditions. Doing so will help minimise disruption to and damage. •A wind monitoring plan which establishes procedures and measures that will be instated during period of strong winds.	Unlikely	Minor	Low	*N/A*			Unlikely	Minor	Low	*N/A*		
OPERATION																												
9	Extreme temperatures (heat)	Heatwaves result in heat stress for plant workers, causing health and safety incidents													●	•Uniper has been certified under ISO 45001 for occupational health and safety since 2021, applying best practice for health and safety management. Cooling provisions for both the plant and the gas turbine will comprise either an air- cooled condenser array or a hybrid cooling system, in addition to a CO_2 cooling and compression plant, and an exhaust gas cooling and conditioning plant.	Moderate	Minor	Medium	Unlikely	Minor	Low	•Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. •Cease outdoor and no essential work if working conditions are too dangerous, and could result in injury to workers and damage to equipment.	Unlikely	Minor	Low	Unlikely	Minor	Low
10	Extreme temperature (heat)	Heatwaves cause the ambient temperature to rise above optimal design temperature of the plant, reducing production efficiency.	●		●		●		●							•Due to extreme heat events, controls will be incorporated within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be interrupted. Controls include cooling provisions for both the plant and the gas turbine will comprise either an air-cooled condenser array or a hybrid cooling system, in addition to a CO_2 cooling and compression plant, and an exhaust gas cooling and conditioning plant.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	•Monitor frequency and magnitude of impact over time and if required incorporate further cooling mechanisms into plant upgrades.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium
11	Extreme temperature (heat)	Damage to infrastructure by prolonged high temperatures (heat damage, deformation, cracking and thermal expansion) causing reduced localised useability of sections of the plant and increased maintenance.	●	●		●		●		●		●		●			Unlikely	Minor	Low	Unlikely	Minor	Low	•Monitor frequency and magnitude of impact over time and if required increase maintenance requirements. •Consider selection of more durable, heat-resistant materials in upgrades. time and if required increase maintenance requirements. •Consider selection of more durable, heat-resistant materials in upgrades.	Unlikely	Minor	Low	Unlikely	Minor	Low
12	Extreme temperature (cold)	Prolonged periods of extreme cold can result in snow and frost conditions. These cold conditions can affect the exterior of the plant, resulting in reduced durability and/or design life, and may affect the efficiency of the plant operations. Black ice on access points increase health and safety risk.					●	●				●			●	•Due to extreme cold temperatures, snow loading and freezing liquids will be accounted within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be interrupted. The heat output of the plant is over 300 MW, requiring a heat recovery boiler to handle excess heat, so extremely low temperatures are unlikely to impact	Unlikely	Minor	Low	Moderate	Minor	Medium	•As part of a wider Winter Service Plan a section will be prepared on Snow and de-icing procedures for when cold temperatures occur and the roads become covered in snow/ice. Doing so will help prevent disruption and avoid possible fatalities.	Rare	Minor	Low	Rare	Minor	Low
13	Extreme rainfall	Extreme rainfall events can cause surface water and or flash flooding to occur proximal to the plant. This may cause malfunctioning of operations and limited access, which carries a health and safety risk.				●						●			●	• The risks have be considered within **Appendix 13-C: Flood Consequence Assessment** (**EN010166/APP/6.4**) and summarised within **Chapter 13: Water, Environment and Flood Risk** (**EN010166/APP/6.2.13**), with an **Outline Surface Water Drainage Strategy Report in Appendix 13-D** (**EN010166/APP/6.4**) to demonstrate management of surface water run-off from the Proposed Development. • The SuDS Manual Simple Index Approach (CIRIA C753) will be used to inform the design of the surface water drainage system so that it provides adequate treatment of run-off. • Consider introducing a drainage maintenance/operation plan so that the drainage system is monitored and kept blockage free. • The DMRB guidance will inform the importance, magnitude and significance of effects to identify the potential impacts of construction and operation on the surface water environment.	Unlikely	Minor	Low	Moderate	Minor	Medium	•Consideration will be given to installing a water pump for the areas with critical infrastructure. This will help increase surface drainage capacity. For operational mitigation, **Appendix 13-C: Flood Consequence Assessment** (**EN010166/APP/6.4**) includes results from hydraulic modelling, providing further details on fluvial flood risk to inform mitigation measures. This includes the proposal to raise critical infrastructure within the MDA buildings to 7.7m AOD which is 600 mm above the 1 in	Unlikely	Minor	Low	Moderate	Minor	Medium
14	Fluvial flooding	Extreme rainfall over an extended period can lead to nearby rivers exceeding their natural capacity causing surface water and or flash flooding to occur to or around the plant, limiting access and causing damage to ground level infrastructure, power supplies and other assets.	●				●		●	●		●			●		Unlikely	Minor	Low	Moderate	Minor	Medium		Unlikely	Minor	Low	Moderate	Minor	Medium
15	Tidal/coastal flooding	Sea level rise and storm surges can results in coastal flooding to occur to or proximal to the plant, potentially damaging assets and limiting access, both of use pose health and safety risks.	●	●	●	●	●	●	●	●	●	●	●	●	●		Moderate	Moderate	High	Moderate	Moderate	High		Moderate	Moderate	Medium	Moderate	Moderate	Medium
16	Water scarcity (Drought)	Drought disrupts water supply, causing process stoppages and therefore disruptions to plant operations	●	●	●											•Weather forecasts will be monitored so any expected drought conditions are prepared for in advance and contingency measures can be in place to minimise disruption.	Rare	Moderate	Medium	Rare	Moderate	Medium		Rare	Minor	Low	Rare	Minor	Low

17	Storm events (Wind)	Severe wind event has higher wind loading than designed, causing stress to infrastructure, resulting in damage or reduced design life and potential safety hazard. This can result in damage to infrastructure resulting in financial loss and the need for upgrades.						●	●	●						• Current wind loadings are incorporated within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be interrupted. •Wind patterns will be monitored and an early warning system will be in place to allow contingency plans to be in place in advance of predicted windy conditions. Doing so will help minimise disruption to and damage. •A wind monitoring plan which establishes procedures and measures that will be instated during period of strong winds.	Unlikely	Minor	Low	Unlikely	Minor	Low		Unlikely	Minor	Low	Unlikely	Minor	Low
18	Storm events (Lightning)	Increased lightning events can cause damage to infrastructure and structures, and may result in power outages, affecting overall operations.	●	●									●			• Design engineering standards to be incorporated for the provision of lighting protection systems on buildings and structures, such as lightning protections (rods) built into structures, which are also earthed. • Weather forecasts will be monitored to assess any potential lightning storms	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	• Workers will avoid any hazards that may increase the risk of being struck by lightning, including open spaces, tall objects, water, open wiring, metal fencing, and other metal objects	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium
19	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to plant and facilities, especially to flammable materials stored on site.	●	●							●					• Location of Proposed Development i.e. Industrial area limits risk of wildfire. All employees of Uniper receive specialist fire prevention training.	Rare	Moderate	Medium	Rare	Moderate	Medium	• Develop and maintain a Fire Management Plan and an early warning detection system.	Rare	Moderate	Medium	Rare	Moderate	Medium
20	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, which could result in injury or fatality to workers.													●		Rare	Major	High	Rare	Major	High		Rare	Moderate	Medium	Rare	Moderate	Medium