

## Appendix 9B

### Climate Change Resilience Assessment

Prepared for: Kronospan

December 2025

DNS5-4-038

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#### 1.0 INTRODUCTION

1.1.1 This appendix has been written in support of Chapter 9.0 of the Environmental Statement (ES) to the planning application for the Proposed Development. This appendix details the extent the Proposed Development is vulnerable to, and how it will be resilient to, the effects of climate change.

1.1.2 The resilience to climate change has been assessed for the following vulnerable receptors:

- i) Plant buildings and operation.
- ii) Vehicular access to site (for workers and waste).
- iii) Grid connection and local users.
- iv) On-site workers.

1.1.3 This has considered the following projected changes to climate as identified in **Appendix 9A (Climate Baseline)**:

- i) Increased Winter precipitation, which could lead to fluvial or pluvial flooding of the Site and access.
- ii) Increased frequency and magnitude of wind and storms which would have the potential to damage the Proposed Development and lead to obstruction of access routes.
- iii) Decreased Summer precipitation, leading to the possibility of reduced water supply and drought.
- iv) Increased Summer temperatures - increases in temperatures could affect electrical infrastructure and conditions within working areas.

1.1.4 The methodology is set out in **ES Chapter 9.0 (Climate Change)**.



## 2.0 INCREASED WINTER PRECIPITATION

2.1.1 As set out in **ES Appendix 9A (Climate Baseline)**, the UKCP18 predictions are there will be a move to wetter winters. As a central estimate it is predicted that the mean precipitation will steadily increase by 5% by 2010-2029; 6% by 2030-2049; and 12% by 2060-2079 from the 1981–2000 time horizon, this trend is also predicted as the high estimate. This predicted increase in precipitation will increase the potential for flooding.

2.1.2 The Site Condition Report<sup>1</sup> for the existing Kronospan Facility provides full details of the flood risk and includes consideration of the potential for flooding from fluvial, tidal, surface water, sewer, groundwater and artificial sources. This also includes consideration of the effects of climate change. In summary this shows that:

- i) The majority of the existing Kronospan Facility is not at risk of river flooding. However, very small areas along the existing Kronospan Facility adjacent to the Afon Bradley have been identified as having a high risk of flooding and area identified as being within a flood zone 3.
- ii) There have been no identified historical flood events and the existing Kronospan Facility does not benefit from flood defences.
- iii) The existing Kronospan Facility is also not allocated as a flood storage area.
- iv) The majority of the existing Kronospan Facility is identified as being either of low or moderate risk of ground water flooding.
- v) Areas within the existing Kronospan Facility were identified as being at risk of surface water flooding. However, lagoons have been implemented as part of the surface water drainage scheme:
  - a) two lagoons on the northern boundary of the Kronospan Facility; and
  - b) A third lagoon takes surface water from the log yard.
- vi) No reports of flooding on the existing Kronospan Facility since the surface water drainage scheme has been implemented

2.1.3 The Proposed CHP Facility is located within the existing buildings on site. No additional areas of hard standing are proposed and the existing drainage system on site will be sufficient to allow for the Proposed Development

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<sup>1</sup> Fichtner Consulting Engineers (Dec 2023). Site Condition Report. [Last Accessed: 19 November 2024].

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## 2.2 Plant buildings and operation

2.2.1 Flooding within the Site has the potential to result in the damage to the plant buildings and operational equipment resulting in the temporary shut down of the proposed CHP Facility. The extent of flooding will determine the level of damage which could be caused.

### *Sensitivity*

2.2.2 The sensitivity of the plant buildings and operation to flooding is deemed to be low for the following reasons:

- i) The value of the receptor is high as the plant buildings and operational equipment have a high monetary value and the operation of the proposed CHP Facility is required to reduce the carbon intensity the board production process at the Kronospan Facility.
- ii) The vulnerability is considered to be low as the Site is not vulnerable to fluvial, tidal or groundwater flooding and the existing Kronospan Facility has an effective surface water drainage system.
- iii) The susceptibility is deemed to be low as the proposed CHP Facility has the ability to withstand the projected changes in rainfall given the surface water drainage system.

### *Magnitude*

2.2.3 The overall magnitude of impact is small for the following reasons:

- i) The probability of increased rainfall is high as a result of climate change (and this is projected to occur in all three future scenarios for both the central and high estimates), but the probability of increased rainfall causing flooding at the Site is low because the Site is located within Flood Zone 1 and the Proposed Development would not result in an increase in impermeable areas.
- ii) The consequence of serious flooding damaging the plant buildings and would be the temporary shutdown of the proposed CHP Facility, but this would also affect the wider Kronospan Facility and as such production would also be affected.



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### ***Significance***

- 2.2.4 As a result, it is considered that the predicted increased Winter precipitation leading to the increased potential for flooding would be of negligible significance to the plant buildings and operation.

### **2.3 Vehicular access to Site**

- 2.3.1 The North Access Road would be used as the main access road to the existing Kronospan Facility. The surface water drainage system at the existing Kronospan Facility has been discussed in paragraph 2.2.2. However, flooding within the wider area has the potential to result in the disruption of access to the existing Kronospan Facility and in turn the Site. If there is no vehicular access to the existing Kronospan Facility, the proposed CHP Facility would not be able to operate. The extent of flooding will determine the level of disruption caused.

### ***Sensitivity***

- 2.3.2 The sensitivity of the vehicular access to the existing Kronospan Facility to increased precipitation is deemed to be medium for the following reasons:
- i) The value of the receptor is high as vehicular access to the existing Kronospan Facility is required for operation of the Proposed Development. Vehicular access is required for full-time workers, maintenance workers, and the transportation of biomass, consumables and residues.
  - ii) The vulnerability is considered to be moderate because the local routes for full-time workers, maintenance workers, and the transportation of wood, consumables and residues may be at risk of flooding.
  - iii) The susceptibility is deemed to be low as the North Access Road into the existing Kronospan Facility is designed to withstand changes in rainfall and retain much of its original function and form. Additionally, alternative local routes to the existing Kronospan Facility can be taken.

### ***Magnitude***

- 2.3.3 The overall magnitude of impact is small for the following reasons:



- i) The probability of increased rainfall is high as a result of climate change (and this is projected to occur in all three future scenarios for both the central and high estimates), but the probability of increased flooding affecting vehicular access routes is low as most roads are designed to be tolerant to flooding.
- ii) The consequence of flooding on vehicular access is the deliveries to and from site and workers' commutes will be disrupted.

### ***Significance***

- 2.3.4 As a result, it is considered that the predicted increase in Winter precipitation leading to the increased potential for flooding would be of slight significance to the vehicular access to Site.

## **2.4 Grid connection and local users**

- 2.4.1 The proposed CHP Facility would provide heat and power to the existing users on site. In the future this may be used to provide power to the national grid but currently the grid connection does not allow for this.

## **2.5 On-site workers**

- 2.5.1 Increased rainfall linked to climate change can impact on-site workers by resulting in dangerous working conditions. However, there are mitigation measures built into the design and Risk Assessment Method Statements (RAMS) currently in place on the Site which will be extended to include the proposed CHP Facility if required. Workers will be equipped with the correct PPE (that is also appropriate for the weather), trained in on-site health and safety. Workers would not be able to or be expected to work in areas that are flooded – they will work within the building and travel around the Site on hardstanding. Therefore, there are no likely significant impacts.



### 3.0 INCREASED FREQUENCY AND MAGNITUDE OF WIND AND STORMS

3.1.1 As set out in **Appendix 9A (Climate Baseline)**, there is large uncertainty in projected changes in wind and air circulation across the UK. However, projections indicate there will be an increase in frequency and magnitude of storms. The predicted increase in extreme events could increase precipitation rates and the occurrence of high wind speeds. The effects as a result of the predicted increase in precipitation has been covered in section 2.0. This section will focus on the effect of wind gusts. The UKCP18 projections predict that wind speeds will increase, but do not quantify what the increase will be.

#### 3.2 Plant buildings and operation

3.2.1 Gusts in wind could cause structural damage to the plant buildings. The projected increased frequency of these events can result in weakening and damage to the plant buildings which could in turn affect the operation of the proposed CHP Facility.

##### *Sensitivity*

3.2.2 The sensitivity of the plant buildings and operation of the proposed CHP Facility to increased frequency and magnitude of wind and storms is deemed to be low for the following reasons:

- i) The value of the receptor is high as the plant buildings and operational equipment have a high monetary value and the operation of the proposed CHP Facility is required to reduce the carbon intensity the board production process at the Kronospan Facility.
- ii) The vulnerability is low. The proposed CHP Facility is able to tolerate a range of wind loading conditions and is embedded within the existing infrastructure as such is not isolated and more vulnerable to increased wind speeds.
- iii) The susceptibility is low as the plant buildings will be able to withstand a range of wind loading conditions.

##### *Magnitude*

3.2.3 The overall magnitude of impact is small for the following reasons:



- i) The probability of increased frequency and magnitude of wind and storms is high. However, the probability of the plant buildings and operational equipment being damaged is low as the plant buildings will be designed to withstand strong winds and they are sheltered from the wind as the proposed CHP Facility is located within the existing infrastructure.
- ii) The consequence of the plant buildings undergoing damage would be temporary shutdown and repair costs for the Operator.

### ***Significance***

- 3.2.4 As a result, it is considered that the predicted increased frequency and magnitude of storms leading to increased wind gusts would be of negligible significance to the plant buildings and operation.

## **3.3 Vehicular access to Site**

- 3.3.1 The predicted increase in rain caused by storms and extreme events is covered in section 2.0. Surges in wind could have an impact on the vehicular access to the Site where they cause branches to be blown off or trees to be blown over, resulting in a road blockage.

### ***Sensitivity***

- 3.3.2 The sensitivity of the vehicular access to the Site to road blockages caused by fallen trees is assessed to be medium for the following reasons:
- i) The value of the receptor is high as vehicular access to the existing Kronospan Facility is required for operation of the proposed CHP Facility. Vehicular access is required for full-time workers, maintenance workers, and the transportation of wood, consumables and residues.
  - ii) The vulnerability is moderate, as it is possible that part of the vehicular access routes could be blocked by trees and branches that have fallen as a result of higher wind speeds.
  - iii) The susceptibility is deemed to be low as there will be effective mitigation measures in place to clear the North Access Road and alternative local routes could be taken.

### ***Magnitude***



3.3.3 The overall magnitude of impact is small for the following reasons:

- i) The probability of increased frequency and magnitude of wind and storms is high, but the probability of this impacting the vehicular access routes is low, as the Local Highways Authority/National Highways are responsible for clearing blockages on strategic roads quickly and any on-site roads can be cleared when conditions are suitable. Any blockages of roads on-site, including the North Access Road, would be cleared by the Operator.
- ii) The consequence of road blockages to vehicular access is the deliveries to and from site and workers' commutes will be disrupted.

### ***Significance***

3.3.4 As a result, it is considered that the predicted increased frequency and magnitude of storms leading to increased wind gusts would be of slight significance to the vehicular access to the Site.

## **3.4 Grid connection and local users**

3.4.1 As detailed previously, the proposed CHP Facility would provide heat and power to the existing users on site. In the future this may be used to provide power to the national grid but currently the grid connection does not allow for this.

## **3.5 On-site workers**

3.5.1 Increased frequency and magnitude of wind and storms can increase the risk to hazards such as parts of the plant buildings, and debris being shifted by wind gusts, coming loose and falling on workers. Regular inspections and preventative maintenance will reduce the risk to on-site workers. The projected increased frequency of these events can result a greater potential for damage to occur.

### ***Sensitivity***

3.5.2 The sensitivity of the on-site workers to increased safety risks from wind gusts is deemed to be medium for the following reasons:

- i) The value of human life is high.





- ii) The vulnerability is considered to be moderate although the proposed CHP Facility is sheltered by the existing Kronospan Facility Infrastructure, the existing Kronospan infrastructure is not as sheltered and may come loose and fall on workers.
- iii) The susceptibility is deemed to be low, as the on-site workers will have access to appropriate PPE and education. Preventative maintenance and regular inspections (of both the proposed CHP Facility and the existing Kronospan Facility) and RAMS will be in place to ensure on-site worker safety. Additionally, the proposed CHP Facility is sheltered by the existing Kronospan Facility Infrastructure.

### ***Magnitude***

3.5.3 The overall magnitude of impact is small for the following reasons:

- i) The probability of increased extreme events is high, however the probability of this impacting on-site workers is low as regular inspections would take place (of both the proposed CHP Facility and the existing Kronospan Facility) and RAMS will be in place to ensure on-site worker safety.
- ii) The consequence of increased gusts is injury to or death of workers.

### ***Significance***

3.5.4 As a result, it is considered that the predicted increased frequency and magnitude of storms leading to increased wind gusts would be of slight significance to on-site workers.



### 3.6 Decreased Summer precipitation

3.6.1 As set out in **Appendix 9A (Climate Baseline)**, the UKCP18 predictions are that there will generally be a move to drier summers. As a central estimate it is predicted that mean precipitation during summer will steadily decrease by 5% by 2010-2029; 9% by 2030-2049; and 21% by 2060-2079 from the 1981–2000 time horizon. This predicted decrease in precipitation could increase the risk of drought and lead to water shortages.

3.6.2 There are several water sources for the existing Kronospan Facility. These include:

- i) Up to 1,600 m<sup>3</sup> of water can be abstracted from the Shropshire Union Canal;
- ii) Up to 600 m<sup>3</sup> of water can be abstracted from Borehole 1, which is located within the Formalin Plant.
- iii) Up to 648 m<sup>3</sup> of water can be abstracted from Borehole 2, which is located within the Lorry Park.
- iv) Up to 2,022 m<sup>3</sup> of surface water run-off from the Log Yard can be retained within Lagoon 3.

3.6.3 These sources are supplemented with mains fed water if there is not enough water available. The mains water supplier to the existing Kronospan Facility by Welsh Water (or Dwy'r Cymru). Welsh Water's Drought Plan<sup>2</sup> outlines the following measures to mitigate the impacts of drought:

- i) Implementing temporary use bans;
- ii) Enhancing efforts to detect and repair leaks across the water network;
- iii) Raising awareness and encouraging water conservation among customers through targeted campaigns;
- iv) Optimising the use of available water sources, including reservoirs, groundwater, and river abstractions; and
- v) Assessing the effectiveness of implemented actions and learning lessons for future drought management.

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<sup>2</sup> Welsh Water (2020). Final Drought Plan 2020. Available at: <https://www.dwrcymru.com/en/our-services/water/water-resources/final-drought-plan-2020> [Last accessed: 18 November 2024].



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### 3.7 Plant buildings and operation

- 3.7.1 The proposed CHP Facility is designed to minimise water use. Water is required for the proposed CHP Facility to produce steam, to quench the bottom ash, and for make up of flue gas treatment (FGT) chemicals.

#### *Sensitivity*

- 3.7.2 The sensitivity of the plant buildings and operational equipment to a water shortage as a result of decreased summer precipitation is deemed to be low for the following reasons:

- i) The value of the receptor is high as the plant buildings have a high monetary value and the operation of the proposed CHP Facility is required to produce MDF and chip board products at the existing Kronospan Facility which generate a profit.
- ii) The vulnerability is low as the proposed CHP Facility is designed to minimise water use. Additionally, the condensate from the FGT would be recirculated and reused in the boiler and any water not vapourised in the quenching process would be collected and recycled for continued use in the quenching process.
- iii) The susceptibility would be low as the main water supplier, Welsh Water, has a Drought Plan and the existing Kronospan Facility currently has an abstraction three abstraction licenses providing security of supply.

#### *Magnitude*

- 3.7.3 The overall magnitude of impact is small for the following reasons:

- i) The probability of decreased summer precipitation is high, but due to the mitigation measures committed to by Welsh Water; the availability of water from the abstraction licenses; and the recovery of water during operation of the proposed CHP Facility, the probability of reduced water supply is low.
- ii) The consequence would be that the operation of the proposed CHP Facility would be temporarily halted and power would need to be provided from elsewhere for the manufacturing process.

#### *Significance*



3.7.4 As a result, it is considered that the predicted decreased summer precipitation leading drought and water shortages would be of negligible significance to the plant buildings and operation.

### **3.8 Vehicular access to Site**

3.8.1 The projected decrease in precipitation and increased risk of water shortages is not expected to affect vehicular access to the Site.

### **3.9 Grid connection and local users**

3.9.1 The projected decrease in precipitation and increased risk of water shortages is not expected to affect grid connection and local users.

### **3.10 On-site workers**

3.10.1 The projected decrease in precipitation and increased risk of water shortages is not expected to affect on-site workers. The measures set out by the Welsh Water would ensure that a supply for welfare facilities at the existing Kronospan Facility is secured.



## 4.0 INCREASED SUMMER TEMPERATURES

4.1.1 As set out in **Appendix 9A (Climate Baseline)**, the UKCP18 predictions are that there will be an increase in mean temperature across the UK. Probabilistic projections show that there is likely to be more warming in Summer than Winter. As a central estimate it is predicted that mean temperature during Summer will steadily increase with summer temperatures projected to increase by 0.9°C by 2010-2029; 1.4°C by 2030-2049; and 2.6°C by 2060-2079 from the 1981-2000 time horizon.

### 4.2 Plant buildings and operation

4.2.1 The predicted increase in mean summer temperatures has the potential to cause materials to be heated up to higher temperatures than the UK has currently experienced which could cause damage to plant buildings and operational equipment and reduce the efficiency of operation.

#### *Sensitivity*

4.2.2 The sensitivity of the plant buildings and operational to increased summer temperatures is deemed to be low for the following reasons:

- i) The value of the receptor is high as the plant buildings have a high monetary value and the operation of the proposed CHP Facility is required to produce MDF and chip board products at the Kronospan Facility which generate a profit.
- ii) The vulnerability is low as although the plant buildings and operational equipment will be exposed to higher temperatures than the UK has currently experienced, these temperatures are not extreme in comparison to the temperatures elsewhere in the world where the technology is also used.
- iii) The susceptibility is low as the materials used within the plant buildings and operational equipment will be tolerant for a range of temperatures well within the project temperatures for the UK. Additionally, most of the operational equipment is shielded from the increased summer temperatures as it is located within the plant buildings which have appropriate cooling.

#### *Magnitude*

4.2.3 The overall magnitude of impact is small for the following reasons:



- i) The probability of increased temperatures is high, but the probability of temperatures high enough to damage the plant buildings and operational equipment is low.
- ii) The consequence is the plant buildings may undergo damage but only at very high temperatures (outside the likely temperatures in the UK), but this would be repairable at the operators cost and impacts would be short term.

### ***Significance***

- 4.2.4 As a result, it is considered that the predicted increase in summer temperatures would be of negligible significance to the plant buildings and operation.

### **4.3 Vehicular access to site**

- 4.3.1 The predicted increase in summer temperatures due to climate change is not expected to impact vehicular access at the Site.

### **4.4 Grid connection and local users**

- 4.4.1 The predicted increase in summer temperatures due to climate change is not expected to impact the grid connection.

### **4.5 On site workers**

- 4.5.1 Projected increases in temperatures can impact on-site workers by resulting in dangerous working conditions. However, there are mitigation measures built into the design and RAMS will be used during operation of the proposed CHP Facility. Workers will be equipped with the correct PPE (that is also appropriate for the weather), trained in on-site health and safety and informed about protecting themselves from the dehydration and the sun. In addition, suitable ventilation will be provided in the buildings.

### ***Sensitivity***

- 4.5.2 The sensitivity of the on-site workers to increased temperatures is deemed to be low for the following reasons:
- i) The value of human life is high.



- ii) The vulnerability is considered to be low as it is likely that on-site workers will be exposed to higher temperatures than the UK has currently experienced, but these temperatures are not extreme.
- iii) The susceptibility is deemed to be low, as mitigation measures would be in place such as access to appropriate PPE, education on safe working practices, and appropriate ventilation. On-site workers may still be impacted by the increase in temperatures, but they would be exposed to these in their everyday life too.

### ***Magnitude***

4.5.3 The overall magnitude of impact is small for the following reasons:

- i) The probability of increased temperatures is high. However, this will apply to the ambient air which on-site workers would be exposed to in their everyday life, and will not be specific to the Site. The probability of regular negative impact to the on-site workers from high temperatures is low.
- ii) The consequence of increased temperatures causing heat stroke would result in staff absences. However, high heat occasions would only occur in Summer and for a few days at a time and appropriate measures to mitigate the effects will be in place.

### ***Significance***

4.5.4 As a result, it is considered that that the predicted increase in Summer temperatures would be of negligible significance to the on-site workers.



