Manchester City Council
Report for Information

Report to: Health Scrutiny Committee – 12 October 2022

Subject: The impact of the recent heatwave, both in terms of physical and mental health and resilience building across the system

Report of: Director of Public Health

Summary

Health and climate change are intricately connected and it is clear that the effects of climate change, such as heatwaves, flooding, poor air quality and impact on food will directly negatively impact health. We are already seeing the impacts of climate change in Manchester's population, and it is predicted that these impacts will worsen over time.

Climate projections suggest that Manchester will face warmer summers in the future and associated with this there is an increased likelihood that we will face very intense heatwaves. As the recent heatwave demonstrated, high temperatures are a dangerous threat to health and wellbeing and reduce economic productivity and as such tackling this risk needs to be one of the highest priorities for an effective response to climate change.

The purpose of this report is to provide an overview of the impact that heatwaves will have on the city and details the activity underway to adapt to a changing climate and reduce the health impacts of future heatwaves in the city.

Recommendations

The Committee is recommended to:

1. Note the content of the report and in particular the detailed impact on heatwaves on health; and

2. Consider how the content of this report could inform the future work planning of the Health Scrutiny Committee.

Wards Affected: All

Environmental Impact Assessment - the impact of the issues addressed in this report on achieving the zero-carbon target for the city
Climate change and health and are intricately connected. Evidence demonstrates that the effects of climate change such as extreme weather events, air quality and food will directly negatively impact health. We are already seeing the impacts of climate change in Manchester's population, and it is predicted that these impacts will worsen over time.

Undertaking action to both reduce carbon emissions and adapt to the impacts of climate change is essential both for the immediate future and for the longer-term. In addition, the city may be impacted by longer-term international events such as waves of new migration resulting from people being forced to move from areas most prone to climate change impacts.

Equality, Diversity and Inclusion - the impact of the issues addressed in this report in meeting our Public Sector Equality Duty and broader equality commitments
This report is for information.

Manchester Strategy outcomes	**Summary of how this report aligns to the OMS/Contribution to the Strategy**
A thriving and sustainable city: supporting a diverse and distinctive economy that creates jobs and opportunities	Healthy and resilient residents and communities' will be able to thrive in employment and opportunities which will support the local economy.
A highly skilled city: world class and home-grown talent sustaining the city's economic success	A healthy population living in a zero-carbon environment is essential for the city's future economic success. In addition, providing people with the skills to obtain jobs in the zero-carbon sector will be important
A progressive and equitable city: making a positive contribution by unlocking the potential of our communities	There is strong evidence to suggest that climate change and social inequality are linked with disadvantaged groups suffering disproportionately from the adverse effects of climate change. Supporting communities to be both healthy and resilient and adaptable to future heatwaves will ensure that they are able to make a positive contribution and reach their full potential.
A liveable and low carbon city: a destination of choice to live, visit, work	Heatwaves have a negative impact on the city's liveability
A connected city: world class infrastructure and connectivity to drive growth	Zero carbon transport will enable Manchester resident to live healthy lives and significantly reduce the negative impact of poor air quality in the city

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Background documents (available for public inspection):

The following documents disclose important facts on which the report is based and have been relied upon in preparing the report. Copies of the background documents are available up to 4 years after the date of the meeting. If you would like a copy please contact one of the contact officers above.

Health Scrutiny, 6th February 2022: An Introduction to the Impact of Climate Change on Health and Healthcare in Manchester

Manchester Climate Change Framework: 2022 Update

Manchester Climate Risk: A framework for understanding hazards & vulnerabilities

Government Guidance, 28 July 2022: Supporting vulnerable people before and during a heatwave: for health and social care professionals

1.0 Introduction

1.1 There is a growing body of evidence that demonstrates that climate change is one of the biggest public health threats and challenges we face. The World Health Organisation (WHO) recognises that the climate crisis is upon us and that the consequences of this for our health are real and often devastating.

1.2 The Paris Agreement is a legally binding international treaty on climate change adopted by 196 Parties at COP21 (Conference of the Parties) in Paris in 2015. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius (°C), compared to pre-industrial levels. However, current climate policies would not deliver close to these targets and consequently the world is currently on track to an expected temperature rise of approximately 2.7°C. Even at 1.5°C warming essential systems will be affected, such as housing, transport, healthcare, food and water supplies, with more significant effects on already vulnerable communities.

1.3 In July 2019, Manchester City Council declared a Climate Emergency which recognised the need for the Council, and the city as a whole, to do more to reduce carbon dioxide (CO_2) emissions and mitigate the negative impacts of climate change. The Council had already adopted a science-based carbon budget for Manchester of 15 million tonnes of CO_2 between 2018 and 2100 following analysis by the Tyndall Centre for Climate Change Research. This also committed the city to become zero-carbon by 2038 at the latest.

1.4 A recent report produced by the Committee on Climate Change (CCC) stated that recent heatwaves have demonstrated, high temperatures are a dangerous threat to health and wellbeing and reduce economic productivity. It states that tackling this risk is one of the highest priorities for an effective response to climate change in the UK.

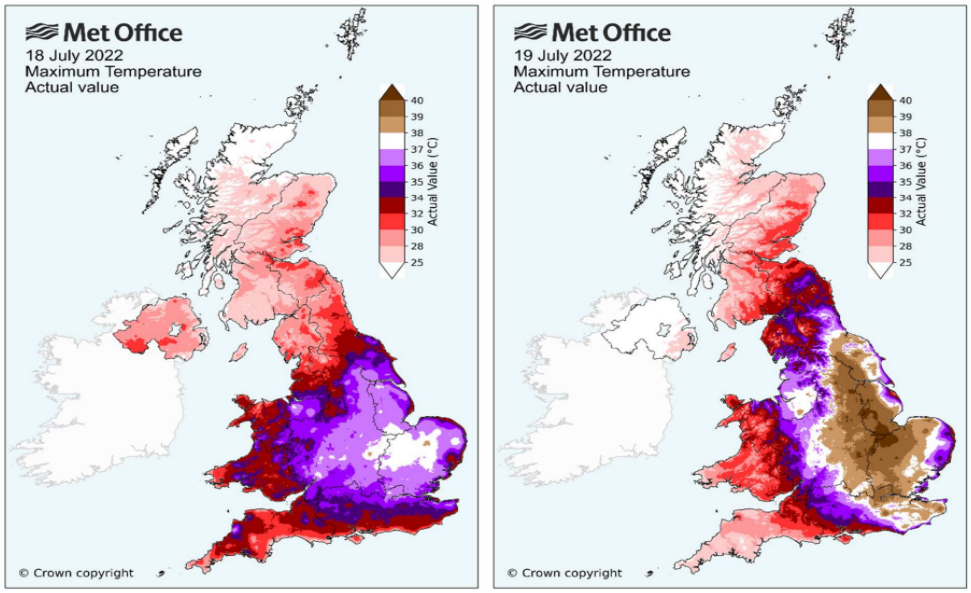
1.5 Key pointed raised by the CCC were:

- Impacts from periods of high temperature are already being felt in the UK today.
- Increasingly hot summers could lead to a trebling of health and productivity impacts without additional adaptation.
- There are multiple effective strategies to help limit the health, wellbeing and productivity impacts of overheating which can be implemented today.
- Government has a critical role in encouraging proactive adaptation to limit overheating health and wellbeing impacts.

2.0 Background

2.1 The UK experienced a brief but unprecedented extreme heatwave from 16 to 19 July 2022, as hot air moved north from the near continent. During this period, the temperature records of many long-running stations were exceeded by wide margins and regional maximum temperature records were also set across all UK climate districts (except western and northern Scotland), again for many by wide margins.

2.2 At this time, the Met Office issued its first red warning for extreme heat since the Extreme Heat National Weather Warning Service was introduced in June 2021. The UK Health Security Agency and Met Office also issued a level 4 alert for the first time since the heatwave plan was introduced for England in 2004, resulting in the government declaring a national emergency. A red warning means adverse health effects are expected not just to those most vulnerable.



Maximum temperatures experiences in July 2022

2.3 Nationally the heat brought challenging conditions for the NHS with a spike in 999 calls, and care services supporting the elderly and vulnerable were put under increased stress, with a likely increase in heat related deaths. Many schools remained open but ran a shorter day in parts of the country. There were several fatalities associated with open water swimming. Several fire services declared major incidents after multiple fires broke out. There were some problems with power cuts in parts of Yorkshire, Lincolnshire and the North East. In some areas gritters spread sand on some roads after surfaces began to melt.

2.4 The purpose of this report is to outline the general health impacts that heatwaves will have on residents in Manchester. At this time there is not data available to be able to provide a detailed description of the impact of the most recent heatwave on residents. The Office for National Statistics (ONS) and UK Health Security Agency (UKHSA) will shortly be publishing some joint analysis of deaths during heat-periods in 2022 and we will explore the feasibility of adopting the methodological approaches used in this analysis to understand better the impact of heat-periods on excess mortality and heat-related mortality in Manchester.

2.5 The report also outlines actions that are being undertaken to better prepare and reduce the impact of future heatwave events.

3.0 The Impact of Heat on Health

3.1 The body normally cools itself in four ways:

- Radiation in the form of infrared rays
- Convection via water or air crossing the skin
- Conduction via a cooler object being in contact with the skin
- Evaporation of sweat

3.2 When the ambient temperature is higher than skin temperature, the only effective heat-loss mechanism is sweating. Therefore, any factor that reduces the effectiveness of sweating such as dehydration, lack of breeze, tight-fitting clothes or certain medications can cause the body to overheat. In addition to this, thermoregulation, can be impaired in the elderly and the chronically ill, and potentially in those taking certain medications, rendering the body more vulnerable to overheating. Young children produce more metabolic heat, have a decreased ability to sweat and have core temperatures that rise faster during dehydration. Older people appear to be more vulnerable to heat possibly due to having fewer sweat glands, but also because of living alone and at risk of social isolation.

3.3 The main causes of illness and death during a heatwave are respiratory and cardiovascular diseases. A clear relationship between temperature and mortality was observed in England in summer 2006, with an estimated 75 extra deaths per week for each degree of increase in temperature. Part of this rise in mortality may be attributable to air pollution, which makes respiratory symptoms worse. The other main contributor is the effect of heat on the cardiovascular system. To keep cool, large quantities of extra blood are circulated to the skin. This causes strain on the heart, which for elderly people and those with chronic health problems can be enough to precipitate a cardiac event.

3.4 In addition to this, there are specific heat-related illnesses including:

- Heat cramps caused by dehydration and loss of electrolytes, often following exercise
- Heat rash (small, red, itchy papules)
- Heat oedema (swelling of the hands and legs) due to vasodilatation and retention of fluid
- Heat syncope (dizziness and fainting) due to dehydration, vasodilatation, cardiovascular disease and certain medications
- Heat exhaustion because of water or sodium depletion, with non-specific features of malaise, vomiting and circulatory collapse. This is present when the body temperature is between 37°C and 40°C. Left untreated, heat exhaustion may evolve into heatstroke
- Heatstroke can become a point of no return whereby the body's thermoregulation mechanism fails. This leads to a medical emergency, with symptoms of:
    - confusion
    - disorientation

- convulsions
- unconsciousness
- hot dry skin, and
- core body temperature exceeding 40°C for between 45 minutes and 8 hours, which can result in cell death, organ failure, brain damage or death.

4.0 Who is at risk?

4.1 Evidence shows that there is a clear and strong link between climate vulnerability and health inequality. Whilst this is evident in the impact that we are seeing in the city today, future vulnerabilities and inequalities are predicted to be much worse having a potentially devastating impact on the lives of our communities

4.2 There are certain factors that increase an individual's risk during a heatwave. These include:

- **Older age**: especially those over 75 years old, or those living on their own and who are socially isolated, or in a care home

- People with **long-term and severe illness**, including the following conditions:
  - respiratory disease
  - cardiovascular and cerebrovascular conditions
  - peripheral vascular disease
  - diabetes and obesity
  - severe mental illness
  - renal insufficiency

- **People on medications** that control electrolyte balance or cardiac function: medicines that potentially affect thermoregulation and the ability to sweat or maintain electrolyte balance can make a person more vulnerable to the effects of heat.

- **Inability to adapt behaviour to keep cool**: having Alzheimer's or related diseases, Parkinson's disease and difficulties with mobility, a disability, being bed bound, too much alcohol, babies and the very young

- **Environmental factors and overexposure**: living in a top floor flat, being homeless, activities or jobs that are in hot places or outdoors and include high levels of physical exertion

4.3 During severe hot weather, there is a risk of development of heat exhaustion, heatstroke and other heat-related illnesses including respiratory and heart problems. In a moderate heatwave, it is mainly the above high-risk groups that are affected. However, during an extreme heatwave, fit and healthy people can also be affected.

5.0 Manchester Context

5.1 Climate projections suggest that Manchester will face warmer summers in the future. Associated with this there is an increased likelihood that we will face very intense heatwaves. This could be a particular problem in the city centre where buildings (particularly high-rise apartments) retain their heat overnight and could cause an increased frequency and intensity of convectional rainfall, which in turn can cause issue with flooding. Manchester is also at risk of reduced air quality due to an increase in moorland fires in the surrounding areas.

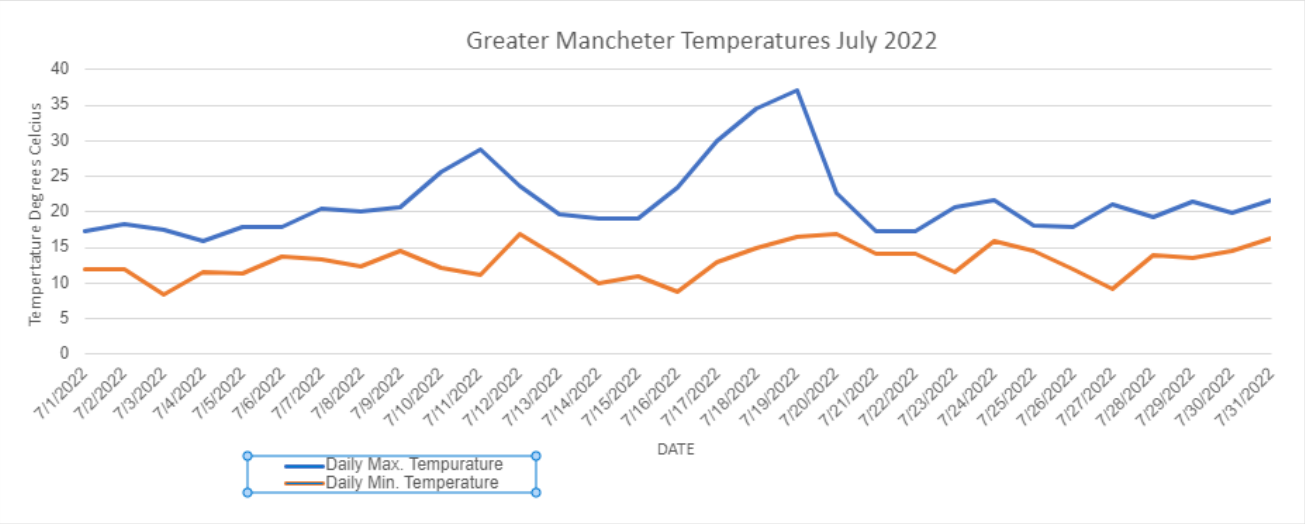
5.2 In General heatwaves can have a significant impact on health causing an increased death rate for the elderly, very young and those with underlying health conditions. However, in very intense heatwaves (such as that experience in July 2022) it is not just those who are the most vulnerable who will suffer the negative impacts but the general population more widely. Thermal comfort will be negatively impacted producing consequences for people's ability to rest and sleep impacting health and productivity. There is an increased likelihood of moorland fires beyond the city with implications for air quality and residents' health.

5.3 Climate change predictions in the UK by 2050 are as follows:

- Hotter, drier summers with +5.6°C summer mean daily maximum temperature
- Warmer wetter winters with +28% winter mean precipitation
- More frequent and intense weather extremes

5.4 In July 2022 the UK saw unprecedented temperatures during a two-day heatwave. Data from the Met Office for Greater Manchester show that the highest recorded day time temperature was 37.2 on 19th July. Temperatures were also extremely high on 18th July 2022 at 34.5. On the 18th, 19th and 20th July night-time highest temperatures were 15, 16.5 and 17 respectively (Appendix 1).

Chart 1: Greater Manchester Temperatures July 2022



Source: Met Office

5.5 The table below shows the maximum daily temperature in Greater Manchester. Before the 2022 heatwave the most recent high daily temperatures were experienced in July 2019.

Table 1: Greater Manchester Highest Daily Maximum Temperatures

Date	Daily Max. Temp (°C)
7/19/2022	37.2
7/18/2022	34.5
7/25/2019	33.9
8/2/1990	33.7
8/3/1990	33.4
7/3/1976	32.2
8/3/1990	32.1
7/31/2020	32
8/2/1990	32

Source: Met Office

5.6 The table below shows long term summer temperature averages and demonstrates an increase in temperatures experience in Manchester overtime.

Table 2: Annual Summer Long Term Averages

GREATER MANCHESTER SUMMER LONG TERM AVERAGES				
30 YEAR LTA	**1961-1990**	**1971-2000**	**1981-2010**	**1991-2020**
Average Maximum temperature (°C)	18.6	19.0	19.3	19.5
Average Minimum temperature (°C)	10.9	11.1	11.4	11.6
Average temperature (°C)	14.7	15.0	15.3	15.5The NHS prepares and plans for the impact of heatwaves on health, as effective action will reduce the associated health impacts on the population. During the heatwave in July 2022, there was no

				increase in A&E attendances or emergency admissions, potentially due to the relatively short duration of the heatwave, combined with adherence to public health advice. Work needs to be undertaken to develop a more sophisticated set of indicators to monitor the health impacts of future heatwaves, as they become longer, more frequent and more intense as a result of climate change.

Source: Met Office

5.7 The NHS prepares and plans for the impact of heatwaves on health, as effective action will reduce the associated health impacts on the population. During the heatwave in July 2022, there was no increase in A&E attendances or emergency admissions, potentially due to the relatively short duration of the heatwave, combined with adherence to public health advice. In primary care there was definitely a spike in demand between 16th – 19th July and an increase in activity when compared to the same period in 2021 and 2022 (Appendix 2). However, due to the small numbers, it is difficult to attribute this to the heatwave.

5.8 The Public Health Team worked closely with UK Health Security Agency colleagues and local partners to prepare and respond to the heatwave. The response was successful and services across health and social care were able to provide as close to business as usual as possible. There were regularly scheduled messages to staff on measures to keep patients and residents safe, particularly the most vulnerable. There was amplification of

national messaging, particularly in relation to hydration, sun screen and the importance of essential travel only. Residents in the city took self-management advice, following easy read local messaging and checked on vulnerable family, friends and neighbours.

5.9 Due to a variety of confounding factors local data, such as hospital attendees, admission and mortality, is unable to demonstrate a measurable impact of the heatwave on health of Manchester residents. In addition to this, many deaths that occurred during July 2022 are still awaiting a death certificate and are therefore not yet included in mortality data.

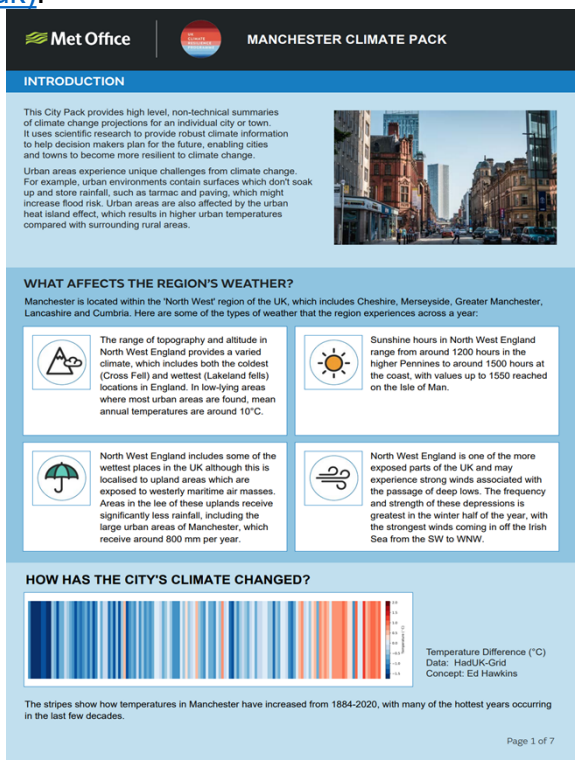
5.10 Work needs to be undertaken to develop a more sophisticated set of indicators to monitor the health impacts of future heatwaves, as they become longer, more frequent and more intense as a result of climate change.

6.0 Activity in Manchester to reduce the impact of future heatwaves

6.1 Met Office Heat Service

6.1.1 Manchester City Council and the Manchester Climate Change Agency are working closely with the Met office one two projects.

6.1.2 The first is the production of a **City Heat Pack** which are high level, non-technical local summaries of city future climate. The city pack contains graphs and tables designed to communicate scientific research in an accessible way. This information can support the city decision makers to plan for the future to enable Manchester to become more resilient to climate change. A copy of the city pack for Manchester can be found here SPF City Pack_editable_template (metoffice.gov.uk).


Met Office

MANCHESTER CLIMATE PACK

INTRODUCTION

This City Pack provides high level, non-technical summaries of climate change projections for an individual city or town. It uses scientific research to provide robust climate information to help decision makers plan for the future, enabling cities and towns to become more resilient to climate change.

Urban areas experience unique challenges from climate change. For example, urban environments contain surfaces which don't soak up and store rainfall, such as tarmac and paving, which might increase flood risk. Urban areas are also affected by the urban heat island effect, which results in higher urban temperatures compared with surrounding rural areas.

WHAT AFFECTS THE REGION'S WEATHER?

Manchester is located within the 'North West' region of the UK, which includes Cheshire, Merseyside, Greater Manchester, Lancashire and Cumbria. Here are some of the types of weather that the region experiences across a year:

The range of topography and altitude in North West England provides a varied climate, which includes both the coldest (Cross Fell) and wettest (Lakeland fells) locations in England. In low-lying areas where most urban areas are found, mean annual temperatures are around 10°C.

Sunshine hours in North West England range from around 1200 hours in the higher Pennines to around 1500 hours at the coast, with values up to 1550 reached on the Isle of Man.

North West England includes some of the wettest places in the UK although this is localised to upland areas which are exposed to westerly maritime air masses. Areas in the lee of these uplands receive significantly less rainfall, including the large urban areas of Manchester, which receive around 800 mm per year.

North West England is one of the more exposed parts of the UK and may experience strong winds associated with the passage of deep lows. The frequency and strength of these depressions is greatest in the winter half of the year, with the strongest winds coming in off the Irish Sea from the SW to WNW.

HOW HAS THE CITY'S CLIMATE CHANGED?

Temperature Difference (°C)
Data: HadUK-Grid
Concept: Ed Hawkins

The stripes show how temperatures in Manchester have increased from 1884-2020, with many of the hottest years occurring in the last few decades.

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City Heat Pack for Manchester

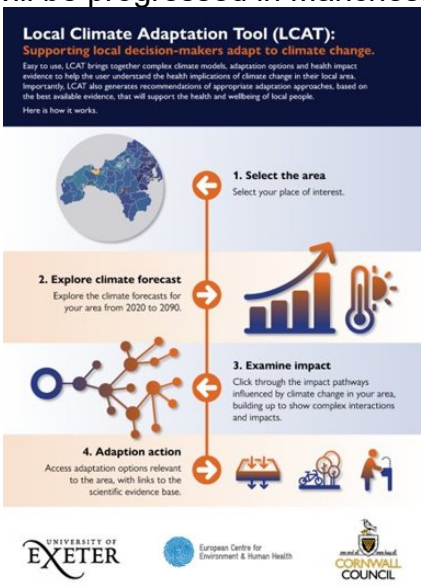
6.1.3 The second is a **Heat Vulnerability Index for Manchester** which will look at risk to heat across the city for both people and systems. This interactive tool will provide areas (Middle Super Output Areas / wards) with vulnerability scores based on hazard exposure, sensitivity and adaptability. The tool will be web based and interactive showing varying projections over time to both inform policy and decision making. The Met Office have funding to develop this tool for Manchester and work should be complete at the end of the calendar year.

6.2 Local Climate Adaptation Tool (LCAT)

6.2.1 The Local Climate Adaptation Tool (LCAT) is a partnership lead by the A partnership between the European Centre for Environment and Human Health at the University of Exeter. It brings together complex climate models, adaptation options and health impact evidence to help the user understand the health implications of climate change in their local area. Importantly, LCAT also generates recommendations of appropriate adaptation approaches, based on the best available evidence that will support the health and wellbeing of local people.

6.2.2 LCAT allows the user to select a local area of interest (starting with areas across Cornwall as a case study) and see the predicted climate for this area over the coming decades. It combines these predictions with evidence on the health impacts of climate change from the scientific literature to support local organisations to plan their adaptation strategies and enable the best possible health and well-being outcomes for local people. For example, planning cycle paths with shade for hotter summer months and protection from stronger cross winds in the winter, ensuring people can continue to gain the health and wellbeing benefits of cycling in a changing climate.

6.2.3 LCAT prototype has been developed for Cornwall Council however there is now funding available to expand the model to different local authority areas and this work will be progressed in Manchester.



LCAT Tool

6.3 Making Manchester Fairer Action Plan

6.3.1 Climate change is a key theme and action within the Making Manchester Fairer Action Plan and as such it contains specific actions that will be carried out to reduce the health impact on climate change to the city. Those specifically related to heat include:

- The production of a **Heatwave Plan for Manchester** including a hot weather warning system to help communicate the effects of heatwaves and what residents can do to reduce them.
- Working with partners to build evidence of the **impact good green space has on Manchester residents' health,** so we can prioritise provision of new or improved green space based on vulnerability to climate change and health inequalities. We will also research how people from different races, cultures and religions access and use green space and how this impacts their health.
- **Mapping risk and vulnerability to climate change and health inequalities,** at both and individual and area level, to better understand their distribution and demonstrate the impact of climate change on health in Manchester.

6.4 Manchester Climate Change Framework Health and Wellbeing Actions

6.4.1 Recognising the direct impact that climate change will have on the health of Manchester's residents the recently update Manchester Climate Change Framework contains a chapter on health and wellbeing, identifies the health co-benefits of all actions within the framework and outlines specific actions that the city will undertake. These are:

- The city's health sector to work collaboratively to carry out **a vulnerability assessment that maps at hyperlocal level where climate change will exacerbate health inequality** so that action can be prioritised and targeted.
- Manchester Climate Change Agency to work with the Health and Wellbeing Advisory Group to develop **city-scale indicators to track and report the impacts of climate change on health inequalities**.
- Manchester City Council to **incorporate health equity and climate action into its policies and strategies** in a consistent and transparent manner and implement methods to measure their impact.
- **The Making Manchester Fairer Taskforce** to lead implementation of the city's action plan.
- Manchester Climate Change Partnership (MCCP) to support partners across Manchester to **share knowledge and action on decarbonisation and adaptation of the health sector**.
- Health sector partners to maximise uptake of Carbon Literacy courses and toolkits co-produced with the NHS to support climate mitigation and adaptation activities, in line with **Greener NHS and Delivering a Net Zero Health Service.**

- MCCP's **Health and Wellbeing Advisory Group to expand this list of recommended actions** to encompass collaborative action across Greater Manchester and a clear set of asks of national government
- Explore the development of a **predictive heat-related risk score at individual patient level** to support more targeted alert systems and messaging at times of very intense heat.

7.0 Recommendations

The Committee is recommended to:

1. Note the content of the report and in particular the detailed impact on heatwaves on health; and

2. Consider how the content of this report could inform the future work planning of the Health Scrutiny Committee.