APPENDIX 14.1: CLIMATE CHANGE RESILIENCE RISK ASSESSMENT

1.1 INTRODUCTION

1.1.1 Schedule 4, Clause 5(f) of the Town and Country Planning (EIA) Regulations 2017 states that information should be included in the ES on the likely significant effects of the development on the environment resulting from the vulnerability of the project to climate change.

1.1.2 In line with the IEMA EIA Guide to Climate Change Resilience and Adaptation (IEMA, 2020) (hereafter referred to as the "IEMA Resilience & Adaptation Guidance"), there are two key strands to assessing climate change resilience and adaptation issues within EIA, as outlined below:

- The risks of changes in the climate to the project (i.e. the resilience or conversely the vulnerability of a project to future climate changes). The IEMA Resilience & Adaptation Guidance states that this is generally better suited to a risk assessment type process than traditional EIA *'determination of significance'*. This climate change resilience risk assessment (CCRA) has therefore been undertaken for the Proposed Development and is reported in this appendix; and
- The extent to which climate exacerbates or ameliorates the effects of the project on the environment (i.e., *'in-combination'* effects). The IEMA Resilience & Adaptation Guidance states that this is best analysed in the existing chapters of the ES and is suited to using traditional significance criteria from the respective chapters. Therefore, this has been included throughout each of the technical ES chapters and has been completed by each technical specialist.

1.2 METHODOLOGY AND ASSESSMENT CRITERIA

Risk assessment

1.2.1 This climate change resilience risk assessment has been undertaken in line with the IEMA Resilience & Adaptation Guidance. The methodology has also been informed by other guidance documents referenced in the IEMA Resilience & Adaptation Guidance, including the C40 Cities Climate Change Risk Assessment Guidance (2018, amended 2025), the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Climate Risk Assessment Methodology (2015), and the Highways England Design Manual for Roads and Bridges Sustainability & Environmental Appraisal. Risks have been assessed based on both the probability of the event occurring and the severity of the consequences of the event, should it occur. The assessment is based on climate change projection data from UKCP18, as well as information provided in other submitted reports, including the Flood Risk Assessment (FRA). The list of climate hazards that has been considered has been adapted from the C40 Cities Climate Change Risk Assessment Guidance (2018, amended 2025).

Probability

1.2.2 Table 1 summarises the criteria that have been used to determine the likelihood rating for an effect, adapted from Appendix 1 of the IEMA 2020 guidance. The project lifetime includes both the construction and operational stages. In line with the principles set out in BS EN 15978, a Reference Study Period (RSP) of 60 years after opening (the opening year) has been used.

Table 1 Criteria used to determine likelihood

Score	Description (probability and frequency of occurrence)
1	The event occurs very rarely during the lifetime of the projects (60 years). For example, once every 60 years (1 event).
2	The event occurs a limited number of times during the lifetime of the project (60 years). For example, once every 25 years (2-3 events).
3	The event occurs regularly during the lifetime of the project (60 years) For example, once every 2-5 years (12-30 events).
4	The event occurs frequently during lifetime of the project (60 years). For example, once per year (60 events).
5	The event occurs very frequently during the lifetime of the project (60 years). For example, multiple times per year (more than 60 events).

Consequence

1.2.3 Table 2 summarises the criteria used to determine the consequence rating for effects relating to a climate risk. Consequence has been determined based on the extent to which the climate risk may impact on the amenity value and function of the Proposed Development. The amenity value is the positive element or elements that contribute to the overall character or enjoyment of the Proposed Development. The function is the extent to which the Proposed Development meets the purpose or purposes that it is designed to fulfil.

Table 2 Criteria used to determine consequence

Score	Description
1	Very low but measurable effect on site users and the Proposed Development itself. Slight negative change in amenity value of the Proposed Development and slight negative change in function.
2	Low but measurable effect on site users and the Proposed Development itself. Low negative change in amenity value of the Proposed Development and slight negative change in function.
3	Moderate effect on site users and the Proposed Development itself. Moderate negative change in amenity value of the Proposed Development and slight negative change in function.
4	Moderate effect on site users and the Proposed Development itself. Major negative change in amenity value of the Proposed Development and low negative change in function.
5	Moderate effect on site users and the Proposed Development itself. Major negative change in amenity value of the Proposed Development and moderate negative change in function.
6	Major effect on site users and the Proposed Development itself. Major negative change in amenity value of the Proposed Development and major negative change in function.
7	Extreme effect on site users and the Proposed Development itself. Loss of asset.

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Risk rating

1.2.4 Table 3 sets out the matrix that has been used to determine the risk rating, based on both the probability of the event occurring and the severity of the consequences of the event, should it occur.

Table 3 Risk rating determined based on the likelihood and consequence scores

	Probability					
Consequence		1	2	3	4	5
	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	18
	5	5	10	15	20	25
	6	6	12	18	24	30
	7	7	14	21	28	35

	Low risk
	Medium risk
	High risk

Limitations and assumptions

1.2.5 The main uncertainty regarding the CCRA surrounds the climate change projections that the scheme is assessed against. Climate change projections (e.g., UKCP18) are presented using a set of scenarios that capture the relationships between human choices, emissions, concentrations and temperature change. The UKCP18 climate change projections have been selected, as they are UK specific, and relatively conservative. Some scenarios are consistent with continued dependence on fossil fuels, while others are associated with deliberate actions to reduce GHG emissions. Therefore, these climate change projections contain inherent uncertainty, reflecting the uncertainty associated with quantifying human activities (including technological change) and their influence on climate. There are four Representative Concentration Pathway (RCP) scenarios available in the UKCP18 climate projections: RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5. In line with the IEMA (2020) guidance, RCP 8.5 has been used, which represents the most conservative, highest-impact scenario.

1.3 LEGISLATION AND POLICY

Legislation

Paris Agreement 2015

1.3.1 Negotiations at the Conference of the Parties (COP) 21 led to the 2015 Paris Agreement, the aim of which is to maintain the increase in global average temperature at 'well below' 2oC and 'pursue efforts' to limit the temperature increase even further to 1.5oC.

1.3.2 A total of 160 parties, including the UK, made voluntary pledges to reduce emissions by 2030, however the cumulative effect of these would still lead to an estimated 3oC of warming or greater.

The Special Report on Global Warming of 1.5°C, International Panel on Climate Change (IPCC) 2018

1.3.3 The IPCC published a special report in response to the Paris Agreement, to present the impacts of the targeted 1.5ºC temperature rise. With regards to climate change resilience and adaptation it states the following:

D.3: *'Adaptation options specific to national contexts, if carefully selected together with enabling conditions, will have benefits for sustainable development and poverty reduction with global warming of 1.5ºC, although trade-offs are possible'*

A.3: *'Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C (high confidence). These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options (high confidence)'*

UK Climate Change Act 2008 (2050 Target Amendment) (Order 2019)

1.3.4 Section 56 requires the UK Government to undertake a Climate Change Risk Assessment (CCRA) on a five-yearly cycle, with the subsequent development of an adaption programme to deliver resilience against these risks. The Act stipulates that the Government must assess '*the risks for the United Kingdom from the current and predicted impacts of climate change*'.

National policy and guidance

National Planning Policy Framework (NPPF), Ministry of Housing, Communities & Local Government (MHCLG (formerly DLUHC), 2025)

1.3.5 Section 14 of the NPPF 2025 focuses on meeting the challenge of climate change, flooding and coastal change. Paragraph 160 states that *'New developments should be planned for in ways that:*

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems'.

National Planning Practice Guidance (NPPG) (MHCLG (formerly DLUHC), 2025)

1.3.6 The Climate Change Guidance states:

'Planning can also help increase resilience to climate change impact through the location, mix and design of development' and that there are *'requirements for local authorities to adopt proactive strategies to mitigate and adapt to climate change in line with the provisions and objectives of the Climate Change Act 2008, and co-operate to deliver strategic priorities which include climate change.'*

UK Climate Change Risk Assessment (HM Government, 2022)

1.3.7 The third and most recent UK-wide CCRA was published in 2022. The assessment outlines risks in the eight priority risk areas relating to the following topics:

- Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards (Priority Risk Area 1);
- Risks to soil health from increased flooding and drought (Priority Risk Area 2);
- Risks to natural carbon stores and sequestration from multiple hazards, leading to increased emissions (Priority Risk Area 3);
- Risks to crops, livestock and commercial trees from multiple climate hazards (Priority Risk Area 4);
- Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks (Priority Risk Area 5);

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- Risks to people and the economy from climate-related failure of the power system (Priority Risk Area 6);
- Risks to human health, wellbeing and productivity form increased exposure to heat in homes and other buildings (Priority Risk Area 7);
- Multiple risks to the UK from climate change overseas (Priority Risk Area 8); and
- Additional More Action Needed Risks.

The third National Adaptation Programme and the Fourth Strategy for Climate Adaptation Reporting (Defra, 2023)

1.3.8 The third and most recent National Adaptation Programme sets out the UK government's response to the fourth CCRA, showing the actions it is, and will be, taking to address the risks and opportunities posed by a changing climate. This breaks down the likely risks associated with climate change in terms of the following themes:

- *'Land, nature and food;*
- *'Infrastructure';*
- *'Built environment and communities*
- *'health and wellbeing;*
- *'economy'.*

Regional and Local Policy

Places for Everyone Joint Development Plan Documents for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan 2022 to 2039

1.3.9 Development will consider sustainability at the forefront of its design, making use of previously-developed (brownfield) land and vacant buildings to meet development needs.

1.3.10 When considering a whole life approach for any new building, embodied emissions from construction can account for up to half of the carbon impacts associated with its lifecycle. In addition, other emissions can be attributed to the end-of-life stages such as demolition, repair or refurbishment.

Objective 8: Improve the quality of our natural environment and access to green spaces.

1.3.11 Objective 8 includes an aim to*: 'enhance special landscapes, green infrastructure, biodiversity and geodiversity; improve access to the natural environment and green spaces including parks; promote the role of green space in climate resilience and reducing flood risk. '*

Policy JP-G2: Green Infrastructure

1.3.12 There is a clear strategic directive towards the enhancement and protection of green infrastructure and its contribution to the development of a Local Nature Recovery Strategy for Greater Manchester.

1.3.13 Any development that involves the removal of land from the Green Belt will need to offset the impact and delivery compensatory improvements.

1.3.14 Where possible, new green infrastructure should be integrated into development design and the developer should make appropriate provision for its long-term management and maintenance.

Policy JP-P1: Sustainable Places

1.3.15 The city region aims to be visually stimulating, socially inclusive and distinctive in design and cultural preservation.

1.3.16 It also aims to be resilient in its perception of environmental hazards, adaptable, durable and resource efficient, ensuring low-carbon footprint and an efficient use of land.

1.3.17 Design should also be functional and convenient, safe and supported by inclusive design that tackles socioeconomic inequalities. It should also be well-connected, comfortable and incorporate well-managed green infrastructure.

Policy JP-G3: River Valleys and Waterways

1.3.18 They will form a central part of the protection and improvement of green infrastructure as contributing to the Nature Recovery Network.

1.3.19 Some of the key considerations to river valleys and waterways are to: retain the open character; promote enjoyment of the features of valleys such as access to the countryside; protect the semi-natural habitats and their unique features such as ancient woodland; preserve areas of relative tranquillity and seclusion; reduce flood risk management through Natural Flood Management (NFM); improve water quality such as through land decontamination; enhance the re-naturalisation of riverbanks and flood plains; increase active access to green space through promotion of canals and watercourses for walking and cycling; and ensure the development relates positively to nearby rivers and other waterways.

Guide to Development in Manchester Supplementary Planning Document (SPD) and Planning Guidance. Adopted April 2007.

1.3.20 This guide is an update to the original Guide to Development in Manchester that was published in 1997. This guidance aims to support sustainable development and enhance the quality of neighbourhoods in Manchester by providing principles for developers, designers and residents. This aligns with government strategies and policies on sustainable development.

1.3.21 The guidance advises on energy efficiency, sustainable materials, renewable energy, promoting sustainable transport methods and incorporating green infrastructure through the public realm design.

1.3.22 Policy E1.5 encourages high standards of energy efficiency in new development. Developers should aim to reduce CO_2 emissions by at least 25% more than the requirements of the current Building Regulations.

1.3.23 *"The following design principles will assist developers in achieving energy efficiency targets*

- *Minimise resilience on energy-using equipment for heating, cooling, lighting and natural ventilation.*
- *Position trees and soft landscaping on and around the development and within buildings to provide natural shading, insulation and air conditioning.*
- *Integrate energy efficient micro-generation and community heating schemes, such as combined heat and power (CHP).*
- *Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in summer*
- *Specify energy and water efficient appliances and systems."*

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1.3.24 Policy T3.9 gives priority to pedestrians, disabled people and cyclists above the needs of car, and developers must take this into consideration in the location and design of any parking facilities. This is one way the document encourages a more active lifestyle.

Manchester's Local Development Framework. Core Strategy Development Plan 2012 to 2027 (MCC, 2012) (as amended, 2024)

1.3.25 This framework was updated in March 2024, after the Places for Everyone joint development plan was adopted.

1.3.26 The 2024 version includes an addendum which lists sections of the Core Strategy policies replaced by Places for Everyone policies, allowing for broader alignment with regional development goals.

1.3.27 PfE policies that have been added in this 2024 addendum under the heading Adaptation to Climate Change are listed below:

- JP –S2: Carbon and Energy – The aim of delivering a carbon neutral Greater Manchester no later than 2038.
- JP-S4: Flood Risk and the Water Environment – An integrated catchment-based approach will be taken to protect the quantity of quality of water bodies with reference to the North West River Basin Management Plant and managing flood risk.
- JP-G8: A Net Enhancement of Biodiversity and Geodiversity – Through local planning and associated activities a net enhancement of biodiversity resources will be sought.

Manchester City Council Climate Change Action Plan 2020-2025

1.3.28 The Manchester City Council (MCC) Climate Change Action Plan sets out MCC's commitments to tackling climate change from 2020-2025 and builds on previous plans over the last decade.

1.3.29 The purpose of the plan is as follows:

- *"The document sets out MCC's commitments to tackling climate change over the next 5 years and builds on previous action plans over the las decade.*
- *It covers MCC's plans for adapting to the expected impacts of climate change and supporting and influencing others, including through the implementation of the Manchester Green and Blue Infrastructure strategy 2015-2025"*

1.3.30 Recommended targets and objectives of the plan are as follows:

- *"To adapt the city's buildings, infrastructure and natural environment to the changing climate and to increase the climate resilience of our residents and organizations.*
- *To improve the health and wellbeing of everyone in Manchester through actions that also contribute to our objective for CO_2 reduction and adaptation and resilience, with particular focus on those most in need.*
- *To ensure that Manchester establishes an inclusive, zero carbon and climate resilient economy where every can benefit from playing an active role in decarbonizing and adapting the city to the changing climate"*
- *"We recognise that limiting CO_2 emissions is not enough. Depending on how successful the world is at reducing emissions, global temperatures by 2100 are likely to rise by between 1.5°C and 4°C above pre-industrial levels. As such, we need to accept that some level of change is inevitable. Climate change is happening now, and we need to assess the risks to our communities in order to reduce their vulnerability to these changes. Adopting appropriate mitigation measures will be essential if we are to create resilient communities of the future in Manchester."*

1.3.31 The plan states the following in relation to adaptation to climate change:

- *Despite the increased international efforts to tackle climate change, we recognise that the world's climate is already changing and that adaptation is required to protect the city's people. We are committed to ensuring that climate change adaptation, including green and blue infrastructure, is included in new developments and across Council owned buildings and land.*
- *Further work needs to be done at a local level through ward plans and neighbourhoods to adapt to make communities more resilient to climate change. This will form part of the Council's work through Neighbourhoods Teams, Highways and also through the development of improved communication information and guidance."*

1.3.32 The plan states the following in relation to citywide emissions:

- *"The Council also recognises the importance of supporting and influencing our residents and organisations to take action to reduce their direct and indirect CO_2 emissions and to adapt to the changing climate."*

1.3.33 It is stated that the following is included in the 2020-2025 Action Plan:

- *"This action plan details the activity that we will undertake over the next five years but also includes activities that will need to be developed and investigated further in order to ensure that we are on the right path to being zero carbon by 2038. The actions include activities to deliver a reduction in emissions from energy, transport and consumption (mitigation) but also adaptation and promoting investment in nature based solutions and green infrastructure."*

Manchester Climate Change Framework 2020-2025

1.3.34 The Manchester Climate Change Framework 2020-25 is the city's high-level strategy for tackling climate change. It sets out how Manchester will 'play its full part in limiting the impacts of climate change', a commitment in the Our Manchester Strategy 2016-25.

1.3.35 The framework sets the following objectives and targets relevant to climate change resilience and adaptation:

- *'Climate adaptation and resilience:*

  Adapting the city's buildings, infrastructure and natural environment to the changing climate and increasing the climate resilience of our residents and organisations.'

- *'Inclusive, zero carbon and climate resilient economy:*

  Ensuring that Manchester establishes an inclusive, zero carbon and climate resilient economy where everyone can benefit from playing an active role in decarbonising and adapting the city to the changing climate.'

1.3.36 The frameworks sets the following areas for action to meet the objectives and targets:

- *'Buildings (existing and new)*
- *Green infrastructure and nature-based solutions'*

Manchester City Council, Manchester Green and Blue Infrastructure Strategy (Implementation Plan Refresh 2021-2025)

1.3.37 The council aims to enhance and protect the recreational spaces of health and greenery such as gardens, golf courses and pond, placing emphasis on their incredible value and functionality.

1.3.38 This implementation plan for 2021-2025 supersedes the 2015-2025 version and continues to be focused on ensuring a greener, more climate resilient Manchester as well as being a better place for people and nature.

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1.3.39 The city has developed a long-term vision that integrates the extent and value of the city's green and blue infrastructure.

- *'Manchester has announced a major park development programme, which will help improve these key green assets even further. '*
- *'The pace at which NBS and SuDS are being implemented across Manchester is beginning to quicken. One of the ways in which this is being done is through enforcing a stricter approach (at the planning stage) to the consideration of NBS and SuDS on new large developments. The Council is also beginning to work with developers to discover feasible ways of adopting more SuDS and adding these to the highway drainage network.'*
- *'Manchester's Nature Recovery Network is, and will be, everywhere. From a window box on a high rise, a tree in a garden, a park, to a river Valley or neighbourhood green space, we will all have a role to play in delivering the people's Nature Recovery Network.'*
- *'It aims to re-energise some of the city's most important natural spaces to make them 21st-century assets, drivers for growth, and places where people and nature can thrive'*

1.3.40 Four main objectives of the Implementation Plan include:

- '*Objective One: Improving GI quality and function, focusing on:*
  - River valley and canals;
  - Parks;
  - Trees and woodlands;
  - Gardens;
  - Other land;
  - Healthier and resilient communities; and
  - Protecting and enhancing ecology.
- *Objective Two: Embedding GI in developments of any scale across the city, including retrofit:*
  - Embedding GI into key plans and policies;
  - Embedding GI into key strategic regeneration and infrastructure projects;
  - Embedding GI in developments of any scale across the city; and
  - Embedding GI into city centre development and planning initiatives.
  - Objective Three: Improving access and connectivity for people and wildlife, focusing on:
  - Green routes – neighbourhood and travel routes;
  - Blue routes – canals and river valley routes; and
  - Cross-boundary links.
- *Objective Four: Increasing understanding of GI with a focus on:*
  - Improving monitoring;
  - Increased research;
  - Equitable engagement and involvement; and
  - Showcasing best practice.'

1.3.41 The strategic plan acknowledges the challenges of COVID-19 and increases in extreme weather events, aiming to combat them through progressive resilience by protecting the climate functionality of existing spaces.

Climate Emergency Declaration

Manchester City Council Climate Emergency Declaration (2019)

1.3.42 Manchester City Council declared a Climate Emergency on 10th July 2019. The council meeting minutes read as follows:

'This Council notes:

- *The serious risks to Manchester's people, of climate change/global heating affecting economic, social and environmental well-being, supply chains – including food security, financial systems and local weather, among many others.*
- *That in 2008 the 'Principles of Tackling Climate Change in Manchester' were agreed as a call to action to engage people from all walks of life in climate change action and, build support for a new way of thinking about climate change.*
- *That Manchester leads the way, with an agreed Paris compliant carbon budget set in December 2018 and an acceleration of the target for becoming a zero-carbon city by 12 years, setting 2038 as the new target for the city, based on research from the world-renowned Tyndall Centre for Climate Change.*
- *The recent and welcome upsurge of action by the young people of Manchester, exemplifying the radical traditions of which Manchester is proud.'*

1.3.43 This Council agrees (or to the extent that the below concern executive functions, recommends to the Executive) to:

Declare a Climate Emergency.

- *'Continue working with partners across Manchester and GMCA to deliver the 2038 target, and determine if an earlier target can be possible, through a transparent and open review. Become carbon neutral by the earliest possible date.*
- *Encourage involvement in all wards by April 2020 through meetings as part of the Our Manchester strategy, to identify residents and partners who want to be actively involved in achieving the target, with provision for those who cannot attend. Ensure ward plans contain specific, measurable, achievable steps.*
- *Review all policies, processes and procedures to ensure the council can become carbon neutral. Present an action plan by March 2020 detailing how the city can stay within its carbon budget. Report back regularly to the NESC. Review the corporate plan.*
- *Work with the Tyndall Centre to review the actual emissions from aviation. Investigate the best way to include aviation in our overall carbon reduction programme in the long term.*
- *Make climate breakdown and the environment, an integral part of activity throughout the Council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target and including an environmental impact assessment in all relevant committee reports.*

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- *Ensure that everyone in the council receives carbon literacy training by the end of 2020. Make attendance easier by varying times and length of sessions.*
- *Encourage all staff on council business to use the lowest carbon, appropriate, travel. Investigate measures to ensure future procurement is carbon neutral. Increase the percentage of social value with an additional environmental element.*
- *Work with suppliers to green their supply chains, and support local production.*
- *Work with training providers to ensure Manchester residents can take on green jobs.*
- *Investigate and introduce measures to help reach domestic zero carbon levels including addressing fuel poverty and retrofitting existing homes.*
- *Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.*
- *Push GMCA to decarbonise public transport, heat and energy as early as possible.*
- *Through our role on GMPF, encourage divestment in fossil fuels as early as possible.*
- *Call on the government to:*
    - *provide powers and resources to make the zero-carbon target possible including funding for big capital projects*
    - *accelerate the reduction of carbon emissions from aviation*
    - *accelerate the decarbonisation of the electricity grid, funding low carbon energy generation*
    - *ensure that the UK prosperity fund focuses on enable the transition to a low carbon economy.'*

Guidance documents

IEMA EIA Guide to: Climate Change Resilience and Adaptation (IEMA, 2020)

1.3.44 This document acts as a revision to the IEMA guidance on Climate Resilience and Adaptation in EIA (2015) and reflects lessons learnt from emerging practice. It provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process.

ISO 14090:2019 Adaptation to Climate Change – Principles, Requirements and Guidelines (BSI, 2019)

1.3.45 The main purpose of this standard is to provide organisations and projects with a consistent, structured and pragmatic approach to prevent or minimise the harm that climate change could cause and also to take advantage of opportunities.

C40 Cities Climate Change Risk Assessment Guidance (C40 Cities, 2018 & 2025)

1.3.46 This document aims to provide a concise, easy-to-read guidance, to help cities to develop a climate risk assessment report. It provides the methodology and components of the assessment, as well as providing a comprehensive list of climate hazards or hazards exacerbated by climate change. The guidance document was updated in 2025. However, the list of climate hazards or hazards exacerbated by climate change has not been include in the updated guidance. Therefore the list from the previous iteration of the guidance has continued to inform this assessment.

1.4 CURRENT & FUTURE BASELINE CONDITIONS

Current Baseline Conditions

1.4.1 Table 4 provides a summary of the current baseline climatic conditions, taken from the closest weather station, Woodford weather station, 10 miles south east of the Proposed Development. The data provides historic average climatic conditions for 1991-2020, which is assumed to be representative of the baseline year of the assessment (i.e. 2025). The monthly mean minimum/maximum temperatures are calculated from the average of the daily maximum and daily minimum temperatures for each month. The warmest month on average was July and the coolest month on average was December. The wettest month on average was December and the driest month on average was May. The sunniest month on average was June and the least sunny month on average was January.

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Table 4 Summary of historic average climatic conditions for 1991-2020 taken from the Woodford Met Office monitoring station.

Month	Mean daily maximum temperature (degrees C)	Mean daily minimum temperature (degrees C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)
January	7.71	1.07	8.82	45.09	77.00
February	7.92	1.40	8.44	76.06	60.48
March	10.13	2.42	5.53	103.86	52.53
April	13.01	4.13	2.40	151.19	55.81
May	16.25	7.05	0.28	179.27	56.21
June	18.93	9.55	0.00	179.53	64.61
July	20.66	11.81	0.00	157.07	80.19
August	20.24	11.64	0.00	144.97	79.73
September	17.56	9.51	0.07	137.66	76.09
October	13.84	6.78	1.01	94.70	91.69
November	9.96	3.35	4.11	62.62	77.08
December	7.47	1.15	9.29	53.08	96.98

Climate Change Projections

1.4.2 The UK Climate Projections 2018 (UKCP18) (Met Office, 2018) provide the most up-to-date assessment of how the climate of the UK may change over the 21st century. UKCP18 uses Representative Concentration Pathways (RCPs). These are named according to the concentration of greenhouse gas modelled to occur in the atmosphere in 2100. There are four RCPs available in the UKCP18 climate projections: RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5. In line with the IEMA (2020) guidance, RCP 8.5 has been used, which represents the most conservative, highest-impact scenario.

Table 5 UKCP18 data for north west England RCP 8.5

Season	Variable	Time Period	Projected Change At		
			10th percentile	50th percentile	90th percentile
Winter	Mean temperature (ºC)	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	4 to 5
		2080 – 2099	1 to 2	3 to 4	5 to 6
	Mean precipitation change (%)	2020 – 2039	-10 to 0	0 to 10	10 to 20
		2040 - 2059	-10 to 0	0 to 10	10 to 20
		2060 - 2079	-10 to 0	10 to 20	30 to 40
		2080 – 2099	-10 to 0	10 to 20	40 to 50
	Mean daily maximum temperature change compared to 1981-2000	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	3 to 4
		2080 – 2099	1 to 2	3 to 4	5 to 6
	Mean daily minimum temperature change compared to 1981-2000	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	4 to 5
		2080 – 2099	1 to 2	3 to 4	5 to 6
Summer	Mean temperature (ºC)	2020 - 2039	0 to 1	1 to 2	1 to 2
		2040 - 2059	0 to 1	1 to 2	3 to 4
		2060 - 2079	1 to 2	3 to 4	5 to 6
		2080 – 2099	1 to 2	4 to 5	7 to 8
	Mean precipitation change (%)	2020 - 2039	-30 to -20	-10 to 0	10 to 20
		2040 - 2059	-40 to -30	-20 to -10	0 to 10
		2060 – 2079	-50 to -40	-30 to -20	0 to 10
		2080 – 2099	-60 to -50	-40 to -30	-10 to 0
	Mean daily maximum temperature change compared to 1981-2000	2020 - 2039	-1 to 0	1 to 2	2 to 3
		2040 - 2059	0 to 1	2 to 3	3 to 4
		2060 - 2079	1 to 2	3 to 4	5 to 6
		2080 – 2099	2 to 3	5 to 6	8+
	Mean daily minimum temperature change compared to 1981-2000	2020 - 2039	0 to 1	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	1 to 2	2 to 3	4 to 5
		2080 – 2099	2 to 3	4 to 5	6 to 7

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According to UKCP18 data, over land the projected general trends of climate changes in the 21st century are similar to UKCP09, with a move towards warmer, wetter winters and hotter, drier summers. However, natural variations mean that some cold winters, some dry winters, some cool summers and some wet summers will still occur.

Temperature

1.4.3 UKCP18 projections show that there is more warming in the summer than in the winter.

Precipitation

1.4.4 Rainfall patterns across the UK are not uniform, varying on seasonal and regional scales, and will continue to vary in the future. While UKCP18 projections show a clear shift to higher probability levels of dry summers, they also suggest that the likelihood of individual wet summers reduces only slightly. The risk of heavy rainfall events is likely to increase.

Sea level rise

1.4.5 According to UKCP18 projections, global sea level has risen over the 20th century and will continue to rise over the coming centuries. The amount of sea level rise depends on the location around the UK and increases with higher emissions scenarios. Sea level rise over the coming centuries may affect tidal characteristics substantially (including tidal range).

Snow

1.4.6 According to UKCP18 projections, for the period 2061-2080, under a high emissions scenario (RCP8.5), the regional (12 km) and local (2.2 km) projections show a decrease in both falling and lying snow across the UK relative to the 1981-2000 baseline.

Wind

1.4.7 There are no compelling trends in storminess, as determined by maximum gust speeds, from the UK wind network over the last four decades. UKCP18 projections over the UK show an increase in near surface wind speeds over the UK for the second half of the 21st century for the winter season when more significant effects of wind are experienced. This is accompanied by an increase in frequency of winter storms over the UK. However, the increase in wind speeds is modest compared to interannual variability.

1.4.8 Winds associated with major storm events can be some of the most damaging and disruptive events for the UK with implications for property, power networks, road and rail transport and aviation.

1.5 IDENTIFICATION AND EVALUATION OF RISKS FROM CLIMATE CHANGE

1.5.1 Table 6 Climate change risk assessment provides a list of potential climate hazards (and hazards exacerbated by climate change), as adapted from the C40 Cities Climate Change Risk Assessment Guidance (C40 Cities, 2018, amended 2025). For each potential hazard a risk assessment has been undertaken, prior to incorporation of mitigation, taking into account the probability of the event occurring and the potential consequence, in line with the methodology described earlier in this document. A risk rating has been assessed for each potential hazard, based on matrix set out in Table 3.

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Table 6 Climate change risk assessment

Climate Hazard	Description	Is it relevant to the Proposed Development	Likely consequences of climate risk occurring	Change in probability as a result of climate change	Probability rating (1-5)	Consequence rating (1-7)	Risk rating	Mitigation needed?
Rainstorm	Strong wind and heavy rain	Yes – rainstorms happen frequently in the UK and are likely to impact the Proposed Development	Damage and degradation of building materials through wetting and impact from rainfall. Discomfort for users of the Proposed Development.	The frequency of precipitation is likely to decrease, particularly in the summer. However, the risk of heavy rainfall events is likely to increase.	5 Rainstorms will occur very frequently during the lifetime of the Proposed Development	1 Very low but measurable effect on site users and the Proposed Development. Damage and degradation of building materials through rainfall impacts.	5	No
Monsoon	*'A persistent seasonal wind, often responsible for seasonal precipitation regime.'* (National Weather Service, 2023)	No – Monsoons do not occur in the UK and therefore do not present a climatic risk to the Proposed Development.	N/A	N/A	N/A	N/A	N/A	N/A
Heavy snow	'*Large snowflakes that greatly reduce the visibility and falls at a rate exceeding 4cm per hour.'* (Wild, 2023)	Yes – Heavy snow can occur during winters in the UK and therefore has the potential to impact the Proposed Development.	Damage to building materials (e.g. roofs). Discomfort and potential injury to users of the Proposed Development.	The frequency of heavy snow events is likely to decrease.	2 Heavy snow is likely to occur a limited number of times during the lifetime of the Proposed Development	2 Low but measurable effect on site users and the Proposed Development. Damage to building materials and potential injury to users.	4	No
Fog	'*Water droplets which are suspended in the air near the Earth's surface and causing reduced visibilities.'* (National Weather Service, 2023)	Yes – Fog occurs under certain climatic conditions in the UK, and therefore has the potential to impact the Proposed Development.	Increased risk of accidents as a result of impaired vision.	It is unknown how climate change will affect the frequency of fog.	5 Fog will occur very frequently during the lifetime of the Proposed Development	1 Very low but measurable effect on site users and the Proposed Development. Increased risk of accidents around the Proposed Development.	5	No
Hail	*'Precipitation of small balls or other pieces of ice (hailstones) falling separately or frozen together in irregular lumps. (Typically associated with thunderstorms and surface temperatures above freezing).'* (National Weather Service, 2023)	Yes – Hail occurs in the UK and therefore has the potential to impact the Proposed Development.	Discomfort for users of the Proposed Development.	The frequency of hailstorms is likely to increase.	5 Hail will occur very frequently during the lifetime of the Proposed Development	1 Very low but measurable effect on site users and the Proposed Development. Discomfort for users of the Proposed Development.	5	No
Severe wind	Mean wind speed exceeding 23 m/s (Met Office, 2024a).	Yes – Severe wind occurs in the UK and therefore has the potential to impact the Proposed Development	Damage to building materials. Discomfort and potential injury to users of the Proposed Development, and immediate surroundings	The frequency of severe wind and storms is likely to remain similar.	4 Severe wind is likely to occur frequently during the lifetime of the Proposed Development.	2 Low but measurable effect on site users and the Proposed Development. Damage to building materials and potential injury to users.	8	Yes
Tornado	'*A violent rotating column of air, usually forming a pendant from a cumulonimbus cloud with the circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena'* (National Weather Service, 2023)	No – Tornados are very rare in the UK. It is therefore very unlikely that they pose a climatic risk to the Proposed Development	N/A	N/A	N/A	N/A	N/A	N/A
Hurricane	'*A severe tropical cyclone with wind speeds in excess of 74 mph (64 knots).'* (National Weather Service, 2023)	No – Hurricanes cannot form at the latitudes of the UK, and therefore do not pose a climatic risk to the Proposed Development.	N/A	N/A	N/A	N/A	N/A	N/A
Extra tropical storm	'*Deep depressions that were originally hurricanes which have moved to higher latitudes.'* (Met Office, 2024b)	Yes – Extra tropical storms (such as ex-Hurricanes) can reach the UK, and therefore have the potential to impact on the Proposed Development.	Damage to building materials. Discomfort and potential injury to users of the Proposed Development and immediate surroundings	The frequency of severe wind and storms is likely to remain similar.	3 Extra tropical storms are likely to happen regularly during the lifetime of the Proposed Development	4 Moderate effect on site users and the Proposed Development. Damage to building materials and potential injury to users.	12	Yes

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Climate Hazard	Description	Is it relevant to the Proposed Development	Likely consequences of climate risk occurring	Change in probability as a result of climate change	Probability rating (1-5)	Consequence rating (1-7)	Risk rating	Mitigation needed?
Tropical storm	*'An organised cyclone in the tropics with wind speed between 35 and 64 knots.'* (National Weather Service, 2023)	No – Tropical storms do not occur in the UK and therefore do not pose a climatic risk to the Proposed Development	N/A	N/A	N/A	N/A	N/A	N/A
Storm surge	'*A change in sea level that is caused by a storm.*' (Met Office, 2024c).	No – the Proposed Development is not located close to the coast, and is therefore not at risk of storm surge	N/A	N/A	N/A	N/A	N/A	N/A
Lightning	*'Electrical discharge cause by imbalances between storm clouds and the ground, or within clouds themselves.'* (National Geographic, 2024)	Yes – Lightening occurs during storms, and therefore has the potential to impact the Proposed Development	Potential damage to building materials. Injury to users of the Proposed Development unlikely but possible.	The frequency of lightning storms is likely to remain similar.	1 Lightening strikes within the site are likely to occur very rarely during the lifetime of the Proposed Development	6 If lightening were to strike a site user or structure within the site, it would have the potential to cause a substantial impact including damage to building materials and potential serious injury to site users.	6	No
Extreme winter conditions	*'A combination of heavy snow, blowing snow and/or dangerous wind chills'* (NOAA, 2024c)	Yes – Extreme winter conditions sometimes occur in the UK, and therefore have the potential to impact the Proposed Development	Damage to building materials (e.g. pipes bursting). Discomfort and potential injury to users of the Proposed Development.	The frequency of extreme winter conditions is likely to decrease.	4 Extreme winter conditions are likely to occur frequently during the lifetime of the Proposed Development.	3 Moderate effect on site users and the Proposed Development. This could include thermal discomfort, damage to building materials and potential injury to users.	12	Yes
Cold wave	*'Average temperatures below 2°C for 5 days' or 'average temperatures below 0°C for 48hrs or more.'* (Met Office, 2023)	Yes – Cold waves happen during winter months, and therefore have the potential to impact the Proposed Development	Damage to building materials (e.g. pipes bursting). Discomfort and potential injury to users of the Proposed Development.	The frequency of cold waves is likely to decrease.	4 Cold waves are likely to occur frequently during the lifetime of the Proposed Development.	3 Moderate effect on site users and the Proposed Development. This could include a reduction in the outdoor activities available or thermal discomfort.	12	Yes
Extreme cold days	Average temperatures below 0°C (Met Office, 2023)	Yes – Extreme cold days occur during winter months, and therefore have the potential to impact the Proposed Development	Damage to building materials (e.g. pipes bursting). Discomfort and potential injury to users of the Proposed Development.	The frequency of extreme cold days is likely to decrease.	4 Extreme cold days are likely to occur frequently during the lifetime of the Proposed Development.	3 Moderate effect on site users and the Proposed Development. This could include thermal discomfort, damage to building materials and potential injury to users.	12	Yes
Heat waves	Three days *'of hot weather relative to the expected conditions of the area at that time of year, which may be accompanied by high humidity.'* (Met Office, 2024d)	Yes – Heat waves occur increasingly frequently in the UK, and therefore have the potential to impact the Proposed Development	Damage and degradation to building materials. Extended period of overheating in building affects comfort and health of occupants.	The frequency of heat waves is likely to increase.	4 Heat waves are likely to occur frequently during the lifetime of the Proposed Development.	4 Moderate effect on site users and the Proposed Development. This could include health impacts, particularly for children and elderly visitors. Damage to buildings (e.g., deterioration of materials) and overheating causing discomfort to occupants, particularly in external areas.	16	Yes
Extreme hot days	A day where temperatures exceed 30°C (Met Office, 2023)	Yes – Extreme hot days occur increasingly frequently in the UK, and therefore have the potential to impact the Proposed Development	Damage and degradation to building materials. Intense overheating in building affects comfort and health of occupants.	The frequency of extreme hot days is likely to increase.	4 Extreme hot days are likely to occur frequently during the lifetime of the Proposed Development.	4 Moderate effect on site users and the Proposed Development. This could include health impacts, particularly for children and elderly visitors. Damage to buildings (e.g., deterioration of materials) and overheating causing discomfort to occupants, particularly in external areas.	16	Yes

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Climate Hazard	Description	Is it relevant to the Proposed Development	Likely consequences of climate risk occurring	Change in probability as a result of climate change	Probability rating (1-5)	Consequence rating (1-7)	Risk rating	Mitigation needed?
Drought	'*When rainfall in an area is below average for the region' or 'when water supplies such as streams and reservoirs are low, which is caused by low rainfall, lack of snowmelt, or other reasons'* (Met Office, 2024e)	Yes – Drought occurs in the UK and therefore has the potential to impact the Proposed Development	Potential damage to building foundations in areas with clay soils. Health of flora and fauna on the site affected.	The frequency of drought is likely to increase.	4 Drought is likely to occur frequently during the lifetime of the Proposed Development.	3 Moderate effect on site users and the Proposed Development. This could include impacts such as hosepipe bans, and impacts on local vegetation and the associated visual amenity.	12	Yes
Wildfire	'*Any uncontrolled vegetation fire which requires a decision, or action, regarding suppression'* (Scottish Government, 2013)	Yes – Wildfires do occur in the UK, and therefore have the potential to impact the Proposed Development	Damage to buildings and contents. Potential injury to users of the Proposed Development.	The frequency of land fire is likely to remain similar.	1 Wildfires are likely to occur very rarely during the lifetime of the Proposed Development. Vegetation close to structures is proposed, so the risk cannot be ruled out. However, the landscape strategy incorporates hardscaping elements which can act as firebreaks to help slow the spread of any potential fire.	6 Major effect on site users and the Proposed Development. Damage to buildings and contents. Potential injury to users.	6	No
Flash/surface flood	'*A flood that occurs within a few hours (usually less than six) of heavy or excessive rainfall, dam or levee failure.*' (National Weather Service, 2023)	Yes – flash/surface floods occur during periods of intense rainfall; there is the potential this could impact the Proposed Development	Damage to buildings and contents. Potential injury to users of the Proposed Development.	The frequency of flash/surface flooding is likely to increase.	1 Surface water flooding at the site is not anticipated. The overall risk of surface water (pluvial) flooding at the site is assessed to be low. Flash/surface floods are likely to occur very rarely during the lifetime of the Proposed Development.	4 Moderate effect on site users and the Proposed Development. Damage to buildings and contents. Potential injury to users.	4	No
River/tidal flood	'*Where a rivers flow will exceed the bank sides and cause damage or obstruction to a nearby area.'* (Flood Guidance, 2024)	Yes – river flooding can occur during intense periods of rainfall, and therefore has the potential to impact the Proposed Development	Damage to buildings and contents. Potential injury to users of the Proposed Development.	The frequency of river/tidal flooding is likely to increase.	1 The site is located entirely within Flood Zone 2 with low fluvial flood risk. River floods are likely to occur a limited number of times during the lifetime of the Proposed Development	4 Moderate effect on site users and the Proposed Development. Damage to buildings and contents. Potential injury to users.	4	No
Groundwater flood	The level of groundwater rises above the ground level as a result of increased rain, causing flooding on the surface (Flood Guidance, 2024)	Yes – groundwater flooding does occur in the UK, and therefore has the potential to impact the Proposed Development	Damage to buildings and contents. Potential injury to users of the Proposed Development.	The frequency of groundwater flooding is likely to remain at a similar level.	1 The potential for groundwater emergence or flooding at the surface is assessed to be low. As such, groundwater floods are likely to occur very rarely during the lifetime of the Proposed Development.	4 Moderate effect on site users and the Proposed Development. Damage to buildings and contents. Potential injury to users.	4	No
Permanent inundation	The increase of sea level over time to where an area is continuously covered by water (DEECA, formerly DELWP, 2021)	No – Permanent inundation is unlikely to happen at the location of the Proposed Development.	N/A	N/A	N/A	N/A	N/A	N/A
Salt water intrusion	When salt water (from the ocean) gets into fresh water coastal aquifers (USGS, 2024)	No – The Proposed Development is not close to the sea, and therefore salt water intrusion is unlikely to impact the Proposed Development	N/A	N/A	N/A	N/A	N/A	N/A
Ocean acidification	'*A reduction in the pH of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide (CO2) from the atmosphere'*. (NOAA, 2024)	No – the Proposed Development is not located close to the ocean and is therefore unlikely to be impacted by ocean acidification	N/A	N/A	N/A	N/A	N/A	N/A

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Climate Hazard	Description	Is it relevant to the Proposed Development	Likely consequences of climate risk occurring	Change in probability as a result of climate change	Probability rating (1-5)	Consequence rating (1-7)	Risk rating	Mitigation needed?
Landslide	'*The movement of a mass of rock, debris, or earth down a slope*' (USGS, 2024b)	No – the Proposed Development is located in a relatively flat location, and is therefore unlikely to be impacted by landslides	N/A	N/A	N/A	N/A	N/A	N/A
Avalanche	'*A mass of snow, rock, ice, soil, and other material slides swiftly down a mountainside*.' (National Geographic, 2024b)	No – the Proposed Development is not located in a location that is steep enough or receives enough snow for avalanches to be a risk	N/A	N/A	N/A	N/A	N/A	N/A
Rock fall	A '*type of fast-moving landslide that happens when rock or earth falls, bounces, or rolls from a cliff or down a very steep slope*.' (Colorado Geological Survey, 2024)	No – the Proposed Development is located in a relatively flat location, and is therefore unlikely to be impacted by rock fall	N/A	N/A	N/A	N/A	N/A	N/A
Subsidence	'*Sinking of the ground because of underground material movement*' (NOAA, 2024b)	Yes – subsidence does occur in the UK, and therefore has the potential to impact the Proposed Development	Damage to building materials. Potential injury to users of the Proposed Development.	The frequency of subsidence is likely to remain low.	1 There have no notices provided stating that there is a risk of subsidence at the site. As such, subsidence is likely to occur very rarely during the lifetime of the Proposed Development.	4 Moderate effect on site users and the Proposed Development. Damage to building materials. Potential injury to users.	4	No
Water-borne disease	'*Illnesses caused by microscopic organisms, like viruses and bacteria, which are ingested through contaminated water or by coming in contact with feces*.' (Lifewater, 2024)	Yes – water-borne diseases do occur in the UK, and therefore have the potential to impact the Proposed Development	Potential illness to users of the Proposed Development.	The frequency of water-borne disease is likely to increase but remain low.	2 Water-borne diseases may occur a limited number of times during the lifetime of the Proposed Development	3 Moderate effect on site users and the Proposed Development. Potential illness to users.	6	No
Vector borne disease	'*Human illnesses caused by parasites, viruses and bacteria that are transmitted by vectors*' (living organisms) (WHO, 2024)	Yes – Vector borne diseases do occur in the UK, and therefore have the potential to impact the Proposed Development	Potential illness to users of the Proposed Development.	The frequency of vector-borne disease is likely to increase but remain low.	1 Given the nature of the proposed development and the Site, vector borne diseases, such as those transmitted through ticks, could occur. However, given the site location, they are only likely to occur a very limited number of times during the lifetime of the proposed development if at all.	3 Moderate effect on site users and the Proposed Development. Potential illness to users.	3	No
Airborne disease	'*Disease that is caused by a microorganism that is transmitted through the air*.' (Ather et al, 2013)	Yes – airborne diseases do occur in the UK, and therefore have the potential to impact the Proposed Development	Potential illness to users of the Proposed Development.	The frequency of air-borne disease is likely to increase but remain low.	2 Airborne diseases may occur a limited number of times during the lifetime of the Proposed Development	3 Moderate effect on site users and the Proposed Development. Potential illness to users.	6	Yes
Insect infestation	'*Recently detected insect pest population, including an incursion, or a sudden significant increase of an established insect, disease agents or weed population in an area leading to damage to plants in production fields, forests or natural habitats and causing substantial damage to productivity, biodiversity or natural resources*' (UNDRR, 2024)	Yes – Insect infestations do occur in the UK, and therefore have the potential to impact the Proposed Development	Potential illness to users of the Proposed Development.	The frequency of insect infestation is likely to increase but remain low.	2 Insect infestations may occur a limited number of times during the lifetime of the Proposed Development	2 Low but measurable effect on site users and the Proposed Development. Potential illness to users.	4	No

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1.6 INCREASING THE RESILIENCE OF THE PROPOSED DEVELOPMENT TO CLIMATE CHANGE

1.6.1 Table 7 summarises the mitigation measures that have been put in place for the Proposed Development that will increase resilience to the likely effects resulting from climate change. The mitigation measures included in this table are already included in the design, and do not require further implementation. These particularly focus on the effects that scored highly in the risk assessment in Table 7.

Table 7 Climate change resilience measures

Risk	Mitigation measure
Severe winds	The Proposed Development will be built in line with current building regulations, and is therefore expected to be capable of withstanding severe wind and storm conditions.
Extreme tropical storm	
Extreme winter conditions	The Proposed Development will be built in line with current building regulations and will therefore have appropriate insulation and heating in place to withstand extreme winter and cold condition. Building materials that are optimized to reduce heat loss in winter months will be sourced, reducing the heating requirements.
Cold wave	
Extreme cold days	
Heat waves	The landscape strategy (Layer Studio, 2025) retains the existing mature trees, alongside additional planting tree and shrub planting which will bring additional cooling benefits to the site helping to offset the impact of extreme hot days. The landscaping strategy (Layer Studio, 2025) proposes planting to preserve a mix of sun and shade areas to provide comfort in the different weather and temperature conditions. Building materials will be chosen to optimise to heat gains in summer months will be used, reducing cooling requirements.
Extreme hot days	
Drought	Planting of biodiverse mix of trees and scrubs communities for resistance against a range of climatic conditions, including shade tolerant woodland mix.
Flash/surface flood	The strategy will incorporate Sustainable Drainage Systems (SuDS) where feasible, ensuring that runoff is attenuated, treated, and discharged at greenfield or agreed rates to prevent an increase in flood risk downstream. Landscaping features will assist with drainage in wetter conditions included terraced/tiered landscaping design.
All risks	Since the effects of climate change are dynamic and constantly changing, an adaptive management approach is recommended. The climate change resilience risk assessment should be periodically revisited by the design team during construction in order re-assess likely effects.

1.7 RESIDUAL RISK

Table 8 provides a summary of the residual risks of climate hazards and hazards exacerbated by climate change on the Proposed Development. Mitigation measures outlined in Table 8 have been taken into account.

Table 8 Summary of residual risks ratings based on probability and consequence taking into account mitigation measures

Hazard	Risk rating pre-mitigation	Residual Risk		
		Probability rating (1-5)	Consequence rating (1-7)	Residual risk rating
Rainstorm	5	5	1	5
Heavy snow	4	2	2	4
Fog	5	5	1	5
Hail	5	5	1	5
Severe wind	8	4	1	4
Extra tropical storm	12	3	3	9
Lightning	6	1	6	6
Extreme winter conditions	12	4	2	8
Cold wave	12	4	2	8
Extreme cold days	12	4	2	8
Heat waves	16	4	3	12
Extreme hot days	16	4	3	12
Drought	12	4	2	8
Wild fire	6	1	6	6
Flash/surface flood	4	1	4	4
River flood	4	1	4	4
Groundwater flood	4	1	4	4
Subsidence	4	1	4	4
Water-borne disease	6	2	3	6
Vector borne disease	3	1	3	3
Air-borne disease	6	2	3	6
Insect infestation	4	2	2	4

1.8 CONCLUSION

1.8.1 Climate hazards and hazards exacerbated by climate change of relevance to the proposed development have been identified and the associated risks have been assessed, based on the probability of an event occurring and the consequence, if it did occur. Mitigation measures have been identified for risks where required, and with the appropriate mitigation measures in place, the risk ratings have been reduced. It is considered that the residual risks are in line with typical expectations for urban developments of this nature in the UK. Nevertheless, due to the nature and scale of many climate hazards, some level of residual risk remains.

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1.10 Abbreviations and Glossary

Term	Definition
EIA	Environmental Impact Assessment
IEMA	Institute of Environmental Management and Assessment
CCRA	Climate Change Risk Assessment
PIEVC	Public Infrastructure Engineering Vulnerability Committee
RCP	Representative Concentration Pathway
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
C40	C40 Cities Climate Change Risk Assessment Guidance
FRA	Flood Risk Assessment
RSP	Reference Study Period
IPCC	International Panel on Climate Change
MCC	Manchester City Council
GMCA	Greater Manchester Combined Authority
NBS	Nature-Based Solutions
SuDS	Sustainable Drainage Systems
DEFRA	Department for Environment, Food & Rural Affairs
DLUHC	Department for Levelling Up, Housing, and Communities
ISO	International Organization for Standardization
BSI	British Standards Institution
NOAA	National Oceanic and Atmospheric Administration
UNDRR	United Nations Office for Disaster Risk Reduction
USGS	United States Geological Survey
WHO	World Health Organization

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