CITY OF GARDENA

Climate Vulnerability Assessment

Appendix A to the Public Safety Element

October 2021

DE NOVO PLANNING GROUP

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A. INTRODUCTION

Communities in California are increasingly vulnerable to the effects of climate change. California's Fourth Climate Change Assessment, conducted in 2018, identifies the Los Angeles Region as especially vulnerable to human-induced impacts to the climate since approximately half the population of the state calls the region home.1 Climate change refers to changes in conditions that result from increased atmospheric greenhouse gas (GHG) concentrations, which are linked to an increase in average global temperature. The increase in global temperature and GHG result in a series of changes to the global climate, including shifts in seasonal temperature patterns; altered precipitation timing, volume, and location; sea-level rise; ocean acidification; and altered severe wind and storm event frequency. These outcomes interact, and the potential consequences may result not only in global climate shifts, but also changes to a variety of characteristics that define biological systems and human progress.

CLIMATE VULNERABILITY ASSESSMENT

The purpose of a Climate Vulnerability Assessment (CVA) is to inform City policies, plans, programs, and guidance to promote effective and integrated action to prepare for climate change. In addition to increasing global average temperature, climate change has the effect of intensifying the frequency and effects of many natural hazards, adding to concerns otherwise addressed in hazard mitigation planning. This creates new challenges for hazard planners, who previously used historic recurrence rates to predict future events, but now must anticipate changes to frequency, severity, and location not previously seen.

ADDRESSING CLIMATE CHANGE

Climate change can be viewed from two scales: global and local. Addressing climate change relies on two high-level approaches at both scales: mitigation and adaptation. Climate change mitigation involves the reduction of GHG emissions, whereas climate adaptation aims to reduce harm from the effects of a changing climate. At the global scale, mitigation appears as less dependency on fossil fuels for energy production and a shift towards renewable forms of energy; at the local scale mitigation appears as multi-modal and active transportation networks, for one example. At the global scale, climate adaptation can be seen as expanded emergency response teams and climate refugee aid. On the local scale, adaptation can be the preparation taken for inevitable climate-induced emergencies and the spin-off social impacts that could emerge from them. Both approaches at both scales are necessary, however, this document focuses on identifying vulnerabilities and adaptation strategies on the local level within the City of Gardena.

REGULATORY FRAMEWORK

There are currently numerous laws and regulations set in place in the State of California that are aimed at reducing the impacts of climate change hazards. For decades, California has continued to adopt, update, and amend Senate and Assembly Bills; create monitoring and mitigation programs; and fund state, regional, and local agencies to promote environmental preservation. A list of relevant bills and documents adopted by the State, region, and City are included in Appendix A. While these documents create general goals and guidelines for the state to achieve and follow, each municipality is unique and therefore can best thrive and meet environmental regulations in its own unique way. The regulatory documents included in Appendix A provide a framework for the direction Gardena should be headed, but it is up to the City to implement programs and designs to reduce the effects of climate change.

ASSESSING VULNERABILITIES

[1] California's Fourth Climate Change Assessment, 2018. Accessed September 30, 2021. Available at https://www.climateassessment.ca.gov/.

The vulnerability that a community experiences resulting from climate change is a product of its geographical setting in combination with the characteristics of the community, ranging from its built pattern to social, political, and economic characteristics. Put simply, the level of climate vulnerability can be calculated using the following formula:

Exposure + Sensitivity - Adaptive Capacity = Vulnerability

Where:

- *Exposure* refers to the nature and degree to which a system or sub-population is exposed to significant climatic variations.
- *Sensitivity* refers to the degree to which a system or sub-population is affected by climate-related stimuli.
- *Adaptive Capacity* refers to the adaptability of a system or sub-population to adjust to climate change, to moderate potential damages, or to cope with the consequences.

Here is an example:

It is 100 degrees Fahrenheit (exposure) on a playground at a Gardena elementary school. Inside a classroom, Cindy is a student with a pre-existing condition (sensitivity) that leaves her at-risk of hyperthermia; however, the classroom is air-conditioned (adaptive capacity), so Cindy can continue learning with the rest of the students.

As shown by the example above, many factors are at play when determining the level of climate vulnerability. The California Adaptation Planning Guide identifies five steps in assessing the vulnerability of a community to climate change:

1. *Exposure:* what climate change effects will a community experience?
2. *Sensitivity:* what aspects of a community (people, structures, and functions) will be affected?
3. *Potential impacts:* how will climate change affect the points of sensitivity?
4. *Adaptative capacity:* what is currently being done to address the impacts?
5. *Risk and onset:* how likely are the impacts and how quickly they occur?

Not only do impacts vary, but vulnerability varies across specific areas and groups. For example, future climate changes, especially increases in extreme heat, are expected to disproportionately burden low-income residents and communities of color across the region. This linkage between the disproportional effects of climate change on disadvantaged communities is discussed further in the City's Environmental Justice Element.

This CVA describes vulnerabilities in terms of social vulnerabilities and physical vulnerabilities. Social vulnerabilities examine how populations, communities, and social systems are affected by climate change. Physical vulnerabilities examine how infrastructure, critical facilities, and land are affected by climate change.

B. CLIMATE IMPACTS AND VULNERABILITY ASSESSMENT

An assessment of a community's vulnerability to climate change begins with an understanding of local exposure to climate impacts. A primary objective of this document is to identify geographic areas, populations, and infrastructure in Gardena with heightened risk from projected climate impacts. This section first describes the methodology used to obtain climate impact projections, then highlights each major impact projected in Gardena and asks the following questions:

- What is the local exposure?
- To what extent will the City be exposed to this impact?
- Who (or what) is the most vulnerable?
- How does this impact affect or tie into other impacts or hazards?
- How is the City currently addressing this impact?

METHODOLOGY

While the science is highly certain that California (and the world) will continue to warm and experience greater impacts from climate change, specific outcomes are inherently uncertain. Future outcomes vary depending on the level of global GHG emissions. Accordingly, most climate models include a range of possible scenarios based on the level of global GHG emissions.

This document pulls data, and analysis, from California's Fourth Climate Change Assessment published in 2018. The data discussed in the assessment, was derived from 32 coarse resolution global climate models, were bias corrected and downscaled using the Localized Constructed Analogues (LOCA) statistical method. The data cover 1950-2005 for the historical period and 2006-2100 for two future climate projections using medium and high GHG and aerosol emissions scenarios.

For city-specific predictions, this document uses climate modeling from Cal-Adapt, a tool that came about as a key recommendation of the 2009 California Climate Adaptation Strategy and created with oversight from the CEC and California Strategic Growth Council. Cal-Adapt makes two predictions for the period of 2006 to 2100 using medium and high GHG and aerosol emissions scenarios. These scenarios are known as Representative Concentration Pathways (RCP). Each RCP represents a standardized set of assumptions of humanity's trajectory in the coming years. The Medium Emissions Scenario (RCP 4.5) represents a mitigation scenario where global CO2 emissions peak by 2040 and then decline. Statewide, temperature is projected to increase 2-4°C for this scenario by the end of this century. The High Emissions Scenario (RCP 8.5) represents a scenario where CO2 emissions continue to rise throughout the 21st century. Statewide, temperature is projected to rise 4-7°C by the end of this century. Precipitation shows fewer wet days, wetter winters, drier springs and autumns, and an increase in dry years as well as maximum precipitation in a single day. Cal-Adapt also specifies that its data is derived from the 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment, observed historical data is derived from Gridded Observed Meteorological Data, and the data presented are aggregated over all LOCA grid cells that intersect Gardena's boundaries.

In addition to the range of potential outcomes, climate change can produce a variety of impacts depending on location. California is expected to experience warmer temperatures, increased drought, and more extreme weather events (IPCC, 2007). This is why climate change projections include both drought and increased precipitation leading to flooding. The range of impacts anticipated in Gardena are summarized below.

IMPACTS

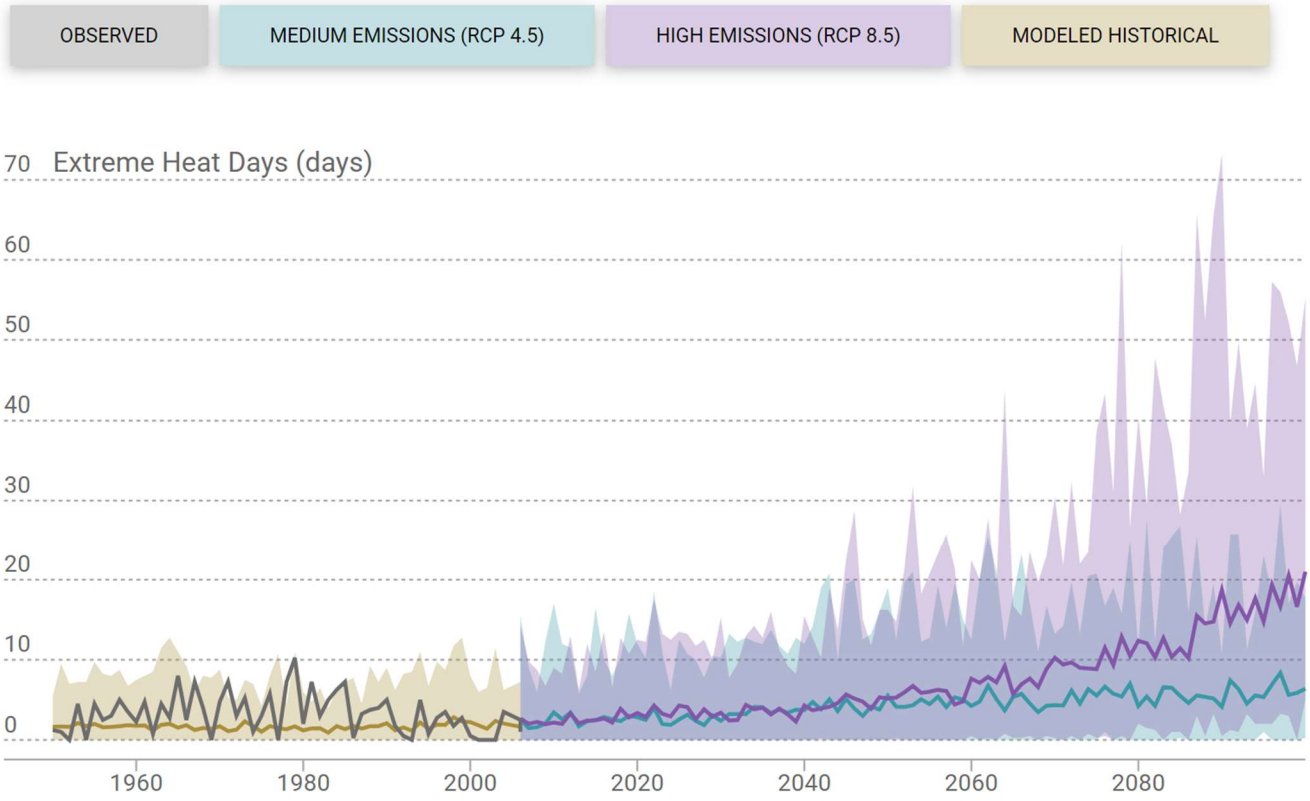
EXTREME HEAT & WEATHER

Climate change alters seasonal temperature patterns. Effects can include changes in average temperature, the timing of seasons, and the degree of cooling that occurs in the evening. In addition to new seasonal temperature patterns, extreme events such as heat waves are projected to occur more frequently or last for longer periods of time. In California, temperature increases are expected to be more pronounced in the summer and in inland areas. Heat waves are projected to increase not only in frequency but in geographic extent (CNRA, 2009). The degree of change experienced partially depends on global GHG emissions and atmospheric concentrations. By 2050, however, temperature increases between 1.8° and 5.4°F are projected under both emissions scenarios examined by the state (CNRA, 2009).

LOCAL EXPOSURE

Temperatures in Gardena are relatively mild. Average daily temperatures peak in the afternoon between the months of June and October (climate-data.org). Over the period from 1950 to 2006, the City observed average annual average maximum temperatures of 71.8° F (Cal-Adapt, 2021). Figure 1 shows the number of days in a year when the daily maximum temperature is above a threshold temperature of 92.1° F. This threshold temperature is the 98th percentile value of historical daily maximum summer temperatures observed in Gardena between April and October from 1961 to 1990.

Figure 1: Extreme Heat Days in Gardena



Source: Cal-Adapt, accessed October 1, 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/
1. Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum temperatures (from 1961–1990, between April and October) observed at that location.

As shown in Figure 1, climate change is expected to increase the number of extreme heat events per year in Gardena. Table 1 supports Figure 1 in that they both demonstrate the number of extreme heat days annually is going to increase over the next century. The Baseline (1961 to 1990) modeled historical

data shows a yearly average of two days that exceeded the 98th percentile high-heat threshold. By mid-century the number of days exceeding the 98th percentile is expected to double under the Medium Emissions scenario and increase by three days under the High Emissions scenario. By the end of the century the average numbers are expected to increase by 4 days and 11 days past Baseline for Medium and High Emissions scenarios, respectively.

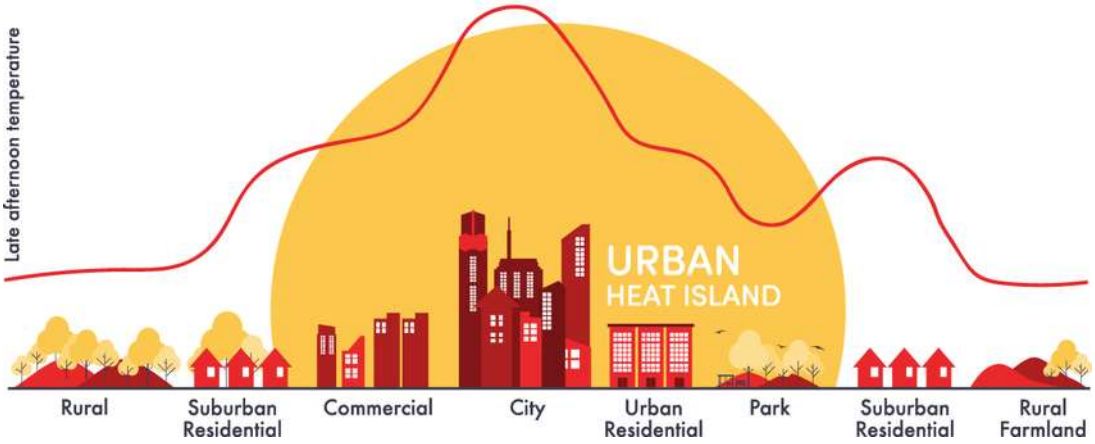
Table 1: Average Number of Days Exceeding 98th Percentile Summertime (April to October) High-Heat Threshold for Gardena, California

Time Period	Scenario	30yr Average	30yr Range	Change from baseline
Baseline (1961-1990)	Modeled Historical	2 days*	1 - 3 days	-
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	4 days	2 – 8 days	+ 2 days
	High Emissions (RCP 8.5)	5 days	3 - 10 days	+ 3 days
End of Century (2070-2099)	Medium Emissions (RCP 4.5)	6 days	4 - 13 days	+ 4 days
	High Emissions (RCP 8.5)	13 days	7 – 35 days	+ 11 days

Source: Cal-Adapt, accessed October 1, 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/
**Observed 30-year average from 1961 to 1990: 4 days*

Heat waves and extreme heat days are made worse by the urban heat island effect, depicted in Figure 2. Heat islands are urbanized areas that experience higher temperatures than rural areas. This is because an urbanized area's buildings, roads, and other infrastructure absorb and re-emit the sun's heat. Daytime temperatures in urban areas are about 1–7° F higher than temperatures in outlying areas, and nighttime temperatures are about 2-5° F higher (EPA, 2021). Because Gardena is part of a large, built-out, urban area the heat island effects are pronounced. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution, GHG emissions, heat-related illness, mortality, and water quality. As the community continues to grow and accommodate new development, it can be expected that the impacts related to the urban heat island effect will continue. The Gardena Climate Action Plan (CAP) addresses this concern (in Goal EE: F) and provides measures for reducing the urban heat island effect. Measures include promoting tree planting and incentivizing or requiring light-reflecting surfaces.

Figure 2: Heat Island Effect



Large amounts of concrete and asphalt absorb and hold heat. As a result, parts of cities can be up to 10° F warmer than the surrounding rural areas

Source: Fuladlu, et al. (2018). https://www.researchgate.net/figure/The-effect-of-Urban-Heat-Island-UHI_fig1_326316773

Gardena actively combats the dangers of extreme heat by promoting energy efficiency in existing residential units. Within the City CAP, there are measures (Measure EE A3 and A4) that promote and require home energy evaluations and renovations. While more cost-effective, ensuring that homes are able to use energy as efficiently as possible, and regulate inside temperatures more easily, people are protected from both extreme cases of weather (extreme heat and extreme cold). Goal EE B of the CAP promotes the same proactiveness with energy efficiency with regards to new residential developments.

Other goals within the Energy Efficiency section of the CAP encourage energy efficiency in commercial and municipal developments. Ensuring that public spaces, such as shopping centers or libraries, have heating and air conditioning, and proper insulation provides heat refuge to residents, and more specifically to sensitive populations, such as houseless people.

WHO IS MOST VULNERABLE?

Everybody can be affected by extreme heat, but certain groups are more vulnerable. Social vulnerabilities include people with health conditions; people who depend on walking, biking, or transit to get around; children and older adults; and people who work outdoors. Infrastructure vulnerabilities include energy and transportation sectors, water delivery, water treatment, and parks and open spaces.

The population of Gardena is predominantly working adults aged 18-64 years, which represents nearly 64 percent of the total population. Seniors (65 years and older) make up almost 17 percent of the population, and children (18 years and younger) represent approximately 20 percent.[2]

Interweaving green spaces throughout Gardena's urban landscape can help reduce the negative effects of extreme heat and weather. Green spaces replace asphalt and concrete within areas of plants and foliage, thereby reducing the temperatures created by the urban environment. Urban forests can be installed along sidewalks, road medians, and in plazas to provide shade and protect people, sidewalks, buildings, and streets, from the sun to diminishes the heat island effect.

[2] De Novo Planning Group, *City of Gardena Environmental Justice White Paper*, April 2021.

DROUGHT

California's highly variable climate is susceptible to prolonged dry spells. A warming climate will compound drought impacts, as evidenced during recent precipitation deficits in the 2000's Southwest drought (Colorado River basin), and during the 2012-2015 drought in California and neighboring states (Pierce, et al, 2018). Furthermore, recent research suggests that extended drought occurrence ("mega-drought") could become more pervasive in future decades (Pierce, et al, 2018).

LOCAL EXPOSURE

California has experienced prolonged droughts off and on throughout the decades, including in Southern California. The Golden State Water Company (GSWC) supplies potable water in the City of Gardena. The City is part of the GSWC Southwest System along with the cities of Hawthorne, Redondo Beach, Lawndale, Carson and El Segundo, and unincorporated areas of Los Angeles County. The main source of water for customers in the Southwest System includes local groundwater pumped from the West Coast Groundwater Basin and water purchased from the Metropolitan Water District of Southern California (MWD). Water purchased from MWD is imported from the Colorado River Aqueduct and the State Water Project.[3] Because water systems are interconnected, the regional impacts of drought may have adverse impacts for the City of Gardena.[4] Recycled water is used for some irrigation and industrial uses.

Table 4 shows the differences in maximum dry spell lengths in the City from Baseline measurements to predicted future variations. The Baseline scenario states that the 30-year average length of a dry spell was approximately 157 days. Dry spells are predicted to increase by 7 to 10 days over Baseline conditions by the middle of the century (2035-2064), and 8 to 15 days by the end of the century (2070-2099).

Table 2: Maximum Length of Dry Spell in Gardena

Time Period	Scenario	30yr Average	30yr Range	Change from baseline
Baseline (1961-1990)	Modeled Historical	157 days*	141 - 170 days	-
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	164 days	140 - 185 days	+7 days
	High Emissions (RCP 8.5)	167 days	143 - 188 days	+10 days
End of Century (2070-2099)	Medium Emissions (RCP 4.5)	165 days	144 - 183 days	+8 days
	High Emissions (RCP 8.5)	172 days	142 - 208 days	+15 days

Source: Cal-Adapt, accessed October 1, 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/
** Observed 30-year average from 1961 to 1990: 155 days*

[3] Goldens State Water Company, *Southwest*, Southwest - Golden State Water Company (gswater.com), accessed November 16, 2021

[4] Risk Management Professionals Incorporated, *City of Gardena & City of Hawthorne Hazard Mitigation Plan Draft*, August 2012.

WHO IS MOST VULNERABLE?

Extreme drought decreases soil moisture and increases plant mortality. Plant die-offs cause a domino effect by reducing available shade and evaporative cooling, thereby raising surrounding temperatures and reducing the thermal comfort of pedestrians. The Willows Wetland Preserve would be an area to suffer from drought conditions, and therefore contribute to the domino effects of reducing shade and cooling.

A vulnerable group highly affected by droughts are farmers and agricultural industries. While there isn't a dedicated agricultural hub in Gardena, the broader agricultural industry in the Southern California and Central Valley regions will likely be adversely impacted by increased droughts, which will have reverberated impacts on the City and on City residents. More frequent occurrences of extreme events similar to the 2011-2016 drought could significantly decrease groundwater recharge, which is essential for the livelihood of the region. People with pre-existing respiratory conditions are also extremely vulnerable: in the absence of rainfall during prolonged periods of drought, the region could experience increased concentrations of resuspended road particulates (dust), which have adverse respiratory impacts (Hall, et al. 2018).

Especially vulnerable infrastructure includes water importing systems. For Gardena this includes two main sources of potable water: imported water from the Colorado River Aqueduct and the State Water Project. To help protect vulnerable populations and infrastructure, Gardena can enact varying water restrictions. Some water restrictions in place in other cities and counties in California include personal and individual restrictions, other restrictions are designed to limit commercial and industrial water use and water waste.

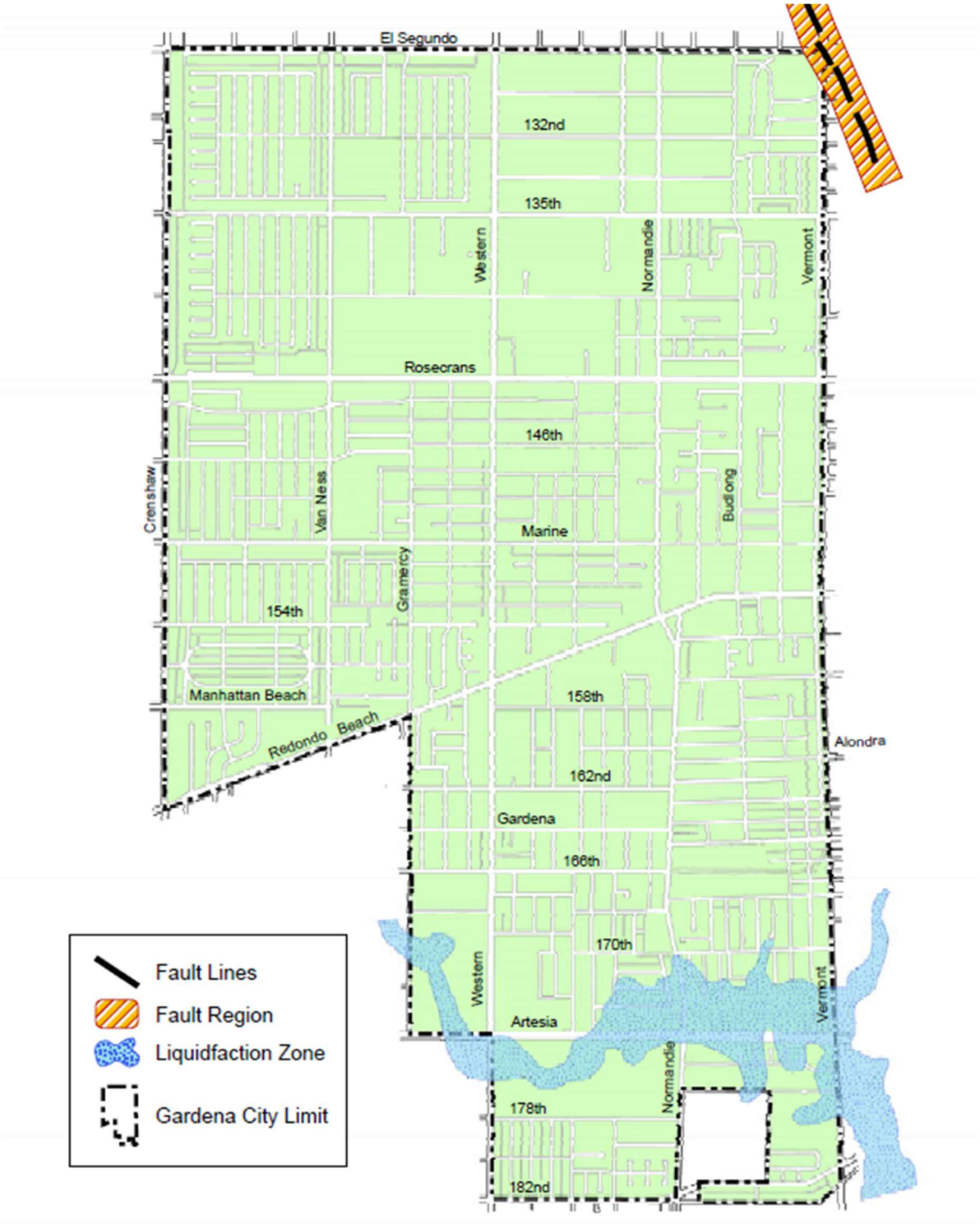
LIQUEFACTION

Liquefaction is caused by a shock or strain from an earthquake, and is when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings can lead to major damage.

LOCAL EXPOSURE

The City is located in a seismically active area that has historically been affected by moderate to occasionally high levels of ground motion. The Gardena & Hawthorne Multi-Jurisdictional Hazard Mitigation Plan, ranks earthquakes as the top natural threat to the City. The biggest seismic threats to the City are: the San Andreas Fault, Newport-Inglewood Fault, Whittier-Elsinore Fault Zone, and Palos Verdes Fault.[3] According to the California Department of Conservation, portions of the southern perimeter of the City is within a liquefaction zone, as depicted in Figure 7. This area of the City contains multiple land uses, including various densities of residential neighborhoods.

Figure 3: Liquefaction Seismic Hazard Zone



Source: City of Gardena Public Safety Plan, Figure PS-2.

WHO IS MOST VULNERABLE?

Older structures within the City are vulnerable to loss by liquefaction as they may not have been constructed or reinforced to meet earthquake standards. The most vulnerable areas are those in a liquefaction zone thereby putting the land uses around the southern edge of the City at risk. Pipeline transportation infrastructure (water, gas, electricity, sanitation) is also highly vulnerable to ground motion due to the majority of it being buried underground.[4] Seismic activity, liquefaction, or land subsidence could damage one pipe, or area, and have a cascading effect throughout the City and region. A large earthquake, or liquefaction incident could also trigger a number of other hazards that could be exacerbated due to climate change. For example, if a strong liquefaction incident were to occur, it could rupture pipelines or electricity poles, with temperatures expected to rise and the climate expected to be more drought prone, knocked over electricity poles could more easily cause an urban fire.

Groups that are specifically vulnerable to liquefaction incidents are the ones living in these southern residential neighborhoods; Gardena has low, medium, and high-density residential areas within a liquefaction zone.

HAZARDOUS MATERIALS

Hazardous materials are defined as a detrimental substance, including but not limited to: pesticides, herbicides, toxic metals or chemicals, liquefied natural gas, explosives, volatile chemicals, and nuclear fuels. All materials, whether they be the intentional product or resulting by-product that can cause harm to individual's health, the public health, or environmental health are considered toxic and must be handled and contained safely. It is imperative to note environmental justice issues here as they are related to potential health impacts associated with land use decisions, including enforcement actions to reduce the adverse health effects of hazardous materials, industrial activity and other land uses, on residents regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location.

LOCAL EXPOSURE

According to the California Department of Toxic Substances Control Envirostor Database and California Water Resources Control Board Geotracker Database, as of 2021 there are 38 hazardous waste sites in the City of Gardena that are currently under evaluation or amid cleanup. Figure 2 within Appendix A of the Environmental Justice Element shows that the majority of these sites are concentrated in the northern hemisphere of the City, with a smaller grouping in the southern region of the City. All hazardous waste sites are within areas classified as disadvantaged communities.

Pipeline infrastructure, namely pipelines that carry oil and gas, are susceptible to becoming damaged in some way (through seismic ground shaking as an example), and could easily release hazardous materials in the ground, water, and air. No pipeline failures have occurred within the City of Gardena, however, the prevalence of oil distribution pipelines throughout the Cities gives the potential for a future event.

WHO IS MOST VULNERABLE?

The most vulnerable populations to hazardous waste and materials are people and communities living on top of these toxic sites. For Gardena, these are communities consist of the residents living at the Ace Trailer Park/Honeywell site and the Normandie Estate. A vast majority of the other hazardous sites border residential areas creating a higher potential for threats for these communities as well.

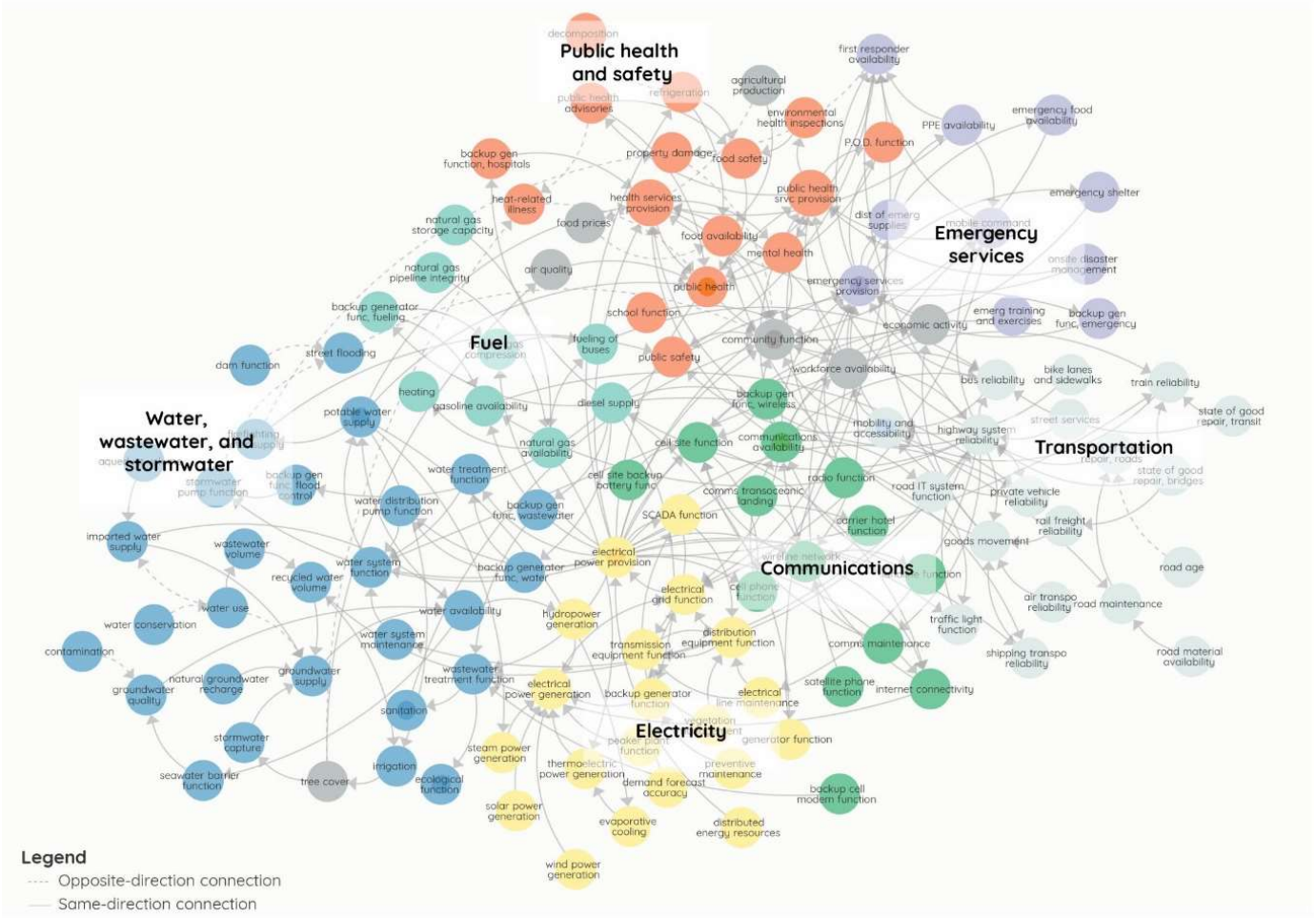
Local habitats, animals, and plants are extremely vulnerable if natural resources become contaminated by hazardous materials. Polluted water and air sources have a lingering and expanding impact as the species living in the contaminated area relocate themselves or are consumed by others and moved

throughout the ecosystem. While there are no hazardous sites directly on the Willows Wetland Preserve, the Preserve is within close proximity to several hazardous sites in the southern portion of the City.

EXTRANEOUS IMPACTS ACKNOWLEDGED

This section considers several climate concerns that do not directly impact Gardena but recognizes threats that pose a danger to the greater Los Angeles and Southern California region. Events such as wildfires or coastal flooding are highly unlikely to directly affect Gardena, but the impacts created by these events are highly likely to cascade outwards to Gardena and its residents. The Los Angeles County CVA discusses in detail the level of connectivity between physical infrastructure and people throughout the County and explains that because of these interconnections, the impacts of a climate hazard extend beyond the initial infrastructure disruption.[5] Figure 6 depicts these interconnections.

Figure 4: Infrastructure Interdependencies



Source: Los Angeles County, Los Angeles Climate Vulnerability Assessment, 2021

[5] Los Angeles County, Climate Vulnerability Assessment, October 2021.

As shown in Figure 6, the infrastructure between departments relies upon, and is reliant upon, infrastructure from other departments; if one system or pipe were to fail, dozens of connections could be adversely affected.

WILDLAND AND URBAN FIRES

As California is expected to experience increased temperatures and reduced precipitation, there will likely be more frequent and intense wildland and urban fires and longer fire seasons. Fires spread more quickly on dry, windy days and move more easily through higher-density vegetation. Weather is one of the most significant factors in determining the severity of fires; natural fire patterns are driven by conditions such as drought, temperature, precipitation, and wind, as well as available fuel (biomass).

Climate change is projected to increase the frequency of wildland and urban fire events, the extent of burned areas across California, and the duration of wildfire seasons. Wildfire seasons are projected to begin earlier in the spring due to drier and warmer spring conditions on average, potentially requiring longer periods for firefighting services.

LOCAL EXPOSURE

Fire protection and emergency services in the City are provided by the Los Angeles County Fire Department (LACoFD). Within the City, the LACoFD operates Fire Station 158, located at 1650 West 162nd Street, and Fire Station 159, located at 2030 West 135th Street. Emergency response within the City is divided to two districts, with Marine Avenue as the division line. Areas north of Marine Avenue is covered by Fire Station 159 and areas south of Marine Avenue are covered by Fire Station 158.

According to CAL FIRE, Gardena is not located in a Very High Fire Hazard Severity Zone (VHFHSZ). However, this does not eliminate the possibility of fire threat to the City, climate change increases the risk of urban fires originating in Gardena or in surrounding areas. Wildland or urban fires originating in the greater Los Angeles region could cause reduced air quality and visibility, putting the health of sensitive populations at risk. This could lead to a compounded risk as Gardena residents already suffer from poor air quality; all census tracts in the City are considered to have medium or high burdens with regard to a majority of health indicators, including high burdens in particulate matter 2.5 and toxic releases and medium or high burdens in ozone, diesel particulate matter, traffic, and drinking water.[2] These air pollutants, in combination with ash and smoke from fires, could put people with respiratory complications at extreme risk.

A sensitive area within the City is the Gardena Willows Wetland Preserve located at 1202 West 170th Street. Approximately 13.5 acres, the Willows Wetland Preserve is considered an environmentally sensitive area (ESA) under Los Angeles County Municipal National Pollutant Discharge Elimination System (NPDES) standards. As a location with large amounts of available fuel (vegetation and biomass), the Willows have the potential to feed in to or be the originating source of a fire.

While there is a possibility of a fire igniting within City limits (due to natural areas such as the Willows Wetlands), Los Angeles County data was utilized to see the impact wildfires could have on the region (including the City of Gardena) since the vast majority of the City is highly urbanized. Table 2 demonstrates the average acreage expected to burn throughout the century is slightly above the Baseline average, however, less and less acres are expected to burn over time. While none of these acres are within Gardena City limits, byproducts from these wildfires, such as smoke and ash, can affect the entire region's air quality and events such as evacuations can cause traffic and panic throughout the region.

Table 3: Average Annual Area Burned, Los Angeles County

Time Period	Scenario	30yr Average	30yr Range	Change from baseline
Baseline (1961-1990)	Medium Emissions (RCP 4.5)	12,235.2 acres	11,780.7 – 12,502.8 acres	--
	High Emissions (RCP 8.5)	12,159.4 acres	11,800.7 – 12,419.5 acres	--
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	14,132.5 acres	13,338.6 – 15,078.3 acres	+1,897.3 acres
	High Emissions (RCP 8.5)	13,993.4 acres	12,559.2 – 14,686.1 acres	+1,834.0 acres
End of Century (2070-2099)	Medium Emissions (RCP 4.5)	13,787.8 acres	13,063.7 – 14,572.0 acres	+1,552.6 acres
	High Emissions (RCP 8.5)	13,035.9 acres	11,715.6 – 13,911.7 acres	+876.5 acres

Source: Cal-Adapt, accessed October 1, 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/

In addition to typical ignition sources for fires, earthquakes and floods have the potential to rupture buried gas lines, and high winds or accidents could cause overhead electric lines to break, creating new ignition sources for fires. Catastrophic earthquakes could cause widespread urban fires, as multiple gas and electrical lines could be broken or disrupted.[4]

WHO IS MOST VULNERABLE?

Especially vulnerable people include people with pre-existing health conditions that make them more sensitive to hazardous air, such as those with asthma. Additionally, households without access to a car may have difficulty evacuating when the air is hazardous; all census tracts within City limits have as least some households without access to a vehicle.[2]

People who live near or have to respond to wildfire can become injured or die; furthermore, wildfires can cause major community-wide disturbances, like evacuations, power outages, economic losses, road and school closures, losses to biodiversity and the natural environment, and disruptions to recreational activities. Wildfires can cause wide-reaching and long-lasting impacts to communities as people are displaced. In some extreme cases, entire communities can be destroyed and people can be forced to relocate.[5]

INLAND FLOODING & EXTREME PRECIPITATION

Flooding occurs when a lot of rain falls over a short period of time, even if the storm is not especially large. Vegetated and pervious surfaces such as grass and soil do not have time to absorb the intense amount of rainfall, and the runoff overwhelms the stormwater infrastructure. In combination, changes in temperature and precipitation may exacerbate impacts. Intense rainstorms could require evacuation and temporary or permanent displacement of people and result in property damage or loss.

LOCAL EXPOSURE

In LA County, climate change brings with it wetter, more intense storm events. Although the total amount of rainfall is not projected to change significantly by mid-century, rainfall events are expected to become more intense within storms. The increase in rainfall volumes in short periods of time can lead to inland flooding across LA County and serious impacts to people and property.[5] As a built-out, urbanized area, Gardena is vulnerable to flooding due to the large area of impervious surfaces such as asphalt and concrete which block rainwater from absorbing into the ground, creating excess runoff.

The Dominguez Channel is located in the western and southern portions of the City and is owned and operated by the Los Angeles County Flood Control District. The Channel runs along the western edge of City and eventually flows into the Los Angeles Harbor and out to the Pacific Ocean. Since the City is already highly built-out, the urban runoff infrastructure is to remain about the same.

FEMA Flood Map identifies one area within City limits that sits on top of a floodplain: the Willows Wetland Preserve is in a 500-year floodplain.[6] This means that there is a 0.2 percent annual chance for this area to flood. However, FEMA floodplain maps do not account for future climate change but instead provide a picture of areas that are more likely to face flooding based on historical conditions.[5] According to the existing Zoning Map, low and medium density residential units are directly north of the Willows, putting sensitive land uses (housing units) at a greater risk than units that are not bordering floodplains.

Table 3 demonstrates the predicted increase in one-day rainfall within the next century. The Baseline average has been approximately 1.68 inches of rain within one day in Gardena. By mid-century (2035-2064) that number is expected to increase to 1.77 inches under the Medium Emissions scenario, and 1.79 inches under the High Emissions scenario. The end of the century is expected to receive even more rain; 1.85 inches in the Medium Emissions scenario and 1.91 inches for the High Emissions model. Taking these increases into account, and analyzing them with the predicted hotter days and larger fires, cascading effects throughout the region can be seen.

Table 4: Maximum One-Day Precipitation in Gardena

Time Period	Scenario	30yr Average	30yr Range	Change from baseline
Baseline (1961-1990)	Modeled Historical	1.684 inches*	1.472 - 2.011 inches	-
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	1.771 inches	1.437 - 2.224 inches	+0.087 inches
	High Emissions (RCP 8.5)	1.787 inches	1.432 - 2.199 inches	+0.103 inches
End of Century (2070-2099)	Medium Emissions (RCP 4.5)	1.850 inches	1.391 - 2.261 inches	+0.166 inches
	High Emissions (RCP 8.5)	1.919 inches	1.346 - 2.428 inches	+0.235 inches

Source: Cal-Adapt, accessed October 1, 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/
** Observed 30-year average from 1961 to 1990: 1.730 inches*

[6] FEMA Flood Map Service Center https://msc.fema.gov/portal/search?AddressQuery=gardena, accessed November 16, 2021.

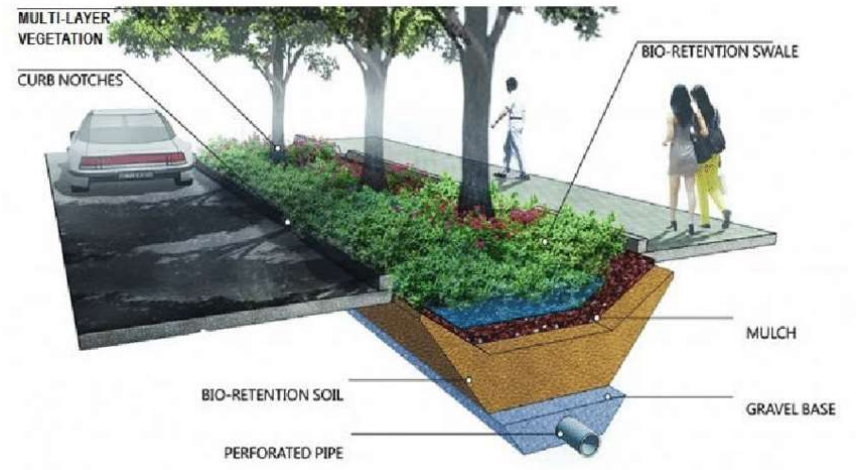
The Gardena CAP contains goals and measures that encourage urban greening. Urban greening includes spaces such as parks, forests, green roofs, local agriculture, street trees, and community gardens. These spaces "carbon sinks" as they store greenhouse gas emissions, that would otherwise be emitted into the atmosphere, and increase the amount of pervious surfaces throughout the City, allowing for a greater water absorption and storage rate.[7]

WHO IS MOST VULNERABLE?

Flooding impacts are not linked to specific populations, such as seniors, children, or individuals with disabilities. Especially vulnerable infrastructure is that which is located in low-lying, more flood-prone areas and includes transportation (especially roadways); public and community centers; and older infrastructure. Nearly 89 percent of the existing housing stock in Gardena was built prior to 1990, causing it to be more susceptible to extreme weather conditions, such as flooding. Additionally, 13 out of 14 census tracts in Gardena are considered disadvantaged communities. Approximately 93 percent of the Gardena population lives within a disadvantaged community.[2] Many people within disadvantaged communities often do not have personal cars, posing potential problems with regards to evacuation if a flood were to impact Gardena.

While not the biggest threat to the City, potential flooding hazards can be decreased by expanding the amount of pervious surfaces within city limits. This can be more landscaping throughout the urban environment, or implementation of strategic landscaping tools such as bioswales. Bioswales, as depicted in Figure 6, allow for greater volumes of water to be held at once, and slowly percolate the water at a rate that the water systems and natural environment can handle.

Figure 5: Flood Control, Bioswale



Source: Green Earth Operations

[7] City of Gardena, Climate Action Plan, December 2017

C. KEY FINDINGS

The key findings for Gardena are summarized below to increase the City's adaptive capacity.

- Climate change increases the severity of various natural hazards and impacts in the City of Gardena.

- Extreme weather, namely extreme heat has the highest potential of creating the most danger within the City of Gardena. This hazard places senior citizens as the most vulnerable populations, as well as the houseless community.

- Multi-regional droughts are also a key hazard to Gardena as a vast majority of the City's potable water relies on imported water. As expected with climate change, multi-regional droughts are expected to increase both in frequency and intensity (duration).

- The most vulnerable areas in the City are those within both the liquefaction zones and adjacent to hazardous materials sites. For Gardena, these are neighborhoods in the southern region of the City, generally along Artesia Boulevard.

- The most vulnerable infrastructure are the buildings that are within the liquefaction zones, particularly older buildings not in compliance with the current California Building Code. Again, these are buildings generally along Artesia Boulevard.

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APPENDIX A: REGULATORY FRAMEWORK

STATE

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), which was adopted in 1988. The CCAA requires that all air districts in the State endeavor to achieve and maintain the California Ambient Air Quality Standards by the earliest practical date. The act specifies that districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources and provides districts with the authority to regulate indirect sources.

CALIFORNIA STRATEGIC FIRE PLAN

This statewide plan guides fire policy for much of California. The plan is aimed at reducing wildfire risk through pre-fire mitigation efforts tailored to local areas. The most recent update is the 2018 Strategic Fire Plan. The 2018 Plan reflects CAL FIRE's focus on: 1) fire prevention and suppression activities to protect lives, property, and ecosystem services, and 2) natural resource management to maintain the state's forests as a resilient carbon sink to meet California's climate change goals and to serve as important habitat for adaptation and mitigation. There are also Unit Fire Plans produced under the Strategic Fire Plan that are localized to a county or region; the City of Gardena falls under the Los Angeles County Unit Fire Plan.

STATE WATER RESOURCES CONTROL BOARD/REGIONAL WATER QUALITY CONTROL BOARD

In California, all wastewater treatment and disposal systems fall under the overall regulatory authority of the State Water Resources Control Board (SWRCB) and the nine California Regional Water Quality Control Board (RWQCBs), who are charged with the responsibility of protecting beneficial uses of State waters from a variety of waste discharges, including wastewater from individual and municipal systems. The City of Gardena falls within the jurisdiction of the Los Angeles Regional Water Quality Control Board.

The RWQCBs' regulatory role often involves the formation and implementation of basic water protection policies. These are reflected in the RWQCBs' Basin Plans, generally in the form of guidelines, criteria and prohibitions related to the siting, design, construction, and maintenance of on-site sewage disposal systems.

STATE WATER BOARD STORM WATER STRATEGY

The Storm Water Strategy is founded on the results of the Storm Water Strategic Initiative, which serve to direct the State Water Board's role in storm water resources management and evolve the Storm Water Program by: a) developing guiding principles to serve as the foundation of the storm water program; b) identifying issues that support or inhibit the program from aligning with the guiding principles; and c) proposing and prioritizing projects that the Water Board could implement to address those issues. The State Water Board staff created a document called the Strategy to Optimize Management of Storm Water (STORMS). STORMS includes a program vision, mission, goals, objectives, projects, timelines, and consideration of the most effective integration of project outcomes into the Water Board's Storm Water Program.

URBAN WATER MANAGEMENT PLANNING ACT

The Urban Water Management Planning Act has as its objectives the management of urban water demands and the efficient use of urban water. Under its provisions, every urban water supplier is required to prepare and adopt an urban water management plan. The plan must identify and quantify the existing and planned sources of water available to the supplier, quantify the projected water use for a period of 20 years, and describe the supplier's water demand management measures.

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

The Department of Public Health contains the Division of Radiation Safety and Environmental Management (DRSEM) which, is divided into three branches: the Radiologic Health Branch, the Environmental Health Branch, and the Drinking Water and Radiation Laboratory Branch. The Radiologic Health Branch enforces the laws and regulations designed to protect the public, radiation workers, and the environment. The Environmental Management Branch regulates the medical waste industry and recreational health (public swimming pools, ocean beaches and organized camps); provides sanitary surveillance of state institutions; administers the Registered Environmental Health Specialist (REHS) program; oversees radiological cleanup at military base closure facilities, coordinates the State's Indoor Radon Program, the Medical Waste Management Program and California Department of Public Health's Nuclear Emergency Response Program. The Drinking Water and Radiation Laboratory Branch is the State's primary drinking water quality testing laboratory and is the state laboratory capable of measuring chemical, microbiological, and radiochemical contaminants in drinking water and drinking water supplies.

CALIFORNIA WATER CODE

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Division 7 of the California Water Code). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and each of the Regional Water Quality Control Boards (RWQCB) power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the Federal Clean Water Act. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a Water Quality Control Plan (Basin Plan) for its region. The regional plans conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its State water policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

CALIFORNIA BUILDING CODE

The California Building Standards Code (CBSC) (California Code of Regulations, Title 24) is a statewide standard that is updated every three years, with the most recent update being in 2019. The CBSC is a compilation of three types of building standards from three different origins:

- Building standards that were adopted by state agencies without change from national model building codes;
- Building standards that were adopted from national model codes but modified to address California-specific conditions; and

- Building standards, authorized by the California legislature, that constitute amendments not covered by national model codes, that were created to address particular California concerns.

The CBSC specifies materials requirements, construction methods, and maintenance standards for earthquake protection and resiliency. All building occupancies in California are subject to national model codes adopted into the CBSC, and occupancies are further subject to amendments adopted by state agencies. State law also authorizes local governments to enact ordinances making building standards amendments to the CBSC to address local conditions. The law includes specific requirements for the basis for a local amendment, how the amendment language and documents must be prepared, and how the amendment must be filed with either the CBSC, the California Department of Housing and Community Development, or other state agencies as required. The City of Gardena officially adopted the entirety of the CBSC, including amendments, into its Municipal Code under Title 15 Buildings and Construction.

CALIFORNIA FIRE CODE

The California Fire Code, as a part of Title 24, California Code of Regulations, establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety and assistance to fire fighters and emergency responders during emergency operations. The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout the State of California.

The City of Gardena has adopted the Los Angeles County Fire Code into Chapter 8.08, *Fire Code*, of the Municipal Code.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT & SEISMIC HAZARDS MAPPING ACT (1972)

The 1971 San Fernando Earthquake resulted in the destruction of numerous structures built along its fault. This led to passage of the Alquist-Priolo Earthquake Fault Zoning Act in 1972. This Act prohibits the construction of buildings for human occupancy across active faults in the state. Similarly, extensive damage caused by ground failure during the 1989 Loma Prieta Earthquake focuses attention on decreasing the impacts of landslides and liquefaction. This led to the creation of the Seismic Hazards Mapping Act (1990), which enhanced construction standards at locations where ground failures are probable during earthquakes

SENATE BILL 610 & ASSEMBLY BILL 901 (2001)

In 2001, SB 610 and AB 901 both modify the Urban Water Management Planning Act. SB 610 requires additional information in an urban water management plan if groundwater is identified as a water source supplier. It also requires that the plan include a description of all water supply projects and programs that may be undertaken to meet total projected water use. SB 610 also requires a city or county that determines a project is subject to CEQA to identify any public water system that may supply water to the project and to request identified public water systems to prepare a specified water supply assessment. The assessment must include, among other information, an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and water received in prior years pursuant to these entitlements, rights, and contracts.

AB 901 requires an urban water management plan to include information, to the extent practicable, relating to the quality of existing sources of water available to an urban water supplier over a given period of time. AB 901 also requires information on the how water quality affects water management strategies

and supply reliability. The bill requires plans to supplement a water source that may not be available at a consistent level of use, to the extent practicable. Additional findings and declarations relating to water quality are required.

ASSEMBLY BILL 1007 (2005)

Assembly Bill 1007 (Pavley, Chapter 371, Statutes of 2005) directed the California Energy Commission (CEC) to prepare a plan to increase the use of alternative fuels in California. As a result, the CEC prepared the State Alternative Fuels Plan in consultation with state, federal, and local agencies. The plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

CALIFORNIA EXECUTIVE ORDERS S-3-05 (2005)

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by 2020 and 3) 80% below 1990 levels by 2050. While two of the benchmark years have passed, the City of Gardena, along with the rest of the State, can still aim to reduce GHG emissions 80% below the 1990 levels by the year 2050.

ASSEMBLY BILL 32 & EXECUTIVE ORDER S-20-06 (2006)

In 2006, California adopted Assembly Bill (AB) 32, the Global Warming Solutions Act, as an effort to address the effects of climate change and help reach the goals presented in Executive Order S-3-05. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 further directs State agencies to begin implementing AB 32, including the recommendations made by the State's Climate Action Team.

BIOENERGY ACTION PLAN- EXECUTIVE ORDER S-06-06 (2006)

Executive Order S-06-06 establishes targets for the use and production of biofuels and biopower. The order also directs state agencies to work together to advance biomass programs while providing environmental protection and mitigation. The executive order establishes targets to increase production and use of ethanol and biodiesel fuels by a minimum of 20% by 2010, 40% by 2020, and 75% by 2050. Additionally, the executive order sets targets for the state related to the use of biomass electricity and cogeneration facilities.

SENATE BILL 375 (2008)

California's Sustainable Communities and Climate Protection Act of 2008 (SB 375) requires transportation agencies to develop a regional "Sustainable Communities Strategy" of land use, housing, and transportation policies that will move the region towards meeting the GHG reduction target set by the CARB. On September 3, 2020, the Southern California Association of Governments (SCAG), the metropolitan planning organization responsible for Gardena and surrounding regions, adopted Connect SoCal (2020–2045 Regional Transportation Plan/Sustainable Communities Strategy), which sets forth a

long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals.

ASSEMBLY BILL 162 (2009)

The bill requires, upon the next revision of the housing element, on or after January 1, 2009, the Conservation Element of the General Plan to identify rivers, creeks, streams, flood corridors, riparian habitat, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management. By imposing new duties on local public officials, the bill creates a State-mandated local program.

This bill also requires, upon the next revision of the housing element, on or after January 1, 2009, the safety element to identify, among other things, information regarding flood hazards and to establish a set of comprehensive goals, policies, and objectives, based on specified information for the protection of the community from, among other things, the unreasonable risks of flooding.

ASSEMBLY BILL 341 CALIFORNIA'S MANDATORY COMMERCIAL RECYCLING LAW (2012)

The purpose of AB 341 is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California.

CALIFORNIA SUSTAINABLE GROUNDWATER MANAGEMENT ACT (2014)

On September 16, 2014, Governor Brown signs into law a package of bills (SB 1168, AB 1739 and SB 1319) collectively called the Sustainable Groundwater Management Act. The Act requires local governments and water agencies with high and medium priority groundwater basins to halt overdraft and bring basins into sustainable levels of pumping and recharge. For each basin, local agencies are required to form new groundwater sustainability agencies and prepare groundwater sustainability plans with quantifiable objectives for achievement of sustainability within 20 years.

SENATE BILL 379 (2015)

SB 379 revised Government Code Section 65302(g)(4) to require cities and counties to update their safety elements to address climate adaptation and resiliency strategies applicable to their jurisdiction. The updates are required at the next update of their local hazard mitigation plan (LHMP) on or after January 1, 2017. Local jurisdictions without an LHMP must update their safety elements beginning on or before January 1, 2022. The safety element update must include:

- A vulnerability assessment identifying the risks that climate change poses to the local jurisdiction
- A set of goals, policies, and objectives based on a vulnerability assessment for the protection of the community
- A set of feasible implementation strategies to carry out the goals, policies, and objectives

STATEWIDE EMERGENCY WATER CONSERVATION REGULATIONS (2016)

In 2016, the State Water Resources Control Board (Water Board) adjusts emergency water conservation regulations in recognition of the differing water supply conditions and ongoing drought across the state to comply with the Governor's executive order declaring a drought emergency.

Executive Order B-37-16, Making Water Conservation a California Way of Life, updates temporary emergency water restrictions and transitions to permanent, long-term improvements in water use by:

- Providing for wiser water use
- Eliminating water waste
- Strengthening local drought resilience
- Improving agricultural water use efficiency and drought planning

In April 2017, a new Executive Order lifts the drought emergency, but retains many of the conservation requirements. Most regulations are still in effect except for water supply "stress test" requirements and conservation standards for urban water suppliers. The temporary restrictions established a baseline of the types of benefits that are possible from water conservation requirements.

SENATE BILL 1383 (2016)

In September 2016, Governor Brown signed SB 1383, Short-Lived Climate Pollutants: Organic Waste Methane Emissions Reductions, establishing methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants (SLCP) in various sectors of California's economy. The bill codifies the CARB's SLCP Reduction Strategy, established pursuant to SB 605 (2014), in order to achieve reductions in the statewide emissions of short-lived climate pollutants. Actions to reduce short-lived climate pollutants are essential to address the many impacts of climate change on human health, especially in California's most at-risk communities, and on the environment.

CALIFORNIA STATE HAZARD MITIGATION PLAN (2018)

The 2018 California State Hazard Mitigation Plan is the state's primary hazard mitigation guidance document. It seeks to help communities with their mitigation and disaster resiliency efforts to reduce or eliminate potential risks and impacts of natural and human-caused disasters. The 2018 plan was approved by the Federal Emergency Management Agency (FEMA) on September 28, 2018, and includes:

- An updated statewide risk assessment, disaster history, and statistics
- Recent mitigation progress, success stories, and best practices
- Updated state hazard mitigation goals, objectives, and strategies
- Updated climate mitigation progress and adaptation strategies

CALIFORNIA WATER PLAN (2018)

The California Water Plan is the State's strategic plan for sustainably managing and developing water resources for current and future generations. Required by Water Code Section 10005(a), it presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The plan is updated every 5 years, with the most recent update occurring in 2018.

LOCAL

CITY OF GARDENA GENERAL PLAN

A variety of policies contained in the existing City of Gardena General Plan address climate change vulnerabilities. Specific goals included within the General Plan that are most related to climate change include:

Land Use Plan

- POLICY LU 3.6: New commercial and industrial developments shall meet or exceed local and state requirements pertaining to noise, air, water, seismic safety, and any other applicable environmental regulations.
- POLICY LU 3.7: Require the mitigation or remediation of potentially hazardous conditions in the City.
- POLICY LU 4.6: Preserve and maintain as open space those areas in the City that serve as significant natural habitats.

Community Design

- POLICY DS 2.15: Promote innovative development and design techniques, new material and construction methods to stimulate residential development that protects the environment.

Conservation

- GOAL CN 1: Preserve and enhance the Willows Wetland and protect its natural resources.
- POLICY CN 1.1: Foster the implementation of the recommendations identified in *A Plan for the Gardena Willows Wetland*, which was adopted by the City in April 1999.
- POLICY CN 1.2: Foster environmental education, passive recreation, and volunteer programs that are compatible with the protection and enhancement of the wetland.
- POLICY CN 1.3: Encourage community involvement in preserving the wetland.
- POLICY CN 1.4: Promote collaboration with regional or state agencies in protecting the biological resources of the Willows Wetland.
- GOAL CN 2: Conserve and protect groundwater supply and water resources
- POLICY CN 2.1: Encourage water conservation through education and water-conserving technology.
- POLICY CN 2.2: Comply with the water conservation measures set forth by the California Department of Water Resources.
- POLICY CN 2.3: Promote the use of reclaimed water for irrigation of public lands and for industrial uses, as feasible.
- POLICY CN 2.4: Increase the quantity and maintain the quality of the City's water table to provide an independent source of water.
- POLICY CN 2.5: Encourage citizens to report illegal dumping and vigorously prosecute illicit dumping of toxic of hazardous materials into the ground water.
- POLICY CN 2.6: Encourage and support the proper disposal of hazardous waste and waste oil. Monitor businesses that generate hazardous waste materials to ensure compliance with approved disposal procedures.
- GOAL CN 3: Reduce the amount of solid waste produced in Gardena
- POLICY CN 3.1: Comply with the requirements set forth in the City's Source Reduction and Recycling Element.
- POLICY CN 3.2: Maximize public awareness of all source reduction and recycling programs.
- POLICY CN 3.3: Encourage participation in local and county waste disposal programs for such household hazardous waste items as automotive products, paints, chemicals, tires, and batteries.

- GOAL CN 4: Conserve energy resources through the use of technology and conservation methods.
- POLICY CN 4.1: Encourage innovative building designs that conserve and minimize energy consumption.
- POLICY CN 4.2: Require compliance with Title 24 regulations to conserve energy.
- POLICY CN 4.3: Encourage the residential and business community to install energy saving features and appliances in existing structures.

Public Safety

- GOAL PS 1: Maintain a high level of fire and police protection for residents, businesses, and visitors.
- POLICY PS 1.3: Maintain an inventory of high-risk fire hazards within the City.
- POLICY PS 1.4: Maintain fire inspection, code compliance, and weed abatement programs.
- POLICY PS 1.5: Require that adequate police and fire service facilities and personnel be maintained to provide services at sufficient levels.
- POLICY PS 1.6: Ensure that law enforcement, crime prevention, and fire safety concerns are considered in the review of planning and development proposals in the City.
- GOAL PS 2: Protect the community from dangers associated with geologic instability, seismic hazards, and other natural hazards.
- POLICY PS 2.1: Maintain an updated Emergency Operations Plan and Disaster Recovery Program to adequately respond to natural disasters and human-induced emergencies and its aftermaths.
- POLICY PS 2.2: Cooperate with the Federal Emergency Management Agency (FEMA), Office of Emergency Services (OES) and other local, state, and federal agencies involved in emergency preparedness and response.
- POLICY PS 2.5: Provide possible funding sources to assist in seismic retrofitting of potentially hazardous structures.
- GOAL PS 3: Protect public health, safety, and the environment from exposure to hazardous materials and other dangers.
- POLICY PS 3.1: Ensure that the storage, processing, and transfer of hazardous materials are not located in areas that could potentially harm resident and other sensitive receptors (i.e., schools, parks, hospitals) and are adequately buffered from environmentally sensitive areas.
- POLICY PS 3.2: Encourage and support innovative technologies that treat and dispose of hazardous waste or use alternative sources to hazardous materials.
- POLICY PS 3.4: Maintain planning procedures for the handling and transportation of hazardous materials and ensure that the procedures are in compliance with applicable County, State and Federal regulations.
- POLICY PS 3.5: Discourage land uses that generate, use, store, or process hazardous materials.
- GOAL PS 4: Increase public awareness of crime and fire prevention, and emergency preparedness and procedures
- POLICY PS 4.1: Provide public safety information regarding crime, fire, natural disasters, and emergency preparedness.

Open Space

- POLICY OS 2.4: Preserve the Willows Wetland as a trail-oriented City park and passive natural open space with limited access to guided tours, volunteer activities, and educational programs.

Housing Element

- POLICY HE 1.1: Encourage the upkeep, maintenance, and rehabilitation of existing housing units.
- POLICY HE 1.2: Continue to explore programs and funding sources designed to maintain and improve the existing housing stock.
- POLICY HE 1.3: Preserve the affordability of assisted rental projects located in the City.
- POLICY HE 1.4: Encourage room additions in the existing housing stock to alleviate overcrowding.

Circulation

- POLICY CL 1.1: Prioritize long-term sustainability for the City of Gardena, in alignment with regional and state goals, by promoting infill development, reduced reliance on single-occupancy vehicle trips, and improved multi-modal transportation networks, with the goal of reducing air pollution and greenhouse gas emissions, thereby improving the health and quality of life for residents.

CITY OF GARDENA STORMWATER/WASTEWATER PROGRAM

The purpose of the Stormwater/Wastewater Program is to reduce stormwater pollution, produce informative education materials, create pollution prevention tips for residents and business, provide online documents, reporting forms, and links to other stormwater program participants and more.

The City has specific stormwater best management practices for automotive repair and maintenance shops, and for restaurants. Programs also discusses proper disposal of household hazardous waste, and how to report illicit discharges and pet waste removal. The best management programs can be accessed on the City website under the "Stormwater Management Program" page.[8]

SOUTH BAY CITIES COUNCIL OF GOVERNMENTS

The City of Gardena is a member agency of the South Bay Cities Council of Governments (SBCCOG); a joint powers authority government agency of 16 cities and Los Angeles County that share the goal of maximizing the quality of life and productivity of the South Bay subregion of Los Angeles County. The SBCCOG focuses on conservation of energy and water, along with waste reduction and shared mobility, through the South Bay Environmental Services Center; senior and homeless services through social welfare, equity and access initiatives; transportation, particularly administration of Measure R and Measure M funding; land use and climate action planning through Sustainable South Bay initiatives; broadband access with the South Bay Fiber Network; geographic information mapping through a technology initiative; and advocacy on legislative positions that address these issues.

CLIMATE ACTION PLAN (2017)

The City of Gardena, in cooperation with the SBCCOG, developed a Climate Action Plan (CAP) to reduce GHG emissions within the city. The City's CAP serves as a guide for action by setting GHG emission

[8] https://cityofgardena.org/stormwater-management-program

reduction goals and establishing strategies and policy to achieve desired outcomes over the next 20 years.

GARDENA & HAWTHORNE MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN (2012)

The City of Gardena and the City of Hawthorne are required to have a Federal Emergency Management Agency (FEMA) approved Hazard Mitigation Plan to be eligible for certain disaster assistance and mitigation funding. The Hazard Mitigation Plan provides direction and guidance on implementing hazard mitigation action items on a hazard-level, probability, and cost-priority basis. The overall goal of the Hazard Mitigation Plan is to reduce the potential for damage to critical assets from natural hazards. In addition, the plan describes past and current hazard mitigation activities and philosophies and outlines future mitigation goals and strategies. The hazards included natural, technical, and human-caused events, with an emphasis on the effect of natural disasters on the Cities' critical facilities.

CITY OF GARDENA ENVIRONMENTAL JUSTICE WHITE PAPER (2021)

The Environmental Justice White Paper is a document that identifies the state of the seven required Environmental Justice topics within the City: pollution exposure and air quality, public facilities, food access, safe and sanitary homes, physical activity, community engagement, and addressing the needs of disadvantaged communities. The City of Gardena contains census tracts that are considered "disadvantaged communities" under SB 1000, thereby requiring the City to implement an Environmental Justice Element into the General Plan. Analyzing the condition and availability of each component helps the City establish a baseline of what needs are currently being met, and which conditions need to be improved upon. The White Paper provides key findings for each topic and presents next steps the City could take to improve living conditions for residents.

CITY OF GARDENA EMERGENCY OPERATIONS PLAN (2016)

This City of Gardena Emergency Operations Plan (EOP) addresses the planned response to an actual or threatened incident, disaster, or emergency associated with natural, technological, and human caused hazards, or a national security emergency in or affecting the City of Gardena.

The Emergency Operations Plan requires planning, training, and exercising prior to an actual or threatened incident, disaster, or emergency in order for the City to respond effectively. This plan outlines the roles and responsibilities assigned to city employees for response and short-term recovery activities and is flexible enough for use to address all hazards. It is designed to include the City of Gardena as part of the Los Angeles County Operational Area. The plan incorporates concepts and principles from the California Standardized Emergency Management System (SEMS), the National Incident Management System (NIMS), and the Incident Command System (ICS) into the City's emergency operations.