Appendix C

Resilience Plan

Memo

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Date: October 1, 2021

To: Elaine Marshall (City of Milpitas)

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Subject: **City of Milpitas Climate Action Plan Update, Final Community Preparedness and Resiliency Plan – Technical Memorandum**

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1 INTRODUCTION

Global climate change is projected to exacerbate the impacts of certain hazards that the City of Milpitas (hereafter referred to as "city") is already exposed to under current conditions. These hazards include indirect impacts from wildfires and effects on air quality, extreme heat, heat wave events, long-term drought, and flooding. Climate change is also projected to create a new set of hazards that the city has not experienced historically (e.g., sea-level rise). While many of these hazards have existed historically for the city, the frequency and intensity of these hazards will increase as a result of global climate change. The City of Milpitas government (hereafter referred to as "City") has prepared this Community Preparedness and Resiliency Plan (Resiliency Plan) to identify the primary and secondary physical impacts of climate change that will most directly affect the city and includes a set of adaptation strategies to improve resiliency. The first portion of the Resiliency Plan includes a climate change vulnerability assessment and serves to inform development of adaptation strategies by analyzing the city's exposure to existing hazards, sensitivity to these hazards, potential climate-related impacts from these hazards, and the City's existing capacity to prepare and adapt for these impacts, known as adaptive capacity. The second portion of the Resiliency Plan includes a set of adaptation strategies to reduce the impacts from climate-related hazards and increase the city's overall resilience to climate change.

1.1 CLIMATE CHANGE MITIGATION AND ADAPTATION

The effects of climate change are already being experienced today. The combustion of fossil fuels, among other human activities, since the Industrial Revolution in the 19th century has introduced greenhouse gases (GHGs) into the atmosphere at an increasingly accelerated pace, intensifying the greenhouse effect and leading to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming. Climate change has more recently become a priority issue on an international, national, and local scale as recent climate data reveal more extreme weather patterns, increased average global temperatures, and the rapid melting of the Earth's Artic and Antarctic poles and glaciers.

The Intergovernmental Panel on Climate Change (IPCC), the international body charged with compiling and interpreting the data surrounding climate change, estimates that global average temperatures will increase by 3.7 degrees Celsius (°C) (6.7 to 8.6 degrees Fahrenheit [°F]) by the end of the century unless additional efforts to reduce GHG emissions are made (IPCC 2014). A more recent IPCC report indicates that average global temperatures will likely increase by 1.5 °C (2.7 °F) between 2030 and 2052 if global GHG emissions continue their current rate (IPCC 2018). There is consensus among the scientific community that a 1.5 °C (2.7 °F) rise in global temperatures will likely cause catastrophic environmental disasters in certain locations including extreme heat, sea-level rise, and more severe and damaging precipitation events (IPCC 2018).

In August 2021, IPCC released the Six Assessment Report, which highlights key new insights into the importance of global climate tipping points, thresholds in the global climate (e.g., global temperatures) that, when exceeded, can lead to large changes in the state of the climate system with one impact rapidly leading to a series of cascading events with vast repercussions. The Six Assessment Report also notes that under the best-case scenario, in which global emissions peak in the 2020s and decline to net zero around 2050 followed by varying levels of net negative emissions thereafter, global temperatures are still more likely than not to exceed 1.5 °C between 2021 and 2040 (IPCC 2021). The Six Assessment Report contains the IPCC's strongest warnings to date on the causes and impacts of climate change. Importantly, the report notes that, in terms of solutions, "We need transformational change operating on processes and behaviors at all levels: individual, communities, business, institutions and governments. We must redefine our way of life and consumption" (IPCC 2021).

According to California Natural Resources Agency's (CNRA's) *Safeguarding California Plan: 2018 Update*, California experienced the driest 4-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2014 and 2015 (CNRA 2018). According to the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration, 2016, 2017, and 2018 were the hottest recorded years in history (NOAA 2019). In contrast, the northern Sierra Nevada experienced one of its wettest years on record during the 2016-2017 water year (CNRA 2018). While it remains imperative that global GHG emissions be reduced, it is equally important for communities to invest in climate change adaptation policy planning to improve resilience to extreme climate events. Current climate projections show that the impacts of climate are largely irreversible through the year 2050, regardless of whether global GHG emissions are reduced before this period (CalOES 2020).

Efforts that focus on reducing the sources of climate change are termed climate change mitigation, GHG mitigation, or climate action. Efforts to reduce harm from the effects of a changing climate, the focus of this report, are referred to as climate adaptation and resilience. Figure VA-1 illustrates the relationship between these two approaches. State law requires communities to address climate change mitigation in local planning and environmental review processes and climate adaptation in local long-range planning processes, such as general plans (CalOES 2020).

Source: CalOES 2020, adapted by Ascent Environmental in 2021

Figure VA-1 Relationship Between Climate Mitigation and Adaptation

1.2 GUIDANCE DOCUMENTS

This section provides a summary of the guidance documents and resources that were used to help develop the vulnerability assessment and adaptation strategies included in this Resiliency Plan.

California Adaptation Planning Guide

The most recent version of the California Adaptation Planning Guide (APG) was released in March 2020. This guidance builds upon the first iteration of the APG released in 2012. The APG was developed by the California Office of Emergency Services (CalOES) and CNRA. The APG provides guidance to local governments for adaptation and climate change resiliency planning. The APG includes a step-by-step process that communities may use to help plan for the impacts of climate change. The APG is designed to be flexible and guide communities through an adaptation planning process that is best suited for their needs. The APG served as the formal guidance document for preparation of this Resiliency Plan (CalOES 2020).

California's Fourth Climate Assessment

CNRA, the Governor's Office of Planning and Research (OPR), and the California Energy Commission (CEC) prepared *California's Fourth Climate Change Assessment* (Climate Assessment) in 2018. The Climate Assessment was designed to address critical information gaps that decisionmakers at the State, regional, and local levels need to close to protect and build the resilience of people, infrastructure, natural systems, working lands, and waterways from climate-related impacts. The Climate Assessment is referenced throughout this report to provide information regarding regional climate change impacts.

Safeguarding California Plan

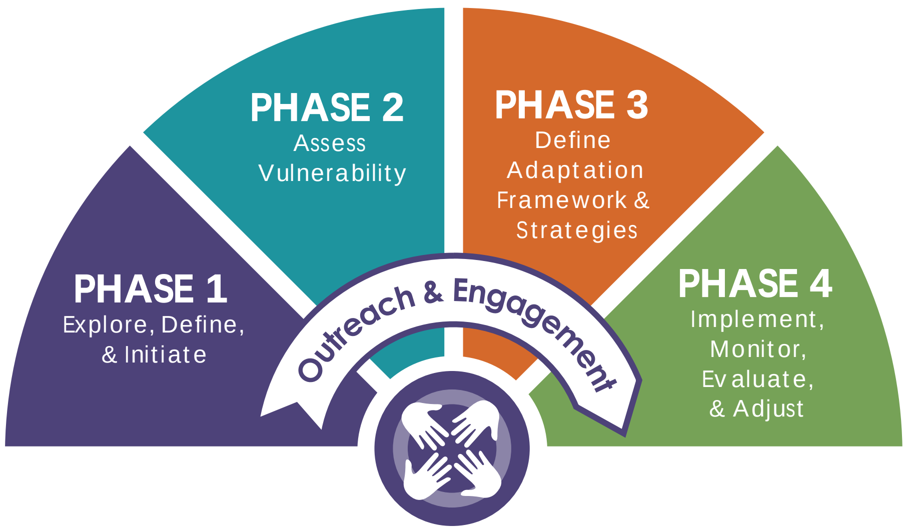
Alongside the update to the Climate Assessment, CNRA released the *Safeguarding California Plan* in 2018 which provides a roadmap for State government action to build climate resilience. The *Safeguarding California Plan* identifies actions the State government will take to protect communities, infrastructure, services, and the natural environment from climate change impacts and includes strategies for use as local examples for climate adaptation. The *Safeguarding California Plan* is referenced in this report to provide guidance on assessing the city's vulnerability to climate change and the development of adaptation strategies.

Santa Clara County and City of Milpitas Regional Planning Efforts

In addition to State adaptation efforts, the County of Santa Clara, the City, and other supporting agencies have developed planning documents focused on local and regional adaptation to climate-related hazards. These planning documents analyze existing hazards and include strategies or guidelines to mitigate the severity of climate impacts. The County of Santa Clara's *Operational Area Hazard Mitigation Plan* (OAHMP), the City's *General Plan 2040*, and the City's *2013 Climate Action Plan* (CAP) were used to support the development of this Resiliency Plan. Other agency documents considered and reviewed for the purpose of developing this Resiliency Plan include the *California's Fourth Climate Change Assessment Report: San Francisco Bay Area Region Report* (Climate Change Assessment Report San Francisco Region), the California Department of Transportation's (Caltrans') *Climate Change Vulnerability Assessment 2017 District 4 Technical Report* (District 4 Technical Report), the Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG) *Plan Bay Area: 2040 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS), the City's *2015 Urban Water Management Plan* (UWMP), the Bay Area Climate Adaptation Network's (BayCAN's) *Equitable Adaptation Resource Guide*, the City's *Water Infrastructure Risk and Resilience Assessment*, and the Adapting to Rising Tides (ART) *Bay Area Sea Level Analysis and Mapping Project* data.

1.3 ADAPTATION PLANNING PROCESS

The APG provides guidance for communities throughout the state in planning for and adapting to the impacts of climate change. The APG includes a four-phase process, illustrated in Figure VA-2 which allows communities to assess their specific climate vulnerabilities and provides guidance on developing strategies to reduce climate change-related risks and prepare for current and future impacts of climate change.



Source: CalOES 2020, adapted by Ascent Environmental in 2021

Figure VA-2 Adaptation Planning Process

- **Phase 1, "Explore, Define, and Initiate,"** includes scoping and defining the adaptation planning effort. Phase 1 also involves identifying key roles and stakeholders in the local government and throughout the community to contribute to the planning process. Potential climate change effects and important physical, social, and natural assets in the community are identified for further analysis. Phase 1 is discussed in Section 1, "Introduction," of this report.
- **Phase 2, "Assess Vulnerability,"** includes an analysis of potential climate change impacts and adaptive capacity to determine the vulnerability of populations, natural resources, and community assets. The vulnerability assessment is composed of four steps: exposure, sensitivity and potential impacts, adaptive capacity, and vulnerability scoring. Phase 2 also integrates stakeholder and public input to provide a comprehensive assessment of the community's sensitivity to climate change and its ability to adapt. Phase 2 is addressed in Section 2, "Vulnerability Assessment" of this report.
- **Phase 3, "Define Adaptation Framework and Strategies,"** focuses on creating an adaptation framework and developing adaptation strategies based on the results of the vulnerability assessment. Adaptation strategies identify how the community will address the potential for harm based on the community's resources, goals, values, needs, and regional context. Community input is needed to prioritize adaptation strategies, identify co-benefits of strategies, and determine implementation steps. Phase 3 is discussed in Section 3, "Adaptation Framework," of this report.
- **Phase 4, "Implement, Monitor, Evaluate, and Adjust,"** the adaptation framework is implemented, consistently monitored, evaluated, and adjusted based on continual learning, feedback, or triggers. The adaptation planning process is intended to be cyclical in nature. Phase 4 is not included within this report, as it is not required for compliance with Senate Bill (SB) 379 and because the City already has processes in place to monitor and evaluate its planning efforts. Furthermore, the adaptation goals and strategies in this report will be included in the City's CAP Update which will contain a chapter that enumerates implementation planning policies. This section of the CAP Update will guide the implementation, monitoring, and evaluation of the adaptation policies.

The ultimate goal of the adaptation planning process is to improve community resilience in the face of a changing climate. A resilient community is one that is prepared for current and future hazardous conditions and experiences less harm when a disaster happens. Resilient communities can prepare for and recover from hazards with an understanding that the climate is going to continue to change in predictable and unforeseen ways. Ongoing learning and monitoring of strategy implementation allow for adjustments to be made in response to new information and opportunities.

1.4 PUBLIC OUTREACH AND STAKEHOLDER ENGAGEMENT

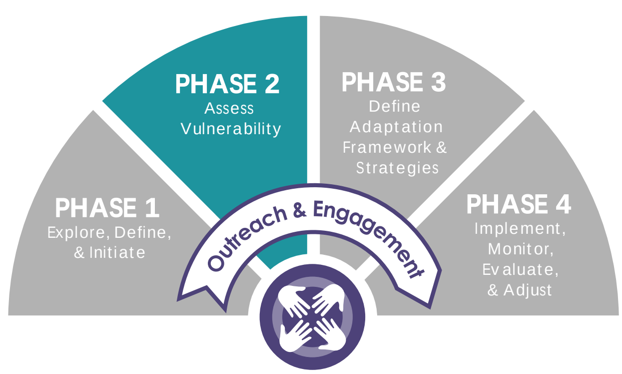
As part of the CAP planning process, several community outreach events were conducted to gain feedback on initial findings from the vulnerability assessment and input on adaptation strategy ideas and priorities that should included in the final CAP. Listed below is the list of community outreach activities conducted, specific to climate vulnerabilities and adaptation.

- CAP Steering Committee Meeting – On March 1, 2021, a meeting was held with the City's CAP Steering Committee to discuss initial findings from the vulnerability assessment, existing climate adaptation efforts the City, and preliminary adaptation strategies.
- Energy and Environmental Sustainability Commission Meeting – On May 19, 2021, a meeting was held with the City's Energy and Environmental Sustainability Commission to discuss initial findings from the vulnerability assessment, climate adaptation priorities, and preliminary adaptation strategies.
- Milpitas High School Workshop – In May 2021, the City hosted a workshop with students from Milpitas High School to discuss climate concerns and potential strategies to be included in the CAP.
- Farmer's Market Booth – On July 25, 2021, the City hosted a pop-up booth at the Milpitas Farmer's Market to gauge public perception of preliminary CAP strategies and identify barriers to personal climate choices.
- CAP Feedback Survey – The City has published an online survey through the CAP Dashboard to gain feedback from the public about the CAP and priorities for addressing climate change.

2 VULNERABILITY ASSESSMENT

This section provides a comprehensive assessment of the city's vulnerabilities to climate change. It identifies and characterizes the climate-related hazards and other climate effects that are anticipated to affect the city. The vulnerability assessment follows the process outlined in Phase 2 of the APG and is composed of the following four steps:

- Exposure: The purpose of this step is to understand existing hazards within the city and how changes in climate variables (e.g., average temperature, precipitation) are projected to affect these hazards. Existing hazards that can be worsened by the effects of climate change are identified and described, based on historical data from sources such as the OAHMP. Climate projection data are used to develop projections for how existing hazards are expected to change by mid-century (2035–2064) and late-century (2065–2099).



- **Sensitivity and Potential Impacts:** This step identifies a list of population groups and community assets that are sensitive to localized climate impacts. Climate-related hazards (e.g., flooding, wildfire) are generally projected to increase in severity, with the potential for climate change to generate new impacts that communities have not experienced historically. Using historical data, research from regional and State reports on climate impacts, and input from stakeholders, this step seeks to understand how sensitive populations and assets may be affected by climate impacts.
- **Adaptive Capacity:** The City, partner agencies, and regional organizations have already taken steps to build resilience and protect sensitive populations and assets from existing hazards. Thus, the purpose of this step is to identify the City's and partner agencies' current capacity to address future climate impacts, referred to as adaptive capacity. The ability of the City to adapt to each of the identified climate impacts is determined through a review of existing plans, policies, and programs, and through stakeholder engagement.
- **Vulnerability Scoring:** This step determines the city's priority climate vulnerabilities through a vulnerability scoring process. Vulnerability scores are based on several factors including the severity of projected climate impacts, how sensitive certain populations and assets are to anticipated climate impacts, and whether sufficient adaptive capacity exists to manage future climate impacts.

The vulnerability assessment helps the city understand which climate vulnerabilities are most urgent and should be prioritized during the adaptation strategy development phase, outlined in Section 3, "Adaptation Framework and Strategies", as well as during strategy implementation.

2.1 EXPOSURE

The city encompasses an area of approximately 18 square miles (35 kilometers [km]), extending between the south end of the San Francisco Bay and the Los Buellis Hills of the Mount Diablo Range in northern Santa Clara County. The city spans across a diverse topographic area with elevations ranging from sea level to about 2,600 feet near Monument Peak. The topography can be divided into two distinct sub-areas referred to as the Valley Floor and the Hillside, each characterized by landscapes that are prone to specific hazards.

The Hillside occupies the eastern half of the city's topography, is much steeper than the Valley Floor, and is characterized by open space with chaparral and native grasses with some scattered pockets of residences. The Valley Floor supports most of the development in the city and is characterized as low-lying and urban.

During winter, temperatures in the city range from 31 °F to 59 °F. Showers and cloudy days come and go during this season and produce most of the city's annual 15 inches (380 millimeters) of precipitation, with precipitation tapering off in the spring. The summer months are dry and warm but cooler than other parts of the Bay Area. Temperatures can reach over 100 °F with most days in the mid- to high-70s. From June to September, the city experiences little rain, and as autumn approaches, the temperature gradually cools down.

This section summarizes existing hazards in the city and describes the projected changes in climate variables that are anticipated to exacerbate these hazards.

Existing Hazards

The OAHMP provides a comprehensive summary of climate-related hazards that affect Santa Clara County, as well as geographic-specific hazards that affect the city. Unlike the majority of the Bay Area, the city is not at high risk from sea-level rise, wildfire, or days where temperatures exceed 100 °F. According to the OAHMP, the city's risk of wildfire has a risk rating score of zero. The city is not located within a Wildland-Urban Interface (WUI) zone according to the Santa Clara County Planning Office's *Santa Clara County Wildland Urban Interface Fire Area* map (Santa Clara County 2009). However, eastern portions of the city including the Milpitas Hillside and the eastern boundary of the city is located adjacent to the wildland urban interface and located in the "moderate" fire hazard severity zone as designated by the California Department of Forestry and Fire Protection (CAL FIRE). Indirect impacts associated with degraded and harmful air pollution from regional fires have historically affected the livelihood and health of the city's citizens. Additionally, during the 2020 wildfires in east portions of the San Francisco Bay Area, the city was under evacuation warnings although an evacuation order was never implemented. About half of the city's Valley Floor lies within one of the Special Flood Hazard Areas; almost all land west of the Southern Pacific Railroad lies within the 100-year flood zone and all land west of Highway 680 is part of the 500-year flood zone.

Climate Change Effects

In Phase 1 of the adaptive planning process, climate change effects are described and projected for the mid- and late-century periods. Climate change effects are categorized as primary (direct) and secondary (indirect). Primary effects are those that are caused by the initial impacts of increased GHG emissions, from which secondary effects result. The primary climate change effects analyzed for the city include changes in average temperature and annual precipitation. The secondary effects, which can occur because of individual changes or a combination of changes in the primary effects, include human health hazards, drought, extreme heat events, extreme precipitation and flooding, landslides, wildfires, and sea-level rise.

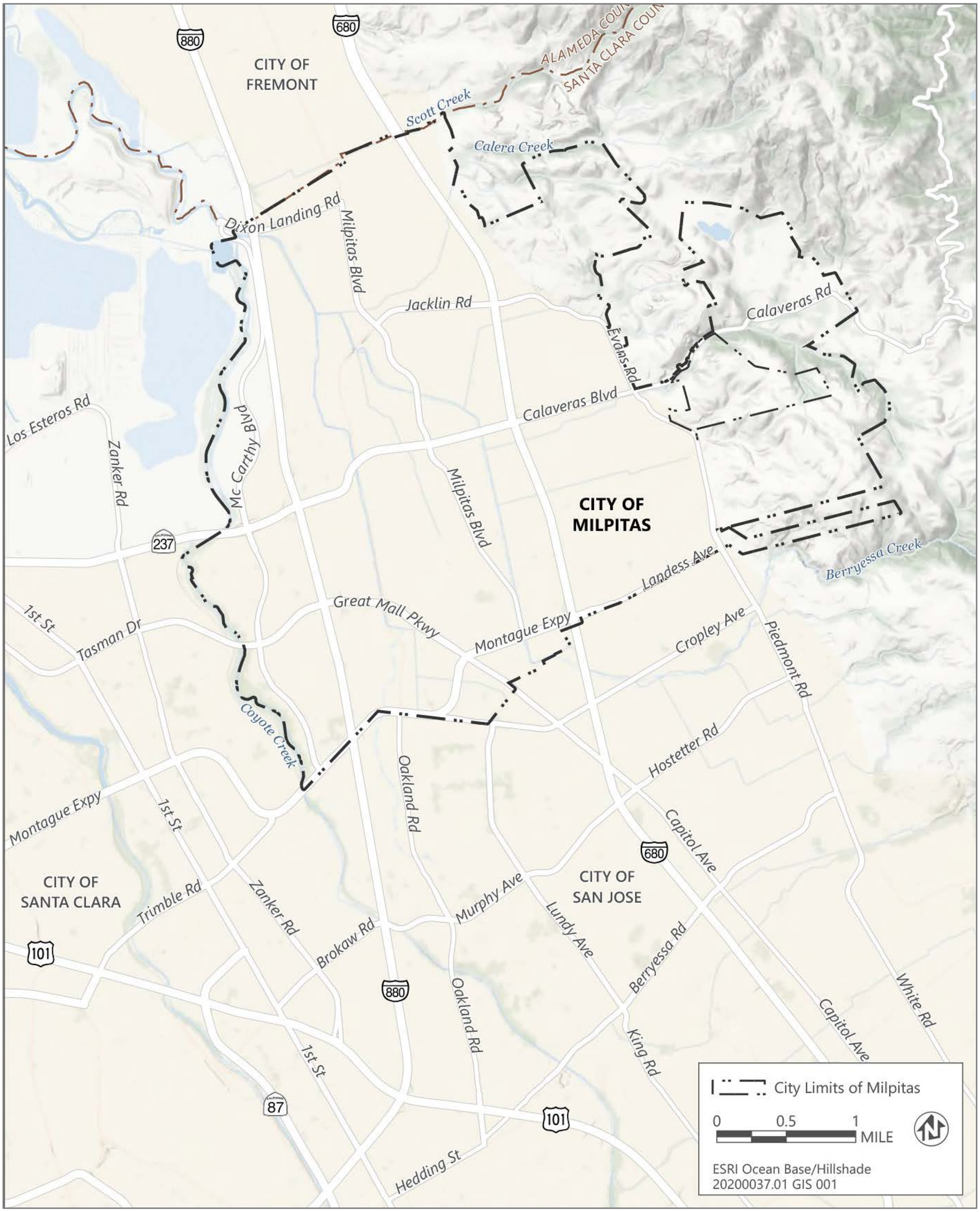
Though the precise extent of future climate change effects is uncertain, historical climate data and forecasted GHG emissions can be used to project climate change effects for the mid-century (2035-2064) and late-century (2065-2099) periods. To assess potential effects from climate change, the APG recommends using Cal-Adapt, a tool developed by CEC and the University of California, Berkeley's Geospatial Innovation Facility that uses global climate simulation model data to identify how climate change might affect various geographies in California.

Cal-Adapt addresses the uncertainty in future GHG emissions by using Representative Concentration Pathways (RCPs) developed by IPCC. The RCP scenarios used in the Cal-Adapt tool are the RCP 8.5 scenario, which represents a business-as-usual future emissions scenario that would result in atmospheric carbon dioxide (CO_2) concentrations exceeding 900 parts per million (ppm) by 2100, and the RCP 4.5 scenario, which represents a lower GHG emissions future and likely the best-case scenario for climate impacts, under which GHG emissions would peak in 2040 and then decline through the rest of the century, resulting in a CO_2 concentration of about 550 ppm by 2100. The emissions scenarios depend on global GHG emissions trends in the future and the efficacy of global GHG reduction strategies proposed by the international community. Because the efficacy of the GHG reduction strategies and the likelihood that a certain RCP scenario will occur are uncertain, a discussion of both emissions scenarios and their subsequent impacts are included in this analysis.

Cal-Adapt also includes 10 global climate models, downscaled to local and regional resolution using the Localized Constructed Analogs statistical technique. Four of these models have been selected by California's Climate Action Team Research Working Group as priority models for research contributing to California's Climate Assessment. Projected future climate from these four models can be described as producing:

- a warm/dry simulation (HadGEM2-ES),
- a cooler/wetter simulation (CNRM-CM5),
- an average simulation (CanESN2), and
- the model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5).

To analyze climate projections for the city, the average global climate model (CanESM2) was chosen, as it represents an average scenario. As noted previously, most of the data presented in Cal-Adapt have been downscaled to grid cells that are 6 km by 6 km in size. The city is approximately 35 kilometers squared (km^2), which is nearly equal to the grid cell sizes provided by Cal-Adapt (i.e., 36 km^2). Therefore, the Cal-Adapt option to evaluate climate change impacts for the incorporated census tract for the city will be used in this analysis. Figure VA-3 shows the study area (the city's boundaries) to assess climate change impacts.



Source: Data downloaded from Santa Clara County in 2020

Figure VA-3 Study Area

PRIMARY CLIMATE CHANGE EFFECTS

Increased Temperatures

According to Cal-Adapt, the historic (1961-1990) annual average maximum temperature for the study area was 68.3 °F, and the historic annual average minimum temperature was 48.2 °F. As shown in Table VA-1, both annual average maximum and minimum temperatures are projected to increase by mid-century and further increase by the end of the century under both emissions scenarios. The annual average maximum temperatures in the city are projected to be 72.8 °F by mid-century (2035–2064) and 73.7 °F by the late-century period (2065–2099) under the medium-emissions scenario. Under the high-emissions scenario, the annual average maximum temperature in the study area is projected to be 73.7 °F by mid-century (2035–2064) and 77.1 °F by the late-century period (2065–2099) (CEC 2021a). This equates to an increase in temperature of approximately 1.5 to 4.3 °F by the end of the century, depending on a medium- or high-emissions scenario (CEC 2021a).

Table VA-1 Changes in Annual Average Temperature in the City of Milpitas

Average Annual Temperature (°F)	Historic Average Annual Temperature (1961-1990)	Medium-Emissions Scenario (RCP 4.5)		High-Emissions Scenario (RCP 8.5)	
		Mid-Century (2035–2064)	End of Century (2065–2099)	Mid-Century (2035–2064)	End of Century (2065–2099)
Maximum Temperature	68.3	72.8	73.6	73.7	77.1
Minimum Temperature	48.2	52.4	53.3	53.5	56.9

Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway.

Source: CEC 2021a

Changes in Precipitation Patterns and Storm Events

According to the Climate Change Assessment San Francisco Region Report, precipitation patterns in California oscillate between extremely dry and wet periods (OPR, CEC, and CNRA 2018b). Climate models predict that precipitation volatility will intensify in future years in the Bay Area. Dry years are likely to become even drier, while wet years will become even wetter in the next several decades. Additionally, sea-level rise occurring in the region will result in saltwater intrusion into groundwater resources.

According to Cal-Adapt, the historic annual average (1961–1990) precipitation in the city has been 15.6 inches. As shown in Table VA-2, the total annual precipitation in the city is projected to be 17.6 inches by mid-century (2035–2064) and 17.7 inches by the late-century period (2065–2099) under the medium-emissions scenario. Under the high-emissions scenario, the annual average precipitation in the city is projected to be 17.8 inches by mid-century (2035–2064) and 19.4 inches by the late-century period (2065–2099) (CEC 2021a).

Alongside changes in total annual precipitation, the city is projected to experience increases in the size of large storm events under both the RCP 4.5 and RCP 8.5 scenarios. As shown in Table VA-2, the historic total 2-day rainfall during a 50-year storm event (i.e., a large storm that has a 2 percent chance of occurring in any given year) in the city is 10.7 inches. Under the medium-emissions scenario, this rainfall is projected to decrease slightly to 10.2 inches by mid-century (2035–2064) but increase to 11.3 inches by the late-century period (2065–2099). Under the high-emissions scenario, the rainfall during these events is projected remain at 10.7 inches by mid-century (2035–2064) and increase significantly to 14.1 inches by the late-century period (2065–2099) (CEC 2021a). Notably, while annual precipitation is projected to increase, increases in annual rainfall will largely occur during larger storm events rather than gradual increases in rainfall throughout the year. In current practice, the stormwater management systems in urban areas are modeled to manage large storm events based on characteristics of rainfall specific to the region from observed historical data. If these historic rainfall intensities are exceeded, as is projected in the future, stormwater management systems can be compromised and affect the performance of the City's stormwater management and flood protection systems.

Table VA-2 Changes in Annual Average Precipitation in the City of Milpitas

Average Annual Precipitation	Historic Average Annual Temperature (1961-1990)	Medium-Emissions Scenario (RCP 4.5)		High-Emissions Scenario (RCP 8.5)	
		Mid-Century (2035–2064)	End of Century (2065–2099)	Mid-Century (2035–2064)	End of Century (2065–2099)
Average Annual Precipitation	15.6	17.6	17.7	17.8	19.4
50-Year Storm Event[1]	10.7	10.2	11.3	10.7	14.1

Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway.

1. 2-day rainfall in the Lower Coyote Creek-Frontal San Francisco Bay Estuaries Watershed.

Source: CEC 2021a

SECONDARY CLIMATE CHANGE EFFECTS

Human Health Hazards

Climate change is closely linked to human health and public safety. In addition to direct impacts on public health and safety from drought, extreme heat, flooding, landslides, wildfires, and sea-level rise, several indirect impacts threaten public health and safety. Some of the potential impacts on public health are listed below.

- Climate change could increase disparities in vulnerable communities, which are often already experiencing disproportionate pollution burden and environmental impacts.
- Extreme heat and wildfires can worsen air quality.
- Climate influences the spread of vector-borne infectious diseases.
- Climate-induced extreme weather events can affect mental health.

Environmental Justice Communities are generally understood as those that face disproportionate environmental impacts or pollution burdens due to socioeconomic factors or historic disadvantages (e.g., racism, income inequality) that have placed them at increased risk to environmental impacts. Environmental Justice Communities are more vulnerable to climate change, as they already face disproportionate environmental impacts and may have fewer resources to prepare for, respond to, and recover from hazard damage. Climate change is likely to increase disparities in Environmental Justice Communities. For example, low-income communities are often more likely to be located in floodplains, coastlines, or other at-risk locations susceptible to extreme weather (U.S. Global Change Research Program 2021). Environmental Justice Communities are discussed in further detail in Section 2.2, "Sensitivity and Potential Impacts."

While some populations will be more severely affected than others, all persons in the city will experience climate impacts. The San Francisco Bay Area Air Basin (SFBAAB), within which the city is located, faces challenges associated with high levels of vehicle movement resulting in emission of transportation-related air pollutants. Santa Clara County, among other southern counties located in the SFBAAB are in nonattainment for several of the national and State ambient air quality standards for ground-level ozone and particulate matter (EPA 2021). Higher temperatures, as a result of climate change, will facilitate the formation of ground-level ozone, a respiratory irritant that is a component of smog. Ground-level ozone is associated with various negative health outcomes, including reduced lung function, pneumonia, asthma, cardiovascular-related morbidity, and premature death (EPA 2013). Many of the same populations that are vulnerable to the effects of extreme heat, such as those with existing chronic health conditions and seniors and children, are also vulnerable to the effects of poor air quality.

Studies have shown climate influences the population size, geographic distribution, behavior, and reproduction of vectors (e.g., rodents, mosquitoes, ticks, fleas, and others) that transmit diseases to humans. The many factors that contribute to the incidence of vector-borne diseases, such as land use patterns and human behavior, present challenges in projecting their spread (Gubler et al. 2001). Additionally, cases of certain viruses are known to increase during warm weather. Models for North America predict increases in infectious diseases spread to humans, such as West Nile Virus carried by mosquitoes, caused by increases in temperature and decreases in precipitation (Harrigan et al. 2014). The California Department of Public Health (CDPH) estimates that several vector-borne infectious diseases will increase in prevalence in California, including malaria, dengue, encephalitis, hantavirus, Rift Valley fever, Lyme disease, chikungunya, and West Nile Virus (CDPH 2019).

Climate change can impact mental health through various pathways, including but not limited to, increases in the frequency and severity of extreme weather events and increases in economic instability. Extreme weather events such as fires and floods can have acute mental health impacts and can be linked to increases in anxiety and depression in certain populations (Kar and Bastia 2006). Climate change can also precipitate chronic impacts including negative impacts on livelihoods (e.g., increased droughts reduce profitability for farmers), leading to mental health impacts such as chronic stress and depression (Hanigan et al. 2012).

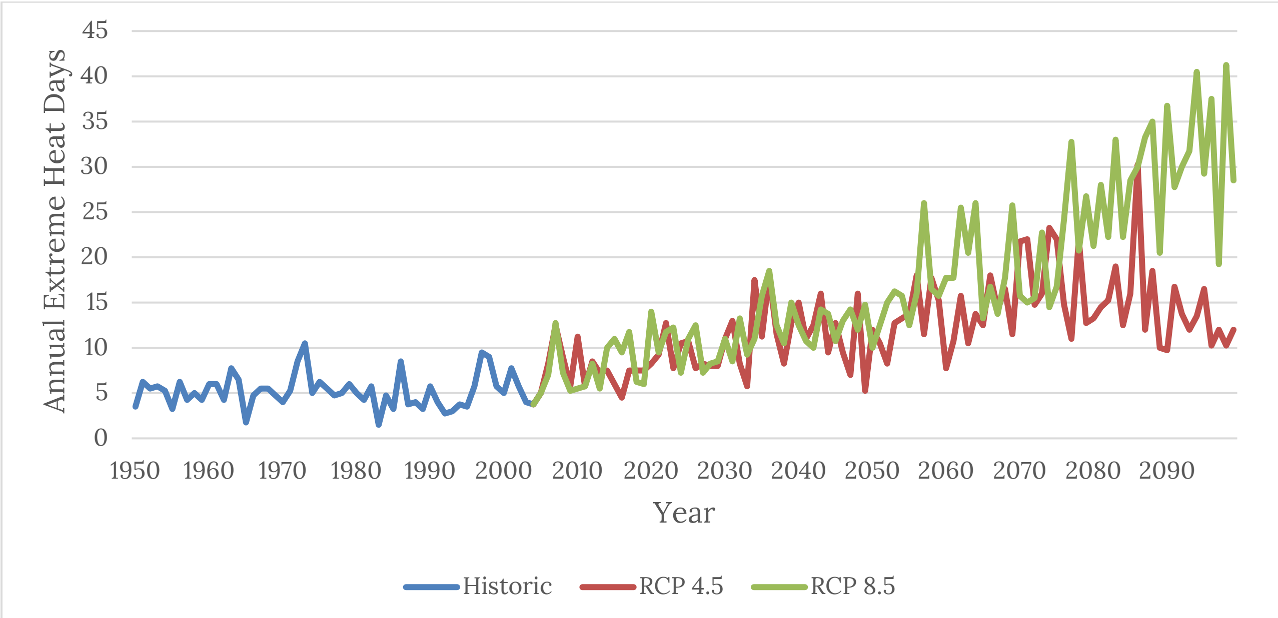
Climate change will likely increase socioeconomic disparities in communities that already experience disproportionate environmental burdens, worsen air quality, increase the spread of vector-borne diseases, and negatively affect mental health.

Extreme Heat Events

Due to its coastal location, the city is not at high risk of extreme heat events over 100 °F. However, heat is a relative effect that will impact populations differently for a number of factors. For instance, the homes of coastal communities or other locations that have historically supported moderate climates may not be equipped with heating, ventilation, and air conditioning (HVAC) systems to regulate internal temperatures during extreme heat events. The Climate Change Assessment San Francisco Region Report identifies this as a contributing factor to a high degree of risk for Bay Area residents (OPR, CEC, and CNRA 2018b:56).

The Cal-Adapt tool provides estimates of future instances of extreme heat events. Extreme heat events represent extreme heat days and heat waves. Extreme heat days occur when the daily maximum/minimum temperature exceeds the 98th historical percentile of the daily maximum/minimum temperatures between April and October. Heat waves are characterized as periods of sustained extreme heat over multiple days (i.e., four or more consecutive extreme heat days).

Based on historical data, the extreme heat day threshold in the city is defined as 91.6 °F. Historically, the city has experienced an average of four extreme heat days per year. As a result of rising annual average maximum temperatures from climate change, the study area is projected to experience up to 17 extreme heat days annually by mid-century and 20 extreme heat days by late-century under the medium-emissions scenario. Under the high-emissions scenario, the study area is projected to experience up to 15 extreme heat days annually by mid-century and 38 extreme heat days by late-century (CEC 2021b). As shown in Figure VA-4, the number of extreme heat days is projected to increase from historic averages and will continue to increase through the end of the century under both emissions scenarios.



Source: Data downloaded from Cal-Adapt, adapted by Ascent Environmental in 2021.

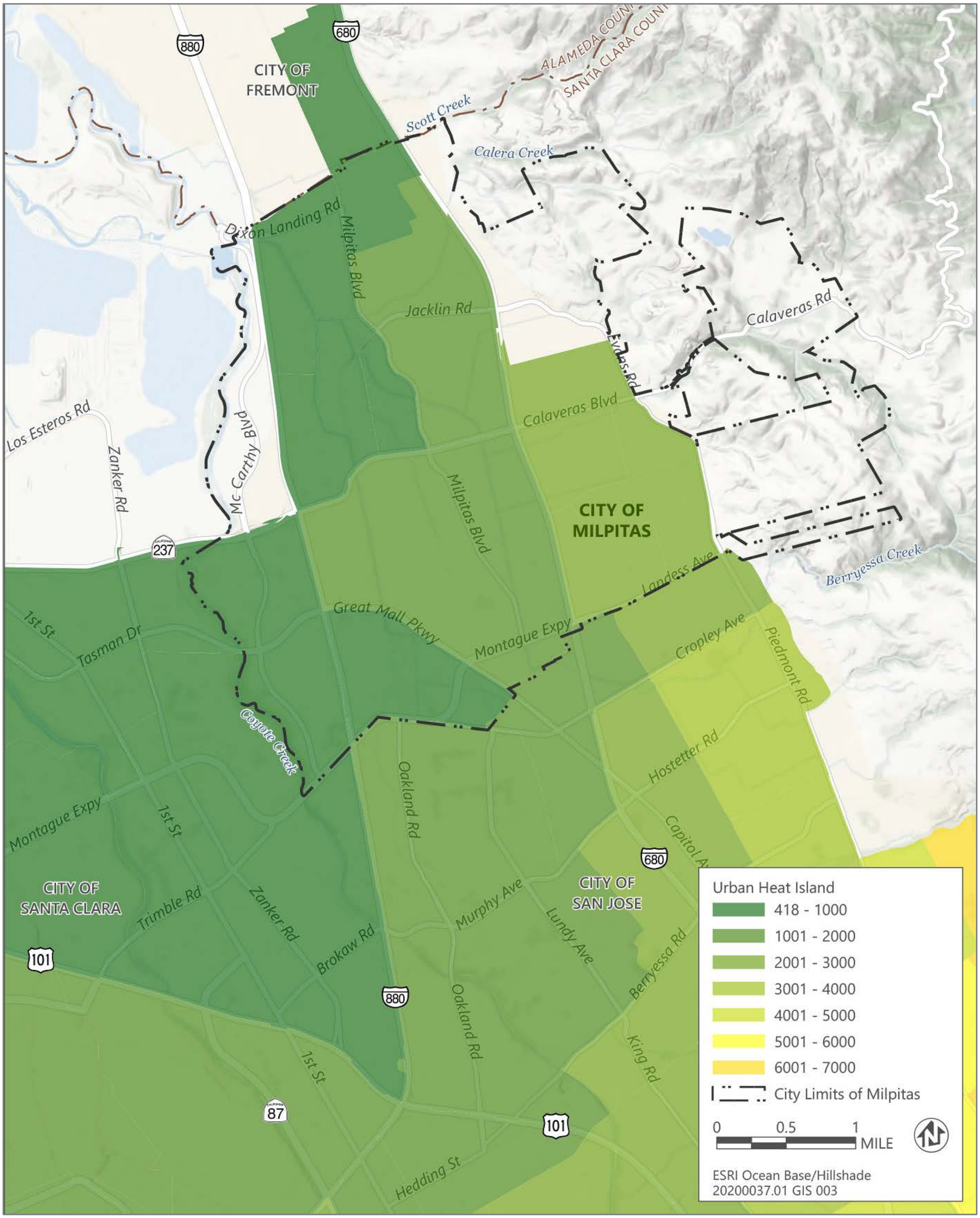
Figure VA-4 Projected Annual Extreme Heat Days

Heat wave events (i.e., four or more consecutive extreme heat days) have historically been infrequent in the study area, with fewer than one recorded per year. Based on Cal-Adapt projections, heat waves will likely continue be infrequent in the future. Under the medium-emissions scenario, the study area is projected to experience 1.3 heat waves per year by late century. Under the high emissions scenario, the study area is projected to experience 1.4 heat waves per year by mid-century and 3.2 heat waves per year by late-century (CEC 2021c).

The Urban Heat Island (UHI) effect is generally understood as the phenomenon of urban areas being significantly warmer than surrounding rural areas because of human activity and land use patterns in the built environment. Several factors contribute to the effect, with the primary cause being changes in land surfaces (EPA 2008). Urban heat islands are created by a combination of heat-absorptive surfaces (e.g., dark pavement and roofing), heat-generating activities (e.g., automobile engines and industrial generators), and the absence of "green spaces" (i.e., vegetative surfaces which provide evaporative cooling). During extreme heat days and heat waves, asphalt and darker surfaces can increase temperatures in the day and reduce nighttime cooling (as retained heat is released from heat-absorbing surfaces).

In 2015, the California Environmental Protection Agency (CalEPA) released a study that defines and examines the characteristics of the UHI and scientifically assigns a score based on atmospheric modeling for each census tract in and around most urban areas throughout the state, resulting in a UHI index for these areas. The UHI index is calculated as a temperature differential over time between an urban census tract and nearby upwind rural reference points at a height of two meters above the ground, where people experience heat. Due to coastal wind patterns and its location in the Bay Area, the city's score on the UHI index is lower than in other urban portions of the region. Figure VA-5 shows CalEPA's UHI Map for the city. The color gradient in the map illustrates approximate average temperature difference between rural and urban areas in the region, with green representing the smallest temperature differential and red representing the greatest temperature differential. As shown in Figure VA-5, most of the city is characterized as green, which represents a low UHI index.

As temperatures continue to increase from climate change, extreme heat days and heat wave events are likely to occur more frequently. In addition, populations and assets in urban areas are more susceptible to higher temperatures due to the prevalence of paved surfaces and lack of evaporative cooling from vegetation. This increased exposure to higher temperatures is a public health risk and may increase stress on sensitive infrastructure.



Source: Data downloaded from Santa Clara County in 2020 and CalEPA in 2020

Figure VA-5 California Environmental Protection Agency's Urban Heat Island Map for the San Francisco Bay Area

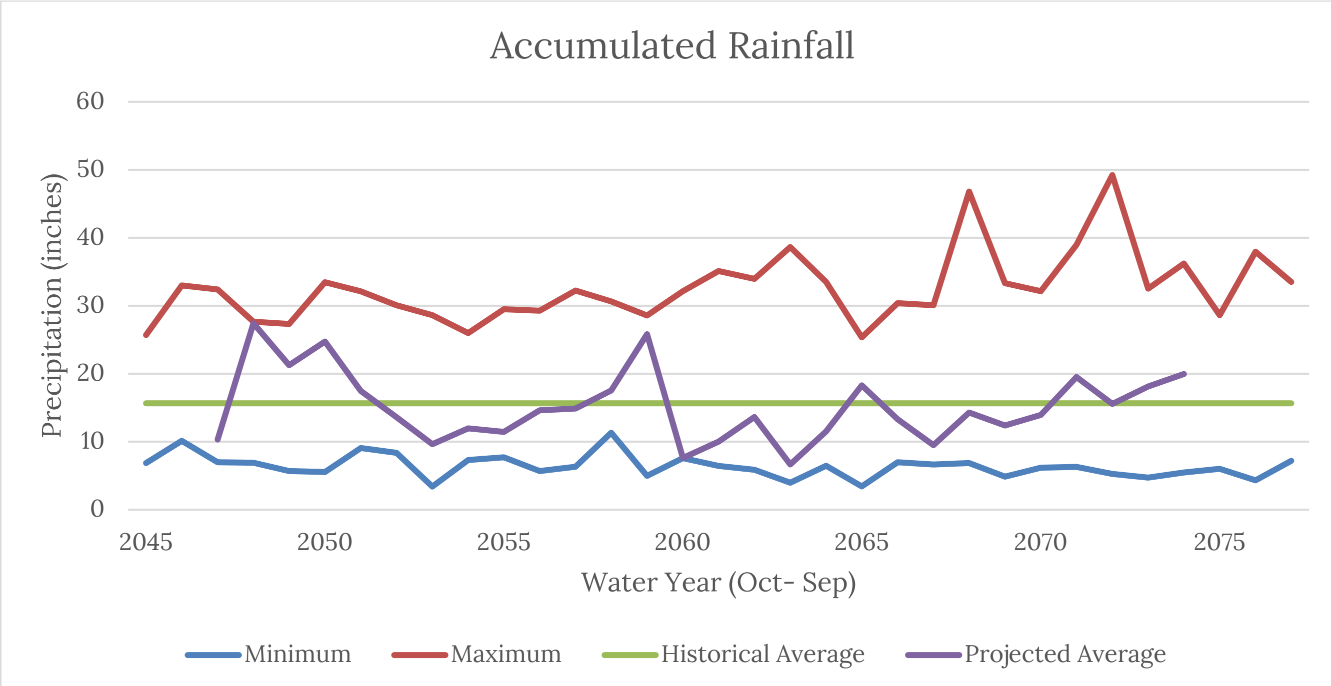
Drought and Water Supply

The city's water supply is generated from multiple locations and sources. The city is supplied by two potable water wholesalers, the San Francisco Public Utilities Commission (SFPUC) and the Santa Clara Valley Water District (SCVWD). SFPUC receives its water from an intricate water system sourced by waters of the Hetch Hetchy Reservoir in Yosemite National Park. The water flows through the San Joaquin Valley where it is distributed to the users of San Francisco, San Mateo, and Santa Clara counties, including the city. SCVWD provides water from a combination of surface and groundwater resources. A large percentage of SCVWD's water supply is supplied by the Sacramento River and its tributaries, which flow into the Sacramento-San Joaquin River Delta (Delta). Approximately 15 percent of SCVWD's water supply is sourced from groundwater with plans to increase groundwater extraction in the future. Additionally, a small, but growing portion of SCVWD's water supply is recycled water (SCVWD 2016). The city also receives some recycled water from South Bay Water Recycling (SBWR), which originates from the San Jose-Santa Clara Regional Wastewater Facility (RWF).

Snowpack in the Sierra Nevada Mountains of Northern California plays a critical role in water supply for the region, including the city, replenishing the watersheds and reservoirs used as water resources throughout the state. Due to increases in climate variability and rising temperatures, California has already seen signs of decreased snowmelt in Northern California: snowpack in the Sierra Nevada is expected to decline by as much as 33 percent by mid-century and 66 percent by end of century, relative to historic baseline snowpack (OPR, CEC, and CNRA 2018c). Warmer temperatures have also caused California snowpack to melt faster and earlier in the year. This change in California's snowpack disrupts the normal timing of groundwater and surface water recharge and makes it harder to store and use during hotter times of the year or during drought conditions. Reduced snowpack and earlier snowmelt will lead to more frequent water shortages and less water available in the Delta and other water supply systems. This lack of a reliable imported water supply may place stress on the city's water supply resources as these waters are equitably distributed throughout the state (City of Milpitas 2016).

In addition to the surface water derived from the Hetch Hetchy Reservoir and the Delta, the city relies on portion of its water supply from local sources such as groundwater. As stated above, of the SCVWD's water supply portfolio, groundwater makes up about 15 percent, and could be affected by projected changes in annual precipitation. The Sustainable Groundwater Management Act (SGMA) regulates groundwater and requires governments and water agencies of high- and medium-priority basins to develop groundwater sustainability plans. These plans are intended to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge by 2040 for critically over-drafted basins and by 2042 for the remaining high- and medium-priority basins. SCVWD, the district that supplies groundwater to the city, pumps its groundwater from the Santa Clara (medium-priority) and Llaga (high-priority) subbasins, which are both located entirely in Santa Clara County. Future periods of drought may result in greater overdraft of these basins.

As shown in Table VA-2 above, under both the medium- and high-emissions scenarios, the city is not expected to experience significant overall changes in average precipitation. However, the city will experience increased variability in precipitation. The city and state have a highly variable climate that is susceptible to prolonged periods of drought. Recent research suggests that extended drought occurrence (a "mega-drought") could become more pervasive in future decades (CEC 2021c). An extended drought scenario is predicted for all of California from 2051 to 2070 under the HadGEM2-ES simulation and high-emissions scenario. The extended drought scenario is based on the average annual precipitation over 20 years. This average value equates to 78 percent of the historic median annual precipitation averaged for the North Coast and Sierra regions. As shown in Figure VA-6, the city's observed historical average annual rainfall accumulation is 15.6 inches. Under the anticipated drought scenario between 2051 and 2070, the city's average annual rainfall accumulation would decrease to 13.4 inches (CEC 2021c). Predicted drought conditions due to climate change will result in stress on reliable water supply and will likely result in water shortages. During extended drought periods, alternative local water storage methods will increasingly be relied upon.



Source: Data downloaded from Cal-Adapt, adapted by Ascent Environmental in 2021

Figure VA-6 Projected Late Century Drought Conditions

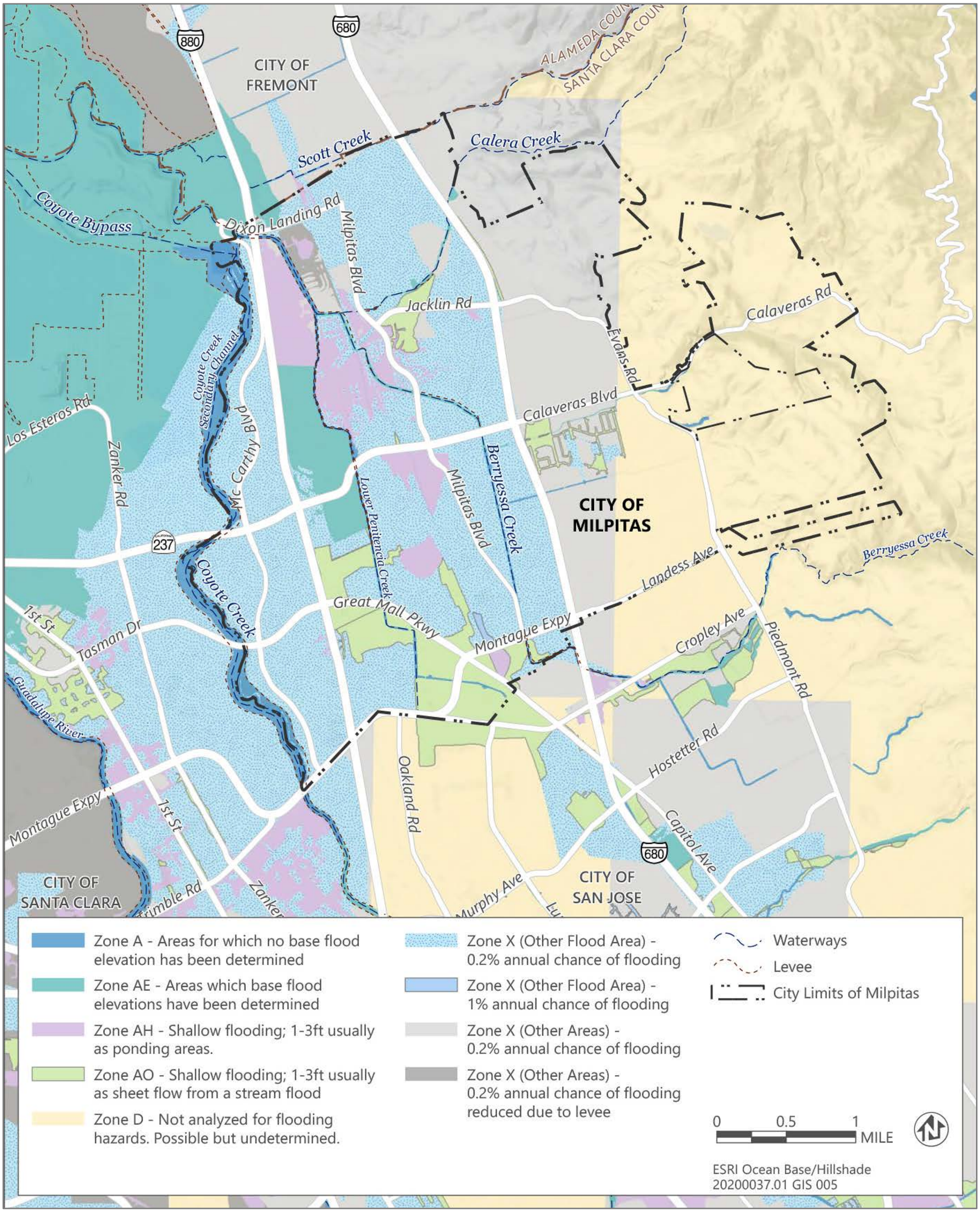
Extreme Precipitation and Flooding

Variability in the climate is likely to result in changes to the frequency, intensity, and duration of precipitation events causing heavy rainfall, thunderstorms, and hail. Like other California regions, the high year-to-year variability of precipitation in the city is severely affected by extreme precipitation events (i.e., days having precipitation at or exceeding the 95th percentile), which accounts for 80 percent of the year-to-year variability (Jennings et al. 2018). Most of the heaviest precipitation events occur during the winter months. It is predicted that the state will experience prolonged periods of drought followed by multi-year wet periods.

Historically, the city experienced an average of one extreme precipitation events per year. An extreme precipitation event is defined as the lowest value from an annual-maximum value over a 2-day period. For the city, this would be 1.05 inches of rainfall over a 2-day period. Under the medium-emissions scenario, the city is expected to experience two extreme precipitation events per year by mid-century and two extreme precipitation events per year by the late-century period. Under the high-emissions scenario, the city is expected to experience two extreme precipitation events per year by mid-century and three extreme precipitation events per year by the late-century period (CEC 2021d).

Extreme precipitation in the city typically occurs in the form of rainstorms driven by atmospheric rivers. An atmospheric river is a narrow band of the atmosphere that transports large amounts of water vapor and produces heavy precipitation across California during the winter months (NOAA 2015). Atmospheric rivers can last for several days, bringing heavy rains to lower elevations. Climate change is projected to result in longer and wider atmospheric rivers that carry larger amounts of water vapor compared to historic conditions (Espinoza et al. 2018). Larger atmospheric rivers would result in greater precipitation volumes and more frequent thunderstorms and hail, which can cause flooding and high winds, damaging infrastructure and endangering public safety.

As shown in Figure VA-7, portions of the city are located in Federal Emergency Management Agency (FEMA) flood zones for the 100- and 500-year storm events. As more intense precipitation events occur over short periods, the city is likely to experience an increase in flood events.



Source: Data downloaded from Santa Clara County in 2020 and from FEMA in 2021

Figure VA-7 Federal Emergency Management Agency Flood Zones in the City of Milpitas

Landslides

Landslides are events where a mass of earth or rock moves down a slope, which can be triggered by both geologic (e.g., earthquake) and climatologic (e.g., high-volume precipitation events) factors. The likelihood of landslides can be significantly higher when heavy rainfall events occur after wildfires, causing increased debris flow which can clog drainage systems and compound flooding impacts. The combination of increased temperatures, increased likelihood of wildfires, and increased occurrence of extreme precipitation events could result in more frequent and larger landslides in the western portion of the city that is characterized by hillsides.

Wildfire

Wildfire risk is determined by several factors: wind speeds, drought conditions, available wildfire fuel (i.e., dry vegetation), past wildfire suppression activity, and expanding wildland-urban interface, defined as areas of human development in or near high wildfire risk areas (Westerling 2018). Climate change is expected to worsen many of the factors that contribute to wildfire risk by increasing the intensity of drought events and creating hotter and drier landscapes more susceptible to burning.

As discussed above, climate change will result in changes in precipitation patterns, increased temperature, and drought conditions. Wetter months may lead to increased vegetative growth followed by periods of drought causing the vegetative growth to dry up, creating greater amounts of fuel for fires. Climate change will also worsen existing severe wind events, which fuel the spread and intensity of wildfires. The Diablos wind events occur during the autumn months resulting from air dropping from the Great Basin deserts of Nevada and Utah. Once the Diablos winds reach Northern California, they are hot, dry, and forceful. These winds have caused some of the region's most damaging wildfires occurring in Northern California including the Santa Clara Unit (SCU) Lightening Complex fire, which consumed approximately 400,000 acres of land in Santa Clara, Alameda, Contra Costa, San Joaquin, Merced, and Stanislaus Counties in August 2020 (CAL FIRE 2021). While future wind events are predicted to decrease, the intensity of a severe wind event over a shorter amount of time is predicted to increase (OPR, CEC, and CNRA 2018b).

Cal-Adapt provides projections for annual mean hectares burned within fire-prone areas within the state; the city is not located in an identified high-fire hazard area, thus, Cal-Adapt does not provide projections for future fire activity in the city (Santa Clara County 2009). Nevertheless, while wildfire risk may not directly occur within the city boundaries, wildfires occurring within Bay Area and beyond will have direct adverse impacts on city residents. Wildfire events not only cause direct physical damage to humans, structures, and biological and hydrological resources, but also contribute to global climate change and air quality degradation. The incomplete combustion of vegetation releases smoke composed of carbon monoxide (CO); particulate matter (PM); hydrocarbons; oxides of nitrogen (NO_X) and reactive organic gases, which combine to produce ground-level ozone); and thousands of other compounds. CO emissions are highest during the smoldering stages of a fire and NO_X emissions are produced primarily from oxidation of the nitrogen deposits in vegetation (Ahuja and Proctor 2018:439).

The composition of pollutants emitted during a wildfire depends on the interaction of several factors including the type, amount, and moisture content of fuels; meteorological conditions; emissions factors; typography; and others. In the treatable landscape, the likelihood of igniting a catastrophic wildfire will also depend on a confluence of prolonged climate trends. For example, the fire regime of 2018 was the result of prolonged drought followed by heavy precipitation coupled by elevated temperatures.

City residents will likely face future conditions where air quality is severely degraded due to wildfire activity within the state. For instance, during the 2020 fire season, air quality in the Bay Area was rated the worst globally due to three major wildfire complexes in the East Bay, North Bay, and southern Peninsula burning concurrently (ABC News 2020).

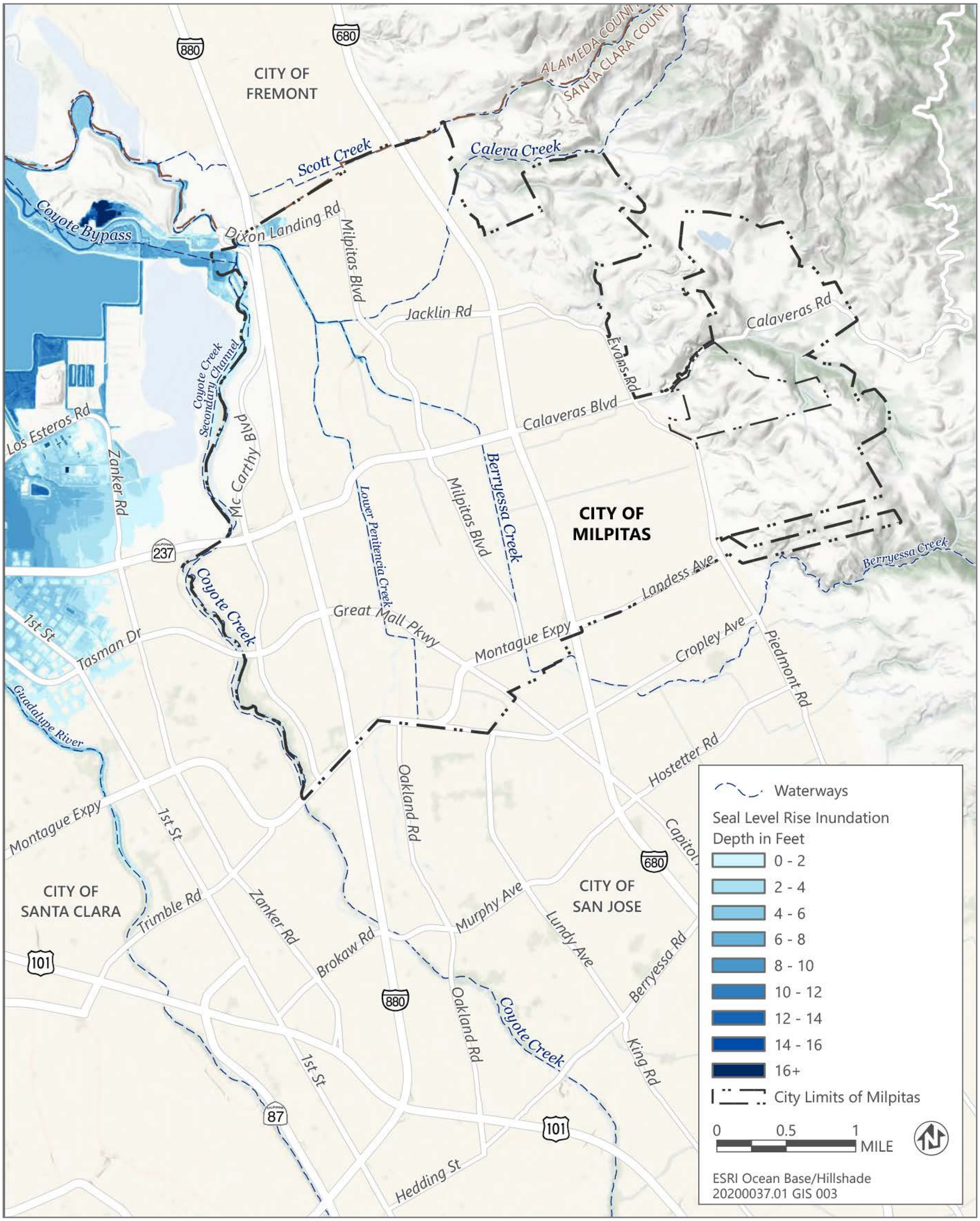
Air quality impacts related to wildfire smoke are disproportionally felt by low-income residents, and particularly, individuals experiencing homelessness. Low-income residents may not be equipped with sufficient filtration systems to provide respite from the smoke in their homes. Moreover, individuals experiencing homelessness face challenges in finding indoor areas that could shelter them from exposure to high concentrations of air pollution. Additionally, outdoor laborers may be required by their employers to continue working even during periods of dangerous levels of air pollution. While regulatory mechanisms implemented by the federal Occupational Safety and Health Administration and the Division of Occupational Safety and Health (better known as Cal/OSHA) exist, enforcement of these protocols is uncertain, particularly in industries that employ undocumented individuals, who are less likely to request compliance with such protocols.

Sea Level Rise

Rising sea levels are considered a secondary effect of climate change due to warming ocean temperatures and melting glacial ice sheets. The California coast has already seen a rise in sea level of 4 to 8 inches over the 20th century due to climate change (DWR 2021). Sea-level rise poses the greatest risk during coastal storms which increase tidal elevations. The large waves associated with storm surges can cause flooding in low-lying areas, loss of coastal wetlands, saltwater contamination of drinking water, impacts on roads and bridges, and increased stress on levees (DWR 2021). In addition, rising sea levels results in coastal erosion as shoreline sediment is re-deposited back into the ocean. A portion of the city's water supply is obtained from SCVWD, which sources its groundwater from the Santa Clara and Llaga groundwater subbasins. The Santa Clara subbasin, located in northern Santa Clara County, borders the San Francisco Bay. However, due to the Santa Clara subbasin's characteristic steep upward gradient, saltwater intrusion to the aquifer is minimized (SCVWD 2016).

The Bay Area will be particularly susceptible to sea-level rise in the 21st century. Cal-Adapt uses global models to indicate where California will see substantial sea-level rise, with the exact magnitude depending on a variety of factors including global GHG emissions, the rate at which oceans absorb heat, melting rates and movements of land-based ice sheets, and local coastal land subsidence or upshift. Cal-Adapt presents data in the form of a mapping tool which identifies where inundation may occur from varying degrees of sea-level rise ranging from 0 to 1.41 meters. While the region and neighboring communities to the city will directly experience sea-level rise and its impacts, the city is not located within an area that Cal-Adapt predicts inundation from up to 1.41 meters of sea-level rise combined with flooding from the 100-year storm event.

The ART Program also provides a mapping tool to evaluate potential sea-level rise impacts in the Bay Area. ART *Bay Area Sea Level Rise and Shoreline Analysis* maps are the most robust and accurate mapping tools for the Bay Area. Figure VA-8 shows projected sea-level rise in vicinity of the city. However, climate models are constantly evolving to accommodate new science and trends in the generation of global GHG emissions. It is foreseeable that if global GHG emissions continue to increase or new science pertaining to ocean dynamics and other carbon-related feedback loops arise, future climate change models may show sea-level rise within the boundaries of the city.



Source: Data downloaded from Santa Clara County in 2020 and AdaptingtoRisingTides.org in 2021

Figure VA-8 Sea-Level Rise in the Vicinity of Milpitas

2.2 SENSITIVITY AND POTENTIAL IMPACTS

This section provides a summary of the city's sensitivity to climate-related hazards and summarizes potential impacts from these hazards. Climate change effects will impact the city differently, such that some population groups and physical assets will be affected much more severely than others. Key populations and assets identified in the city are organized into the following overarching categories: populations, transportation, energy, water, and emergency services.

Figure VA-9 shows the locations of critical facilities identified in the city. In this context, critical facilities include childcare facilities, fire stations, police stations, city buildings, pump stations, and schools which have been identified as part of the OAHMP.

Populations

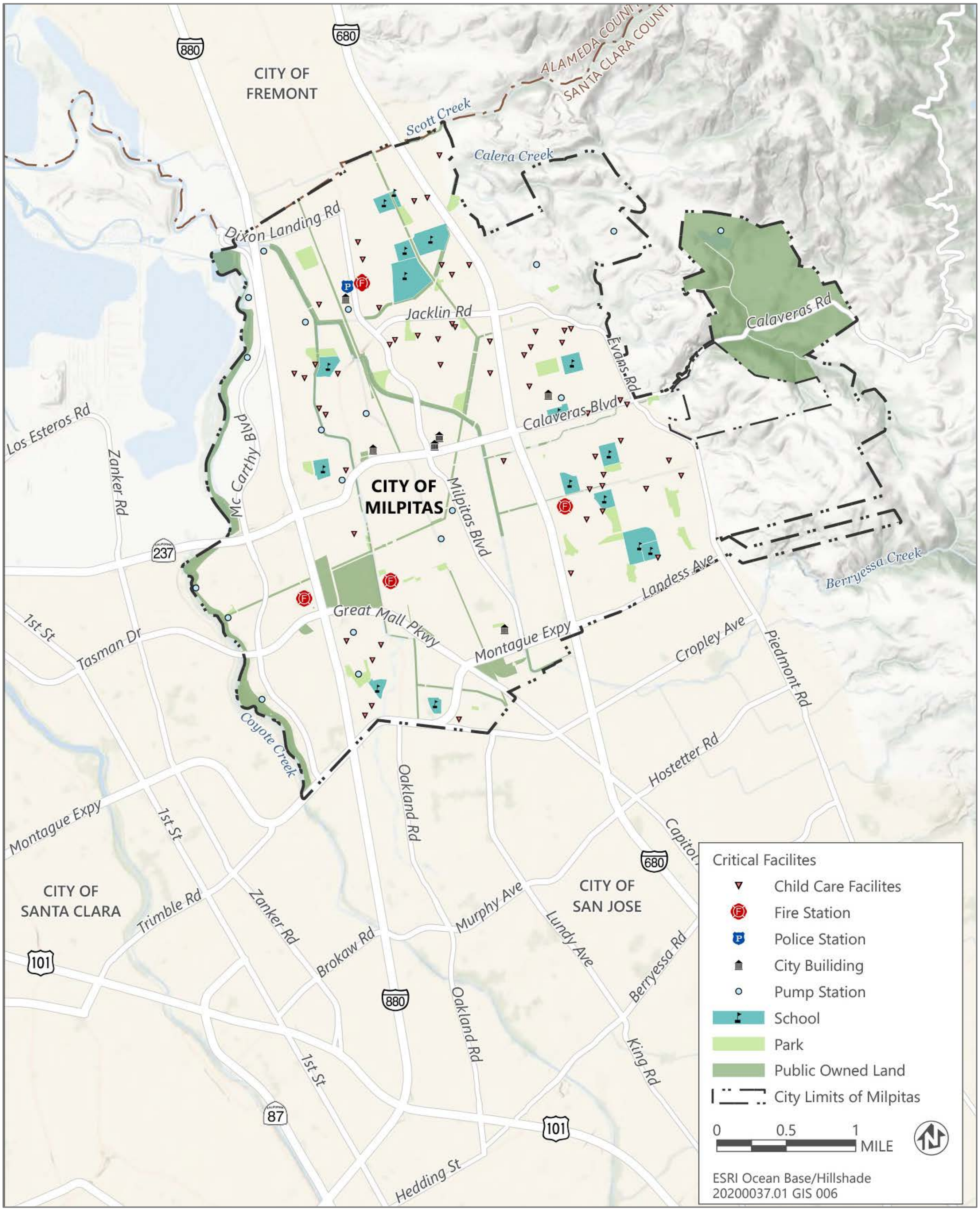
POLLUTION-BURDENED COMMUNITIES

In general, Environmental Justice Communities and communities of color are more susceptible to climate change-related hazards due to limited access to financial resources, health challenges or disabilities, living or working conditions, or historical and current marginalization. These factors, among others, can lead to increased susceptibility to, and disproportionate harm from climate impacts. Vulnerable populations in the city include Environmental Justice Communities, low-income persons, communities of color, linguistically isolated persons, senior citizens, persons with disabilities, and persons experiencing homelessness, among others.

Climate change affects human health through environmental changes, such as more frequent extreme heat event, more frequent and powerful wildfires, degradation of air quality, heightened growth and dispersal of allergens, and enhanced prevalence of infectious diseases. The resulting human health impacts include, but are not limited to, increases in the risk of asthma, allergies and other respiratory illnesses, cardiovascular diseases, vector-borne diseases, mental health impacts, civil conflicts and migrations, malnutrition, injuries, health-related illness, heatstroke, and death (Bell et al. 2016). While all persons in the city are anticipated to experience some level of health impacts from climate change, the populations most vulnerable to these health impacts are the same communities that experience health inequities or systemic differences in health status under current conditions (CDPH 2019). The vulnerable communities described below, particularly Environmental Justice Communities which have a disproportionate environmental burden, face climate change impacts that compound and exacerbate existing public health sensitivities and vulnerabilities.

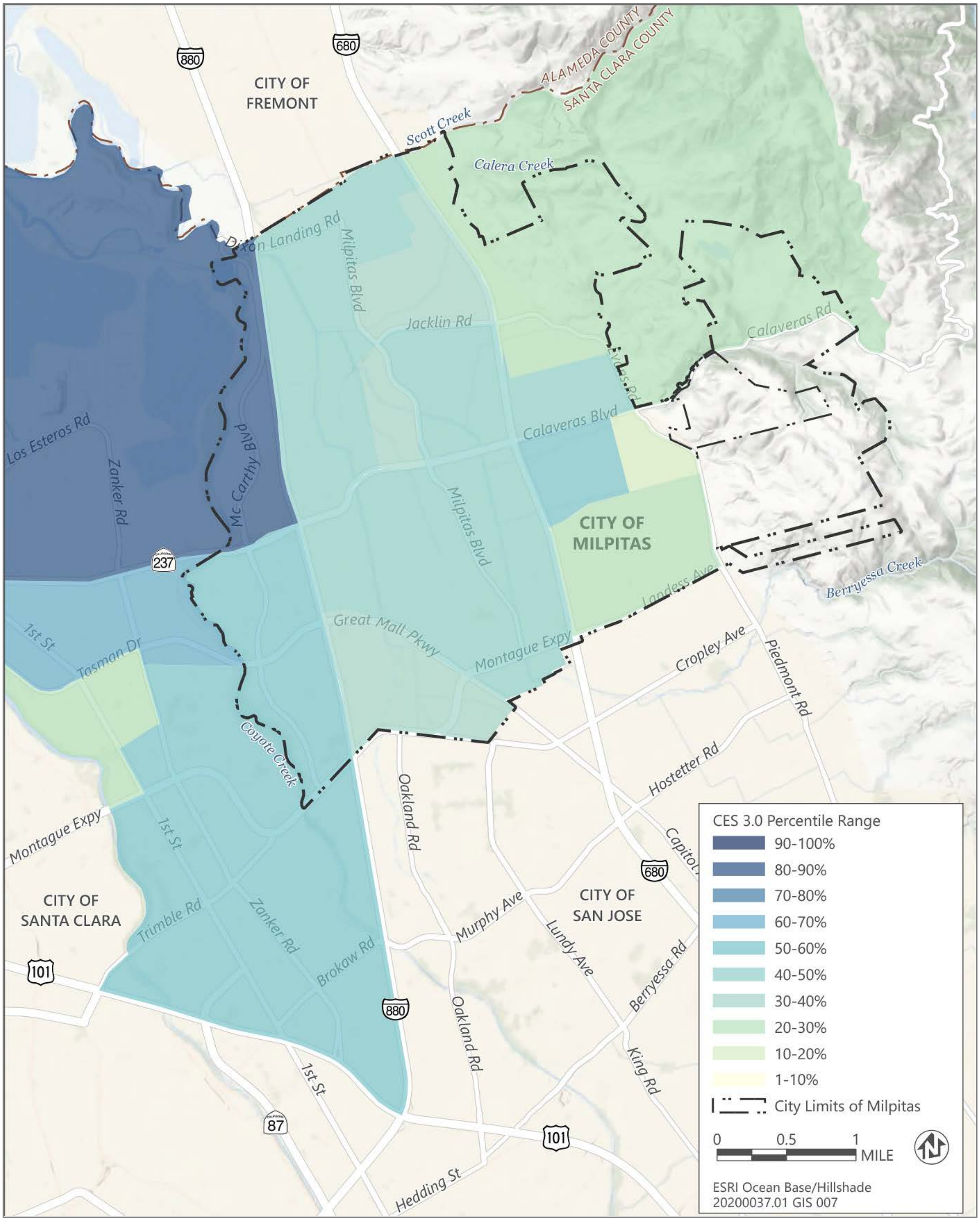
CalEPA's California Environmental Health Screening Tool 3.0 (CalEnviroScreen 3.0) is a mapping tool developed by the Office of Environmental Health Hazards Assessment to help identify low-income census tracts in California that are disproportionately burdened by and vulnerable to multiple sources of pollution. CalEnviroScreen 3.0 uses environmental, health, and socioeconomic information based on data sets available from State and federal government sources to produce scores for every census tract in the state. Figure VA-10 below shows the scoring of the city's residents organized by census tract using the CalEnviroScreen 3.0 mapping tool.

As shown above in Figure VA-10, the city is generally composed of census tracts that are within the 20-50 percentile, indicating Milpitas residents face a moderate level of pollution burden. Notably, the results of CalEnvironScreen 3.0 are a composite of several different factors including pollution exposure, existing hazardous sites, sensitivity of the population, and socioeconomic factors.



Source: Data downloaded from Santa Clara County in 2020 and received from City of Milpitas in 2021

Figure VA-9 Critical Facilities in the City of Milpitas



Source: Data downloaded from Santa Clara County in 2020 and California Office of Environmental Health Hazard Assessment in 2020

Figure VA-10 Disadvantaged Communities in the City of Milpitas

The Public Health Alliance of Southern California has also produced a mapping tool called the California Healthy Places Index (HPI). The HPI combines 25 community characteristics into a single indexed HPI Score. HPI scores for each census tract can be compared across the state to provide an overall picture of health and well-being in each neighborhood in California. The tool also allows multiple census tracts to be pooled together into a single score, allowing the comparison of zip codes, project areas, and other geographies. In addition to the overall score, the index also contains eight sub-scores for each of the Policy Action Areas (Economic; Education; Housing; Health Care Access; Neighborhood; Clean Environment; Transportation; and Social factors). The index was created using statistical modeling techniques that evaluated the relationship between these Policy Action Areas and life expectancy at birth. The statistics were designed to maximize the ability of the HPI to identify healthy communities and quantify the factors that shape health. Figure VA-11 below shows the HPI scoring for the city.

As shown in Figure VA-10 and Figure VA-11, there are several locations in the city which score disproportionately higher as part of the CalEnviroScreen 3.0 Tool and the HPI index. These include the neighborhood directly south of Calaveras Boulevard and east of Interstate 680 (Census Tract 5044.18) as well as the neighborhood directly south of Scott Creek Road and west of Interstate 680 (Census Tract 5044.22). Additionally, the residents in the northeastern and southwestern parts of the city are proportionally healthier, in general, than other California census tracts, whereas the residences of the central part of the city are comparatively less healthy.

Communities of Color

The city is an urbanized community and supports a dense population. The city's population in 2020 was approximately 84,000 residents composed of residents of primarily Asian (65.7 percent), Caucasian (15.5 percent) Hispanic or Latino (14.2 percent), and African American (3.5 percent) descent (U.S. Census 2021a). Across the U.S., including California and the city, communities of color are disproportionately vulnerable to and impacted by climate change. This vulnerability is often due to variables such as location, employment type, income level, and access to resources, which are often the result of historic inequitable planning processes (Lynn et al. 2011).

Low-Income Communities

Approximately 7.3 percent of the city's population were living below the federal poverty level in 2020 compared to the national average of 13.1 percent (U.S. Census Bureau 2021b). The largest demographics living in poverty are males and females between the ages of 18-24, and females between the ages of 35-44. The most common racial group living below the poverty line are of Asian descent, followed by those of Hispanic descent.

Linguistically Isolated Communities

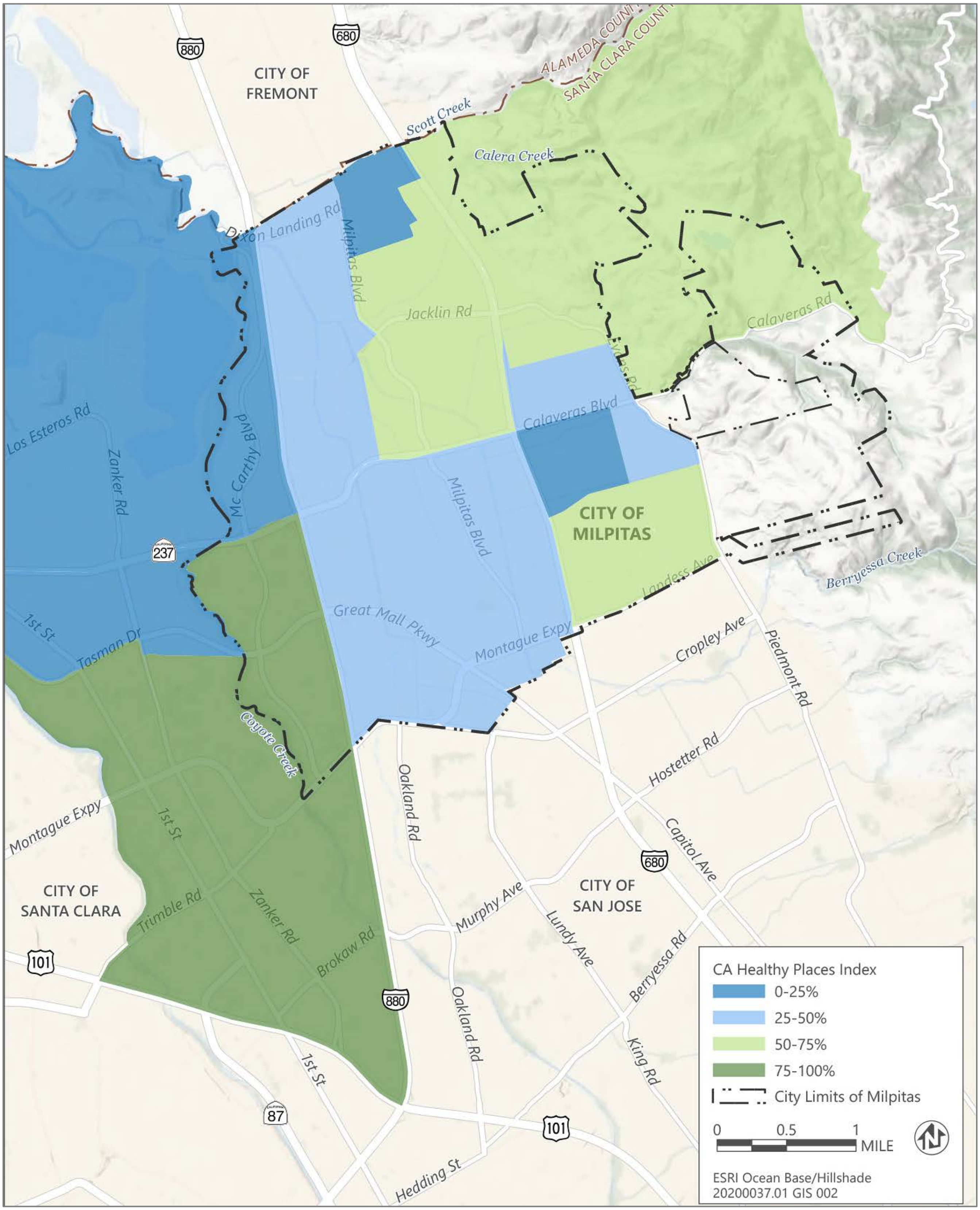
Communities of color can also face challenges due to limited English proficiency and may not be able to access important information regarding climate hazards. Communities of color are often left out of community planning and emergency planning processes. Approximately 67 percent of the city's population speaks a language other than English at home. Of this 67 percent, 26 percent speak English at a level characterized as less than "very well" (U.S. Census Bureau 2021a).

Senior Citizens

Vulnerable populations also include senior populations who are 65 years of age and older. The city's population in 2020 was approximately 8 percent seniors (U.S. Census Bureau 2021a).

Persons with Disabilities

During hazard events such as wildfires, flooding, or extreme storms, vulnerable populations such as persons with disabilities may require additional assistance to adequately respond to these hazard events. Challenges that these populations face include potential inability to access emergency supplies, evacuate, or receive and understand emergency information. Further, the effects of climate change hazards can result in infrastructure disruptions including electric power outages. Such events could result in additional health hazards for seniors or persons with disabilities who rely on electricity to sustain medical equipment/assistive technology use.



Source: Data downloaded from Santa Clara County in 2020 and California Healthy Places Index in 2021

Figure VA-11 Healthy Places Index for the City of Milpitas

Persons Experiencing Homelessness

Every 2 years, Santa Clara County conducts "point-in-time" counts of sheltered and unsheltered persons. In 2019, North Santa Clara County, which includes the city, had a total of 1,621 persons experiencing homelessness (193 sheltered and 1,428 unsheltered), an increase of 62 percent from 2017. Additionally, North Santa Clara County saw an increase in the number of unsheltered persons, rising from 69 percent of the unsheltered homeless population in 2017 (846 persons) to 88 percent (1,428 persons) in 2019. Individuals experiencing homelessness are especially vulnerable to climate change impacts including increased heat waves and extreme heat days, flooding, and impacts on human health. This vulnerability stems from lack of shelter, resources to respond to events, and sanitation. In addition to impacts from existing climate change risks, emergency events such as wildfires and flooding can disproportionately affect persons experiencing homeless. Extreme weather events can result in the loss of housing stock and reduced regional housing affordability, resulting in increased occurrences of homelessness (Center for American Progress 2019).

Wildfires are another major public health concern for the Bay Area. Although Environmental Justice Communities in the city are not located in areas where wildfire risk is predicted to increase, unlike other climate-induced natural disasters that have more localized health impacts, a single wildfire can influence the health outcomes of multiple regions because wildfire smoke can travel long distances and worsen the air quality for weeks. Wildfires are a major source of PM, which is an air pollutant that increases one's risk for respiratory illnesses, cardiovascular disease, negative birth outcomes, and premature death (Bell et al. 2016). As identified above, wildfire smoke also increases one's exposure to CO, ground-level ozone, PM, and toxic chemicals (e.g., pesticides, plastics, and paints) released from burned vegetation, buildings, and other human-made materials. Even when sheltering indoors, individuals are at risk of exposure to hazardous air quality because wildfire smoke penetrates into homes, particularly older homes that are poorly insulated (Rudolph et al. 2018). While there is no exact definition for older homes, in 2014, the State implemented the first California Green Building Standards Code which required significant improvements in the building envelope and building energy use. Approximately 83 percent of the residential units in the city were bult before 2013, making these homes less energy efficient and more susceptible to impacts in air quality impacts (U.S. Census Bureau 2021a). Moreover, wildfires can also cause immediate health impacts through burns, injuries, and heat stress. Beyond these immediate health impacts, the stress, displacement, and loss of home and community from wildfires can cause significant mental health impacts, such as anxiety, depression, and post-traumatic stress disorder (Hanigan et al. 2012).

Table VA-3 provides a summary of impacts on the city's population from the set of climate-related hazards discuss above.

Table VA-3 Climate Change Impacts to Populations

Climate Change Effects	Populations						
	Environmental Justice Communities	Low-Income Communities	Communities of Color	Linguistically Isolated	Seniors	Persons with Disabilities	Persons Experiencing Homelessness
Human Health Hazards	▸ Increased exposure to poor air quality and infectious disease compared to non-Environmental Justice Communities ▸ Exacerbated economic insecurity resulting in mental health concerns	▸ Increased exposure to poor air quality and infectious disease compared to non-low-income population ▸ Exacerbated economic insecurity resulting in mental health concerns	Increased exposure to poor air quality and infectious disease compared to non-communities of color	Increased exposure to poor air quality and infectious disease compared to non-linguistically isolated population	Increased risk from poor air quality and infectious disease compared to non-senior population	▸ Increased exposure to poor air quality and infectious disease compared to abled population ▸ Exacerbated economic insecurity resulting in mental health concerns	▸ Increased exposure to poor air quality and infectious disease compared to housed population ▸ Exacerbated economic insecurity resulting in mental health concerns
Drought and Water Supply	Water shortages during droughts likely to disproportionately impact Environmental Justice Communities	Water shortage during droughts likely to disproportionately impact low-income households	Water shortages during droughts likely to disproportionately impact communities of color	Limited ability to interpret and react to drought and available water supply messaging	Increased hazards to human health from limited access to potable water	Increased hazards to human health from limited access to potable water	Increased hazards to human health from limited access to potable water
Extreme Heat Events	▸ Increased exposure to heat at home from limited ability to afford air conditioning systems ▸ Increased exposure to UHI effect	▸ Increased exposure to heat at home from limited ability to afford air conditioning systems ▸ Increased exposure to UHI effect	▸ Increased likelihood of limited access to air conditioning and cooling facilities ▸ Increased exposure to UHI effect	Potentially limited access to information and cooling centers	▸ Increased vulnerability to heat-related health risks ▸ Increased exposure to UHI effect	▸ Increased exposure to outdoor heat without access to air conditioning or protection ▸ Increased exposure to UHI effect	▸ Increased exposure to outdoor heat without access to air conditioning or protection ▸ Increased exposure to UHI effect
Extreme Precipitation and Flooding	▸ Limited access to warning messages and city precautionary measures ▸ Environmental Justice Communities are located in flood-prone areas	▸ Limited access to warning messages and city precautionary measures. ▸ Populations are more likely to be located in flood-prone areas and would be exposed to increased risk of flooding	▸ Limited access to warning messages and city precautionary measures ▸ Populations are more likely to be located in flood-prone areas and would be exposed to increased risk of flooding	Limited access to warning messages and city precautionary measures	▸ Limited mobility and ability to react to flooding events ▸ Limited ability to prepare for extreme weather events and reliance on existing supplies and infrastructure	▸ Limited mobility and ability to react to flooding events ▸ Limited ability to receive warnings and access to shelter	Limited ability to receive warnings and access to shelter due to limited mobility

Climate Change Effects	Populations						
	Environmental Justice Communities	Low-Income Communities	Communities of Color	Linguistically Isolated	Seniors	Persons with Disabilities	Persons Experiencing Homelessness
Landslides	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate	Potential inability to receive and interpret warning messages and evacuation notices	Limited ability to evacuate due to lack of mobility or limited situational understanding from cognitive conditions	Limited ability to evacuate due to lack of mobility, limited situational understanding from cognitive conditions, or reliance on medication or devices	Limited ability to receive warnings and ability to evacuate due to lack of mobility
Wildfires	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate	Potential inability to receive and interpret warning messages and evacuation notices	Limited ability to evacuate due to lack of mobility or limited situational understanding from cognitive conditions	Limited ability to evacuate due to lack of mobility, limited situational understanding from cognitive conditions, or reliance on medication or devices	Limited ability to receive warnings and ability to evacuate
Sea-Level Rise	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Extreme Precipitation and Flooding	▶ Limited access to warning messages and city precautionary measures ▶ Environmental Justice Communities are located in a flood-prone area	▶ Limited access to warning messages and city precautionary measures ▶ Populations are more likely to be located in a flood-prone area and would be exposed to increased risk of flooding	▶ Limited access to warning messages and city precautionary measures ▶ Populations are more likely to be located in a flood-prone area and would be exposed to increased risk of flooding	Limited access to warning messages and city precautionary measures	▶ Limited mobility and ability to react to flooding events ▶ Limited ability to prepare for extreme weather events and reliance on existing supplies and infrastructure	▶ Limited mobility and ability to react to flooding events ▶ Limited ability to receive warnings and access to shelter	Limited ability to receive warnings and access to shelter due to lack of mobility
Landslides	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate	Limited access to warning messages and limited ability to evacuate.	Potential inability to receive and interpret warning messages and evacuation notices	Limited ability to evacuate due to lack of mobility or limited situational understanding from cognitive conditions	Limited ability to evacuate due to lack of mobility, limited situational understanding from cognitive conditions, or reliance on medication or devices	Limited ability to receive warnings and ability to evacuate

Notes: N/A = not applicable.

Source: Ascent Environmental 2021

Transportation

The public roadway system including bicycle and pedestrian facilities in the city are operated and maintained by the City's Public Works Department. One of the major effects of climate change on the city's roadway system is the reduction in the overall lifespan of transportation infrastructure (OPR, CEC, and CNRA 2018b). Increased average temperatures and extreme heat can result in the degradation of pavement and could impact roadway, trail, and bicycle facilities. Increases in flooding-related hazards along roadways can result in increased erosion of subbase materials underneath roadways and further roadway degradation. This impact can result in secondary impacts on roadway facilities, including disruptions to vehicular access and commerce between cities. Roadway degradation overtime can increase the risk to human safety by damaging or blocking evacuation routes and limiting access for emergency responders.

Transit services in the city are operated by the Santa Clara Valley Transportation Authority (VTA). The city is also serviced by Bay Area Rapid Transit (BART), which operates a station in the Milpitas Transit Center. The transit systems available in the city also include local bus services, light rail, and ride-sharing programs. Transit access, safety, and cost can be impaired by climate change impacts such as extreme heat. Transit stops without adequate sheltering (i.e., bus shelters or street trees) can lead to dangerous exposure to extreme heat with disproportionate impacts on low-income populations who, in general, use transit at higher rates Additionally, bus and rail transit vehicles can undergo increased stress to maintain proper air conditioning and engine cooling during extreme heat events and risk failure during extreme heat days over 100 °F (Cambridge Systems 2015).

Climate impacts to the transportation system are presented in Table VA-4.

Table VA-4 Climate Change Impacts to Transportation

Climate Change Effects	Assets				
	Roadways	Emergency Access/ Evacuation Routes	Transit Facilities and Services	Railroads	Bicycle Paths and Trails
Human Health Hazards	Damage to roadways, if substantial, can disrupt access to regular medical care for people with chronic illnesses.	Damage to roadways, if substantial, can potentially reduce emergency response time but is unlikely to significantly reduce access.	Increased spread of infectious disease may lead to decreased transit ridership.	N/A	N/A
Drought and Water Supply	N/A	N/A	N/A	N/A	N/A
Extreme Heat Events	Increased likelihood of roadway damage from heat expansion	Damage to roadways, if substantial, can potentially reduce emergency response times but unlikely to significantly reduce access	▶ Increased heat exposure for riders at stations without adequate shading ▶ Increased stress on transit vehicles	N/A	Increased likelihood of damage from pavement degradation
Extreme Precipitation and Flooding	Increased likelihood of roadway damage from erosion of roadway subbase materials	▶ Potential closure of evacuation routes due to damage or water coverage ▶ Reduced ability for emergency services access	Risk of physical damage to transit facilities	Risk of physical damage	Risk of physical damage
Landslides	Risk of physical damage	▶ Potential closure of evacuation routes due to damage or landslide coverage ▶ Reduced ability for emergency services access	Risk of physical damage	Risk of physical damage	Risk of physical damage
Wildfires	Risk of physical damage	▶ High risk for areas on single-access roads ▶ Potential closure of evacuation routes due to damage or ongoing wildfire ▶ Reduced ability for emergency services access	Fixed routes limit effectiveness in evacuation and may experience physical damage	Fixed routes limit effectiveness in evacuation and may experience physical damage	Risk of physical damage
Sea-Level Rise	Increased likelihood of roadway damage from erosion of roadway subbase materials	▶ Potential closure of evacuation routes due to damage or water coverage ▶ Potential removal of vehicle access to low-lying areas ▶ Reduced ability for emergency services access	Risk of physical damage	N/A	Risk of physical damage

Notes: N/A = not applicable.

Source: Ascent Environmental 2021

Energy

Electrical and natural gas infrastructure within the city is owned and operated by Pacific Gas and Electric (PG&E). Electricity delivered to consumers in the city is generated from a mix of power sources from elsewhere in the region and state, as well as on-site generation of electricity from local public and private facilities. The City is a member of Silicon Valley Clean Energy (SVCE), a local community-choice aggregator, that partners with PG&E and supplies carbon-free electricity to its members. The city supports the development and maintenance of electricity generation and transmission facilities, and the maintenance and operation of facilities on City-owned sites (i.e., on-site solar panels at City facilities).

Impacts on electricity resources from climate hazards can include stress and physical damage to the electricity generation, transmission, and distribution system. Extended drought periods may reduce the available surface water supply to generate hydroelectric power. Transmission facilities face increasing climate-related risks as a result of the increased frequency of wildfires, severe wind, and extreme heat events. Extreme heat events result increased energy demand for cooling in residential and commercial buildings and can add stress to transmission systems, resulting in brownouts and damage to electricity infrastructure. Wildfires, flooding, landslides, and severe wind can cause physical damage to or destruction of transmission facilities. Due to a number of recent large-scale wildfires caused by electricity infrastructure exposed to extreme heat and high-winds, utilities have begun to implement public safety power shutoff events (PSPS) to avoid wildfire risk. PSPS events can result in communities experiencing no electricity for multiple days and prevent individuals from using prescribed medications and treatments that rely on electricity or refrigeration. PSPS events can also result in impacts to commerce and economic losses, particularly for businesses that rely on refrigeration such as grocery stores. Hazards such as landslides, wildfires, and flooding can also affect underground natural gas pipelines, exposing and/or damaging these pipelines. The damage resulting from climate change-related hazards on electricity and natural gas infrastructure can have a greater impact on disadvantaged populations, particularly communities that are low-income or individuals who have limited mobility or lack the financial means to make repairs to their property.

Increases in extreme heat and heat waves will have implications for energy demand in residential and nonresidential buildings in the city with a higher energy demand for cooling and a decrease in energy demand for heating, in general. In general, for buildings in the city, increases in will result in increased electricity demand for cooling and place increased demand on the electricity grid, particularly during extreme heat days and heat wave events which is projected to increase peak electricity demand for utilities. Currently, during extreme heat days and heat wave events, electricity utilities and the State's grid operator, California Independent System Operator, initiate "Flex Alerts", requesting customers to conserve energy during certain times of the day to reduce stress on the electricity grid. Some initial research that models future changes in peak load for utilities in California during extreme heat events has demonstrated that peak loads are substantially more sensitive to temperature anomalies, indicating warm-anomalous temperatures (e.g., extreme heat days and heat waves) will have a disproportionate impact on higher-intensity electricity consumption (Kumar et al. 2020). The research also indicates that disregarding the asymmetry in temperature response of electricity demand will lead to underestimating the climate-sensitive portion of the upper extremes of demand for electricity utilities in California, for short-term (2021-2040) and long-term (2081-2099) time periods included in the study. This will likely lead to an increase in the frequency of brownout and blackouts, in which portions of the electricity grid are disrupted and communities lose power due to an imbalance between power generation and power consumption.

Studies of PG&E electricity and natural gas infrastructure show that hazards from sea-level rise, flooding, and wildfire are the greatest threats from climate change. As flooding may occur from a storm event, power system infrastructure in the coastal regions may be damaged and could be impacted for several weeks (OPR, CEC, and CNRA 2018b). As flooding becomes more frequent, transmission lines will become more susceptible to corrosion. Though impacts on natural gas infrastructure would be less severe than impacts on electrical facilities because gas pipelines are generally located underground, natural gas infrastructure will require increased maintenance due to climate change-related impacts such as wildfire and flooding (Bruzgul et al. 2018). Climate impacts to energy resources are presented in Table VA-5.

Table VA-5 Climate Change Impacts to Energy

Climate Change Effects	Assets	
	Electricity Transmission Lines and Natural Gas Pipelines	Electricity Generation
Human Health Hazards	Public safety power shutoff events can prevent residents' use of prescribed medications and treatments that rely on electricity and refrigeration	N/A
Drought and Water Supply	Increased stress on system and potential failure	▸ Increased stress on systems and potential failure ▸ Reduced effectiveness of hydroelectric generation facilities
Extreme Heat Events	Increased stress on system and potential failure	Increased electricity demand for building cooling and increased likelihood of brownouts or blackouts
Extreme Precipitation and Flooding	Risk of potential damage/failure	▸ Reduced effectiveness of hydro-electric generation facilities ▸ Risk of potential damage/failure. ▸ Risk of physical damage and increased stress on generation facilities from turbulent weather
Landslides	Risk of potential damage/failure	Risk of potential damage/failure
Wildfires	Risk of potential damage/failure	▸ Increased smoke cover reduces effectiveness of solar generation ▸ Risk of physical damage/failure
Sea-Level Rise	Risk of potential damage/failure	N/A

Notes: N/A = not applicable.

Source: Ascent Environmental 2021

Water

The city's water resources will be affected by climate change due changes in precipitation, and a slight increase in the occurrence of extreme precipitation events. Extreme precipitation events that occur with more intensity over a short period could cause flooding, limiting access to or damage to water facilities. As previously discussed, snowmelt in Northern California is also projected to occur earlier in the year, causing springtime recharge to occur before the warmer and drier summer months when it is most needed. Reduced snowpack also reduces water captured for storage in surface water bodies and aquifers for potable drinking water. As a result, the city and region could experience decreased water supply during the spring and summer months, which are also projected to become drier and warmer as a result of climate change.

Changes in rainfall and snowmelt timing can affect SFPUC and SCVWD's ability to provide adequate and safe drinking water on a reliable basis. While these agencies may be able to rely on groundwater to provide additional supply, which is currently the direction SCVWD is moving, drawing from these sources can substantially lower water tables, resulting in land subsidence. Precipitation variability will also affect the city's local surface and groundwater supply causing the city to rely on other sources such as recycled water resources, which is currently the intent of SCVWD moving into the future.

It is estimated that by 2040, the city's water demand will increase by approximately 28 percent from 2020 levels due to population and economic growth, further emphasizing the need for a sustainable water supply and water supply management (City of Milpitas 2020). Increased episodes of drought and increased water demand could result in water shortages for the region, endangering residents, and ecological systems (e.g., flood control or sensitive habitat, recreational areas).

SFPUC and SCVWD and their member agencies contribute to the region's local water supply, which is composed of surface water, groundwater, and recycled water. Throughout Northern California, and extending from the coast to the Sierra Nevada mountains, surface water reservoirs retain water resources for residents in the region. Currently groundwater does not supply customers located in the city; however, groundwater resources do supply water to SCVWD, the main water provider for the city. Recycled water in the region has increased over time and provides non-potable water to recreational areas in the city with plans to increase overall recycled water use in the future.

The city's stormwater infrastructure was developed to maintain flood control while directing water northwest to the San Francisco Bay. The system consists of conveyance pipelines known as municipal separate stormwater systems which discharge stormwater and non-stormwater. The city identifies the highest priority water quality conditions within each watershed and specific goals, strategies, and schedules to address those priorities, including numeric goals and activity levels, and requirements for water quality monitoring and assessment (City of Milpitas 2016).

Wastewater facilities are also threatened by climate change. Flooding during larger storm events increases the risk of sewage and hazardous and/or toxic materials being released into waterways if wastewater treatment plants are inundated, storage tanks are damaged, or pipelines are damaged. Wastewater treatment facilities in Santa Clara County have already been impacted during large storms that have caused sewage spills. During these flooding-induced spill events, there is an increased risk of contracting water-borne illnesses and fungal infections. While the City does not treat wastewater, it pumps its wastewater through two force mains to the San Jose/Santa Clara Water Pollution Control Plant, also known as the RWF, which is located approximately 0.25-miles directly west of the northwestern boundary of the city. Though the City may not have jurisdiction over operations of the RWF, flooding-related incidences may be widespread and could affect city residents. Anticipated climate impacts to water resources are presented in Table VA-6.

Table VA-6 Climate Change Impacts to Water and Wastewater Infrastructure

Climate Change Effects	Assets			
	Flood Control	Water Conveyance	Available Water Supply	Water and Wastewater Treatment
Human Health Hazards	N/A	N/A	Increased concentration of industrial chemicals, heavy metals, and agriculture runoff contaminants in groundwater drinking sources	Increased risk of contracting water-borne illnesses and fungal infections during sewage spill events
Drought and Water Supply	N/A	Reduced efficiency of water conveyance from limited supply and increased energy costs	Significant reduction in water available during droughts from reduced reserve supplies and changing water runoff patterns	N/A
Extreme Heat Events	Potential damage to channels and other engineered flood control facilities	Increased stress on water conveyance system	Increased demand for potable water and for industrial cooling	Potential damage to channels and other engineered flood control facilities
Extreme Precipitation and Flooding	▸ Increased demand for flood control facilities and increased risk of damage from overflow or ground saturation surrounding facilities ▸ Increased demand for flood control and storm surge facilities and increased risk of physical damage	▸ Risk of physical damage ▸ Increased stress on conveyance system	Increased risk of water contamination and reduction in available potable water	▸ Increased demand for flood control facilities ▸ Increased risk of damage from overflow or ground saturation surrounding facilities
Landslides	Risk of physical damage	Risk of physical damage	Risk of physical damage	Risk of physical damage
Wildfires	Risk of physical damage	Risk of physical damage	Increased demand for water for persons displaced by wildfire, exposed individuals, and for fire suppression	Risk of physical damage
Sea-Level Rise	Increased demand for flood control facilities and increased risk of damage from overflow or ground saturation surrounding facilities	Potential physical damage to conveyance facilities	Increased risk of water contamination and reduction in available potable water	Increased demand for flood control facilities and increased risk of damage from overflow or ground saturation surrounding facilities

Notes: N/A = not applicable.

Source: Ascent Environmental 2021

Emergency Services

On August 5, 2021, the Milpitas City Council approved a full update to the City's Emergency Operations Plan (EOP). The EOP provides an overview of the City's approach to emergency operations. It identifies emergency response policies, describes the response and recovery organization, and assigns specific roles and responsibilities to City departments, agencies, and community partners. The EOP has the flexibility to be used for all emergencies, including climate change-related hazards, and will facilitate response and recovery activities in an efficient and effective way.

The EOP is reviewed, updated, republished, and redistributed on a 2-year review, 5-year revision cycle in accordance with the 2016 State Homeland Security Grant Program guidance. The EOP may be modified as a result of post-incident analyses and/or post-exercise reviews and assessments. City staff will coordinate future revisions to ensure that relevant or updated climate-related hazards or risk conditions are included.

Emergency operation facilities are locations that provide essential products and services to the public, particularly during emergency events. Emergency operation facilities can include hospitals or other health care facilities, police and fire stations, and communication facilities. An increase in climate-related hazard event emergencies will place more demand on emergency operation facilities, emergency personnel, related infrastructure, and equipment in the city. As discussed above, the city is anticipated to experience more frequent hazard events including coastal storms, erosion, floods, wildfire impacts, drought, and extreme weather. As temperatures increase and heat waves occur more frequently, the city is likely to experience potential public health impacts. Floods and landslides may threaten transportation routes, emergency services stations, and evacuation routes, which could hinder emergency response times during such events. PSPS events may place pressure on emergency generators, which are used during black-out periods to power police, fire, and the emergency operations center.

Additionally, physical damage to emergency services facilities could occur as a result of climate change-related hazards. Within the city, four fire stations and one police station are located in within either the 100- or 500-year flood zones. Schools often serve as community resource centers and evacuation centers during emergencies. Based on the GIS analysis in the OAHMP, 12 schools are located within FEMA floodplain designations. Notification of emergencies and evacuation instructions rely upon functioning communication facilities such as AM/FM antennas, broadband radio transmitter, and television transmitters. Communications facilities within the city may be affected by increases in frequency and severity of flooding events and extreme heat events. Climate impacts to emergency services are presented in Table VA-7.

Table VA-7 Climate Change Impacts to Emergency Services

Climate Change Effects	Assets		
	Emergency Response Personnel	Emergency Facilities	Telecommunications
Human Health Hazards	Increased exposure to infectious diseases and personal injuries	Increased stress on health care facilities in responding to health impacts from exposure to poor air quality, extreme heat, infectious diseases, and other climate-induced effects	Increased demand on telecom systems during climate-induced natural disasters and infectious disease outbreaks
Drought and Water Supply	Increased demand for emergency services and reduced water availability for fire suppression	Increased demand on facilities for emergency response and preparedness planning	Increased stress on telecom systems
Extreme Heat Events	Increased exposure to heat-related health impacts for emergency responders	Increased demand for cooling centers	Increased stress on telecom systems
Extreme Precipitation and Flooding	▸ Increased exposure to flood conditions for emergency responders ▸ Potential increases in emergency response times ▸ Increased challenges in responding to emergencies, providing treatment, or performing search and rescue operations	▸ Increased stress on evacuation centers and risk of physical damage to emergency facilities ▸ Risk of physical damage	▸ Risk of physical damage ▸ Risk of disruption to communication abilities in the city and region
Landslides	Increased exposure to hazard areas for emergency responders	▸ Risk of physical damage ▸ Increased demand on evacuation shelters	Risk of physical damage
Wildfires	Increased exposure of emergency response personnel to extreme health risk including smoke inhalation and dangerous fire conditions	▸ Risk of physical damage ▸ Increased demand on evacuation shelters	Risk of physical damage
Sea Level Rise	Increased exposure to flood conditions from emergency response	▸ Increased stress on evacuation centers ▸ Risk of physical damage to emergency facilities	N/A
Human Health Hazards	Increased exposure to infectious diseases and personal injuries	Increased stress on health care facilities in responding to health impacts from exposure to poor air quality, extreme heat, infectious diseases, and other climate-induced effects	Increased demand on telecom systems during climate-induced natural disasters and infectious disease outbreaks

Notes: N/A = not applicable.

Source: Ascent Environmental 2021

2.3 ADAPTIVE CAPACITY

This section analyzes the City's current capacity to address and adapt projected increase in severity and frequency of climate-related hazards. The City and regional partners have established plans, policies, and programs that address climate change impacts. These efforts, however, do not comprehensively identify strategies that will be taken by local and regional governments to address the full scope and magnitude of potential climate impacts. Climate change will increase the frequency and severity of climate-related hazards in the future, requiring updates to emergency response, land use planning, and strategic partnerships. A summary of the City's existing efforts to adapt to climate change effects is presented below.

Existing Plans and Reports

CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT SAN FRANCISCO BAY AREA SUMMARY REPORT

The Climate Change San Francisco Regional Report, prepared in 2018, is one in a series of 12 climate vulnerability assessments in California which provide an overview of climate science, specific strategies to adapt to climate impacts, and key research gaps needed to safeguard the region from climate change. The Summary Report breaks down regional vulnerability by land use, infrastructure and services, communities, and cross-border climate interactions while providing adaptation strategies applicable to the city.

The report can be found here: Climate Change Assessment San Francisco Regional Report

CALIFORNIA DEPARTMENT OF TRANSPORTATION CLIMATE CHANGE VULNERABILITY ASSESSMENT 2018 DISTRICT 4 TECHNICAL REPORT

Caltrans District 4 Technical Report, prepared in 2018, assesses the vulnerability of the State Highway System to the impacts of climate change in District 4. District 4 includes the nine Bay Area counties (i.e., Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma). The technical report was developed to better understand the vulnerabilities of the California State Highway System from greater intensity and frequency weather-related and longer-term climate change events including temperature, precipitation, wildfire, sea-level rise, storm surge, cliff retreat, and flooding. The report identifies the vulnerability of Caltrans assets to these climate change-related natural hazards. In addition, through a partnership with regional agencies, the report explains how State Highway System projects should be prioritized to adapt to climate change. Caltrans's approach to adaptation is to consider risk-based implications of damage and economic loss during the project design phase. This method for inherently considering climate change effects in project design was developed by the Federal Highway Administration and is known as the Adaptation Decision-Making Assessment Process.

The report can be found here: California Department of Transportation Climate Change Vulnerability Assessment 2018 District 4 Technical Report

PLAN BAY AREA 2040

Every four years, MTC/ABAG prepares and updates a regional plan that forecasts population and employment growth to inform transportation infrastructure decisions to provide greater mobility, strengthen the economy, promote a healthy environment, and support communities. The current regional plan is *Plan Bay Area 2040*, which includes strategies to increase sustainability and address climate change by focusing on housing and job growth in areas near transit, preserving open space and sensitive habitat, investing in transit options that lead to reductions in GHG emissions, and considering the potential impacts of climate change on transportation projects.

MTC/ABAG is currently preparing an update, titled *Plan Bay Area 2050*, with a focus on solutions to reduce GHG emissions from passenger vehicles and light trucks. Adoption of *Plan Bay Area 2050* is anticipated in late 2021.

Plan Bay Area 2040 can be found here: Plan Bay Area 2040

SANTA CLARA OPERATIONAL AREA HAZARD MITIGATION PLAN

The County of Santa Clara Office of Emergency Services updated its OAHMP in 2017. The OAHMP is intended to enhance public awareness and understanding, create a decision tool for management, promote compliance with State and federal program requirements, enhance local policies for hazard mitigation capability, provide inter-jurisdictional coordination of mitigation-related programming, and achieve regulatory compliance. The OEHMP update includes an assessment of risk and vulnerability associated with hazards including wildfire/structure fire, flood, coastal storms/erosion/tsunami, earthquake/liquefaction, rain-induced landslide, dam failure, drought, hazardous materials incidents, terrorism, and emerging risks from climate change. The OAHMP specifically targets climate change resiliency as a component of emergency preparedness. In addition to identifying risks, the OAHMP provides the following mitigation types used to categorize hazard mitigation planning (Santa Clara County 2017).

- Prevention—Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- Property Protection—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
- Public Education and Awareness—Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
- Natural Resource Protection—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Emergency Services—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
- Structural Projects—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Climate Resilient—Actions that minimize the impacts of climate change via an aquifer storage and recovery system to increase water supply for drought mitigation and a flood diversion and storage project to reduce flood risk.

The OAHMP can be found here: Santa Clara County Operational Area Hazard Mitigation Plan

CITY OF MILPITAS GENERAL PLAN

A comprehensive update of the City's General Plan is undergoing public review. The *General Plan 2040* was released for public comment in August 2020. The *General Plan 2040* provides the long-term vision and policy direction guidance for residents, city staff, decision-makers, and the broader community. The *General Plan 2040* serves as the foundation for most City regulatory documents and addresses land use, circulation, community design, economic development, conservation and sustainability, utilities and community services, safety, noise, parks and recreation, and community health and wellness. The updated Safety Element provides information pertaining to the natural hazards that have historically affected the city including earthquakes, flooding, and hillside wildfire and well as climate resiliency and adaptation policies consistent with SB 379. Goal SA-6 of the *General Plan 2040* serves to "minimize risk to life, property, the economy, and the environmental through climate adaptation strategies that enhance and promote Milpitas' community resilience."

The *General Plan 2040* can be found here: City of Milpitas General Plan 2040

CITY OF MILPITAS 2020 URBAN WATER MANAGEMENT PLAN

Under the Urban Water Management Planning Act (California Water Code Division 6, Part 2.6, Sections 10610 through 10656), the City's Public Works Department developed the 2020 UWMP to ensure a reliable water supply for the region until 2040. The report includes annual water supply reports which include documentation of local and imported water supplies. The overall objective of the 2020 UWMP was to develop a mix of drought-resilient water resources available to the region to avoid periods of water shortages and adopt a Water Shortage Contingency Plan that aligns to the State's six standard shortage levels. The 2020 UWMP acknowledges that climate change will likely result in changes to precipitation patterns in California; however, the 2020 UWMP does not provide recommendations or policies to address these changes, nor does it predict what and how these changes may affect water resources for the city. Under the Urban Water Management Planning Act, an urban water supplier is required to submit an updated plan every five years. The City's Public Works Department is currently in the process of developing its 2025 UWMP.

The plan can be found here: https://www.ci.milpitas.ca.gov/2020_uwmp/

BAYCAN EQUITABLE ADAPTATION RESOURCE GUIDE

The *BayCAN Equitable Adaptation Resource Guide* (BayCAN Guide) provides guidance to the Bay Area communities for the equitable distribution of resources to improve the resilience of the region. The BayCAN Guide selects six of the most comprehensive resources on equitable adaptation and outlines the distinct phases of the adaptation process and identifies key strategies to embed equity within each phase. These phases are then supplemented with "how-to" tools to help with the equitable adaptation process. The BayCAN Guide also presents example plans, guidance, and case studies in the Bay Area to inform other adaptation projects.

The BayCAN Guide can be accessed here: BayCAN Equitable Adaptation Resource Guide

WATER INFRASTRUCTURE RISK AND RESILIENCE ASSESSMENT

The *Water Infrastructure Risk and Resilience Assessment* was prepared by the City pursuant to the American's Water Infrastructure Act of 2018. Section 2013 of the act requires community drinking water systems serving more than 3,300 people to develop or update their risk and resilience assessment and emergency response plans. As of December 2020, the City serves approximately 75,500 water customers. The assessment identifies, quantifies, and communicates the risk and resilience of these plans. Earthquake, cyberattack, landslide, liquefaction, and physical sabotage are identified as the more likely threats to the City's assets. The assessment concludes that the City's water supply has resilience to these threats and indicates that, if necessary, water could be supplied by the SFPUC's water supply. The assessment also notes that water supply resiliency has been fortified more recently as the city's wholesale water supplies have been implementing their own measures to account for changes to precipitation patterns associated with climate change (City of Milpitas 2020).

ADAPTING TO RISING TIDES BAY AREA SEA LEVEL RISE ANALYSIS AND MAPPING PROJECT

The ART program led by the San Francisco Bay Conservation and Development Commission provides support, guidance, tools, and information to help agencies and organizations understand, communicate, and begin to address complex climate change issues. The ART *Bay Area Sea Level Rise Analysis and Mapping Project* produces inundation data associated with sea-level rise and flood events and mapping projects for all nine San Francisco Bay counties. The inundation scenarios capture permanent inundation and temporary flooding impacts for sea-level rise scenarios for 0 to 66 inches and extreme high tide events from the 1-year to the 100-year extreme tide. Additionally, the mapping identifies key structures that would be adverse impacted by sea-level rise (San Francisco Bay Conservation and Development Commission 2021).

The ART *Bay Area Sea Level Analysis and Mapping Project* and related GIS files are located here: Adapting to Rising Tides Bay Area Sea Level Rise Analysis and Mapping Project

Summary of Adaptive Capacity

Table VA-8 evaluates the specific climate change effects covered under each of the plans and reports discussed above. As shown in Table VA-9, multiple planning efforts have been made to address the climate change-related impacts that are expected to impact the city. Mitigation and adaptation measures for hazards including flooding, storms and extreme weather events, and wildfires and severe wind have been relatively well documented in assessments prepared previously. Other climate change hazards including impacts on human health, drought and available water supply, extreme heat and heat waves, landslides, and sea-level rise are noted in various regional planning efforts. However, these efforts do not analyze regional climate change effects consistently while developing adaptation strategies. Most of the policies provided in existing plans are broad-based strategies to reduce risk from climate change. Thus, it is important to note that specific and targeted policies should be developed to address the resilience of the most vulnerable populations and assets in the city.

Table VA-8 Adaptive Capacity in Existing Plans and Reports

Plan or Report	Climate Change Hazard						
	Human Health Hazards	Drought and Water Supply	Extreme Heat Events	Extreme Precipitation and Flooding	Landslides	Wildfires	Sea-Level Rise
Santa Clara County OAHMP	✓	✓	✓	✓	✓	✓	✓
City's General Plan 2040	✓	✓	✓	✓	✓	✓	✓
California's Fourth Climate Change Assessment SF Regional Report	✓	✓	✓	✓	✓	✓	✓
Caltrans Climate Change Vulnerability Assessment District 4				✓	✓	✓	✓
Plan Bay Area 2040	✓	✓	✓	✓	✓	✓	✓
2015 Urban Water Management Plan		✓					
BayCAN Equitable Adaptation Resource Guide	✓	✓	✓	✓		✓	✓
Water Infrastructure Risk and Resilience Assessment							
Adapting to Rising Tides Bay Area Sea-Level Rise				✓			✓

Notes: OAHMP = Operational Area Hazard Mitigation Plan, SF = San Francisco, BayCAN = Bay Area Climate Adaptation Network

Source: Data compiled by Ascent Environmental in 2021

2.4 VULNERABILITY SCORING

The city's vulnerability to each identified climate change impact is assessed based on the magnitude of risk posed to populations and assets, and any existing measures in place to mitigate these impacts. Potential impacts and adaptive capacity are rated on a qualitative scale from Low to High based on guidance from the APG. A description of each qualitative rating for both factors is provided in Table VA-9.

Table VA-9 Potential Impact and Adaptive Capacity Scoring

Score	Potential Impact	Adaptive Capacity
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.	The population or asset lacks capability to manage climate impact; major changes would be required.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.	The population or asset has some capacity to manage climate impact; some changes would be required.
High	Impact is highly likely based on projected exposure; would result in substantial consequences to public health, safety, and/or other metrics of concern.	The population or asset has high capacity to manage climate impact; minimal to no changes are required.

Source: CalOES 2020

After rating potential impacts and adaptive capacity, an overall vulnerability score is determined for each climate change impact. This scoring can help the City understand which effects pose the greatest threats and should be prioritized in future planning efforts. Table VA-10 presents the rubric used to determine the overall vulnerability scores based on the ratings for potential impacts and adaptive capacity.

Table VA-10 Vulnerability Scoring

		Vulnerability Score		
Potential Impacts	High	3	4	5
	Medium	2	3	4
	Low	1	2	3
		High	Medium	Low
		Adaptive Capacity		

Source: CalOES 2020

Vulnerability scoring for each climate-related impact identified in Tables VA-3 through VA-7 is included below and organized by the same overarching categories: populations, transportation, energy, water, and emergency services. Some similar impacts have been combined to reduce redundancy.

Impacts to Populations

Major climate change-related impacts to populations in the city include increased exposure of air pollutants hazardous to human health, potential increased exposure to infectious diseases, and exposure to wildfire smoke, flooding, and extreme heat. Based on climate projections, the city is expected to experience higher average temperatures, and more frequent droughts, extreme heat events, flooding, and wildfires.

The Santa Clara County Public Health Department provides resources for the prevention and treatment of infectious diseases, heat-related illnesses, and mental health concerns. SCVWD also provides flood management planning in its E2, Emergency Response Planning project, which allows SCVWD to coordinate with local municipalities, including the

City, to clearly identify roles and responsibilities for floodplain management and flood emergency management. The E2 program is a continually evolving project. The City's *Water Infrastructure Risk and Resilience Assessment* evaluates the risk of the city's water-related infrastructure and has concluded that the infrastructure is of high resiliency. SCVWD's *Water Supply Master Plan* also looks forward to a future affected by climate change and accounts for water planning in future extended drought conditions.

Santa Clara County provides residents with real-time information regarding flooding events, among other emergency events, through their AlertSCC notification system, which administers notifications through cell phone calls and SMS text messages. The Milpitas Fire Department Office of Emergency Services (Milpitas OES) keeps its Emergency Operations Center in a constant state of readiness to manage and respond to emergencies affecting residents and the business community of the city. The structure of command supports the state-mandated Standardized Emergency Management System and the federal-mandated National Incident Management System.

To address impacts to people during PSPS events, PG&E partners with the City to operate Community Resource Centers. Community resource centers provide information, resources, and necessities to customers in the city. Historically, the Milpitas Sports Center has been used as a Community Resource Center during PSPS events and will likely be used during future events. The following policies from the *General Plan 2040* Safety Element address climate-change related impacts to the city's vulnerable populations:

- **Policy SA 6-5:** Ensure that climate impacts and climate adaptation measures aimed at reducing climate risks do not lead to disproportionally adverse effects on vulnerable populations.
- **Policy SA 6-6:** Consider the needs of vulnerable populations and individuals with limited mobility when planning for access to safe and comfortable shelter during extreme heat events or other severe weather events.

Table VA-11 provides a summary of the vulnerability scores for the potential climate change impacts on vulnerable populations.

Table VA-11 Population Vulnerability Scoring

Vulnerability Description	Vulnerability Score		
	Potential Impact	Adaptive Capacity	Vulnerability
Increased human health risk (i.e., poor air quality, infectious diseases, mental health concerns, limited access to potable water, heat-related illnesses)	High	Medium	4
Lack of electricity during Public Safety Power Shutoffs implemented during times of high wildfire risk	Medium	Low	4
Reduced available water supply from extended drought periods	High	High	3
Increased exposure to flood risk from extreme precipitation and sea-level rise	Medium	Medium	3
Increased exposure of people to landslides	Medium	High	2
Limited ability to prepare for climate events and to respond and evacuate	Medium	High	2
Increased exposure of people to wildfires	Low	High	1

Source: Ascent Environmental 2021

Impacts to Transportation

Transportation facilities play an important role in the region's economic prosperity and emergency response to climate-related hazards and other hazards. These facilities not only provide access throughout the region for the movement of workers and goods, but also provide evacuation routes and access to emergency services during hazard events. Damage to transportation facilities such as highways and railways can have a negative impact on the region's economy. Furthermore, these disruptions could disproportionately affect low-income communities or individuals with disabilities from accessing necessary employment centers, health centers, or other services.

The primary impacts of climate change on transportation facilities are physical damage to roadways, railways, and transit facilities from extreme heat events, flooding, sea-level rise, landslides, and wildfires. Climate impacts including extreme heat days, heat waves, and heavy precipitation events can reduce the likelihood of individual use of alternative modes of transportation (i.e., public transit, biking, walking) due to various factors including exposure to extreme heat or heavy precipitation and flooding.

The roadway network in the city is maintained and operated by various State, regional, and local agencies. These agencies collaborate to effectively prepare and adapt to climate change impacts to the transportation system. MTC/ABAG and Caltrans have developed plans and programs to identify roadway network vulnerabilities as well as guidance for how to prioritize transportation projects. Project prioritization through Caltrans' Adaptation Decision-Making Assessment Process will help the city's transportation system increase resilience as climate impacts become more frequent and severe over time, for roadways under Caltrans' jurisdiction. MTC/ABAG's *Plan Bay Area 2040* provides strategies to incorporate climate adaptation in the design of new projects and improvements of existing infrastructure. The next iteration, *Plan Bay Area 2050*, will provide even more resiliency strategies to be implemented throughout the Bay Area.

The City's *General Plan 2040* Circulation Element contains goals and policies that address the safe and efficient operation, maintenance, and management of the transportation network. The following policies serve to bolster the efficacy of the city's transportation network:

- Policy CIR 1-3: Promote interconnectivity of the transportation network in existing and new developments and actively measure the quality of conditions in neighborhoods to better understand what barriers exist in order to support use of and access to the network.
- Policy CIR 1-7: Coordinate with neighboring jurisdictions regarding planned developments and transportation improvements that impact communities in both jurisdictions.
- Policy CIR 6-9: Maximize efficient maintenance of transportation infrastructure of all modes, such as coordinating roadway paving or striping projects to include maintenance of pedestrian and bicycle infrastructure.

The vulnerability scores for impacts on transportation facilities and infrastructure in the county are provided in Table VA-12.

Table VA-12 Transportation Vulnerability Scoring

Vulnerability Description	Vulnerability Score		
	Potential Impact	Adaptive Capacity	Vulnerability
Increased impacts to evacuation routes and emergency access during hazard events	Medium	High	4
Increased risk of damage to roadways from landslides	Medium	Medium	3
Increased risk of damage to roadways from extreme heat events	Low	Medium	2
Increased risk of damage to roadways from flooding or sea-level rise	Low	Medium	2
Increased risk of damage to roadways from wildfires	Low	Medium	2
Increased risk of damage to transit facilities	Low	Medium	2
Increased risk of damage to railways	Low	Medium	2
Increased risk of damage to bicycle paths and trails	Low	Medium	2
Increased stress on transit service and reduced ridership from increased extreme weather events and spread of infectious disease	Low	Medium	2

Source: Ascent Environmental 2021

Impacts to Energy

Energy systems include electricity transmission lines, natural gas pipelines, and energy generation facilities (e.g., solar photovoltaic systems) that are within or serve the city. Climate change impacts to these resources include increased demand on transmission systems and energy production during extreme heat events as well as risks of physical damage to infrastructure during flooding events and wildfire or grassland fire events in the surrounding region. Climate change impacts will make it increasingly difficult for utility providers to sustain energy generation rates, repair damaged energy transmission infrastructure, and meet the increased demand for energy during extreme heat events which are becoming more common and more severe.

The city relies on PG&E and SVCE for the generation and distribution of a majority of its electricity and natural gas supply. In the event of an emergency or a climate change-related hazard event, PG&E and the California Independent System Operator issue preventative measures that may reduce stress on energy systems and reduce energy demand. These measures include conservation notifications such as Flex Alerts and operational notifications such as restricted maintenance operations or PSPS events. PG&E has also invested in the implementation of wildfire safety measures, which are included in its *2021 Wildfire Mitigation Plan*, which provides updated details on PG&E's comprehensive Community Wildfire Safety Program, incorporates lessons learned from 2020, and outlines additional programs to continue to reduce wildfire risk ignited by electrical infrastructure (PG&E 2021). Based on the *2021 Wildfire Mitigation Plan*, PG&E operated over 300 Community Resource Centers in 2020 with plans to expand this number through partnerships with participating counties and cities (PG&E 2021). Additionally, SVCE has partnered with Bay Area-based solar installer Sunrun to install up to roughly 20 megawatts of emissions-free solar and battery backup power to 6,000 households vulnerable to emergency power shutoffs during wildfire seasons.

Additionally, the following policy from the *General Plan 2040* Safety Element addresses the city's energy resources:

- Policy SA 6-3: Encourage and support private sector investment in climate adaptation through climate-resilient infrastructure such as onsite renewable energy, integrated stormwater management and water conservation.
- Policy SA 6-4: Promote community awareness of climate-resilient actions that can be implemented by homeowners, such as water conservation, on-site water collection, passive solar designs, and alternative energy strategies.

The vulnerability scores for impacts to energy resources are shown in Table VA-13.

Table VA-13 Energy Vulnerability Scoring

Vulnerability Description	Vulnerability Score		
	Potential Impact	Adaptive Capacity	Vulnerability
Increased demand for electricity generation during extreme heat events	Medium	Low	4
Increased system stress during droughts and extreme heat events	Medium	Low	4
Reduced effectiveness of hydro-electric electricity generation facilities during drought and extreme precipitation events	Low	Low	3
Reduced effectiveness of solar electricity generation facilities due to increased smoke from wildfires	Low	Low	3
Increased system stress and physical damage from flooding, sea-level rise, and landslides	Medium	Medium	3
Risk of physical damage from wildfires	Low	High	1

Source: Ascent Environmental 2021

Impacts to Water

Limited water supply and damage to the city's flood control system are the main climate vulnerabilities of the city's water resources. Extreme precipitation events and flooding have the potential to damage existing flood control and water conveyance facilities. Failure of flood control facilities could result in damage to other structures within the city and risks to public safety.

The majority of the city's water supply is imported from areas outside of the city. SFPUC imports water from the Hetch Hetchy Reservoir located in Yosemite National Park; SCVWD imports water from the Delta. The City's 2020 UWMP, prepared in coordination with SFPUC and SCVWD, demonstrates a goal of meeting future demand through a combination of implementing water conservation and demand management strategies, and increasing recycled water usage. Additionally, the City's *Water Supply Augmentation Study* recommends that the City add groundwater as a water resource to meet future demand. The City has also amended its water conservation ordinance that addresses extended periods of drought. In 2015, the city was able to conserve 30 percent more water than the previous year in response to the state's 4-year period drought period from 2012-2016, demonstrating the city's adaptive capacity to reduce water consumption when necessary. The vulnerability scores for impacts on water resources are shown in Table VA-14.

Table VA-14 Water Vulnerability Scoring

Vulnerability Description	Vulnerability Score		
	Potential Impact	Adaptive Capacity	Vulnerability
Reduction in available water supply	Medium	Medium	3
Increased risk of physical damage to flood control and water conveyance facilities	Medium	High	2
Increased demand for flood control and water conveyance facilities	Medium	High	2
Increased water demand	Medium	High	2
Increased risk of contamination of potable water supply from sea-level rise	Low	Medium	2

Source: Ascent Environmental 2021

Impacts to Emergency Services

The primary climate vulnerabilities in the city regarding emergency services are the exposure of emergency responders to increased frequency of hazards, the demand for emergency facilities to provide shelter and safety for residents impacted by hazardous events, and reliance on telecommunication services to alert residents and emergency responders.

Milpitas OES is responsible for emergency response in disaster situations. Milpitas OES provides alerts and notifications to residents through various communication channels in the event of an emergency and is also responsible for ensuring resources are available and for implementing emergency response and recovery procedures. The City contributed to the development of the OAHMP, which identifies goals, objectives, and potential actions to reduce hazard risks and enhance emergency response capabilities. The City also retains and updates a city-specific Multi-Hazard Mitigation Plan and manages the Community Emergency Response Team program to train residents to protect themselves, family, and neighborhood in the event of an emergency. Additionally, the City keeps the Emergency Operation Center active at all times and provides residents with emergency preparedness resources on its website. Also, Policy SA-62 of the *General Plan 2040* directs the city to "ensure that emergency response plans and training programs continue to evolve and are modified to protect residents, infrastructure, and facilities during emergencies and extreme weather events." The vulnerability scores for impacts to emergency services are shown in Table VA-15.

Table VA-15 Emergency Services Vulnerability Scoring

Vulnerability Description	Vulnerability Score		
	Potential Impact	Adaptive Capacity	Vulnerability
Increased exposure of emergency responders to heat-related sickness, smoke inhalation, and infectious disease	High	Medium	4
Increased risk of damage to emergency facilities (e.g., hospitals, cooling centers, telecommunication systems, and evacuation centers)	Medium	Medium	3
Increased demand for emergency response services	Medium	High	2
Increased demand for emergency facilities (e.g., hospitals, cooling centers, telecommunication systems, and evacuation centers)	Medium	High	2

Source: Ascent Environmental 2021

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