

## APPENDIX 7.1 CLIMATE CHANGE RESILIENCE ASSESSMENT

### Construction Phase

A summary of potential climate change resilience (CCR) impacts during the construction phase of the Proposed Development is provided in Table 1 below. In line with the Institute of Environmental Management and Assessment (IEMA) guidance, embedded mitigation measures (existing design measures) have been considered.

**Table 1 Construction Climate Change Resilience Impacts**

| Climate Change Trend                                                                    | Climate Change Impact on Receptor                                                                                                                                                                           | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                                                                                    | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                       | Significance and Additional Mitigation Required                                                                                                                                                                    |
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| Increased frequency and intensity of extreme weather events:<br>Intense rainfall events | <b>Receptor: Building</b><br>Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets. This could result in secondary impacts such as localised flooding. | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less longer than a day but less than a week due to flooding and silting of drainage assets.<br><b>Impact Magnitude:</b> High<br><b>Significance:</b> Significant | As specified within the Environmental Standards Statement, which supports this planning application, a Site Waste Management Plan (SWMP) would be developed prior to the commencement of construction. This would include specific measures to avoid and minimise the potential for contamination impacts.<br><br>The contractor would prepare a Traffic Management Plan as part of the Construction Phase Plan, which would consider prefabrication off-Site and 'just-in-time' deliveries. This would help minimise stockpiling on-Site and ensure the workplace does not become congested. As detailed within ES Chapter 6: Air Quality, stockpiles would be covered, seeded, or fenced. It is assumed that soil stockpiles would be revegetated as soon as practicable to stabilise surfaces and that de-watering of the Site would be undertaken by the principal contractor if required.<br><br>The Construction Management Plan (CMP) contains measures to appropriately store and regularly remove waste materials, with due regard to the potential for mobilisation into surface drainage.<br><br>Best practice measures for stockpile management would be utilised. For example, control measures | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b> Additional Mitigation not required assuming all measures described are implemented. Existing design and mitigation measures are appropriate to account for climate change/extreme weather. |

| Climate Change Trend | Climate Change Impact on Receptor                                                                                                                                                                                                     | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                   | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                  | Significance and Additional Mitigation Required                                                                                                                                                                                                                |
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|                      |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                   | <p>and dust suppression techniques, screening and covering of stockpiles, and the installation of appropriate wheel and body wash facilities.</p> <p>The CMP contains measures for the protection of construction materials that are stored on the Site to minimise damage by weather and reduce erosion. These measures would also include appropriate storage, handling and management of construction materials with due regard to the potential for mobilisation into surface drainage.</p> <p>Surface water management during construction would be considered within the CMP. It has also been assumed that Site's drainage, including surface run-off and dewatering effluents, would be discharged to sewers where reasonably practicable and relevant permissions would be obtained from the sewerage undertaker. Additionally, it has been assumed that Site's drainage would meet the requirements for effluent and flood risk standards required by the sewerage undertaker.</p> <p>It has been assumed the relevant sections of BS6031: Code of Practice for Earthworks for the general control of Site's drainage would be followed.</p> |                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                |
|                      | <p><b>Receptor: Building</b></p> <p>Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt).</p> | <p><b>Likelihood level:</b> Likely</p> <p><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less longer than a day but less than a week, causing</p> | <p>It has been assumed that works on the Site would be undertaken in accordance with the provisions of the Construction (Design and Management) (CDM) Regulations 2015.</p> <p>Furthermore, in line with best practice construction measures, more vulnerable activities such as the construction of earthworks would take place in appropriate weather conditions (taking into account construction programme timescale constraints). This reduces the likelihood of weather delays to these activities and would be implemented via the CMP.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>Likelihood level:</b> Unlikely</p> <p><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.</p> | <p><b>Not significant.</b></p> <p>Additional mitigation not required. It has been recommended that more vulnerable activities should be undertaken during appropriate weather conditions and that poor weather conditions be accounted for within the CMP.</p> |

| Climate Change Trend                                                                    | Climate Change Impact on Receptor                                                                                                                                                                                                                                                         | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                                                                                       | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                       | Significance and Additional Mitigation Required                                                                                                                        |
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|                                                                                         |                                                                                                                                                                                                                                                                                           | delays in the programme.<br><b>Impact Magnitude:</b> High<br><b>Significance:</b> Significant                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Impact Magnitude:</b> Low                                                                                                                                                                                                                                                                                      |                                                                                                                                                                        |
|                                                                                         | <b>Receptor: Environmental and human health receptors</b><br>Extreme rainfall events could spread contaminated soil during ground excavations to nearby environmental receptors, which could affect local soil and water quality. Secondary impacts could include harm to Site personnel. | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, prolonged negative local/regional reports due to spread of contaminated materials into the local environment and partial disruption across elements of the Site lasting more than a day but less than a week.<br><b>Impact Magnitude:</b> High<br><b>Significance:</b> Significant | The Ground Conditions Assessment prepared for the Proposed Development confirmed that there was a moderate risk to Site end users from soil contamination and moderate/slight risk to groundwater. There is the potential that materials within the ground may pose a risk to construction workers (direct contact/ingestion and inhalation from fugitive dust) and controlled waters over a temporary short-term basis, during the excavation and driving through made ground materials. During the development of the Site, it would be necessary to implement measures to protect construction workers from exposure to any contaminated material which is encountered as well as to protect controlled waters. Measures to prevent run-off from the Site's storage compounds, and any temporary fuel or cement storage would be within bunds to prevent leaking. Site personnel would adhere to health and safety precautions including use of personal protective equipment (PPE). Wheel and vehicle wash facilities would be in place to ensure delivery wagons leave the Site clean. These measures would be incorporated into the CMP. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |
| Increased frequency and intensity of extreme weather events:<br>Intense rainfall events | <b>Receptor: Human health receptors</b><br>Wetter winters and increased frequency of intense rainfall events could result in increased groundwater levels, creating                                                                                                                       | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, prolonged negative local/regional reports and partial disruption                                                                                                                                                                                                                 | An intrusive site investigation was completed in June 2016 and the Drainage Strategy Report (DSR) concludes that, due to the depths of the groundwater encountered by the Site investigation, it is envisaged that the Site has a negligible risk of groundwater flooding. Therefore, the Site is considered to be at low risk of flooding from groundwater.<br>Risk of groundwater flooding would be considered within a Health and Safety Plan. This should                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by impacts relating to heat stress, localised stakeholder concern                                                                                                            | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

| Climate Change Trend                                                      | Climate Change Impact on Receptor                                                                                                                                                    | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                       | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                                              | Significance and Additional Mitigation Required                                                                                                                        |
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|                                                                           | unsafe conditions for construction workers undertaking below ground excavations.                                                                                                     | across elements of the Site lasting more than a day but less than a week.<br><b>Impact Magnitude:</b> Medium<br><b>Significance:</b> Not Significant                                                                                                                                                                                                                  | include hazards, e.g., flooding to excavations, working near/ within drainage features as well as adequate and safe access to and egress from the Site both for workers and emergency services. Workers on the Site should be informed of risks and their mitigation. Groundwater levels should be continually monitored to establish the risk of inundation of excavations. Suitable measures including pumping/dewatering should be employed as necessary.                                              | over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low                                                                                                                                                                                                        |                                                                                                                                                                        |
| Increased frequency and intensity of extreme weather events:<br>Heatwaves | <b>Receptor: Human health receptors</b><br>Heatwaves and higher temperatures could impact on-site personnel welfare, for example, causing heat stress and unsafe working conditions. | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by heatstroke/heat stress, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low<br><b>Significance:</b> Not Significant | It is assumed that all works on the Site would be undertaken in accordance with the provisions of the Construction (Design and Management) (CDM) Regulations 2015.<br><br>It is assumed that the Principal Contractor would produce a Construction Phase Health and Safety Plan. The risk of heat stress to the Site personnel working outdoors should be managed through this plan, e.g., provision of necessary personal protective equipment (PPE) and toolbox talks to highlight risks of heatstroke. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by impacts relating to heat stress, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |
|                                                                           | <b>Receptor: Human health receptors</b><br>Heatwaves, higher temperatures, and drought conditions could increase dust generated during construction activities which                 | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, prolonged negative local/regional reports and partial disruption                                                                                                                                                   | As detailed within ES Chapter 6: Air Quality, the Site is of medium risk of dust, and therefore the control of dust emissions from construction relies upon good management of the Site and mitigation techniques to reduce emissions of dust and limit dispersion. Recommended dust mitigation measures for high-risk sites (provided by the Institute of Air Quality Management (IAQM) guidance) would be detailed within the Site's Dust Management Plan (DMP). This would be secured                  | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and                                                                                                                                | <b>Not Significant.</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

| Climate Change Trend | Climate Change Impact on Receptor                                                                                                                                 | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                     | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                     | Significance and Additional Mitigation Required                                                                                                                        |
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|                      | could impact Site personnel.                                                                                                                                      | across elements of the Site lasting more than a day but less than a week.<br><b>Impact Magnitude:</b> High<br><b>Significance:</b> Significant                                                                                                      | by means of an appropriately worded planning condition.<br>Other mitigation measures would potentially include: <ul style="list-style-type: none"> <li>Undertake daily inspections of the Site;</li> <li>Record and take action for all dust complaints;</li> <li>Plan the Site layout to ensure dust generating activities are far from receptors;</li> <li>Solid barriers around dusty activities;</li> <li>Appropriately store materials and ensure materials that are delivered are enclosed;</li> <li>Use of water assisted dust sweepers and inspection of haul routes;</li> <li>Remove materials, that have a potential to produce dust, from the Site as soon as possible; and</li> <li>Ensure adequate on-site water supply for effective dust suppression.</li> </ul> It is assumed that the Principal Contractor would produce a Construction Phase Health and Safety Plan. The risk of increased dust generation and its impacts on-site personnel would be addressed through these plans. | partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low                                                                                                                                         |                                                                                                                                                                        |
|                      | <b>Receptor: Building</b><br>Heatwaves and higher temperatures could affect the ability to undertake certain construction activities leading to programme delays. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the | It has been assumed that all works on-site would be undertaken in accordance with the provisions of the CDM Regulations 2015.<br>In line with best practice construction measures, more vulnerable activities such as construction of earthworks would take place in appropriate weather conditions (taking into account construction timescale constraints). This would reduce the likelihood of hot weather delays to these activities. For the purposes of this assessment, these measures would be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

| Climate Change Trend                  | Climate Change Impact on Receptor                                                  | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                           | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                       | Significance and Additional Mitigation Required                                                                                                                        |
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|                                       |                                                                                    | Site lasting less than a day.<br><b>Impact Magnitude:</b> Low<br><b>Significance:</b> Not Significant                                                                                                                                                                                                                                                     | implemented via the CMP and the Construction Phase Health and Safety Plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low                                                                                                                                                                                                                                                 |                                                                                                                                                                        |
| Extreme weather events:<br>Windstorms | <b>Receptor: Building</b><br>Winds gusts could result in the damage of stockpiles. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low<br><b>Significance:</b> Not Significant | Where stockpiles exist on-site, best practice measures for stockpile management would be utilised. In addition, the following measures would be implemented: <ul style="list-style-type: none"> <li>Prefabrication off-site would be considered, which would help to minimise stockpiling on-site;</li> <li>Covering, seeding, fencing or damping down stockpiles;</li> <li>Deliveries would generally be 'just-in-time' to avoid storing large volumes of materials. Any construction materials that are stored on-site would be protected to minimise damage by weather;</li> <li>Skips would be covered to prevent dust and debris blowing around the Site; and</li> <li>Solid screens would be placed around stockpiles.</li> </ul> <p>These measures and other best practice measures would be implemented as part of the CMP. Additionally, a DMP would be prepared for the Site, as specified in ES Chapter 6: Air Quality.</p> | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

| Climate Change Trend                                 | Climate Change Impact on Receptor                                                                                                                                                | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                    | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                                               | Significance and Additional Mitigation Required                                                                                                                        |
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| Extreme weather events:<br>Windstorms and wind gusts | <b>Receptor: Human health</b><br>Windstorms could cause wind gust conditions and create unsafe conditions for on-Site personnel and pedestrians within the vicinity of the Site. | <b>Likelihood level:</b><br>Possible<br><b>Consequence level:</b><br>Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Low<br><b>Significance:</b> Not Significant | During the construction phase, health and safety measures would be implemented to ensure that the construction workers are adequately protected from wind conditions. For example, minimising stock piling and positioning in a manner that reduces risk of dust arising through wind action.<br>A wind microclimate assessment has been undertaken in ES Chapter 13: Wind Microclimate. This assessment has concluded that wind conditions throughout the existing Site and surrounds satisfy the safety and comfort criteria for all uses. | <b>Likelihood level:</b><br>Unlikely<br><b>Consequence level:</b><br>Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Low                | <b>Not Significant.</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |
|                                                      | <b>Receptor: Building</b><br>Windstorms could cause wind gust conditions and damage or disrupt on-Site crane operations.                                                         | <b>Likelihood level:</b><br>Unlikely<br><b>Consequence level:</b><br>High as a result of damage to construction equipment, with indirect health and safety impacts, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Medium                          | The CMP includes best practice and mitigation measures for operating tall cranes during high winds and the contractor would be required to implement all relevant conditions on operating procedures, and other relevant commitments. BS 7121-1 Code of Practice for the Safe Use of Cranes would be followed at all times.                                                                                                                                                                                                                  | <b>Likelihood level:</b><br>Unlikely<br><b>Consequence level:</b><br>High as a result of damage to construction equipment, with indirect health and safety impacts, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Medium | <b>Not Significant.</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

| Climate Change Trend | Climate Change Impact on Receptor                                                                              | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                    | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Impact Magnitude (with mitigation measures)                                                                                                                                                                                                                                                                                | Significance and Additional Mitigation Required                                                                                                                        |
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|                      |                                                                                                                | <b>Significance:</b><br>Significant                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                        |
|                      | <b>Receptor: Building</b><br>Windstorms could cause the wind gust conditions and result in damage to hoarding. | <b>Likelihood level:</b><br>Possible<br><b>Consequence level:</b><br>Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Low<br><b>Significance:</b> Not Significant | As committed to in the CMP, the existing 2.4m hoarding would be maintained during the construction works and if necessary, lengths of the existing hoarding would be replaced, repaired or adapted to maintain the Site boundary and provide secure access to the Site. The CMP would include best practice measures to ensure that hoardings would be erected and removed securely. It is assumed that the Principal Contractor would produce a Construction Phase Health and Safety Plan to ensure safety of Site personnel. | <b>Likelihood level:</b><br>Unlikely<br><b>Consequence level:</b><br>Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b><br>Low | <b>Not Significant.</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |

## Operational Phase

A summary of potential CCR impacts during the operational phase of the Proposed Development is provided in Table 2 below. In line with IEMA guidance, embedded mitigation (existing design measures) have been considered.

**Table 2 Operation Climate Change Resilience Impacts**

| Climate Change Trend                                                                    | Climate (Change) Impact on Receptor                                                                                                                                                                                                                                                 | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                         | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Impact Magnitude                                                                                                                                                                                                                                                                                                                 | Significance and Additional Mitigation Required                                                                                                                           |
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| Increased frequency and intensity of extreme weather events:<br>Intense rainfall events | <p><b>Receptor: Building and human health</b></p> <p>Wetter winters and increased frequency of intense rainfall events could result in the overwhelming of drainage assets. This could result in secondary impacts such as localised flooding or mobilisation of contamination.</p> | <p><b>Likelihood level:</b> Likely</p> <p><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption lasting more than one day but less than one week.</p> <p><b>Impact Magnitude:</b> High</p> <p><b>Significance:</b> Significant</p> | <p>The DSR considers the flood risk to the Proposed Development and downstream receptors. The DSR indicates that the Site is within Flood Zone 1 and therefore, has a low probability of river or sea flooding. The Site is also at low risk of flooding from surface water flows and all other sources.</p> <p>It is considered that the DSR would include the necessary water treatment precautions to ensure compliance with CIRIA C753 guidance. In addition, attenuation measures would be required to accommodate the necessary volumes generated up to the 100 year +45% Climate Change event. The DSR outlines the following attenuation measures: cellular attenuation tank; piped systems; Vortex flow control device; and green roof.</p> <p>The DSR confirms that the foul drainage system would be designed in accordance with the following:</p> <ul style="list-style-type: none"> <li>- Building Regulations 2010 Drainage and Waste Disposal Approved Document; and</li> <li>- BS EN 752:2017 Drain and sewer systems outside buildings.</li> </ul> <p>A maintenance schedule would be developed following relevant CIRIA guidance to plan long term maintenance and any monitoring required.</p> <p>The Landscape Design and Environmental Standards Statements, which support this planning application, confirm that the Proposed Development would incorporate:</p> | <p><b>Likelihood level:</b> Unlikely</p> <p><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption lasting more than one day but less than one week.</p> <p><b>Impact Magnitude:</b> Low</p> | <p><b>Not Significant.</b> Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/extreme weather.</p> |

| Climate Change Trend                                                   | Climate (Change) Impact on Receptor                                                                                                                                                      | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                           | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Impact Magnitude                                                                                                                                                                                                                                                                                                  | Significance and Additional Mitigation Required                                                                                                                       |
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|                                                                        |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>- Permeable surfacing for public walkways on the east side of the Proposed Development; and</li> <li>- Rain garden and area of sustainable drainage at the southern boundary of the park.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                       |
|                                                                        | <b>Receptor: Building</b><br>Wetter winters and increased frequency of intense rainfall events could result in increased groundwater levels.                                             | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low<br><b>Significance:</b> Not Significant | The DSR states that due to the depths of the groundwater encountered by the site investigation, the Site is considered to be at low risk of flooding from groundwater. Additionally, there are no permanent underground structures. As stated within the CMP, the substructure would be waterproofed in accordance to designed drawings with the installation inspected regularly during construction to ensure integrity.                                                                                                                                                                                                                                 | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/extreme weather. |
| Increased frequency of extreme weather events: Intense rainfall events | <b>Receptor: Building and human health</b><br>Increased frequency of intense rainfall events could result in increased river levels leading to flooding within the vicinity of the Site. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption lasting more than one day but less than one week.<br><b>Impact Magnitude:</b> Medium                                      | According to the DSR, the Site is shown by the Environment Agency Flood Map for Planning to be within Flood Zone 1 and therefore has a low 0.01% per year probability of river or sea flooding.<br>Attenuation measures would be required to accommodate the necessary volumes generated up to the 100 year +45% Climate Change event. This is in accordance with advice, issued by the Environment Agency, which updates previous climate change allowances outlined in the National Planning Policy Framework. The DSR outline the following attenuation measures: cellular attenuation tank; piped systems; Vortex flow control device; and green roof. | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than one day but less than one week.        | <b>Not Significant</b><br>Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change.                  |

| Climate Change Trend                                                      | Climate (Change) Impact on Receptor                                                                                                                                                              | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                            | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Impact Magnitude                                                                                                                                                                                                                                                                                                  | Significance and Additional Mitigation Required                                                                                                                                                                                                                 |
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|                                                                           |                                                                                                                                                                                                  | <b>Significance:</b> Not Significant                                                                                                                                                                                                                                                                                                                       | A maintenance schedule would be developed following relevant CIRIA guidance to plan long term maintenance and any monitoring required. The Landscape Design Statement confirms that the Proposed Development would incorporate: <ul style="list-style-type: none"> <li>- Permeable surfacing for public walkways on the east side of the Proposed Development; and</li> <li>- Rain garden and area of sustainable drainage at the southern boundary of the park.</li> </ul>                     | <b>Impact Magnitude:</b> Low                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                 |
| Increased frequency and intensity of extreme weather events:<br>Heatwaves | <b>Receptor: Environmental</b><br>Increased frequency and severity of extreme heat events (i.e., heat waves) could result in the landscape design being compromised (e.g., tree and shrubs die). | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Medium<br><b>Significance:</b> Not Significant | The Landscape Design Statement confirms that the Proposed Development would incorporate a diverse tree planting, and shrub and perennials palette. Proposed species are robust and suitable for the microclimate of the Site. <u>Species would also be selected that tolerate increased temperatures and drought conditions.</u><br>It is recommended that drought-resistant vegetation is planted to minimise water use. Drought management, e.g., watering regimes, should also be specified. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b> Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/extreme weather. It has been recommended that drought resistant vegetation and watering regimes are explored. |
|                                                                           | <b>Receptor: Building</b><br>Increased frequency and severity of extreme heat events (i.e., heat waves) could result in                                                                          | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over                                                                                                                                                                         | The Proposed Development would be student accommodation residences. Ventilation would be compliant with approved Document Part F of the building regulations and consider overheating. The Ventilation Strategy would be delivered by a combination of natural ventilation and a mechanical ventilation system. Spaces would be naturally ventilated where possible.                                                                                                                            | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over                                                                                                                              | <b>Not Significant.</b> Additional Mitigation not required.                                                                                                                                                                                                     |

**Commented [EG1]:** This isn't included within the Landscape DS yet but from discussions with the landscape architects it should be included in the next iteration of the report

| Climate Change Trend | Climate (Change) Impact on Receptor                                                                                                                                                                                   | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                          | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Impact Magnitude                                                                                                                                                                                                                                                                                                        | Significance and Additional Mitigation Required                |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
|                      | overheating of mechanical and electrical equipment.                                                                                                                                                                   | sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Medium<br><b>Significance:</b> Not Significant                                                                                                                                                                                  | Mechanical cooling is anticipated via variable refrigerant flow (VRF) heat recovery system to management suites, amenity areas, clusters, and studios.<br>As stated in the Ventilation Strategy, measures to reduce overheating include: <ul style="list-style-type: none"> <li>Provision of mechanical ventilation with heat recovery (MVHR) supply and extract ventilation systems to amenity areas and habitable rooms on the ground and first floor;</li> <li>Provision of mechanical extract ventilation (MEV) extract ventilation for all residential homes on the first-floor and at certain homes on the second and third-floor level;</li> <li>Provision of MEV extract ventilation with trickle vents assigned to cluster bedrooms, studios, and cluster kitchen/lounges on the fourth to 27<sup>th</sup> floor; and</li> <li>Mechanical extract assigned to WC's.</li> </ul> | sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low                                                                                                                                                                                            |                                                                |
|                      | <b>Receptor: Human health</b><br>High temperatures and heatwaves could result in overheating and unsuitable conditions e.g. discomfort for building occupants in the residential element of the Proposed Development. | <b>Likelihood level:</b> Likely<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than a day and health and safety implications.<br><b>Impact Magnitude:</b> Medium | The Proposed Development would be student accommodation residences. Ventilation would be compliant with approved Document Part F of the building regulations and consider overheating. The Ventilation Strategy would be delivered by a combination of natural ventilation and a mechanical ventilation system. Spaces would be naturally ventilated where possible.<br>Mechanical cooling is anticipated via VRF heat recovery system to management suites, amenity areas, clusters and studios.<br>As stated in the Ventilation Strategy, measures to reduce overheating include: <ul style="list-style-type: none"> <li>Provision of MVHR supply and extract ventilation systems to amenity areas and habitable rooms on the ground and first floor;</li> </ul>                                                                                                                      | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than a day and health and safety implications. | <b>Not Significant.</b><br>Additional Mitigation not required. |

| Climate Change Trend                                                           | Climate (Change) Impact on Receptor                                                                                 | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                                      | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Impact Magnitude                                                                                                                                                                                                                                                                                                  | Significance and Additional Mitigation Required                                                                                                                        |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                |                                                                                                                     | <b>Significance:</b> Not Significant                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Provision of MEV extract ventilation for all residential homes on the first-floor and at certain homes on the second and third-floor level;</li> <li>Provision of MEV extract ventilation with trickle vents assigned to cluster bedrooms, studios, and cluster kitchen/lounges on the fourth to 27<sup>th</sup> floor; and</li> <li>Mechanical extract assigned to WC's.</li> </ul>                                                                                                                                                                                                                                                                                                                                          | <b>Impact Magnitude:</b> Medium                                                                                                                                                                                                                                                                                   |                                                                                                                                                                        |
| Increased frequency and intensity of high temperature s:<br>Drought conditions | <b>Receptor: Building and human health</b><br>Prolonged periods of drought could affect potable water availability. | <b>Likelihood level:</b> Possible<br><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than a day but less than a week.<br><b>Impact Magnitude:</b> Medium<br><b>Significance:</b> Not Significant | <p>The Environmental Standards Statement, which supports this planning application, notes that low flow fittings and dual flush WCs would be used to minimise water consumption. Sanitary fixtures would be specified to achieve a calculated daily consumption of &lt;110 litres/person/day. A water efficiency strategy would be determined for the Site and would include for the provision of 'A' rated appliances as a minimum and a water meter on the mains water supply to the building would be specified to monitor and manage.</p> <p>The following BREEAM credits are being targeted for the Proposed Development with regards to water:</p> <ul style="list-style-type: none"> <li>WAT 01 Water Consumption</li> <li>WAT 02 Water Monitoring</li> </ul> | <b>Likelihood level:</b> Unlikely<br><b>Consequence level:</b> Low as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting less than a day.<br><b>Impact Magnitude:</b> Low | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. |
| Extreme weather events:                                                        | <b>Receptor: Building and human health</b>                                                                          | <b>Likelihood level:</b> Possible                                                                                                                                                                                                                                                                                                                                                    | The Proposed Development building structure is to be designed in accordance with BS EN 1991-4 to provide sufficient stability for design wind loads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Likelihood level:</b> Unlikely                                                                                                                                                                                                                                                                                 | <b>Not Significant.</b><br>Additional mitigation not required. Existing design and mitigation                                                                          |

Appendix 9.1 Climate Change Resilience Assessment

| Climate Change Trend      | Climate (Change) Impact on Receptor                                                                                                                                             | Impact Magnitude and significance (without mitigation measures)                                                                                                                                                                                                                                                                                                              | Proposed Development and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Impact Magnitude                                                                                                                                                                                                                                                                                                              | Significance and Additional Mitigation Required                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Windstorms and wind gusts | Windstorm events could cause damage to the Proposed Development. This could include damage to roof sheeting, wall cladding. This could also create unsafe conditions for users. | <p><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than a day and health and safety implications.</p> <p><b>Impact Magnitude:</b> Medium</p> <p><b>Significance:</b> Not Significant</p> | <p>It should also be noted that although the UKCP18 climate data identifies trends for near surface wind speeds for the second half of the 21<sup>st</sup> century (accompanied by an increase in frequency of winter storms over the UK) any increase would be modest compared to interannual variability for the PPE-15 (perturbed parameter ensemble)<sup>1</sup>.</p> <p>It considered that climate change would not impact the predicted wind microclimate conditions in and around the Proposed Development. The structural design would account for appropriate wind loading at the detailed design phase.</p> | <p><b>Consequence level:</b> Medium as a result of short term impact on persons who could be affected by injuries, localised stakeholder concern over sustained period and partial disruption across elements of the Site lasting more than a day and health and safety implications.</p> <p><b>Impact Magnitude:</b> Low</p> | measures are appropriate to account for climate change/ extreme weather. |

<sup>1</sup> UKCP18, 2018. Factsheet: Wind. Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind.pdf>. [Accessed 01/02/2022]