



Climate Action and Adaptation Plan

Climate Change Vulnerability Assessment

prepared by

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CITY OF CAMPBELL

**Climate Action &
Adaptation Plan**

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1 Introduction

1.1 Land Acknowledgement

The City of Campbell acknowledges that the city is located on ancestral lands of great importance to Tamien Nation, a tribe recognized under California State Law, and that the people of Tamien Nation are important members of the Campbell community.

1.2 Purpose

Climate change is a global phenomenon that can impact ecosystems, community health, public safety, buildings, transportation infrastructure, water infrastructure, waste infrastructure, and emergency response services. The primary driver of climate change is increased greenhouse gases (GHG) in the atmosphere due to human activity. This Climate Change Vulnerability Assessment (CCVA) evaluates how climate change is anticipated to impact Campbell. The guiding methodology used in this assessment is based on the Santa Clara County Office of Sustainability's 2015 Silicon Valley 2.0 Climate Adaptation Guidebook¹ and Climate Change Preparedness Tool² (collectively referred to as SV 2.0)³, which is discussed in more detail in the Vulnerability Assessment Methodology section of this report.

Understanding Campbell's vulnerabilities to climate change provides a foundation for developing climate adaptation measures and actions for the City's Climate Action and Adaptation Plan (CAAP), along with measures and actions that will help to reduce GHG emissions.

Causes of Climate Change

Climate change is caused by the addition of excess greenhouse gases to the atmosphere, which trap heat near the earth's surface, raising global average temperatures. Known as the greenhouse effect, this increase in average temperatures across the globe affects sea level rise, ocean temperatures and chemistry, precipitation patterns, the severity of wildfires, the prevalence of extreme heat events, and water supply (NASA 2022). According to the Intergovernmental Panel on Climate Change (IPCC), GHG are now higher than they have been in the past 400,000 years, raising carbon dioxide levels from 280 parts per million to 410 parts per million in the last 150 years (IPCC 2021). The dramatic increase in GHG is attributed to human activities—beginning with the industrial revolution in the 1800s, which represented a shift from an agrarian and handicraft-based economy to one dominated by industry and machine manufacturing (NASA 2022).

¹County of Santa Clara Office of Sustainability and Climate Action. 2015. Silicon Valley 2.0 Climate Adaptation Guidebook. https://sustainability.sccgov.org/sites/g/files/exjcpb976/files/documents/1_150803_Final%20Guidebook_W_Appendices.pdf

²County of Santa Clara Office of Sustainability. N.d. Silicon Valley 2.0 Climate Change Preparedness Tool. <https://siliconvalleytwopointzero.org/home>

³County of Santa Clara Office of Sustainability and Climate Action. 2015. Silicon Valley 2.0 Climate Adaptation Guidebook.

1.3 Glossary

Several words and phrases are used throughout this assessment to illustrate climate vulnerabilities within Campbell. These definitions come from IPCC and the California Governor’s Office of Emergency Services (Cal OES):

- **Adaptation.** The process of adjustment to actual or expected climate and its effects, either to minimize harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate.
- **Asset.** Refers to a resource, structure, facility, or service that is relied on by a community.
- **Climate Hazard.** A dangerous or potentially dangerous condition created by the effects of the local climate. Climate hazards of concern for Campbell are extreme heat, poor air quality, riverine flooding, and drought.
- **Impact.** Effects on natural and human systems including those on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate hazards and the vulnerabilities of the system or asset effected.
- **Mitigation.** An act or sustained action to reduce, eliminate, or avoid negative impacts or effects.
- **Resilience.** The capacity of an entity (an individual, a community, an organization, or a natural system) to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience.
- **Vulnerability.** The propensity or predisposition to be adversely affected.
- **Vulnerable Populations.** Certain populations experience increased exposure or risk to climate change and often have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. Given this, assessing and mitigating impacts to these populations is a priority.

1.4 Vulnerability Assessment Methodology

This report is informed by the findings of SV 2.0, which describes anticipated climate change impacts in Santa Clara County. SV 2.0 identifies historic climate variables in the County, including riverine flooding, wildfire, extreme heat, drought, and air quality deterioration. SV 2.0 assesses the following sectors: buildings and properties, communications, ecosystem, energy, public health, solid and hazardous waste, transportation, and water and wastewater. The Climate Change Preparedness Decision Support Tool offers an analysis of climate projections by city, or countrywide. In alignment with the Cal OES California Adaptation Planning Guide, this report considers a high-emissions scenario (RCP 8.5⁴) when analyzing projected climate change hazards and impacts.⁵

The social vulnerability methodology used in this report is informed by the Silicon Valley 2.0 Social Vulnerability Index (SoVI) methodology,⁶ which offers a socioeconomic context to climate change impacts. The SV 2.0 SoVI methodology identifies, groups, and analyzes vulnerable populations using data from the Santa Clara County Department of Public Health, U.S. Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances and Disease Registry (ATSDR), California Office of

⁴RCP 8.5 is a Representative Concentration Pathway (RCP) scenario that describes a potential future of global warming. It's a high-emissions scenario that assumes a continuation of rising emissions throughout the 21st century.

⁵California Governor’s Office of Emergency Services. 2020. California Adaptation Planning Guide. <https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf#search=adaptation%20planning%20guide>

⁶County of Santa Clara Office of Sustainability. Silicon Valley 2.0 Social Vulnerability Index (SoVI) Methodology. 2021. https://siliconvalleytwopointzero.org/downloads/SiliconValley2.0_SOVI-Methodology.pdf

Environmental Health Hazard Assessment, Public Health Hazard Assessment, Public Health Alliance of Southern California, San Francisco Bay Conservation and Development Commission (BCDC), California Department of Public Health, Pacific Institute & California Energy Commission, Delta Stewardship Council, and U.S. Census Bureau. Vulnerable populations were also mapped using BCDC's Community Vulnerability index, along with the Metropolitan Transportation Commission's Equity Priority Communities, or "Communities of Concern."

Input from the Campbell community was incorporated into the development of this report, providing critical validation of the findings. As part of the CAAP process, the City convened a Community Advisory Committee (CAC) made up of a diverse group of community members who have a vested, long-term interest in Campbell. For more information about how the CAC's input was incorporated, see the Vulnerable Community Members section of this report.

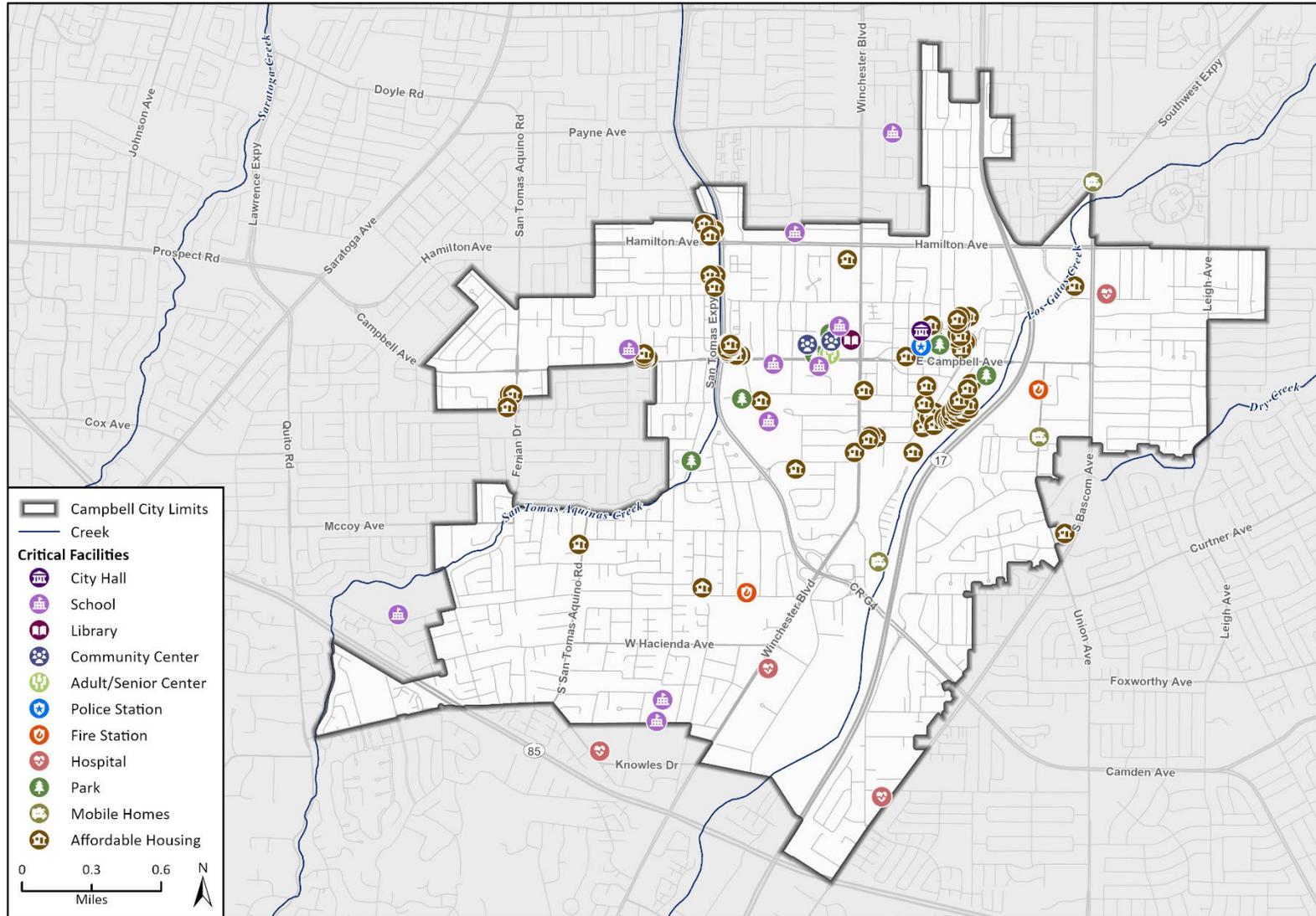
1.5 Campbell Snapshot

Campbell is located in Santa Clara County, about 25 miles east of the California coastline. The City is surrounded by the City of San Jose, City of Saratoga, and Town of Los Gatos. Campbell spans 6.35 square miles and has a population of over 42,000 residents. The City has various neighborhood parks located throughout the city for the peaceful enjoyment of residents, their families, and guests. Facilities and amenities at these parks include restrooms and playgrounds for children.

Critical facilities are important to a community's response and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts on the community and accelerate recovery. Critical facilities in Campbell, as defined in the Santa Clara County Multijurisdictional Hazard Mitigation Plan 2023 Update City of Campbell Annex⁷ and shown in Figure 1 include police stations, fire stations, and hospitals. Other facilities considered critical in this report are those that house climate vulnerable populations, including schools, senior centers, affordable housing units, and mobile home parks, as well as City Hall, libraries, community centers, and parks. The majority of the critical facilities are located along Campbell Avenue. Some critical facilities outside of City limits have been included in the map as they are commonly used by Campbell residents.

⁷Santa Clara County. 2023. Santa Clara County Multijurisdictional Hazard Mitigation Plan 2023 Update City of Campbell Annex Draft. https://emergencymanagement.sccgov.org/sites/g/files/exjcpb261/files/2023-07/City%20of%20Campbell_Annex%20Draft_6.20.23.pdf

Figure 1 Critical Facilities in Campbell



Basemap provided by Esri and its licensors © 2024.
 Additional data provided by NHD, 2024.

23-15480 EPS CAAP
 Fig X Critical Facilities

2 Vulnerable Community Members

The presence of vulnerable populations in the City of Campbell were identified based on SV 2.0, Metropolitan Transportation Commission’s Equity Priority Communities (EPC), the San Francisco Bay Conservation & Development Commission (BCDC) community vulnerability map, and feedback received from the Campbell CAAP Community Advisory Committee. The following sections describe how each source was used to determine areas with high concentrations of vulnerable populations in Campbell.

Silicon Valley 2.0

The SV 2.0 methodology is a modified version of the methodology developed by the Delta Stewardship Council. The Delta Stewardship Council model is specifically tailored to capture social and economic factors that have been tied to increased vulnerability to flooding, extreme heat, and wildfire. The indicators used in SV 2.0 are the same as in the Delta Stewardship Council model with two exceptions, the addition of homelessness status to reflect the vulnerability of unhoused populations and transit access to reflect the vulnerability for residents living in areas not accessible to public transportation. SVI 2.0 includes data from the 2015-2019 American Community Survey (ACS) and other sources on socioeconomic status, age and ability, minority status and English language proficiency, housing and transportation access, and health care and food access.

SV 2.0 uses the following indicators to calculate a social vulnerability index to identify locations in Santa Clara County that are vulnerable to climate change:

Population, Housing, and Transportation

- Population density
- Low-income households
- Educational attainment
- Children
- Older adults living alone
- Ability
- Race and ethnicity
- Linguistic isolation

- Cost-burdened renters
- Vehicle access
- Homelessness status
- Transit access

Health and Food Access

- Health insurance
- Asthma
- Cardiovascular disease
- Food access

The index assigns a score to each Census tract in Santa Clara County based on the number of indicators that fall in the 70th percentile or higher. Three Census Tracts in Campbell (5065.03, 5065.04, and 5065.05), shown as the hatched area in Figure 2, were identified as moderately vulnerable as part of SV 2.0.

Metropolitan Transportation Commission: Equity Priority Communities

MTC developed a list of Equity Priority Communities (EPC) – Census Tracts that are overwhelmingly and historically underserved based on socioeconomic status – in order to direct funding toward projects that enable more equitable access to transportation, housing, and services.⁸ EPCs are

⁸Metropolitan Transportation Commission (MTC). 2024. Equity Priority Communities. <https://mtc.ca.gov/planning/transportation/access-equity-mobility/equity-priority-communities>

included in this report because the demographic factors that make up these communities also increase vulnerability to climate change. The indicators included in the EPC framework are:

- People of color
- Low-income
- Limited English proficiency
- Zero-vehicle household
- Seniors 75 years and over
- People with a disability
- Single parent families
- Severely rent-burdened

There are two Equity Priority Communities within Campbell as shown in green in Figure 2: the Rosemary neighborhood (northwest of W. Hamilton Avenue and Winchester Boulevard in Census Tracts 5065.04 and 5065.05) and outside of the city boundary in the South Bascom Urban Village (between Southwest Expressway and W. Hamilton Ave in Tract 5021.04).

San Francisco Bay Conservation and Development Commission Community Vulnerability Map

The San Francisco Bay Conservation and Development Commission (BCDC) Adapting to Rising Tides Program developed a community vulnerability map to better understand vulnerability to current and future flooding due to sea level rise and storm surges. The data is used to help inform the implementation of the BCDC Environmental Justice and Social Equity Bay Plan amendment. The community vulnerability map uses Census Block Groups using data from the American Community Survey (2017-2021) and CalEnviroScreen 4.0 to identify areas of low, moderate, high, and highest social vulnerability. This data extends into all of Santa Clara County, including Campbell, and is used in this report because the social vulnerability indicators used by BCDC also reflect increased vulnerability to other types of climate change hazards. Social vulnerability indicators included in the BCDC map are:

- Renters
- Under 5
- Very low-income
- Not U.S. citizen
- Without a vehicle
- People with a disability
- Single parent families
- Communities of color
- 65 and over, living alone
- Limited English proficiency
- Without a high school degree
- Severely housing cost burdened

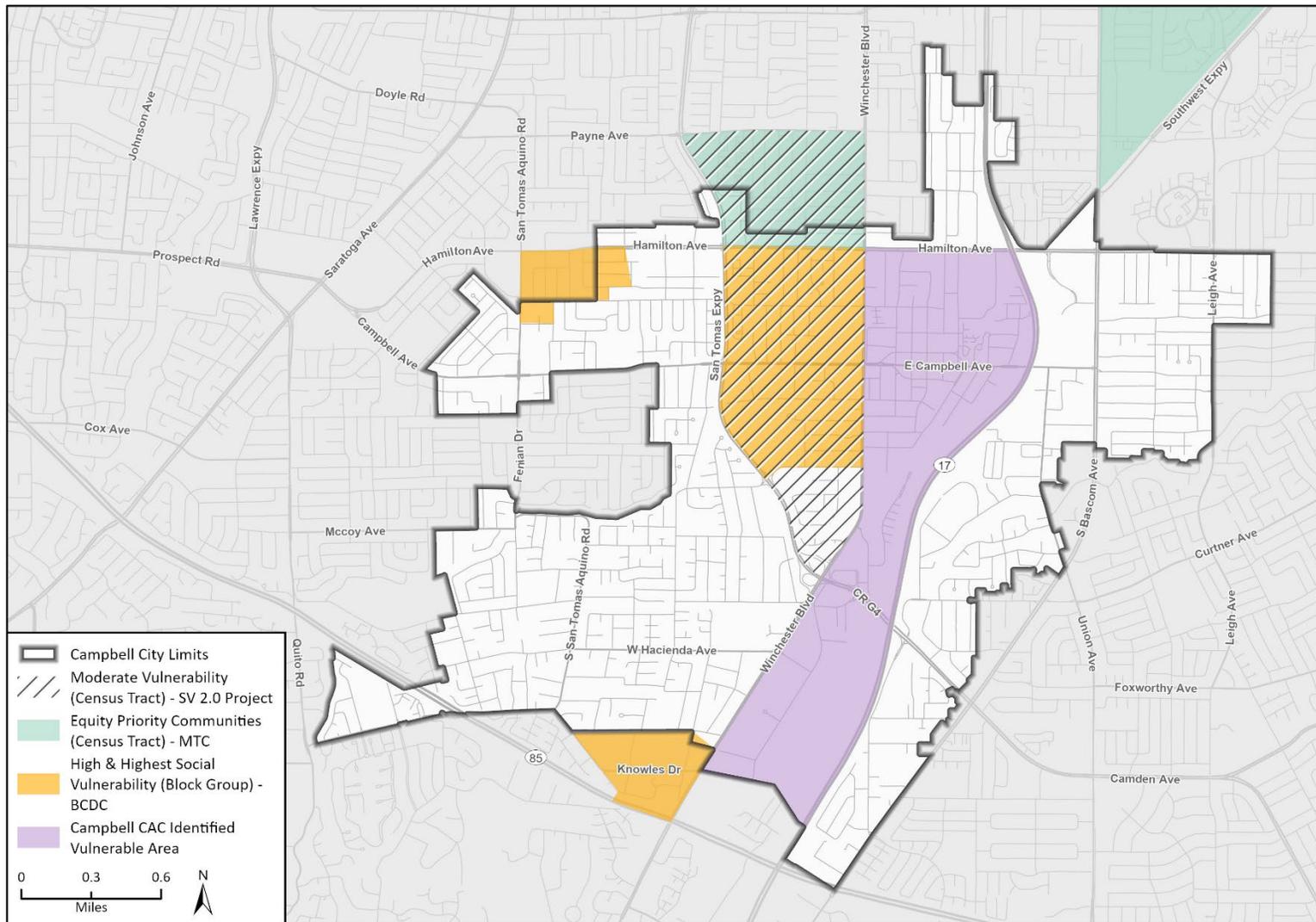
There are four Block Groups in Campbell identified as high or highest social vulnerability, as defined by the BCDC community vulnerability map and shaded in orange in Figure 2: one Block Group in the northwest south of Hamilton Avenue (Block Group 3 in Census Tract 5066.06), two in downtown Campbell (Block Groups 1 and 2 in Census Tract 5065.03), and one in south Campbell surrounding Knowles Drive between Pollard Road and Winchester Boulevard (Block Group 3 in Census Tract 5067.03).

Campbell CAAP Community Advisory Committee Feedback

In June 2024, the Campbell CAAP Community Advisory Committee provided feedback on the draft climate vulnerability map developed using data from SV 2.0, EPC, and BCDC. The Community Advisory Committee validated the areas initially identified in these data sets, and added an additional climate-vulnerable area shown in purple in Figure 2 (Census Tract 5065.02) along the Los Gatos Creek, based on high concentrations of affordable housing units (shown in Figure 1) as well as

unhoused individuals living along the creek. Figure 2 shows the climate vulnerable communities in Campbell by data source and Figure 3 shows a simplified version of all climate-vulnerable communities in Campbell resulting from the combination of methodologies described here.

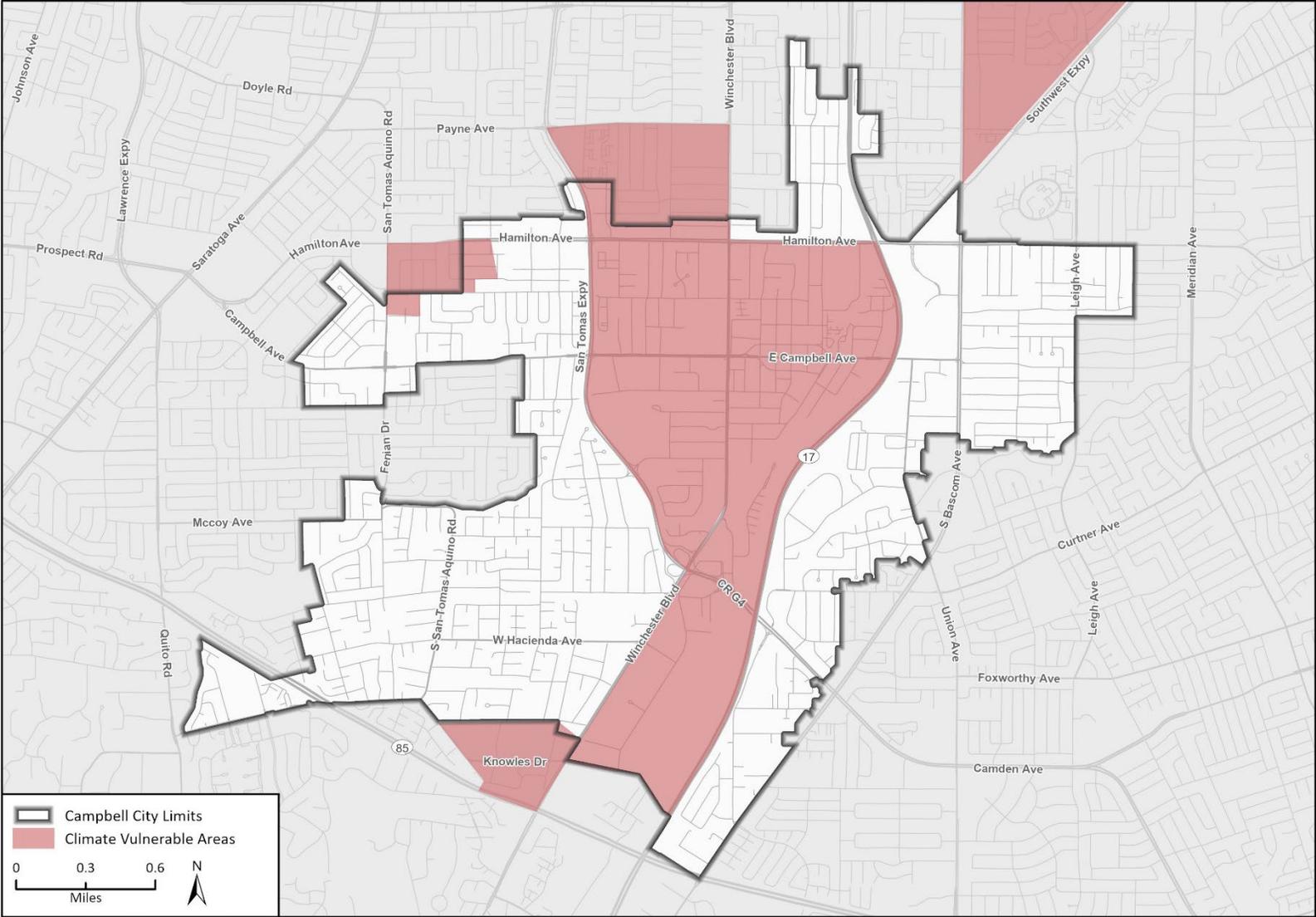
Figure 2 Climate Vulnerability in Campbell by Data Source



Basemap provided by Esri and its licensors © 2024.
 Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021.

23-15490 EPS-CAAP
 Fig X Social Vulnerability

Figure 3 Climate Vulnerability in Campbell



Basemap provided by Esri and its licensors © 2024.
Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021.

23-13480 EPS CHMP
Fig X Climate Vulnerable Areas

3 Climate Hazards and Impacts

This section describes climate hazards and impacts that the Campbell will likely experience: extreme heat, air quality degradation, riverine flooding, and drought.

3.1 Climate Hazards

The climate change projections included for each climate hazard are from SV 2.0. SV 2.0 uses projection data from Cal Adapt, as recommended in the California Adaptation Planning Guide developed by the University of California, Berkely, with oversight from the California Energy Commission.⁹

Extreme Heat

Cal Adapt defines a single day of extreme heat during the months between April and October where temperature exceeds the 98th percentile of maximum temperature of that local region from 1961 to 1990. For Campbell, the threshold temperature that exceeds the 98th percentile is 96 degrees Fahrenheit (°F). Cal Adapt defines an extreme heat event as a period of five or more consecutive extreme heat days. As described in SV 2.0, Santa Clara County has experienced a total of six extreme heat events in 1961, 1973, 1992, 2000, 2006, and 2009. Extreme heat events in 2000 and 2006 had the most devastating impacts. In 2000, temperatures reached 109°F, which caused one death and 11 heat-related illnesses in Santa Clara County. The heatwave in 2006 lasted 14 days and resulted in public health impacts and caused power outages throughout the county. The Santa Clara County area, including Campbell, is projected to experience longer and more frequent heatwaves, including an increase in daytime and nighttime temperatures. Campbell is expected to experience an increase from an average of four to an average of 24 extreme heat days per year by the end of the century according to the high emissions scenario.

Air Quality Degradation

Climate change is projected to result in increased air pollution, despite potential decreases in pollutant levels through advances in technology in the energy, transportation, and industrial sectors. Increased temperatures, increased humidity, decreased airflow, wildfires, and other weather conditions could reduce air quality. Ozone formation tends to increase with higher temperatures, strong sunlight, and a stable air mass. Higher temperatures also increase air pollution by causing vegetation to emit more natural hydrocarbons, air conditioners to work harder, fuel evaporation to increase, and demands on power plants to increase as well. The Bay Area Air Quality Management District (BAAQMD) shows that ozone concentration measurements in the air district violated federal standards on five days in 2014. Increasing impacts from climate change will result in poorer air quality in Santa Clara County. Increases in extreme heat and wildfire events as a result of climate change will result in higher levels of air pollution. Although there is low risk of wildfire in Campbell, air quality degradation from surrounding wildfires in the region will impact the Campbell community.

⁹California Energy Commission (CEC). 2023. <https://cal-adapt.org/>

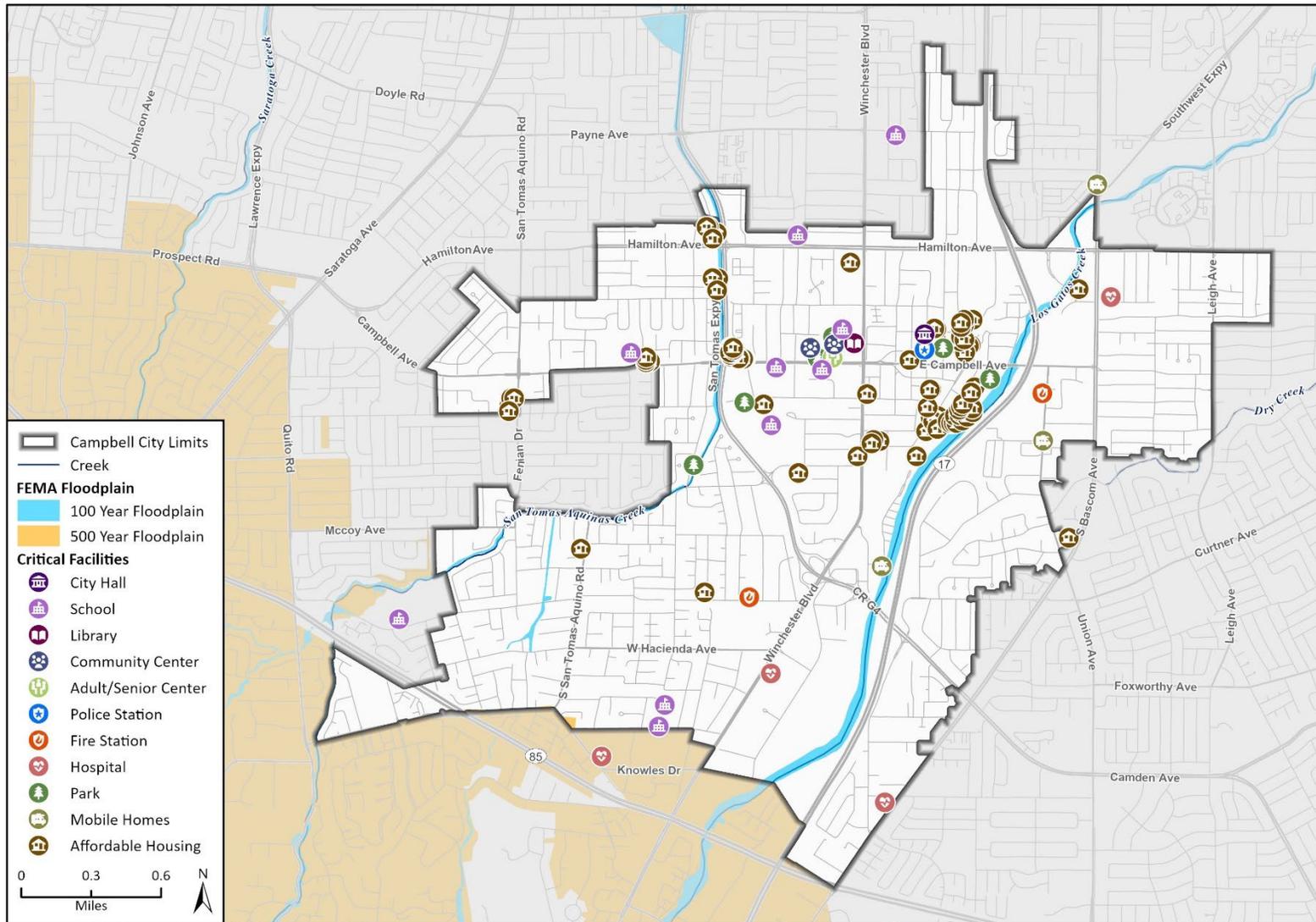
Riverine Flooding

Riverine flooding along Los Gatos Creek may intensify in Campbell given the projected increase in intensity and frequency of extreme precipitation events. Figure 4 shows critical facilities and the areas within and surrounding the city exposed to 100 and 500-year flooding events. The 500-year floodplain within Campbell is minimal because FEMA limited the study of the 500-year floodplain to outside of city limits. Given the extensive 500-year floodplain just south of the city, it is likely that areas within Campbell, along the southern border and Los Gatos Creek, would be at risk to 500-year flooding events. Though FEMA floodplains provide useful information about flood risk, they are based on historical flow data from river gauges and do not account for current or future environmental changes.

Drought

Drought is a period of abnormally dry weather caused by changes in primary variables including increase in temperature and decrease in precipitation. Campbell will experience an increasing number of drought events. According to SV 2.0, extreme dry spells are expected to occur in Santa Clara County every six to eight years by mid-century and increasing to every three to four years by end-of-century.

Figure 4 Riverine Flood Projections in Campbell



Basemap provided by Esri and its licensors © 2024.
 Additional data provided by FEMA, 2021; NHD, 2024.

23-11490 EPS CAMP
 Fig X Critical Facilities and Flood Hazards

3.2 Climate Impacts

This section provides a summary of the climate impacts of each climate hazard described in Section 3.1 Climate Hazards. SV 2.0 asset sectors include buildings and properties, communications, ecosystem, energy, public health, solid and hazardous waste treatment facilities, transportation, and water and wastewater facilities. For the purpose of this report, the asset sectors have been synthesized into four groups that are expected to experience similar impacts from climate hazards.¹⁰

- **Public Health and Safety:** This includes vulnerable populations, as well as emergency and critical services (such as hospitals, fire service, police service, power service, and water service). In alignment with SV 2.0, vulnerable populations are grouped into the following sub-asset sectors: seniors over 65 years old, young children under 5 years old, disadvantaged individuals (e.g., low-income, rent-burdened, individuals experiencing homelessness, and individuals living in mobile homes), and individuals with health conditions.
- **Buildings and Properties.** This includes buildings and properties located in Campbell, including critical facilities shown in Figure 1.
- **Transportation.** This includes highways and local roads, bridges, pedestrian ways, and bikeways, in Campbell.
- **Ecosystems.** This includes parks, natural landscapes, and minimally developed areas in Campbell.

Public Health and Safety

Extreme Heat

An increase in the intensity and frequency of heatwaves can cause several public health issues, which increase hospital admissions and emergency response calls. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors** are at higher risk of dehydration as their bodies are not able to thermoregulate compared to young and middle-aged adults.
- **Young Children** are still physiologically developing and therefore less able to regulate their bodies during extreme heat events.
- **Disadvantaged Individuals** may not be able to pay for adequate air conditioning, increasing exposure to extreme heat events. In addition, disadvantaged individuals are less likely to receive medical care for illnesses triggered or exacerbated by extreme heat, or face a significant medical costs if treated. Mobile homes, especially older homes, are more difficult to cool and retrofit, which can lead to financial stress on people living in these homes. Renters and individuals living in substandard housing are less likely to have adequately hardened and weatherized housing and are more likely to have limited control over home hardening and improvements against extreme heat. Unhoused individuals are unprotected from extreme heat due to limited access to shelter and air conditioning.
- **Individuals with Health Conditions** are particularly at risk of heat-related illness because heat can exacerbate existing conditions such as asthma, cardiovascular disease, high blood pressure, diabetes, and other respiratory and cardiovascular conditions. Extreme heat can also affect

¹⁰There are no water, wastewater, solid waste treatment, or hazardous waste treatment facilities within the City, so these have been excluded from the analysis.

medications. Additionally, extreme heat can result in power outages, which are particularly dangerous for individuals who are electricity-dependent for mobility, communication, or medical devices.

Air Quality Degradation

Air quality degradation can lead to the development of respiratory illnesses or worsen existing health conditions related to respiratory diseases .

- **Seniors** are more susceptible to impacts of air quality degradation because their bodies are less able to compensate for the effects of environmental hazards.
- **Young Children** are physiologically more vulnerable to air quality degradation as pollution can affect brain and lung development and function.
- **Disadvantaged Individuals** may experience health issues caused by poor air quality and are likely to experience financial burden associated with medical treatment. Renters and individuals living in substandard housing have limited control over home hardening and improvements, such as filtration, which protects against poor air quality. Individuals living in mobile homes may also face disproportion risk if their homes do not have adequate filtration.
- **Individuals with Health Conditions** are particularly at risk to respiratory health impacts associated with poor air quality. Individuals with cardiovascular disease, high blood pressure, or stroke risk may experience severe cardiovascular health impacts if exposed to poor air quality.

Riverine Flooding

With increasing temperatures and rain events, Campbell’s creeks are more likely to flood, which can lead to a rise in infectious diseases such as vector-borne illnesses or increase in the distribution of diseases carried by insects and rodents. Specific disease risks include a rise in Lyme disease and West Nile Virus which have both been identified in Santa Clara County. The Santa Clara County Vector Control District and the Public Health Department monitor infectious diseases and publish data to manage the spread of infectious diseases. Flooding in buildings along the creeks can also lead to mold growth. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors**, especially those living alone, may not be able to safely evacuate floodwater hazard areas.
- **Young Children** may experience more difficulty safely evacuating floodwater hazard areas. Mold exposure in children may lead to the development of asthma and further sensitivity to mold.
- **Disadvantaged Individuals** may experience injuries from flooding events and are less likely to receive medical treatment. They may also experience cost burdens if their belongings and homes are damaged from floodwater inundation. Disadvantaged individuals, including those in substandard housing and renters are less likely to have adequately hardened and weatherized housing and are more likely to have limited control over home hardening and improvements against flooding. There are various affordable housing units and one mobile home park in the 100-year floodplain, shown in Figure 4.
- **Individuals with Health Conditions** may be more at risk of injury or illness due to exposure to mold after flooding events. According to the Center for Disease Control (CDC), exposure to damp and moldy environments may cause health effects ranging from sneezing and mild allergic reactions to fungal infections for more susceptible populations, such as those with chronic respiratory disease. Flooding can also result in power outages which are particularly dangerous

for individuals who are electricity-dependent, either for their mobility, communication, or medical devices.

Drought

Warmer temperatures and longer dry periods could result in water supply challenges across California. Increased water demand can lead to diminished storage reserves. Statewide assessments at the end of the 2012-2014 drought revealed that water levels were at 50 percent of average for that time of year, according to the California Department of Water Resources. Water supply depletion can increase costs. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors** are most likely not disproportionately at risk to drought unless there are major water shortages. Seniors who are economically disadvantaged, such as those on fixed incomes, are more likely to experience cost burden associated with increased water rates, as described for Disadvantaged Individuals below.
- **Young Children** are most likely not disproportionately at risk to drought unless there are major water shortages.
- **Disadvantaged Individuals** are more likely to experience cost burden associated with increased water rates and may struggle to access clean and affordable drinking water which may cause financial strain.
- **Individuals with Health Conditions** are most likely not disproportionately at risk to drought unless there are major water shortages.

Buildings and Properties

Extreme Heat

Extreme heat can accelerate the degradation of building materials such as wood, metal, and concrete. Prolonged exposure to high temperatures can cause roofing to contract and crack. This deterioration of building materials can lead to increased maintenance costs. In addition, operational costs could increase due to a rise in air conditioning used to cool buildings.

Air Quality Degradation

Poor air quality is not expected to impact buildings and properties.

Riverine Flooding

Properties around Los Gatos Creek are vulnerable to riverine flooding. These assets include residential buildings (including affordable housing units and a mobile home park), walking trails, and parks. With increased extreme precipitation rates, flooding extent and frequency are expected to increase.

Drought

Drought is not expected to impact buildings and properties.

Transportation

Extreme Heat

Extreme heat can impact asphalt and other materials, accelerating the deterioration of the road conditions. State Route 17 and the San Tomas Expressway, which run through Campbell, will be moderately vulnerable to extreme heat by the end of the century.

Air Quality Degradation

Air quality degradation will not affect the transportation system in Campbell.

Riverine Flooding

Parts of the transportation infrastructure in Campbell are moderately vulnerable to riverine flooding, particularly along Los Gatos Creek. This infrastructure includes bridges (Creekside Way and San Tomas), residential roads, Highway 17, pedestrian walkways and bikeways (including the Los Gatos Creek Trail).

Drought

Drought will not have an impact on the transportation system in Campbell.

Ecosystems

Extreme Heat

Extreme heat can cause plant and wildlife stress in landscaped areas, parks, riparian areas along the Los Gatos Creek, and the percolation ponds along Oka Lane. Wildlife face impacts of heat stress and heat related illness as well as disrupted reproductive cycles, and risks associated with early and extended seasonal temperature increases.¹¹ Plants are more likely to experience heat stress and drying, impacting the surrounding ecosystem. Extreme heat may also cause a shift in both plant and wildlife species range, and some species ill-suited to the new warmer conditions may suffer increased mortality rates.¹²

Air Quality Degradation

Air quality declines from regional wildfires can impact ecosystem health by increasing the levels of air pollutants, which can cause plant and wildlife stress and mortality. The degradation of plant and wildlife health could impact the quality of parks and outdoor recreational areas in Campbell, and make outdoor recreational resources dangerous or unhealth for climate vulnerable populations.

Riverine Flooding

Ecosystems in Campbell that are highly vulnerable to flooding include freshwater wetland, riparian and riverine, and grassland. Some areas in Campbell that may be affected include Los Gatos Creek, Camden Pond, Budd Avenue Pond, and San Tomas Aquinas Creek. Negative impacts from flooding can result in erosion, increased exposure to toxins such as mercury, vegetation removal, disruption to wildlife, and decreased ecosystem services, such as flood control and carbon storage. Sensitive

¹¹Backlund, Peter, Anthony C. Janetos, and David Steven Schimel. The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States. Vol. 4. US Climate Change Science Program, 2008

¹²Ackerly, David, Andrew Jones, Mark Stacey, Bruce Riordan (University of California, Berkeley). 2018. San Francisco Bay Area Summary Report. California's Fourth Climate Change Assessment. Publication number: CCCA4-SUM-2018-005.

aquatic organisms are particularly vulnerable to habitat change due to flood events and species diversity and population in general are expected to decrease. Water quality is projected to be lower from the impacts of riverine flooding.

Drought

Drought can increase irrigation requirements for maintaining landscaping, park facilities, and street trees, while water use restrictions would potentially prevent asset managers from meeting this increased watering demand, resulting in water-stressed vegetation, increased vegetation mortality, and potentially reducing the quality of and benefits provided by parks and the urban forest.¹³ Drought will disrupt habitats and the ability for wildlife to survive from dehydration and unreliable food sources.

¹³Lund, Jay, et al. 2018. "Lessons from California's 2012–2016 Drought." *Journal of Water Resources Planning and Management*, vol. 144, no. 10, [ascelibrary.org/ doi/10.1061/%28ASCE%29WR.1943-5452.0000984](https://doi.org/10.1061/%28ASCE%29WR.1943-5452.0000984).

Okin, G. S., Dong, C., Willis, K. S., Gillespie, T. W., & MacDonald, G. M. (2018). The impact of drought on native southern California vegetation: Remote sensing analysis using MODIS-derived time series. *Journal of Geophysical Research: Biogeosciences*, 123(6), 1927-1939.

4 Conclusion

A summary of the key climate change hazard vulnerabilities for each asset sector is provided below. The CAAP will include measures and actions that increase resilience of these key vulnerabilities in Campbell.

Public Health and Safety

- Extreme heat citywide with highest vulnerabilities to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions).
- Air quality degradation citywide with highest vulnerabilities to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions).
- Riverine flooding impacts to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions) living along the Los Gatos Creek. In particular, there are various affordable housing units and the Timber Cove Mobile Home Park, which house vulnerable populations, within the 100-year floodplain along Los Gatos Creek.
- Drought citywide with highest vulnerabilities to disadvantaged individuals.

Buildings and Properties

- Riverine flooding along the Los Gatos Creek, in particular flooding of the Timber Cove Mobile Home Park and affordable housing units.

Transportation

- Riverine flooding along the Los Gatos Creek, in particular flooding of bridges (Creekside Way and San Tomas), residential roads, Highway 17, pedestrian ways, and bikeways.

Ecosystems

- Extreme heat impacts to ecosystems citywide.
- Riverine flooding of ecosystems along Los Gatos Creek, in particular Campbell Park.
- Drought impacts to ecosystems citywide.