

# 9

## HEALTH AND SAFETY ELEMENT

State law requires every general plan in California to address natural and human-caused hazards and dangers and identify the potential risk of death, injuries, property damage, and economic and social dislocation from fires, floods, earthquakes, and other events. Contra Costa County is at risk from a number of natural and human-caused hazards, and climate change is likely to make many of these more damaging for people, buildings and structures, ecosystems, and other important community assets.

This Element focuses on improving public health and safety and reducing the risk of hazards. It is organized into the following 11 sections:

- The **Air Quality** section includes policy guidance supporting clean air and promoting community and environmental health equitably throughout the county.
- The **Greenhouse Gases** section includes policy guidance to reduce greenhouse gas (GHG) emissions in Contra Costa County in support of statewide carbon neutrality and other GHG emissions reduction goals.
- The **Climate Change, Resilience, and Adaptation** section includes policy guidance promoting community resilience to climate change hazards.
- The **Flood Hazards and Sea Level Rise** section includes policy guidance to mitigate flood and sea level rise hazards.
- The **Wildfire Hazards** section includes policy guidance to minimize wildfire risks to residents, infrastructure, and natural resources.
- The **Extreme Heat** section includes policy guidance supporting resilience to an increasing number of extreme heat events per year.
- The **Management of Hazardous Materials and Hazardous Waste** section includes policy guidance to protect communities from past and present activities involving the use of hazardous materials and hazardous waste.
- The **Seismic and Geologic Hazards** section includes policy guidance to protect residents, property, and infrastructure from seismic and geologic hazards, including earthquakes, liquefaction, and landslides.
- The **Emergency Preparedness, Response, and Evacuation Routes** section includes policy guidance to maintain emergency response and recovery procedures, including effective evacuation capacity and capability, that protect human life and allow communities and economies to function during emergencies.
- The **Noise and Vibration** section includes policy guidance to maintain an acceptable level of noise and vibration in communities.
- The **Health and Safety Element Performance Measures** describe how the County will track its progress in achieving some of the major objectives expressed in this Element.

Appendix B provides additional information about many of these hazards.



This General Plan highlights policies and actions that address four major themes that serve as a framework for the Plan. For the reader's ease, policies and actions related to these themes are identified throughout the General Plan using the following icons. The policies and actions related to each theme are also compiled in Appendix A. See Chapter 1 for more information about each theme.



Community Health



Environmental Justice



Economic Development



Sustainability



*Delta flooding, as occurred on Bradford Island in 1983, is a significant hazard in Contra Costa County. (Credit: California Department of Water Resources)*

## AIR QUALITY

### Countywide Air Quality

As basic and critical as it is to healthy living, clean air is not guaranteed in any community. Air quality in Contra Costa County is primarily affected by ozone pollution from vehicle exhaust and particulate matter from industrial centers and diesel trucks. Higher temperatures can increase surface ozone concentrations, which is associated with negative health outcomes, including reduced lung function, pneumonia, asthma, cardiovascular diseases, and premature death. Ozone concentrations are projected to increase in most places that already experience high levels, such as East County, by 2040. During cooler months, near-ground particulate matter is trapped in the air for longer periods of time due to an inversion layer, especially in the northern and eastern parts of the county where particulate matter rates are already high. Higher rates of particulate matter increase the likelihood of cardiovascular and asthma-related health complications.

Contra Costa County is committed to protecting human health and the environment by meeting State of California and federal standards for all air pollutants. The California and National Ambient Air Quality Standards (CAAQS and NAAQS, respectively) are the air quality levels considered to provide a margin of safety to protect public health and welfare. The California Air Resources Board (CARB) regulates and enforces air quality laws, rules, and regulations set by the State. Local air districts are delegated the authority to regulate local stationary sources of air pollution to improve air quality. The local air district in the San Francisco Bay Area is the Bay Area Air Quality Management District (BAAQMD).

For over 60 years, BAAQMD has been tasked with improving air quality in the Bay Area and reducing exposure to air pollution, including “criteria air pollutants” like ozone, particulate matter, and toxic air contaminants (TACs), all of which are dangerous to human health. BAAQMD monitors and reduces air pollution throughout the region to achieve the air quality standards established by the State and federal governments. As of 2023, the San Francisco Bay Area Air Basin, which encompasses Contra Costa County and the rest of the Bay Area, is not meeting the State and federal standards for ozone and particulate matter.

Improving air quality requires constant oversight and can involve significant expenditures and changes in behavior. Since the late 1980s, BAAQMD has required major stationary sources of air pollution (e.g., petroleum refineries and other heavy industrial sources) to reduce emissions to the maximum achievable level. In 2004, BAAQMD initiated its Community Air Risk Evaluation (CARE) program to reduce TAC exposure from stationary and mobile sources (i.e., cars, trucks, trains, and airplanes) in the Bay Area, and has more recently provided related planning assistance through its *Planning Healthy Places* guidebook. The Planning Healthy Places guidance maps communities with higher concentrations of air pollution, shares best practices to reduce health risks associated with air pollution, and encourages jurisdictions to address and minimize potential local air pollution issues early in the land use planning process, with technical guidance for implementation.

Additionally, BAAQMD’s 2017 Clean Air Plan, prepared in cooperation with the Association of Bay Area Governments (ABAG)/Metropolitan Transportation Commission (MTC), includes several control strategies for reducing air pollution from new and existing stationary sources and vehicle travel.



Freeways and other high-traffic roads, such as State Route 4, are a major source of air pollution. (Community-submitted photo)

### Goal HS-1

Air quality that supports community and environmental health.

### Policies

#### HS-P1.1



Coordinate air quality planning efforts with State and regional agencies, such as CARB, BAAQMD, and ABAG/MTC.



### HS-P1.2



Prioritize participation in emission and exposure reduction, public education, engagement, outreach, and other programs that promote improved air quality, focusing on Impacted Communities.

### HS-P1.3



Require new development to adhere to BAAQMD's Planning Healthy Places guidance when local conditions warrant.\*

### HS-P1.4



Require new industrial development to locate significant pollution sources at the maximum distance possible from sensitive receptors.\*

### HS-P1.5



Require new sources of air pollution that will generate significant new air quality impacts or expose sensitive receptors to substantial increases in harmful emissions of TACs to prepare a Health Risk Assessment that identifies appropriate mitigation consistent with BAAQMD California Environmental Quality Act (CEQA) Air Quality Guidelines, based on the findings of the Health Risk Assessment.\*

### HS-P1.6



Require that any mitigation of air quality impacts occur on-site to the extent feasible to provide the greatest benefit to residents in neighboring communities most impacted. For mitigation that relies on offsets, require that the offsets be obtained from sources as near to the project site as possible or from sources that would improve air quality in an

Impacted Community. If the project site is within or adjacent to an Impacted Community, require offsets/mitigation within that community unless determined infeasible by the County.\*

### HS-P1.7

Encourage modernization projects at existing industrial facilities that support State energy and climate goals and achieve all of the following:

- (a) Improved community and worker health and safety.
- (b) Enhanced environmental protection.
- (c) Significant reductions in criteria pollutants, TACs, and GHGs using Best Available Retrofit Control Technology when applicable.
- (d) Timely remediation of preexisting and future on- and off-site contamination as a component of the project or through a fully funded work program that restores the site to a condition suitable for commercial or industrial use, or to a higher standard when determined necessary and feasible on a case-by-case basis.

### HS-P1.8



Require new or expanded commercial and industrial projects resulting in 25,000 square feet or more of gross habitable floor area, such as warehouses and other large enclosed buildings, to be near zero-emission operations, including the facilities themselves and the associated fleets. Require all necessary measures, such as the following, to achieve near zero emissions:

- (a) Reduce on-site energy consumption and increase on-site energy generation and energy storage.

- (b) Provide adequate on-site zero-emission-vehicle parking for all anticipated truck traffic to prevent idling and off-site queuing.
- (c) Provide electrified loading docks with receptacles allowing plug-in of refrigerated trailers.
- (d) Use heavy-duty trucks that are model year 2014 or later and expedite a transition to zero-emission trucks by establishing a clear timeline for electrification of trucks as they become commercially available. Ensure contracts with motor carriers include air quality incentives or requirements, such as providing incentives to fleets that meet United States Environmental Protection Agency (EPA) SmartWay standards or requiring use of zero-emission or near-zero-emission trucks.
- (e) Use a “clean fleet” of delivery vehicles as they become commercially available, but no later than 2025.
- (f) Use zero-emission yard equipment, such as forklifts, pallet trucks and jacks, and stackers.
- (g) Implement practices to control and remove fugitive dust and other contaminants from paved areas.

Uses with fewer than five vehicles domiciled on-site are exempt from this policy.\*

### HS-P1.9



Require construction activities that involve large grading operations to implement additional construction measures identified in BAAQMD’s CEQA Guidelines to reduce air pollutant emissions.\*

### HS-P1.10



Prohibit nonessential diesel engine idling countywide and nonessential idling of all vehicles within 100 feet of sensitive receptors.\*

### HS-P1.11



Support efforts to provide HVAC upgrades and portable clean air filters to persons who live in Impacted Communities and other areas burdened by disproportionate exposure to poor air quality.

### HS-P1.12



Encourage installation of upgraded HVAC systems at schools, childcare centers, and similar uses located proximate to industrial facilities.

## Actions

### HS-A1.1



Consult with BAAQMD and community stakeholders and prepare an Air Quality Community Risk Reduction Plan that applies to areas with high levels of cancer risk, providing a comprehensive strategy to protect community members from the negative health effects of air pollution.

### HS-A1.2



Consult with BAAQMD and community stakeholders and amend County Ordinance Code Title 8 – Zoning to create an Air Pollution Exposure Overlay Zone around freeways that requires new construction in these areas to install enhanced



ventilation systems and other strategies to protect people from respiratory, heart, and other health effects associated with breathing polluted air.

### HS-A1.3



Consult with BAAQMD and community stakeholders and amend County Ordinance Code Title 8 – Zoning to include an Industrial-Sensitive Receptor Interface Overlay Zone applied to areas where residential land uses and other sensitive receptors interface or directly abut heavy industrial land uses. In the overlay zone, require industrial uses to reduce pollution and employ strategies to mitigate air quality, noise, vibration, odor, light, visual, and safety impacts on nearby sensitive receptors. In addition, require new sensitive receptors to install enhanced ventilation systems and implement other strategies, paid for by neighboring sources of pollution to the extent possible, to protect residents from health and quality of life impacts.

### HS-A1.4



Consult with BAAQMD and community stakeholders and amend County Ordinance Code Title 7 – Building Regulations to include a clean construction ordinance that requires projects to implement extra measures to reduce emissions at construction sites in or near places that are already overburdened by air pollution, such as Impacted Communities.

### HS-A1.5



Adopt an ordinance at least as stringent as the State's maximum idling law, and coordinate with CARB and law enforcement to achieve compliance.

### HS-A1.6



Develop a plan to provide convenient and accessible clean air refuges during times when outdoor air quality is deemed unhealthy.

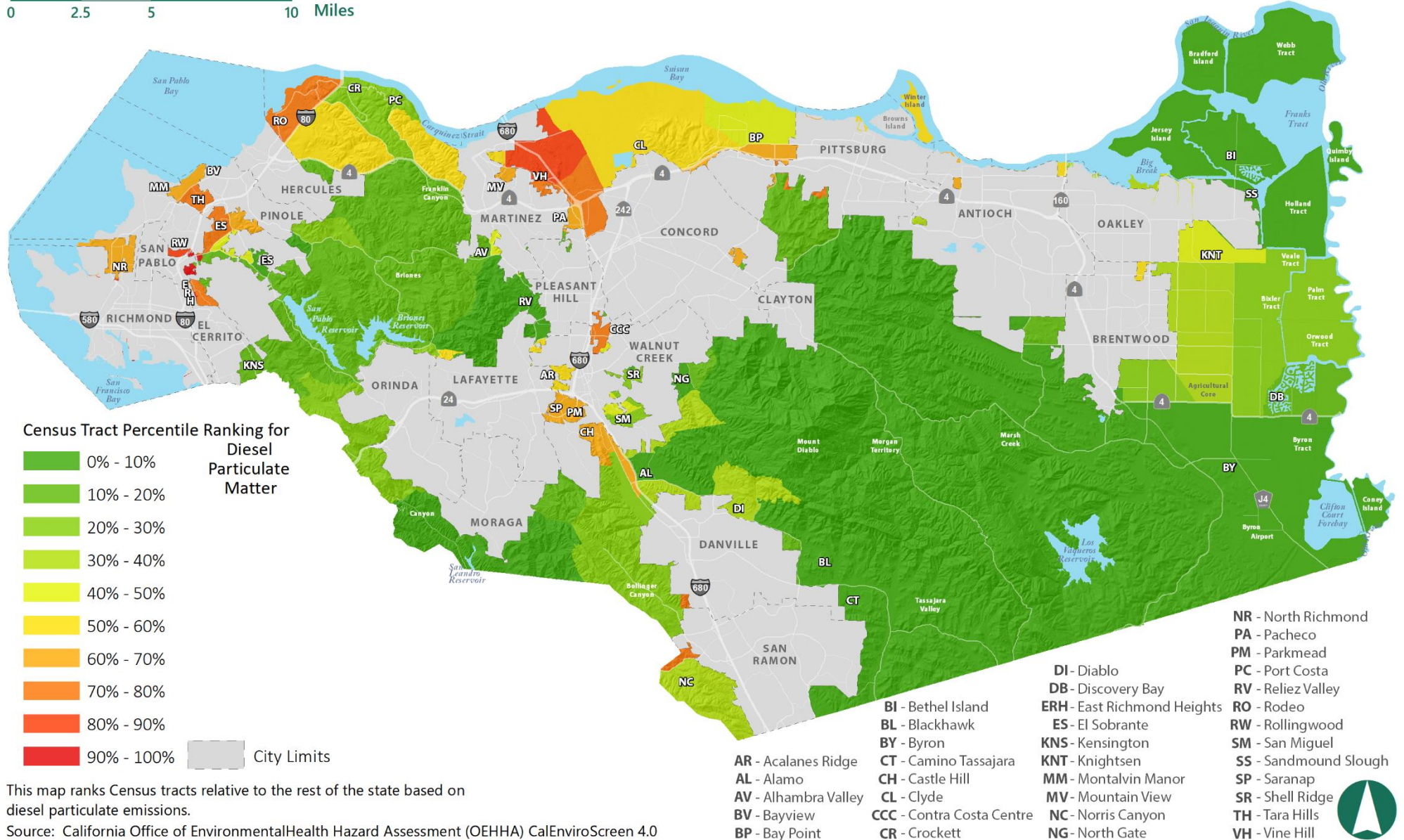
*See the Transportation Element for policies and actions related to air quality associated with vehicular emissions.*

## Air Quality in Impacted Communities

Poor air quality tends to disproportionately affect vulnerable populations, such as children and people who are elderly, chronically ill, unsheltered, or on a limited income. Often these populations live in proximity to high-volume transportation corridors (e.g., freeways, railroads) or stationary sources of toxic air emissions. Despite the federal, State, and BAAQMD air quality standards and requirements discussed above, there are still communities in the Bay Area that are exposed to significantly more air pollution than others, and these communities are often home to higher-than-average proportions of vulnerable populations, low-income households, and people of color. As explained in the Stronger Communities Element, Impacted Communities are unincorporated communities that are disproportionately impacted by pollution and negative health outcomes. In Contra Costa County, they are located near refineries and other large industrial facilities, major freeways and high-traffic roads, distribution centers, and railroad lines. Figure HS-1 displays rates of diesel particulate matter emissions, or exhaust from diesel engines, in unincorporated Census tracts relative to the rest of the state, and demonstrates how communities near heavy industry and freeways experience the highest rates of diesel particulate matter pollution.

**FIGURE HS-1 DIESEL PARTICULATE MATTER RANKINGS RELATIVE TO THE STATE**

0 2.5 5 10 Miles



This map ranks Census tracts relative to the rest of the state based on diesel particulate emissions.

Source: California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen 4.0



CARB recently established the Community Air Protection Program in response to Assembly Bill (AB) 617, through which BAAQMD must implement community air monitoring and community emissions reduction programs for communities most affected by air pollution. As of Fall 2023, BAAQMD, in partnership with community members in Richmond, San Pablo, and portions of unincorporated Contra Costa County, is completing the AB 617 Path to Clean Air (PTCA) Community Emissions Reduction Plan (CERP) to reduce emissions and exposure for people in these communities. Additional communities in the county may benefit from this program in future years.



*Emissions from heavy industrial facilities disproportionately affect Impacted Communities. (Credit: California Department of Water Resources)*

## Goal HS-2

Healthy air quality for all communities, so no community bears the disproportionate burden of environmental hazards and health risks.

## Policies

### HS-P2.1



When evaluating health risk impacts of projects in Impacted Communities, use an excess cancer risk of 6.0 per million and a non-cancer (acute and chronic) hazard index greater than 1.0 as thresholds for finding that the project could cause a cumulatively considerable contribution and a significant impact.\*

### HS-P2.2



Increase the tree canopy on public property, especially in Impacted Communities and areas with a high heat index, by prioritizing funding for new street tree planting and maintenance.

### HS-P2.3



Support protection, restoration, and enhancement of natural landscapes in and near Impacted Communities to improve air quality and community health.



## Actions

### HS-A2.1



Partner with community members and regulatory agencies such as BAAQMD to conduct data collection and monitoring of pollution exposure, prepare a community-scale plan for reducing and mitigating air pollutant emissions and industrial hazards, such as pipeline risks, accidents, potential water or soil contamination, and impacts to sensitive ecological resources for each Impacted Community, or group of Impacted Communities, as appropriate. Require future projects to demonstrate consistency with those plans.

### HS-A2.2



Coordinate with community members, BAAQMD, and other regulatory agencies to facilitate AB 617 citizen-led programs, including data collection, monitoring of pollution exposure, and identification and implementation of solutions in Impacted Communities. Consider future General Plan and Zoning Code amendments as needed to support BAAQMD in meeting AB 617 objectives.

### HS-A2.3



Conduct a housing condition survey in Impacted Communities to identify units likely requiring upgrades to provide adequate protection from toxic releases. Based on the survey's findings, target outreach to provide information about weatherization and similar improvement programs.

### HS-A2.4



Coordinate with BAAQMD to determine where to focus a targeted permit inspection program in Impacted Communities to help ensure enforcement of air quality permits.

### HS-A2.5



Prepare a tree master plan for the county that emphasizes planting of low-maintenance native tree species and includes quantified goals and tracking methods, including mapping the tree canopy, and prioritizes planting in Impacted Communities and along safe routes to schools.

*See the Extreme Heat section of this Health and Safety Element and the Conservation, Open Space, and Working Lands Element for additional policies and actions related to tree preservation and planting.*

## GREENHOUSE GASES

Scientific consensus is that human activity involving the use of fossil fuels has resulted in an ever-accelerating increase in the concentration of heat-trapping gases, known as GHGs, in Earth's atmosphere (termed the "greenhouse effect"). In California, communities are now adapting to the resulting climate change stressors: warmer annual average temperatures, changes in precipitation patterns, sea level rise, and a reduction in snowpack. Recognizing the numerous threats posed by climate change, the State has set ambitious GHG emission reduction targets:

- Reduce statewide GHG emissions by 40 percent from 1990 levels by 2030.



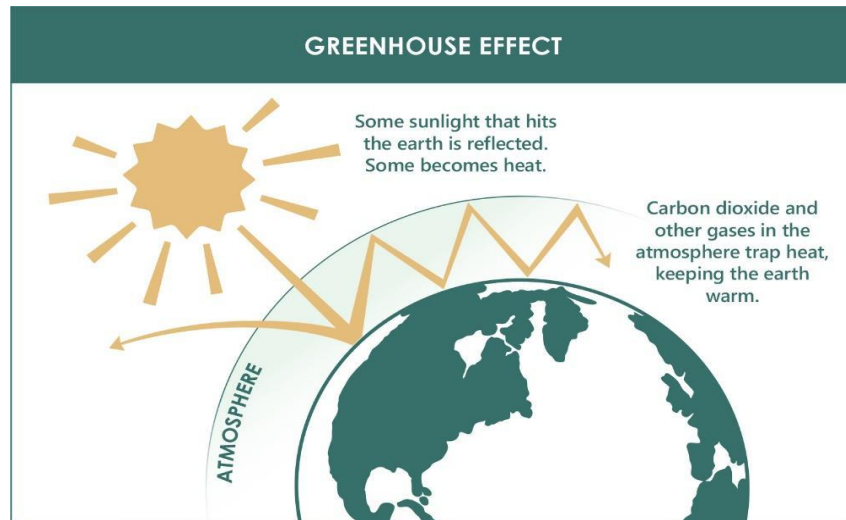
- Reduce statewide GHG emissions by at least 85 percent from 1990 levels by 2045 and be on a path to support statewide carbon neutrality by 2045.

Since 2005, the County has implemented various measures to address climate change, including efforts to quantify GHG emissions, prioritize climate change adaptation in local government, and use nature-based solutions to achieve GHG emissions reductions. In 2020, the Board of Supervisors declared that climate change “threatens the long-term economic and social well-being, health, safety, and security of the county, and that urgent action by all levels of government is needed to immediately address this climate emergency.”

To support State efforts related to climate change and its own GHG emissions reduction goals, the County strives for carbon neutrality through a conscientious transition to renewable and carbon-free fuels, resource conservation, sustainable practices, and other approaches.



*Solar panels help reduce reliance on natural gas and electricity providers and increase resilience for homeowners.*



Source: State of Washington Department of Ecology, "What is Climate Change," [www.ecy.wa.gov/climatechange/whatis.htm](http://www.ecy.wa.gov/climatechange/whatis.htm)

The goals, policies, and actions in this section focus on reducing GHG emissions throughout the county. The County's Climate Action and Adaptation Plan, one of the tools for implementing this General Plan, provides more specific strategies and actions to achieve Contra Costa County's GHG emission reduction goals.

### Goal HS-3

Communities that reduce existing and anticipated GHG emissions in support of statewide carbon neutrality goals and other GHG reduction targets.

## Policies

### HS-P3.1



Prioritize implementation of the Contra Costa County Climate Action and Adaptation Plan to reduce GHG emissions from community-wide sources and adapt to changing climate conditions.

### HS-P3.2



Facilitate carbon-neutral development projects and communities that support a circular economy, zero-emission modes of transportation, reliable and renewable energy resources, energy-efficient buildings, zero waste, water efficiency and conservation, green infrastructure, soil conservation, and a system of natural and working lands that support natural carbon sequestration and climate resilience.

### HS-P3.3



Require new development projects using the Contra Costa County Climate Action and Adaptation Plan to streamline their environmental review of GHG emissions, as permitted by CEQA Guidelines Section 15183.5, to demonstrate consistency with the Climate Action and Adaptation Plan and incorporate applicable GHG reduction and climate change adaptation measures.\*

## Actions

### HS-A3.1



Update the Contra Costa County Climate Action and Adaptation Plan as needed to maintain consistency with CEQA Guidelines Section 15183.5(b), other State and

regional guidance, and best practices. Future updates must include:

- (a) Inventories of GHG emissions in the unincorporated county.
- (b) GHG reduction targets for 2030 and 2045 at a minimum.
- (c) Forecasts of GHG emissions for the unincorporated county consistent with growth assumptions of this General Plan.
- (d) GHG reduction strategies with quantifiable outcomes.
- (e) Climate adaptation and resilience strategies to ensure the county's communities can respond to changing climate conditions.
- (f) An implementation and monitoring program to track the County's progress toward achievement of the GHG reduction targets.
- (g) A community and stakeholder engagement program for Climate Action and Adaptation Plan preparation and implementation.

### HS-A3.2



Study the feasibility of establishing a low-carbon concrete requirement for all new construction and retrofit activities and consider additional strategies to reduce embedded carbon in construction materials. The intent is to determine what the County can and should do to support or exceed State requirements for net-zero emissions for cement use by 2045.



### HS-A3.3



Regularly review and revise the County's purchasing and contracting programs as necessary to ensure consistency with the County's sustainability and GHG reduction goals.

*Every Element of this General Plan includes policies and actions that will contribute to reduced GHG emissions and a more sustainable future.*

## CLIMATE CHANGE, RESILIENCE, AND ADAPTATION

According to the California Climate Action Team—a committee of State agency secretaries and the heads of agencies, boards, and departments, led by the Secretary of the California Environmental Protection Agency—even if actions could be taken to immediately curtail GHG emissions, the potency and long atmospheric lifetimes of emissions that have already built up, combined with the inertia of the Earth's climate system, could still produce significant additional climate change hazards. Consequently, some effects from climate change are now considered unavoidable. To sustain the quality of life communities have come to expect, the County now must consider how to counteract potential threats to public health, buildings and infrastructure, economic drivers, biological resources, and key community services.

In 2020, the County released the [Contra Costa County Vulnerability Assessment](#), which analyzes how the changing climate can harm residents, buildings, ecosystems, natural resources, and more. Table HS-1 lists climate change-related hazards of concern identified in the Vulnerability Assessment.

The goals, policies, and actions in this section address climate change through a resilience and adaptation lens. Individual hazards are addressed through policy guidance in subsequent sections of this Element.

### Goal HS-4

Resilient communities that are prepared for, responsive to, and recover from hazards created or worsened by climate change.

### Policies

#### HS-P4.1



Address the effects of climate change, particularly the increased frequency and intensity of hazards, during review of new development applications.

#### HS-P4.2

Discourage new below-market-rate housing in High and Very High Fire Hazard Severity Zones, the Wildland-Urban Interface, and Alquist-Priolo Fault Zones. If below-market-rate housing must be constructed within these zones, require it to be hardened or make use of nature-based solutions to ensure it remains habitable to the greatest extent possible.\*

#### HS-P4.3



Prioritize efforts to protect Impacted Communities and other vulnerable populations from the impacts of climate change, including through improving community capacity and meaningfully involving community members in decision making.

**TABLE HS-1 CLIMATE CHANGE HAZARDS OF CONCERN IN CONTRA COSTA COUNTY**

Hazard	Climate Change-Induced Impacts
Agricultural Pests and Diseases	Disease-carrying pests are most active during warmer months, so the threat of infection or infestation rises with temperatures, thereby harming crops and rangelands.
Air Quality	Higher temperatures can increase surface ozone and particulate matter concentrations, which are associated with reduced lung function, pneumonia, asthma, cardiovascular diseases, and premature death. In addition, smoke from wildfires can increase air pollution levels, which can exacerbate many of the same health conditions as extreme heat.
Bay Shoreline Flooding	Rising sea levels mean that shoreline flooding from high tides and wave run-up can be more severe and frequent, damaging buildings, infrastructure, and important economic and environmental assets located in low-lying areas.
Drought	Changes in precipitation patterns are expected to cause more frequent and intense droughts statewide, reducing water supplies for homes, businesses, industrial centers, and agriculture.
Extreme Heat	The number of extreme heat days is expected to increase dramatically due to increases in annual average temperature, which can cause heat stress in humans, animals, and plants not adapted to these conditions. Power lines, roadways, and other infrastructure also may fail under higher temperatures.
Flooding	The frequency and intensity of floods is expected to increase with climate change, damaging buildings and infrastructure, and disrupting local economies and services. Floods can also exacerbate the growth of mold in indoor environments, threatening human health.
Fog	Tule fog (in East County) and coastal fog (in West County) are expected to decrease, which further increases temperatures and may have harmful effects on local ecosystems.
Human Health Hazards	Diseases carried by animals that are considered pests, such as mice and rats, mosquitos, and ticks are likely to increase, causing negative health outcomes for residents and visitors.
Landslides and Debris Flows	Landslides are expected to increase due to an increase in precipitation that can saturate the ground and wildfires that exacerbate slope instability.
Severe Storms	Severe storms, including heavy rainfall, high winds, and thunderstorms, may occur more often and become more intense than in the past.
Sea Level Rise	As temperatures rise, sea levels increase globally and locally as a result of melting ice and warmer waters. Higher sea levels threaten buildings and infrastructure that may be permanently inundated in the Bay shoreline and Delta areas. Without intervention, sea level rise could eventually necessitate movement and relocation of entire populations and communities.
Wildfire	Warmer temperatures, an increase in drought conditions, and greater prevalence of forestry pests and diseases are likely to create more ideal conditions for fires. Fire season is expected to occur at all times of the year, putting lives, buildings, and infrastructure at greater risk.

Source: Contra Costa County Vulnerability Assessment, 2020.



#### HS-P4.4



As climate conditions change, evaluate the feasibility of implementing adaptive land use strategies to help avoid repetitive threats to life and property.

### Actions

#### HS-A4.1



Update the capital project planning and budgeting processes to account for anticipated effects of climate change hazards on County capital investments, including buildings and infrastructure, by integrating either the Contra Costa County Vulnerability Assessment or the best-available climate science data related to impacts, risks, sensitivities, adaptive capacities, and vulnerabilities.

*See the Land Use Element for additional policies and actions related to development in hazard areas.*

## FLOOD HAZARDS AND SEA LEVEL RISE

### Flood Hazards

Flooding occurs when the natural and built systems that normally contain water are overwhelmed or fail. Floods can be caused by heavy or prolonged rainfall, clogged drainage infrastructure, and in rare instances, a break in a dam, levee, water pipe, or water tank. The water can build up and wash into normally dry areas and cause significant harm to buildings, people, and habitats. Construction of impervious surfaces (e.g., buildings and pavement) and reclamation of Delta land dating back over a century has reduced natural stormwater absorption, increasing flooding potential.

The Federal Emergency Management Agency (FEMA), California Department of Water Resources (DWR), and United States Army Corps of Engineers (USACE) map areas at risk of inundation from a 100-year flood, which has a 1 percent chance of occurring in any year, and a 500-year flood, where the risk of flooding is 0.2 percent annually, as shown in Figure HS-2. These areas are primarily located in northern and eastern Contra Costa County and along creeks throughout the county. They are mostly along what FEMA designates as a “regulatory floodway,” which refers to the channel of a watercourse.

Climate change will likely enlarge the area of the county that is at risk of flooding. Further changes to these flood zones are likely as land use patterns shift and improvements are made to flood-control systems and channels. In Figure HS-3, these flood hazard zones are overlaid with existing development to illustrate how existing land uses are at risk of flooding.

As discussed in the Public Facilities and Services Element, DWR implements the Central Valley Flood Protection Plan (CVFPP), which calls for local agencies to protect urban communities (defined as communities with at least 10,000 residents) in the Central Valley from a 200-year flood (i.e., a flood that has a 0.5-percent probability of occurring in any year). Discovery Bay is the only unincorporated community meeting the CVFPP threshold for 200-year flood protection. There are no mapped 200-year flood zones in unincorporated Contra Costa County, but the 500-year flood zone can be used as a proxy in low-lying portions of East County (i.e., areas mainly at risk of flooding from the Delta). DWR has developed Urban Levee Design Criteria to measure the level of flood protection in urban and urbanizing areas that is necessary to withstand a 200-year flood, as required by the CVFPP. Figure HS-2 displays areas with reduced flood risk because of levees.

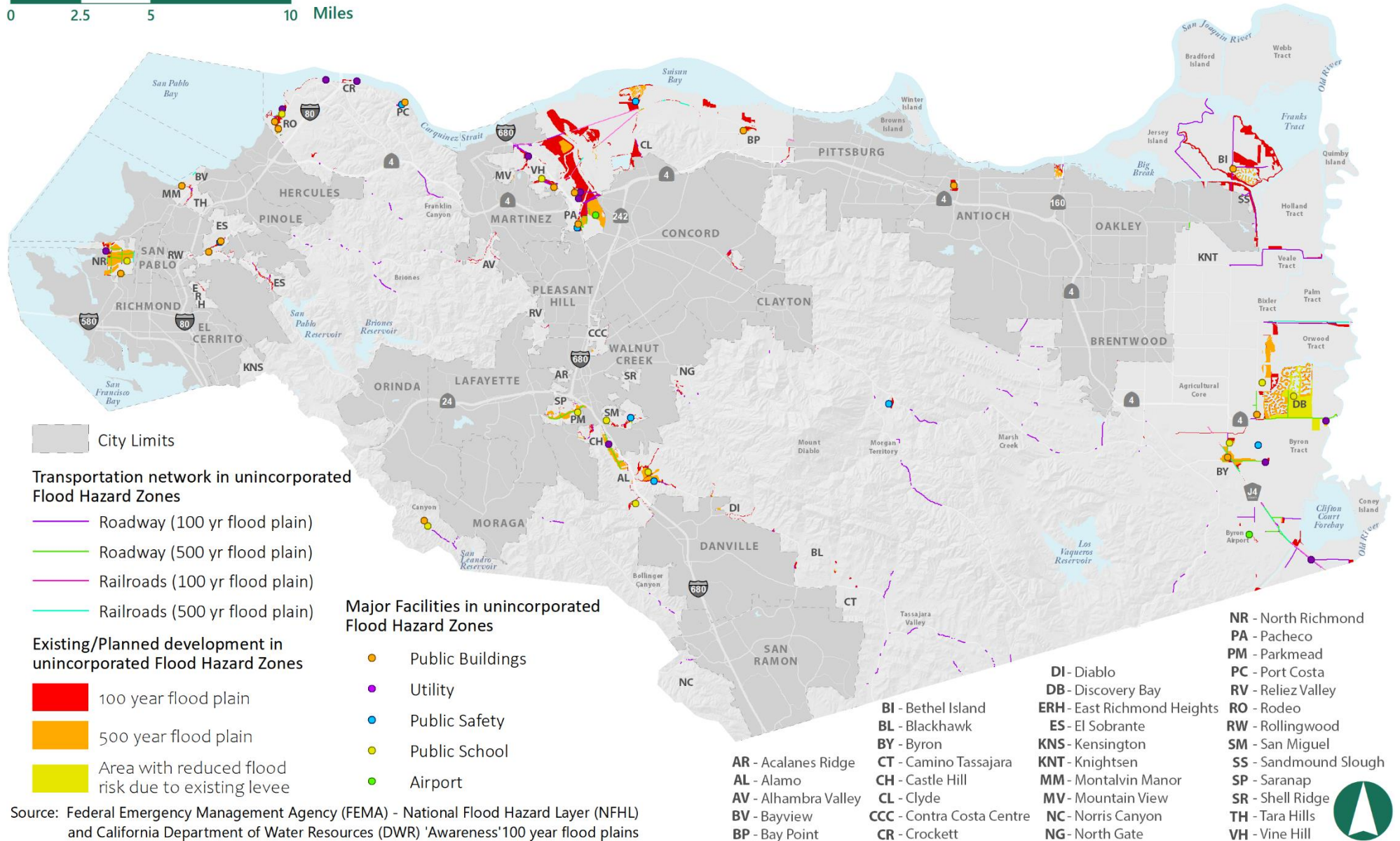
As also discussed in the Public Facilities and Services Element, levees exist across the county, with many protecting agricultural and rural areas of East County. There are over 1,100 miles of earthen levees and revetments managed by the Contra Costa County Flood Control and Water Conservation





**FIGURE HS-3 EXISTING DEVELOPMENT IN FLOOD ZONES**

0 2.5 5 10 Miles



Source: Federal Emergency Management Agency (FEMA) - National Flood Hazard Layer (NFHL) and California Department of Water Resources (DWR) 'Awareness' 100 year flood plains





District and 13 reclamation districts in the county. Rudimentary levees along local creeks and streams, in many cases constructed by adjacent landowners, also protect small areas.



*Wetlands absorb excess water and reduce flood risk. (Community-submitted photo)*

Earthquakes or overtopping due to major storms can cause levees to fail. The county has historically faced flooding due to heavy precipitation events and levee failures. In 1973, 1980, 1982, 1983, 1986, 2004, and 2009, one or more Delta levees were breached or failed. Some islands in the Delta have been flooded two or three times since 1980, which will likely occur more frequently with stronger storm systems and higher tide levels.

Flooding can also be induced by dam failure, which is caused by structural failure or deficiency associated with intense rainfall, prolonged flooding, earthquakes, landslides, or equipment malfunction. There are over 20 dams of significant concern in Contra Costa County and another six dams outside the county that have inundation areas extending into the county.

Figure HS-4 displays areas at risk of flooding because of a dam failure.

Although dam failures are very rare, they aren't unprecedented. Complete failure of the St. Francis Dam in 1928 killed over 400 people and destroyed several communities in Los Angeles and Ventura Counties. In 2017, over 180,000 people in several Northern California counties were evacuated when heavy rainfall caused partial failure of Oroville Dam's main spillway. Each dam is required to have a comprehensive emergency action plan approved by the Federal Energy Regulatory Commission, and USACE and the California Division of Safety of Dams conduct inspections of all dams.

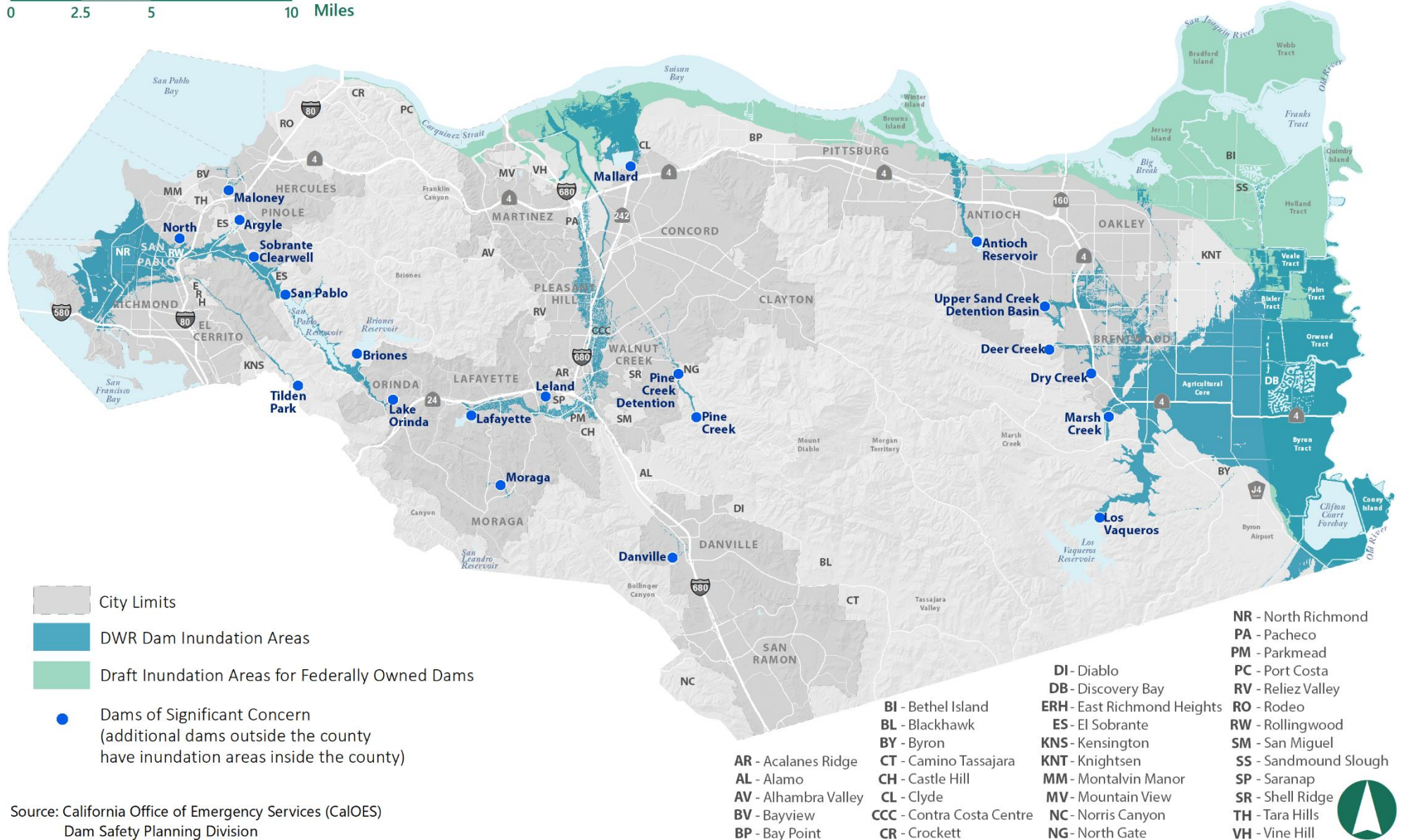
Tsunamis, massive waves caused by offshore earthquakes, can severely damage property, take lives, disrupt emergency services, and obstruct roads through intense flooding. Figure HS-5 illustrates the areas that may be subject to tsunami inundation in Contra Costa County, which include shoreline areas along San Francisco Bay, San Pablo Bay, and a portion of the Carquinez Strait. Earthquakes with magnitudes below 6.5 are very unlikely to trigger tsunamis, so it is a particularly rare phenomenon. The narrow opening of the Golden Gate Strait also protects much of the inner Bay Area shoreline from severe tsunami impacts. Nonetheless, the County considers susceptibility to tsunami when reviewing development proposals.

A seiche is a wave that can occur in an enclosed or partially enclosed body of water, such as a reservoir, bay, or harbor. Seiches can be caused by a variety of factors, including changes in atmospheric pressure, wind, and seismic or geologic activity. When a seiche occurs, it can cause water levels to rise and fall rapidly, which poses a risk to boats, docks, and other structures in the affected area. Seiches can generate waves that can inundate areas around the affected water body, similar to a tsunami. Additionally, seiches occurring in a reservoir can cause overtopping of a dam and result in regional flooding. While seiches are a risk associated with earthquakes and tsunamis, it is unlikely that one would occur in the San Pablo or San Francisco Bays or in the reservoirs in Contra Costa County.



**FIGURE HS-4 DAM INUNDATION AREAS**

0 2.5 5 10 Miles



Source: California Office of Emergency Services (CalOES)  
Dam Safety Planning Division





## Goal HS-5

Minimized risk of loss of life, injury, damage to property, and economic or social dislocations resulting from flood hazards.

## Policies

### HS-P5.1

Prohibit urban development in areas designated 100- or 200-year (or 500-year when used as a proxy for the 200-year) floodplain, as shown on Figure HS-2, or in areas subject to increased flood hazards due to subsidence or other changes, unless appropriate mitigations to reduce flood risk to the standards of the Flood Disaster Protection Act of 1973 or above are implemented.\*

### HS-P5.2

Require flood-proofing of new and expanded buildings and structures in any area subject to flooding. Flood-proofing methods will be determined on a project-by-project basis by the Floodplain Manager, and may include, but not be limited to:

- (a) Anchoring to prevent flotation, collapse, or lateral movement.
- (b) Using flood-resistant construction materials.
- (c) Elevating building pads and habitable building floors above the base flood elevation plus required freeboard.

- (d) Providing adequate venting to allow for equalization of hydrostatic forces.
- (e) Employing any other construction methods and practices appropriate to minimize flood damage.\*

### HS-P5.3

For any development project in a FEMA- or DWR-designated floodplain, require review by the Floodplain Manager to consider potential downstream flood damage that may result from the project.\*

### HS-P5.4

Evaluate development within the Sacramento-San Joaquin Valley for consistency with DWR's Urban Level of Flood Protection Criteria. Prohibit new single-family residences, density increases, subdivision maps, or development agreements for any property within a 200-year floodplain in an urban or urbanizing area, unless an adequate finding can be made pursuant to California Water Code Sections 9600 to 9603.

### HS-P5.5

Prohibit permanent buildings and structures in designated floodways where such impediments could increase risks to human life or restrict the floodway's carrying capacity.



### HS-P5.6

Prohibit construction of critical infrastructure in areas subject to flooding or sea level rise unless no feasible alternative exists.



### HS-P5.7

Require new subdivisions within the inundation area of a levee or dam, as shown in Figure HS-4, to include a deed notification explaining to future owners that the property may be subject to flooding if the levee or dam were to fail or be overwhelmed.

### HS-P5.8

Require new development in designated tsunami hazard zones to be designed to withstand anticipated tsunami forces, based on County-prepared studies conducted pursuant to Action HS-A5.4.

## Actions

### HS-A5.1

Review flooding policies and maps in this General Plan on an annual basis and incorporate best-available information regarding 100-, 200-, and 500-year floodplains and projected sea level rise due to climate change.



### HS-A5.2

Establish countywide protection priorities for vulnerable communities and their populations identified to be at high risk of displacement from future flooding and sea level rise in the Contra Costa County Vulnerability Assessment or the best-available climate science data and use regional funding mechanisms to plan and implement protection measures in these locations or for these populations.

### HS-A5.3

Amend the Floodplain Management Ordinance to address hazardous material storage.

### HS-A5.4

Conduct a study of existing development within designated tsunami hazard zones to determine evacuation and emergency response needs prior to and during a tsunami event.\*

### HS-A5.5

Pursue a TsunamiReady designation and certification as a TsunamiReady Tier Two community.

*See the Public Facilities and Services Element for policies and actions related to flood hazards and sea level rise; the Conservation, Open Space, and Working Lands Element for policies and actions related to floodplain management; the Land Use Element for additional policies and actions related to development in hazard areas; and the Sea Level Rise section of this Element for policies and actions related to adaptive management of rising tides.*

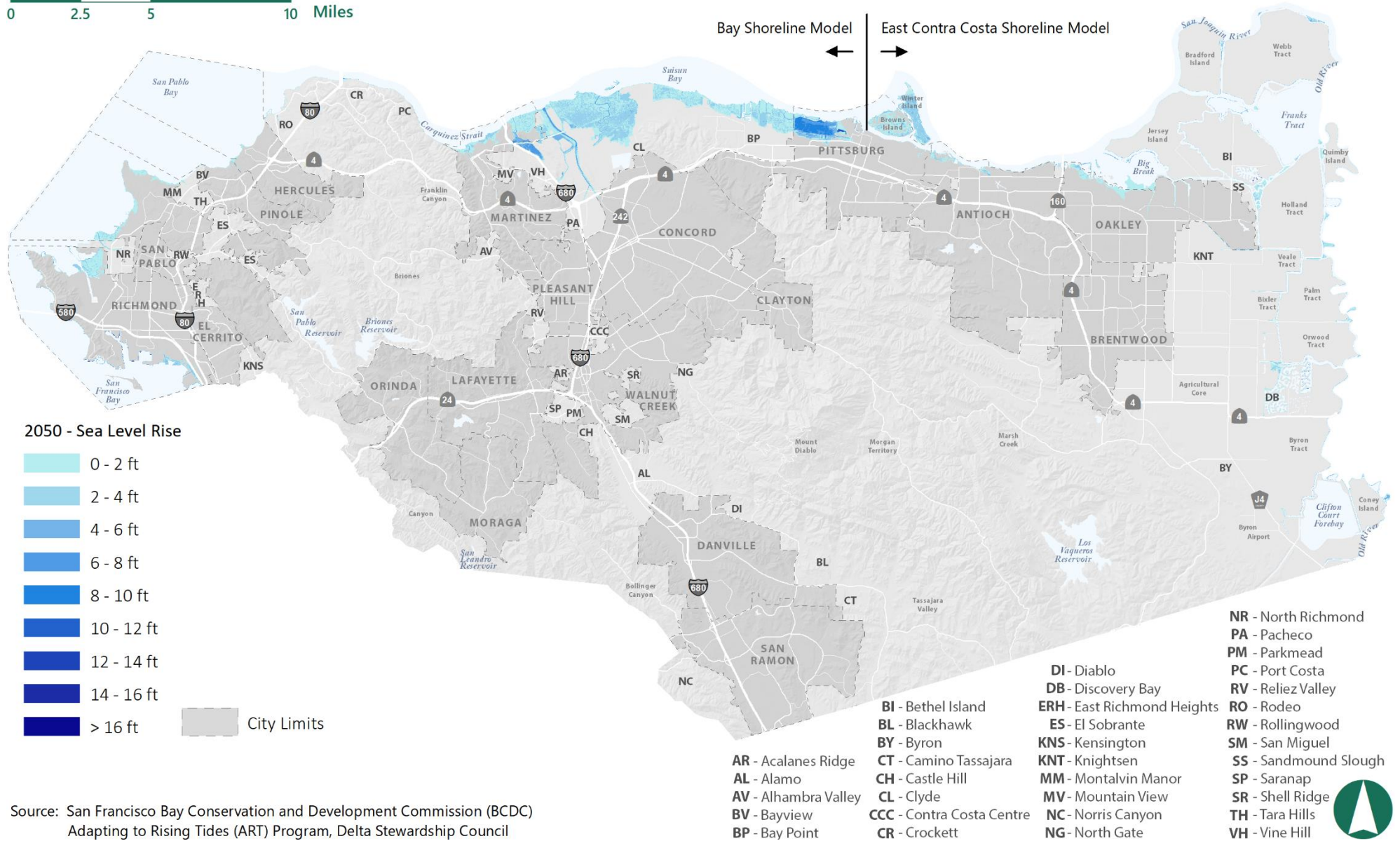
## Sea Level Rise

As global temperatures rise, glaciers and other land ice near the north and south poles melt, gradually raising sea levels. Higher temperatures also cause water to expand in oceans, further contributing to sea level rise. Along the Contra Costa County shoreline, sea levels are projected to rise up to about 2 feet (24 inches) by 2050 and 7 feet (84 inches) by 2100. However, it is possible that sea levels could rise faster than these projections, which has happened historically. Figures HS-6 and HS-8 display the expected depth of water that would inundate dry land in Contra Costa County in 2050 and 2100 based on the Bay Shoreline and East Contra Costa Shoreline models from the San Francisco Bay Conservation and Development Commission's (BCDC) Adapting to Rising Tides Program. Land that is below sea level could be inundated by water deeper than the sea level rise (e.g., 2 feet of sea level rise could expose land 2 feet below sea level to 4 feet of water). Rising sea levels



**FIGURE HS-6 2050 SEA LEVEL RISE PROJECTION**

0 2.5 5 10 Miles

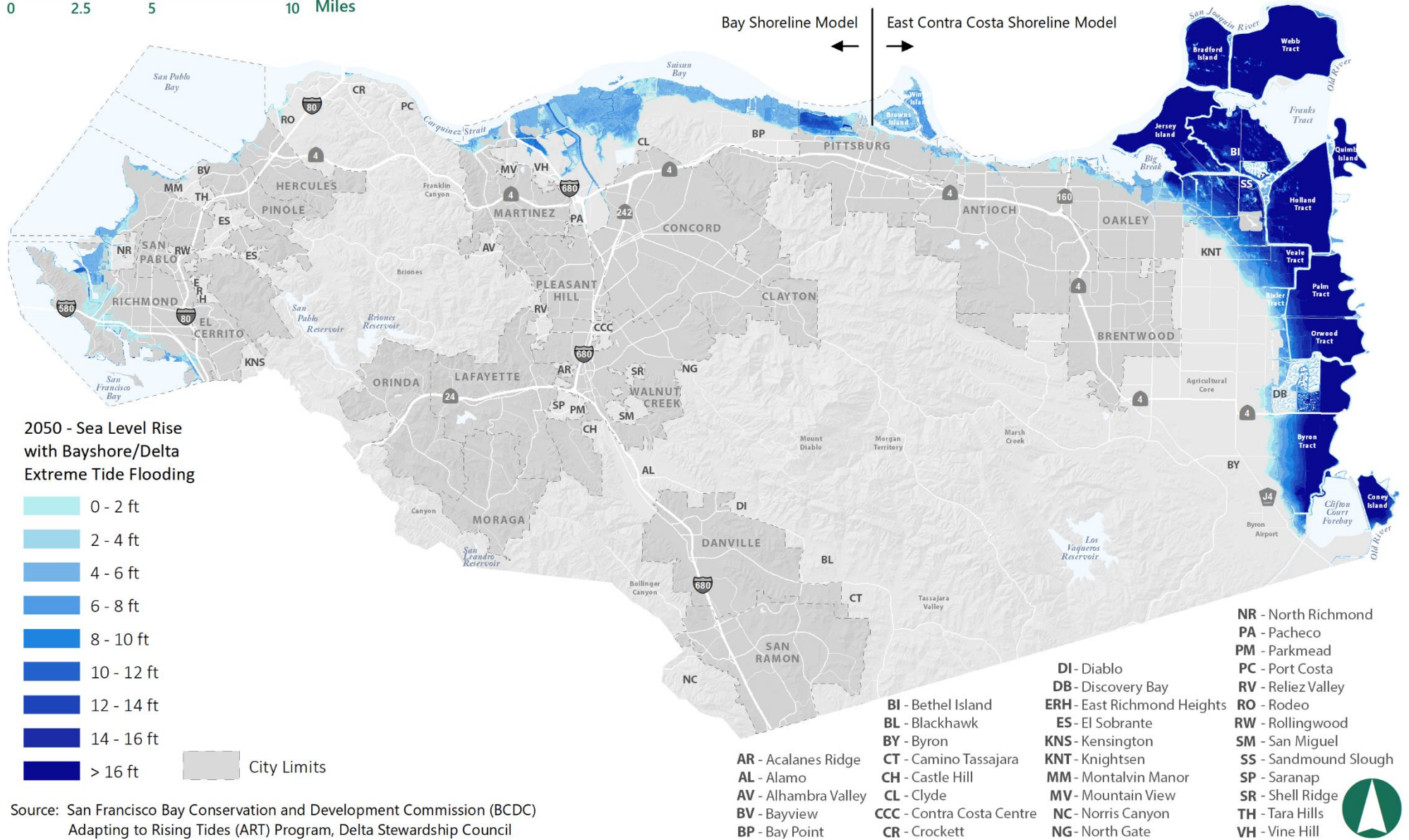


Source: San Francisco Bay Conservation and Development Commission (BCDC)  
 Adapting to Rising Tides (ART) Program, Delta Stewardship Council



FIGURE HS-7 2050 SEA LEVEL RISE PROJECTION WITH BAYSHORE/DELTA FLOODING

0 2.5 5 10 Miles

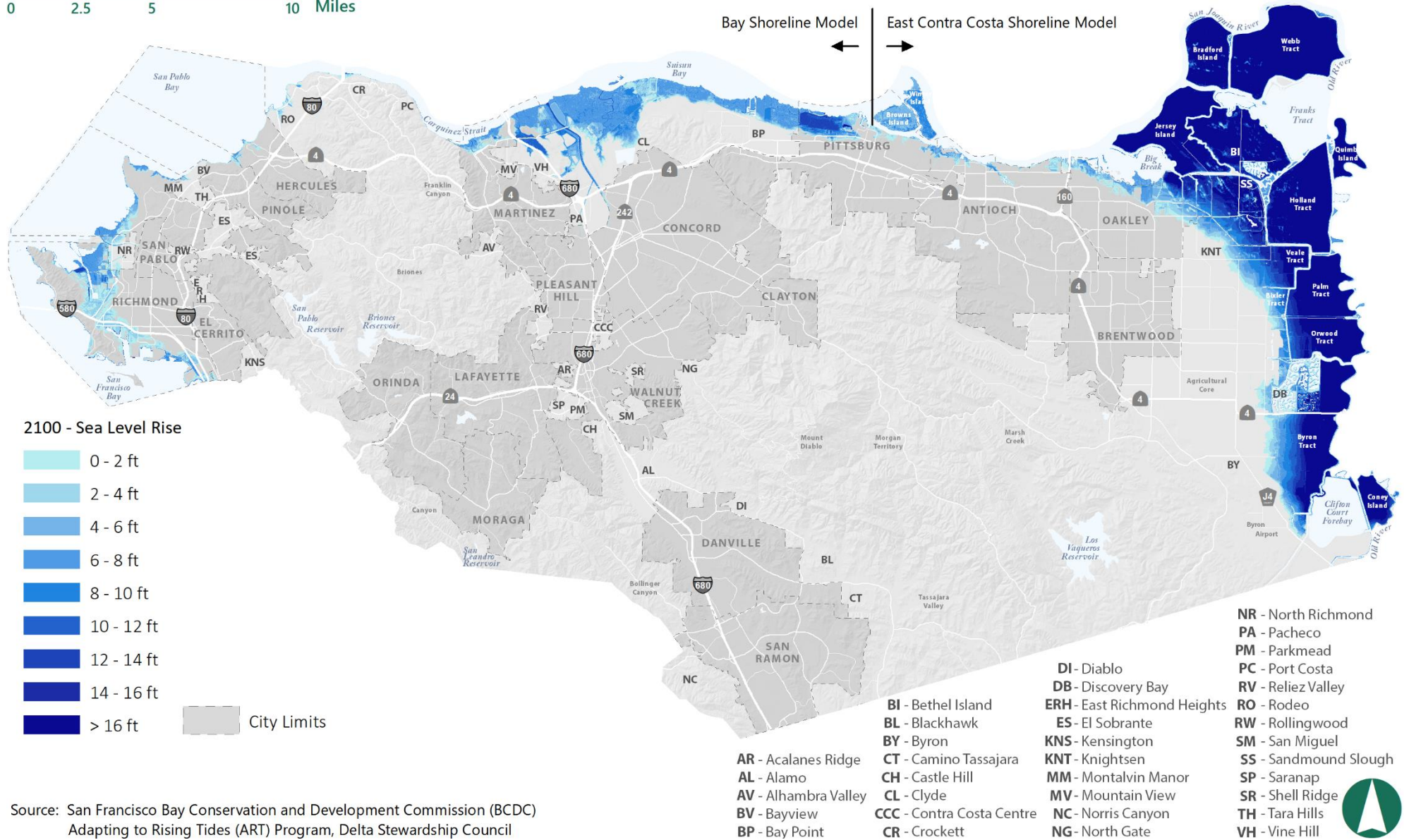


Source: San Francisco Bay Conservation and Development Commission (BCDC)  
 Adapting to Rising Tides (ART) Program, Delta Stewardship Council



**FIGURE HS-8 2100 SEA LEVEL RISE PROJECTION**

0 2.5 5 10 Miles



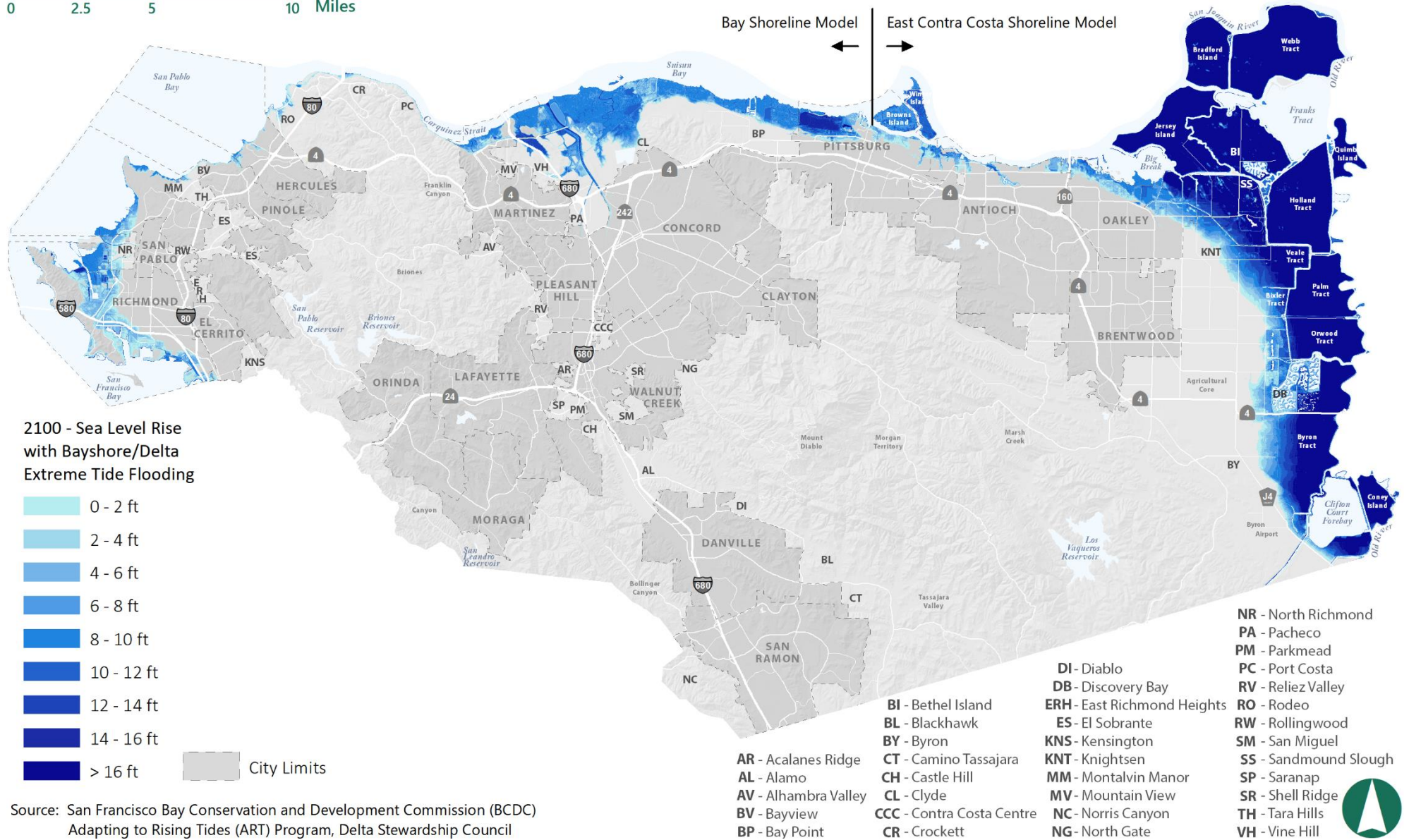
Source: San Francisco Bay Conservation and Development Commission (BCDC)  
 Adapting to Rising Tides (ART) Program, Delta Stewardship Council





FIGURE HS-9 2100 SEA LEVEL RISE PROJECTION WITH BAYSHORE/DELTA FLOODING

0 2.5 5 10 Miles



Source: San Francisco Bay Conservation and Development Commission (BCDC)  
 Adapting to Rising Tides (ART) Program, Delta Stewardship Council



can cause the shoreline to flood more frequently and severely during storms or king tide events. For example, a storm that has a one in five chance of occurring in a given year (known as a five-year storm) can create a temporary increase in sea levels of approximately 2 feet. Because sea level rise will cause ocean levels to be higher during normal conditions, shoreline floods will reach further onto land. Sea level rise projections in 2050 and 2100 with shoreline flooding are shown on Figures HS-7 and HS-9.

Rising seas increase the risk of flooding, storm surge inundation, erosion and shoreline retreat, and wetland loss. Rising sea levels also threaten a significant portion of prime agricultural land in the county, as low-lying areas could be subject to more frequent shoreline flooding and saltwater intrusion into groundwater basins could disrupt agricultural water supplies. Meanwhile, rising tides may increase groundwater levels, inundating contaminated soil and pushing toxins toward the surface. Given that some contaminated sites in Contra Costa County sit near the shoreline, rising groundwater may cause contaminated soils to leach into previously unaffected areas. Natural ecosystems in the Bay and Delta regions will be disrupted by the higher tide levels and intrusion of saltwater into freshwater systems. Historically, marshes have adapted to changes in sea level by building up sediment, increasing the height of the marsh to keep pace with the tide levels of San Francisco Bay, and by moving inland. However, sea level rise is expected to outpace the rate of marsh-level rise and development near wetlands will likely prevent marsh migration. Without substantial intervention, most tidal marshes in Contra Costa County are expected to convert to another habitat type, a process called “downshifting,” which will lead to the establishment of different plant and animal species. Some wetlands may be altered while others are lost. The use of nature-based solutions, which combine natural buffers like wetlands or bluffs with traditional infrastructure to mitigate flooding risks, could be an opportunity to preserve existing ecological communities and protect natural habitats.

The goals, policies, and actions in this section focus on planning for a medium- to high-risk aversion (1-in-200 chance) scenario in 2100, which projects 84 inches of sea level rise by 2100 under State guidance prepared in 2018. This scenario uses a higher level of caution, which helps in planning for more vulnerable developments or populations that will have a harder time adapting to sea level rise and will experience more severe consequences from underestimating it.



*Sea level rise resulting from climate change will inundate marinas over the next century.*

### Goal HS-6

Resilient and thriving Bayshore and Delta communities that are safeguarded and adaptively managed for rising sea levels.

## Policies

### HS-P6.1



Require new development to locate habitable areas of buildings above the highest water level expected, based on Figures HS-6 through HS-9, accounting for sea level rise and other changes in flood conditions, or construct natural and nature-based features, or a levee if necessary, adequately designed to protect the project for its expected life.\*

### HS-P6.2



Support tidal wetland restoration projects in a manner consistent with community needs of flood-risk reduction, habitat and biodiversity conservation, and water quality protection.

### HS-P6.3



Work with transportation agencies and infrastructure owners, such as railroads, to increase the resilience of transportation networks against sea level rise and increases in flooding intensity, including emergent groundwater flooding.

### HS-P6.4

Work with property owners in areas prone to emergent groundwater flooding to pre-emptively harden properties using methods that minimize erosion, subsidence, and structural damage from rising waters.\*

## Actions

### HS-A6.1

Amend the Floodplain Management Ordinance to apply to areas subject to sea level rise under at least a medium-high risk aversion scenario by 2100, in accordance with State and regional guidance.\*

### HS-A6.2



Adopt a Sea Level Rise Overlay Zone with associated land use regulations for site planning and minimum construction elevations that reflects sea level rise data under at least a medium-high risk aversion scenario by 2100. Refer to BCDC policy guidance when developing this overlay zone.

### HS-A6.3



Coordinate with BCDC, Delta Stewardship Council, Caltrans, cities, and other affected agencies, organizations, and stakeholders to prepare and adopt a community-driven countywide sea level rise adaptation and resilience plan addressing increased flooding and sea level rise that provides unique adaptation options for the entire county shoreline and identifies funding mechanisms for implementation. Use Figures HS-6 through HS-9 or the best-available climate science data to identify where sea level rise hazards are likely to occur and lead efforts to:

- (a) Maximize awareness and disclosure to property owners and the public.
- (b) Assess and address impacts to future development, including promoting the Adaptation Pathways model to respond to uncertainty and evolving conditions.



- (c) Plan for resiliency projects and adaptation measures to protect existing development and infrastructure, emphasizing nature-based solutions.
- (d) Partner with the Adapting to Rising Tides Program, property owners, and community-based organizations to conduct a study of opportunities and costs for shifting development away from areas at risk from inundation.
- (e) Inform governance, funding, and financing decisions about short-term and long-term resiliency and adaptation projects.
- (f) Ensure that the disproportionate impacts on vulnerable populations and Impacted Communities are addressed.

#### HS-A6.4



Partner with cities and CCTA to develop and fund a countywide plan to increase the resiliency of roads that will be impacted by sea level rise and tsunamis to ensure emergency responders can get to those in need and that community members, including those that rely on public transit, can continue to reach services.

#### HS-A6.5

Work with State and regional agencies to conduct improved modeling of the areas at risk from emergent groundwater flooding to better understand the threat this hazard poses to Contra Costa County.

#### HS-A6.6

Incorporate Figures HS-6 through HS-9 into the County's geographic information system for use as a publicly accessible tool for tracking flooding and sea level rise.

## WILDFIRE HAZARDS

Wildfires are a regular feature of the landscape in much of California and can be sparked by lightning, malfunctioning equipment, carelessness, and other causes. In addition to direct fire impacts on people and property, wildfires remove stabilizing vegetation from hillsides, increasing the likelihood of future landslides and erosion. When wildfires burn at very high temperatures, soils can become hydrophobic, preventing the ground from absorbing stormwater and causing flooding downslope. Wildfire smoke is also harmful and can impact people hundreds of miles from the fire itself. Particulate matter from smoke can cause respiratory illnesses, especially for those who spend substantial time outdoors during smoky conditions or whose homes are poorly sealed and allow smoke to penetrate.

The California Department of Forestry and Fire Protection (CAL FIRE) designates lands into responsibility areas based on who is financially responsible for fire protection services. Local Responsibility Areas (LRAs) include areas where local fire protection districts and fire departments are charged with fire protection. State Responsibility Areas (SRAs) include unincorporated areas and State lands where the State/CAL FIRE has financial responsibility for fire protection. CAL FIRE can also provide fire protection services by contract to cities and counties. Six fire protection districts and three city fire departments provide fire prevention and protection services that adequately cover the entire county except for Jersey Island, Bradford Island, Quimby Island, Webb Tract, and the Marathon Refinery near Martinez. The Contra Costa County Fire Protection District covers 553 square miles and is by far the largest local fire protection agency serving the county (see Figure PFS-5 in the Public Facilities and Services Element for a map of fire district service areas). All fire protection agencies within the county have signed mutual-aid agreements to provide assistance to neighboring agencies.

Within the responsibility areas, CAL FIRE designates Fire Hazard Severity Zones. CAL FIRE designates lands within SRAs as Moderate, High, and Very High Fire Hazard Severity Zones; in LRAs, at the time the General Plan was adopted, CAL FIRE only designates land within Very High Fire Hazard Severity Zones (with city and county approvals). CAL FIRE is expected to designate Moderate and High Fire Hazard Severity Zones in the LRAs in future updates to the Fire Hazard Severity Zone Maps. As shown in Figure HS-10, Very High Fire Hazard Severity Zones are mainly in the interior of Contra Costa County, in areas with dense forest, brush, or grassland vegetation and steep terrain that is difficult to access. Wildfires may start in natural areas but can easily spread to developed areas bordering wildlands; this area is called the Wildland-Urban Interface (WUI) and is mapped in Figure HS-11.

All Very High Fire Hazard Severity Zones in Contra Costa County are within the service area of a fire protection district. Information about the fire districts' capacities is provided in Appendix B. Fire districts serving rugged, hard to reach areas are usually equipped with tank trucks because such areas typically lack public water infrastructure. Properties designated for residential use in areas without public water service are required to maintain sufficient on-site water storage and new development must show that it has sufficient water pressure for firefighting purposes.

Within the SRAs and Very High Fire Hazard Severity Zones, there are existing homes, businesses, and public land uses, as well as associated infrastructure like major roadways (e.g., SR 24 and SR 4), electrical transmission lines, water and wastewater distribution systems, and communication facilities. Most of this development occurred prior to recent wildfire hazard mapping. The policies and actions in this section limit future residential development in High and Very High Fire Hazard Severity Zones and aim to protect existing buildings and infrastructure. Meanwhile, State law requires that homeowners in the WUI create and maintain defensible space around

homes and other structures, keep roofs clear of flammable material, and use spark arresters on chimneys.



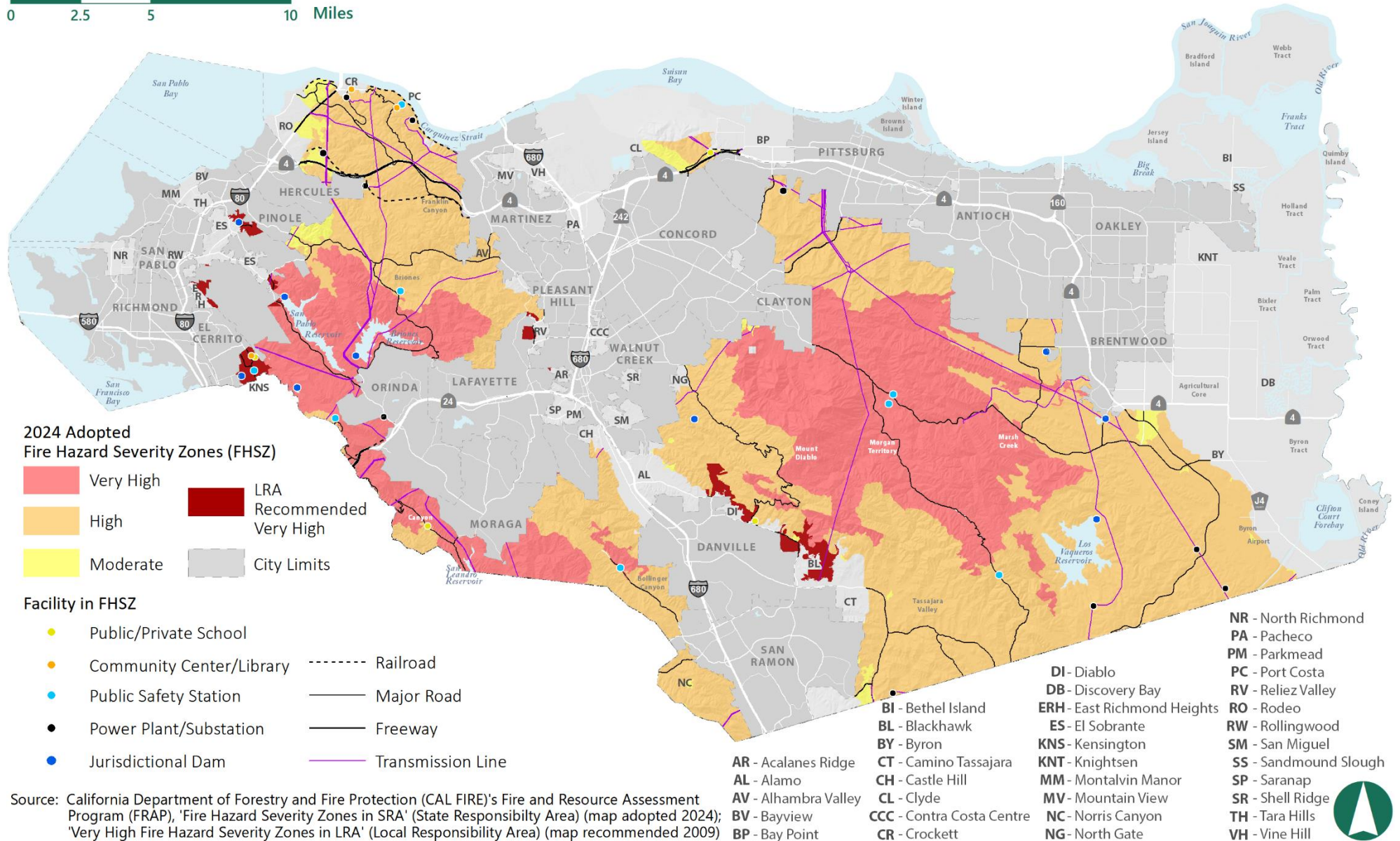
*Wildfires pose risks to residents and their homes and produce smoke that can impact the region. (Credit: University of California)*

From 2010 to 2022, there were 24 wildfires in Contra Costa County, most burning over 100 acres each. Some burned considerably more acreage, most notably the 2020 Santa Clara Unit Complex Fire, which burned 396,824 acres in total (3,305 acres in Contra Costa County). Figure HS-12 shows the perimeters of wildfires from 1950 to 2022. Areas that have previously burned, regardless of their location within or outside of a Fire Hazard Severity Zone, are likely to burn again. Because of climate change, fire activity is projected to increase where development expands in the WUI, in addition to the dry hills around Mount Diablo.



**FIGURE HS-10 FIRE HAZARD SEVERITY ZONES**

0 2.5 5 10 Miles



Source: California Department of Forestry and Fire Protection (CAL FIRE)'s Fire and Resource Assessment Program (FRAP), 'Fire Hazard Severity Zones in SRA' (State Responsibility Area) (map adopted 2024); 'Very High Fire Hazard Severity Zones in LRA' (Local Responsibility Area) (map recommended 2009)

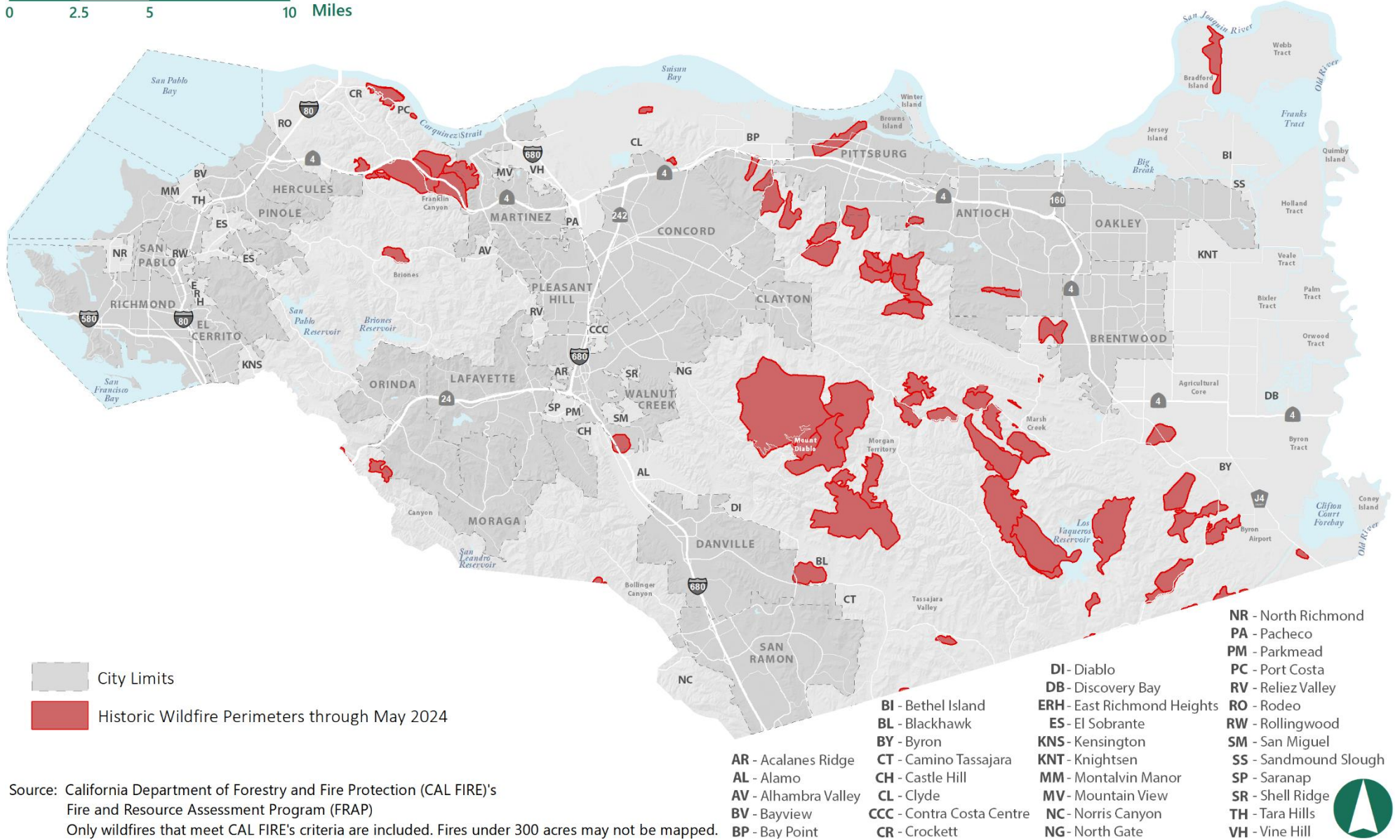






**FIGURE HS-12 HISTORIC WILDFIRE PERIMETERS**

0 2.5 5 10 Miles



Source: California Department of Forestry and Fire Protection (CAL FIRE)'s Fire and Resource Assessment Program (FRAP)  
 Only wildfires that meet CAL FIRE's criteria are included. Fires under 300 acres may not be mapped.





## Goal HS-7

Minimized injury, loss of life, and damage to property from wildfire hazards.

## Policies

### HS-P7.1

Deny entitlements for projects creating additional residential units (i.e., units not allowed by-right) in Very High Fire Hazard Severity Zones in the LRA or SRA. Discourage such projects in High Fire Hazard Severity Zones in the SRA and discourage them in the LRA unless adequate fire protection services are provided.\*

### HS-P7.2

Require any construction of buildings or infrastructure within a High or Very High Fire Hazard Severity Zone in the LRA or SRA, as shown on Figure HS-10, or in areas that may be designated as the WUI to incorporate fire-safe design features that meet the State Fire Safe Regulations and Fire Hazard Reduction Around Buildings and Structures Regulation for road ingress and egress, fire equipment access, and adequate water supply.\*

### HS-P7.3

Require new development within a Very High Fire Hazard Severity Zone in the LRA or SRA (as shown on Figure HS-10) or in areas that may be designated as the WUI, and on a residential parcel with evacuation constraints (as shown on Figure HS-21), to prepare a traffic control plan to ensure that construction equipment or activities do not block roadways

or interfere with evacuation plans during the construction period. Work with the appropriate fire protection district to review and approve the traffic control plan prior to issuance of building permits.\*

### HS-P7.4

Require subdivisions in the High Fire Hazard Severity Zone in the LRA or SRA and projects requiring a land use permit in the High or Very High Fire Hazard Severity Zone in the LRA or SRA, as shown in Figure HS-10, to complete a site-specific fire protection plan. Work with the appropriate fire protection district to review and revise the fire protection plans. The fire protection plan shall include measures for fire-resistant construction materials and modifying fuel loading, as well as a plan to maintain that protection over time. The fire protection plan shall include:

- (a) A risk analysis
- (b) Fire response capabilities
- (c) Defensible space requirements
- (d) Fire safety requirements for infrastructure
- (e) Building ignition resistance
- (f) Mitigation measures and design for non-conforming fuel modification
- (g) Wildfire education
- (h) Maintenance and limitations
- (i) A plan for emergency preparedness, response, and evacuation\*



### **HS-P7.5**

Work with property owners in High or Very High Fire Hazard Severity Zones in the LRA or SRA, or in areas that may be designated as the WUI, to establish and maintain fire breaks and defensible space, vegetation clearance, emergency access roads, water supply and fire flow, signage, and firefighting infrastructure that meet adopted State, County, or community fire safety standards.

### **HS-P7.6**

Coordinate with Caltrans and other agencies, local fire safe councils, and community organizations to ensure long-term maintenance of fire hazard reduction projects, including community fire breaks and public and private road clearance.

### **HS-P7.7**

Promote installation of smoke detectors at the time of sale or lease agreement, and maintenance of smoke detectors in existing residences and commercial facilities that were constructed prior to the requirement for their installation.

### **HS-P7.8**

Work with water service providers and fire protection districts to safeguard the long-term integrity of water supplies to meet firefighting needs and ensure that new and existing developments in high fire risk areas have suitable water delivery infrastructure.

### **HS-P7.9**

Construct critical facilities, such as Office of Emergency Services facilities and other uses on the County's designated critical facilities list, with fire-resistant materials, defensible space, and fire-resistant landscaping that allows them to maintain structural integrity and ensure functional operation

to the greatest extent feasible. Avoid locating these facilities in high fire risk areas to the extent possible.\*

### **HS-P7.10**

Coordinate with energy service providers to underground power lines, especially in the WUI and High and Very High Fire Hazard Severity Zones.

### **HS-P7.11**

Work with energy service providers to ensure an adequate power supply to vulnerable populations during planned power shutoffs.

### **HS-P7.12**

Facilitate post-fire recovery by supporting efforts to stabilize slopes, control erosion, and replant with native species.

### **HS-P7.13**

Support State legislative efforts to reduce fire insurance costs and address resident concerns about rising liabilities and risk of dropped policies.

## **Actions**

### **HS-A7.1**

Work with local fire safe councils, CAL FIRE Santa Clara Unit, and other fire protection agencies to update and implement the *Community Wildfire Protection Plan* for Contra Costa County.\*



### HS-A7.2



Support local fire protection agencies with efforts to seek funding for development and implementation of a continuous vegetation management program in fire hazard severity zones and WUI areas.

### HS-A7.3

Update countywide fire hazard severity zone and WUI mapping as new data becomes available from the California Board of Forestry and Fire Protection.

### HS-A7.4

Upon future updates to LRA mapping, as promulgated by CAL FIRE, identify and as necessary adopt a WUI zone.

### HS-A7.5



Following a large fire, evaluate the feasibility and resilience of redevelopment, and consider changes to building or development standards to improve resilience.

### HS-A7.6

Collaborate with local and regional fire safe councils, CAL FIRE Santa Clara Unit, and other fire protection agencies to develop a fire safe education program to provide information about State fuel modification, defensible space, access, water, signage, and other fire safe regulations.\*

### HS-A7.7



Pursue grants and other funding mechanisms to retrofit ventilation systems at County buildings to provide refuge for residents during periods of unhealthy air quality caused by excessive wildfire smoke.

*See the Public Facilities and Services Element for policies and actions related to fire and emergency services and the Land Use Element for additional policies and actions related to development in hazard areas.*

## EXTREME HEAT

Extreme heat occurs when temperatures rise significantly above normal levels; it is defined as a daytime temperature that exceeds the 90<sup>th</sup> percentile of the historic average temperature for that date. Extreme heat is a relative term, and different temperatures in different parts of Contra Costa County qualify as extreme heat events because people and buildings accustomed to cooler average temperatures may be less prepared for extreme heat events. For example, an extreme heat day in Rodeo is when temperatures reach 93 degrees Fahrenheit (°F), while in Alamo it is 97°F, and in Knightsen it is 102°F.

Extreme heat can cause various heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke. Seniors (particularly those living alone), small children, outdoor workers, people with chronic illnesses, unsheltered persons, persons living in multiple-family housing without air conditioning, and those on certain medications are particularly susceptible to heat illnesses. Nursing homes and elder-care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning or electricity-powered medical devices are not available. In addition, when extreme heat days occur while the air is smokey from wildfires, residents may have to choose between opening windows to cool their homes, letting



in smoke, or keeping windows closed, causing dangerous indoor air temperatures.

Extreme heat has various other impacts. Some types of infrastructure, including power lines, communications equipment, railways, and roadways, are more prone to failure when temperatures are high. An example occurred in Contra Costa County in June 2022, when extreme heat buckled BART tracks causing a derailment. Very high temperatures increase demand for electricity, which can lead to outages and associated health and economic impacts. Extreme heat can also increase the risk of wildfires by drying out plants, exacerbating drought conditions, and harming wildlife that is not adapted to these conditions.



*Extreme heat can exacerbate drought conditions. (Credit: National Park Service)*

Historically, Contra Costa County has experienced an average of four extreme heat days a year. Figure HS-13 displays the projected average annual temperatures for 2070 through 2099. By the end of the century, the county is projected to experience an annual average of 18 to 30 extreme heat days per year.

## Goal HS-8

Communities that can continue to function and thrive with an increase in average temperatures and extreme heat days.

## Policies

### HS-P8.1



Coordinate with public agencies, utilities, and community-based organizations to provide community resilience centers in all regions of the county during extreme heat events, severe weather events, and other highly hazardous conditions. Work to ensure that these facilities are in highly accessible areas and that information about their availability is widely distributed, especially to vulnerable populations.

### HS-P8.2



Work with energy service providers to promote programs encouraging reduced energy use during extreme heat events.

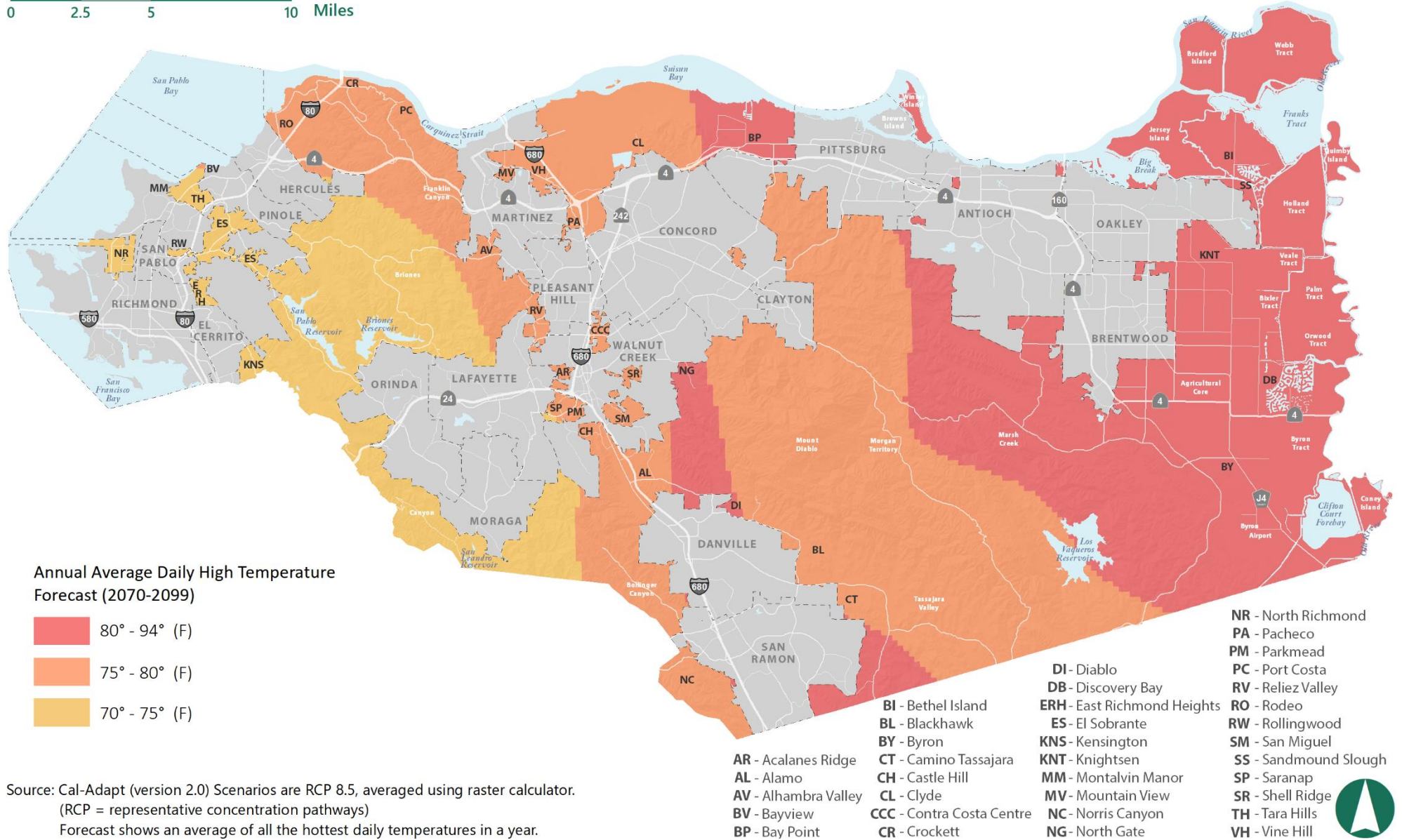
### HS-P8.3



Require new commercial parking lots with 50 or more spaces to mitigate heat gain through installation of shade trees, solar arrays, or other emerging cooling technologies. Prioritize the use of solar arrays where feasible and appropriate.

FIGURE HS-13 TEMPERATURE FORECAST

0 2.5 5 10 Miles



Source: Cal-Adapt (version 2.0) Scenarios are RCP 8.5, averaged using raster calculator. (RCP = representative concentration pathways)  
Forecast shows an average of all the hottest daily temperatures in a year.



### HS-P8.4



Support efforts by East Bay Regional Park District and other local recreation agencies to provide outdoor recreation facilities with adequate shading and refillable water stations where appropriate.

### HS-P8.5



Provide shade trees or shade structures at parks, plazas, and other outdoor spaces.

## Actions

### HS-A8.1



Amend County Ordinance Code Chapter 82-16 – Off-Street Parking to achieve consistency with Policy HS-P8.3.

*See the Air Quality section of this Element and the Conservation, Open Space, and Working Lands Element for additional policies and actions related to tree preservation, planting, and air quality.*

## MANAGEMENT OF HAZARDOUS MATERIALS AND HAZARDOUS WASTE


Heavy industrial uses play a large role in the history of Contra Costa County, particularly along its west and north coasts, where historic and ongoing activities handle, store, and transport vast amounts of hazardous materials and hazardous waste. Land uses involving hazardous materials include Military Ocean Terminal Concord (MOTCO), petroleum and chemical processing plants, oil and gas wells, power plants, ammonia refrigeration facilities, and petroleum product and natural gas storage and pipelines.

Potential hazards include release of flammable materials that could cause an explosion or fire along with smoke and combustion byproducts, and chemical releases with various levels of chemical toxicity. Notwithstanding industrial safety procedures, the presence of hazardous materials in large quantities, especially close to or upwind of populated areas, poses a constant safety hazard.

Hazardous materials and hazardous waste facilities are heavily regulated by the State and federal governments, including the California Department of Toxic Substances Control (DTSC) and the State Water Resources Control Board (SWRCB). Preventing environmental releases of hazardous materials depends primarily on compliance with industrial safety requirements and procedures regulated by the DTSC. The California Fire Code also minimizes public safety risks by requiring a buffer between hazardous materials use areas and residential populations.



*Pipelines transport crude oil through Rodeo and other communities.*



Contra Costa Hazardous Materials Programs (CCHMP) is the Certified Unified Program Agency (CUPA) for all of Contra Costa County. As the CUPA, CCHMP administers the State’s hazardous materials regulatory programs through routine inspections at sites that handle hazardous materials, as well as the County’s Industrial Safety Ordinance and Unannounced Inspection, Green Business, and Pollution Prevention programs.

The County Office of Emergency Services (OES) is responsible for planning, outreach, and training related to disaster management and emergency preparedness. Hazardous materials releases are reported to OES to ensure a coordinated response by County emergency services, such as fire and medical units, and evacuation notification, if needed.

Sites that have been contaminated with hazardous materials or hazardous waste can be remediated to protect human health and the environment. Remediation typically occurs in three stages. In the first phase, the current or prospective property owner performs an environmental assessment in which they review records to determine if the potential exists for exposure to hazardous materials. If potential contamination is discovered, environmental samples are collected and a health risk assessment is prepared. If the assessment identifies significant contamination, DTSC implements Health and Safety Code requirements to perform necessary cleanup activities. DTSC or the SWRCB oversees the assessment and remediation process; the County has no role in cleanup and remediation of contaminated sites, although it is an issue of significant concern to county residents and is typically considered during development review processes.

Reducing community exposure to hazardous materials is crucial in Impacted Communities to address the health disparities caused by exposure to hazardous materials from historic and ongoing activities. As shown in Figures HS-14 through HS-16, there are higher concentrations of toxic releases, hazardous waste generators and facilities, and cleanup sites in and around Impacted Communities than many other parts of the county.

### Goal HS-9

Communities that are protected from hazards associated with use, manufacture, transport, storage, treatment, and disposal of hazardous materials and hazardous waste, including from fossil fuels, chemical refining, and power plants, as well as pipelines, rail lines, and truck transportation.

### Policies

#### HS-P9.1



Provide equitable inspection and enforcement of hazardous material and hazardous waste regulations throughout the county.

#### HS-P9.2

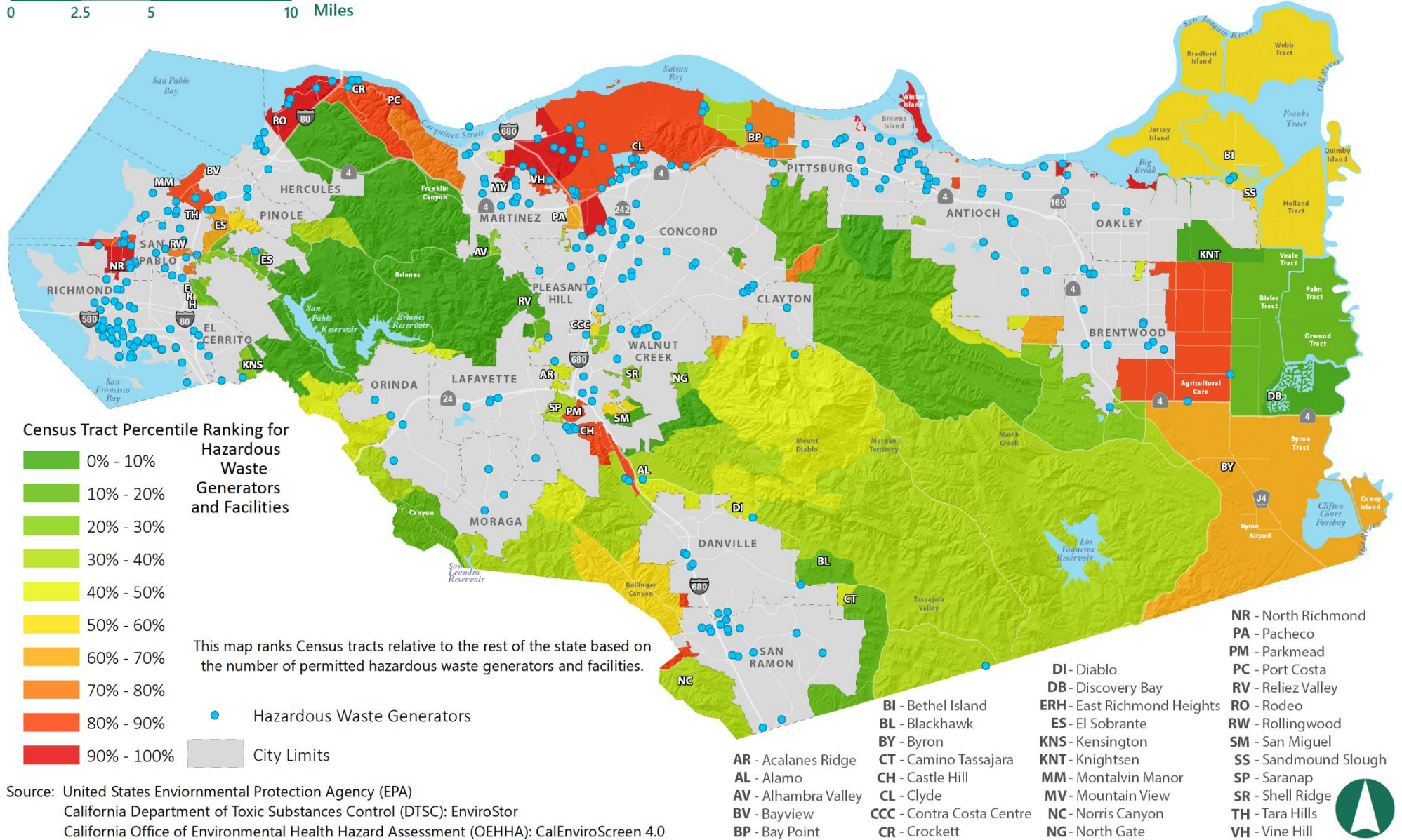
Ensure CCHMP staff have an opportunity to review and comment on all entitlement applications for projects involving use of hazardous materials or hazardous waste regardless of whether a land use permit is required pursuant to County Ordinance Code Chapter 84-63 – Land Use Permits for Development Projects Involving Hazardous Waste or Hazardous Material.





FIGURE HS-15 HAZARDOUS WASTE GENERATORS AND FACILITIES RANKINGS RELATIVE TO THE STATE

0 2.5 5 10 Miles



Source: United States Environmental Protection Agency (EPA)  
 California Department of Toxic Substances Control (DTSC): EnviroStor  
 California Office of Environmental Health Hazard Assessment (OEHHA): CalEnviroScreen 4.0





### HS-P9.3



Require new industrial development to reduce generation and disposal of hazardous materials to the maximum extent feasible by (listed in order of importance):

- (a) Implementing operational source reduction strategies and replacing hazardous materials with less hazardous materials.
- (b) Reducing generation of those wastes not amenable to source reduction or recycling.
- (c) Recovering and recycling the remaining waste for reuse.
- (d) Properly disposing of hazardous wastes and residuals generated from treatment of hazardous waste.\*

### HS-P9.4



Support development of alternative hazardous waste management technologies and methodologies that reduce the relative risk to human health and the environment.

### HS-P9.5



Require industrial projects involving use, management, or generation of hazardous materials or waste, particularly those utilizing stationary or fixed storage tanks, in areas at risk from sea level rise, surface or emergent groundwater flooding, or tsunami to incorporate best management practices to reduce risk and prepare plans for prevention and remediation of hazardous materials/waste releases resulting from inundation. Remediation plans must meet regulatory standards for protection of people and the environment in the event of permanent inundation and include financial assurances to guarantee implementation.\*

### HS-P9.6

Require transport of hazardous materials via the safest available method for each material, avoiding Impacted Communities, populated areas, and areas subject to natural hazards whenever possible.

### HS-P9.7



Prioritize implementation of projects that reduce the risk of hazardous materials transportation accidents along hazardous material transportation corridors in Impacted Communities.

### HS-P9.8



Require applicants for projects that involve hazardous materials or hazardous waste to provide clear information in plain language about potential hazards their projects pose to nearby communities at the beginning of the review process. Review and verify this information, make it available to residents, and encourage project applicants to host at least one community meeting to discuss potential hazards.

### HS-P9.9



Deny entitlements for construction of new large-scale facilities that treat, store, or dispose of hazardous waste from off-site sources and negatively impact Impacted Communities.

### HS-P9.10



Prohibit new hazardous waste facilities in the following areas:

- (a) Watersheds of an existing or planned drinking water reservoir.



- (b) Ecologically significant resource areas.
- (c) Within 200 feet of an active or potentially active fault.
- (d) Within a 100-year floodplain.
- (e) Within a setback distance determined in accordance with DTSC guidance under SB 673, once final.\*



### HS-P9.11

Require design and operation of new or expanded hazardous waste facilities to adhere to the following criteria, as well as the permitting criteria established by the DTSC for vulnerable communities and cumulative impacts pursuant to SB 673, once final:

- (a) Minimize risk to the surrounding area in the case of a hazardous waste accident or spill.
- (b) Ensure spills of waste will not reach the Bay, Delta, streams, creeks, reservoirs, or other bodies of water or environmentally sensitive resources by incorporating buffers as appropriate and/or using engineered structural design features (e.g., spill containment and monitoring devices).
- (c) Avoid known or suspected groundwater recharge areas or areas where residential uses rely on wells. If located in such areas, facilities must provide properly engineered spill containment features, inspection measures, and other environmental protection controls.
- (d) In areas with unstable soils, such as steep slopes and areas subject to liquefaction or subsidence, ensure structural stability through engineered design features.

- (e) Use access roads leading to major transportation routes that:
  - Do not traverse residential neighborhoods.
  - Minimize, buffer, or employ physical barriers to residential frontages.
  - Demonstrate road network safety through road design, construction, accident rates, and traffic flow.
- (f) Minimize noise impacts on the surrounding area.\*



### HS-P9.12

Require hazardous waste facilities to prepare a cumulative risk assessment that analyzes, characterizes, and quantifies the combined risks to human health and the environment from the facility, in combination with other off-site hazardous materials risks. The assessment must consider risks in the absence of actions to control or mitigate a potential release and determine whether buffers or other mitigation is necessary to protect residential uses, immobile populations (e.g., schools, hospitals, behavioral health facilities, convalescent homes, and prisons), other places where people gather, environmentally sensitive resources, and other sensitive areas from adverse emissions or contamination. The assessment must also be guided by DTSC guidance for vulnerable communities and cumulative impacts pursuant to SB 673, once final. Require that project applicants fund the needed technical review for the assessment.\*

### HS-P9.13

Include a condition in entitlements for new and expanded hazardous waste facilities that requires periodic (i.e., every one to three years) permit review to ensure ongoing compliance with conditions of approval.

### HS-P9.14



Encourage and facilitate establishment of adequate sites for collection of household hazardous waste (HHW), unused pharmaceuticals, and universal wastes, along with provisions for residents who are physically unable to deliver materials to a collection site.

## Actions

### HS-A9.1



Provide technical assistance to hazardous waste generators to encourage them to reduce their hazardous waste to the maximum extent feasible.

### HS-A9.2



Update the Oil Spill Contingency Plan to protect the Bay and Delta shoreline areas in the event of an oil or other hazardous materials spill.

### HS-A9.3



Provide information to county residents about less toxic alternatives to household products containing universal wastes and the safe handling, storage, and disposal of such products, including pharmaceuticals.

## Goal HS-10

Communities that are protected from the impacts of historical hazardous waste releases.

## Policies

### HS-P10.1



Coordinate with other agencies in efforts to remediate or treat contaminated surface water, groundwater, and soils in or affecting Impacted Communities.

### HS-P10.2



Require development of contaminated sites to comply with all clean-up plans, land use covenants, and deed restrictions imposed by the DTSC or Regional Water Quality Control Board (RWQCB).\*

### HS-P10.3



Require new, modified, or expanded industrial uses involving hazardous materials or wastes to provide sufficient funds, in the form of a financial instrument acceptable to the County, to guarantee site remediation, including removal of facilities, equipment, and structures, and ensure community safety and site reusability.



## Actions

### HS-A10.1



Support public access to the inventory of contaminated sites published by the DTSC and SWRCB by posting links to this information on the County's website.

## SEISMIC AND GEOLOGIC HAZARDS

Contra Costa County is in a region of high seismicity. Underlying California are two tectonic plates, the Pacific Plate and North American Plate. Their primary boundary is the San Andreas Fault, which runs most of the length of the state. These plates move past each other at a rate of about two inches per year. Friction occasionally causes the plates to become stuck, resulting in stress and stored energy deep below Earth's surface. When the plates inevitably break loose, the stored energy is suddenly released in the form of an earthquake. Several significant (i.e., stronger than magnitude 5.0) earthquakes have impacted the county, including the 1906 San Francisco earthquake (magnitude 7.8), 1989 Loma Prieta earthquake (magnitude 6.9), and 2014 South Napa earthquake (magnitude 6.0).

Many smaller, active faults exist within the San Andreas Fault Zone. Faults are commonly considered "active" when they have ruptured the ground surface or otherwise produced evidence of seismic activity within the last 10,000 years, while "potentially active" faults are those formed during approximately the last 2 to 3 million years. There are five major active faults running through the county:

- Calaveras (North Central) Fault
- Concord-Green Valley Fault
- Greenville Fault

- Hayward Fault
- Mount Diablo Fault

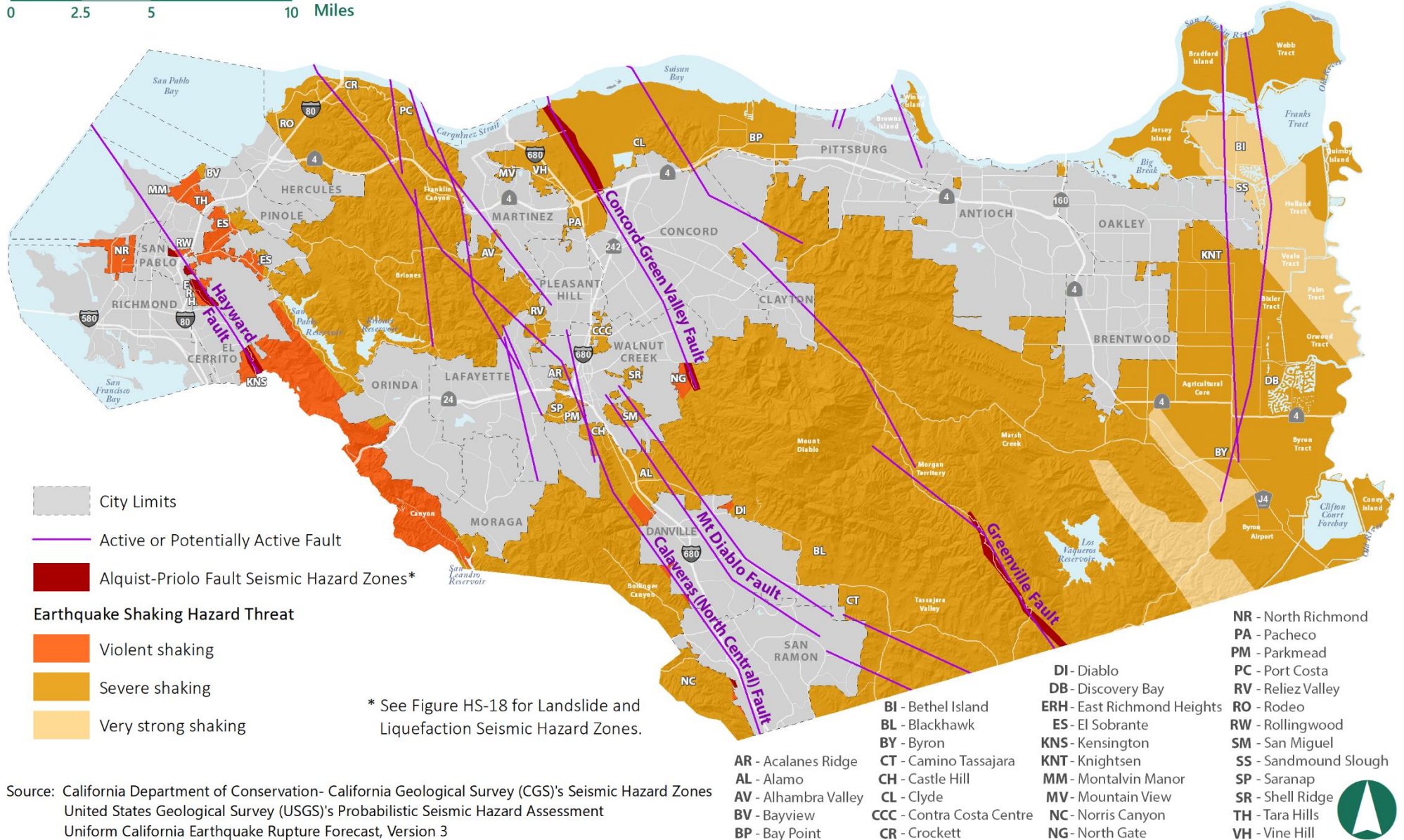
Movement on any of these faults or other fault lines in the region could cause earthquakes and fault rupture. The Hayward Fault is particularly concerning, as it runs beneath densely populated sections of Contra Costa and Alameda Counties. A significant earthquake on the Hayward Fault is predicted to result in catastrophic damage to buildings and infrastructure and substantial loss of life.

The Alquist-Priolo Earthquake Fault Zoning Act is a State law enacted in 1972 that limits development along active faults in areas known as "Alquist-Priolo Fault Zones." The Alquist-Priolo Fault Zones are areas around active faults that are known to cause surface rupture, meaning that the surface of the ground is "pulled apart" during seismic activity. Structures within these zones are subject to specific building codes and regulations to ensure they can withstand the effects of earthquakes, as surface rupture can seriously damage buildings and other structures built on top of the fault. Figure HS-17 shows active and potentially active faults, Alquist-Priolo Fault Zones, and anticipated shaking levels based on State modeling data.

Earthquakes have secondary effects as well. One of these is liquefaction, which occurs when sandy or silty soil materials become saturated during ground shaking, losing strength, causing the ground to liquefy. This can rupture pipelines, buckle roads and railroad tracks, and damage or destroy building foundations. Figure HS-18a shows the susceptibility of land to liquefaction. Areas along the Bay shoreline and in the Delta are most susceptible. As explained in the Flood Hazards and Sea Level Rise section of this Element, earthquakes can also cause tsunami and seiche.

FIGURE HS-17 EARTHQUAKE HAZARDS

0 2.5 5 10 Miles



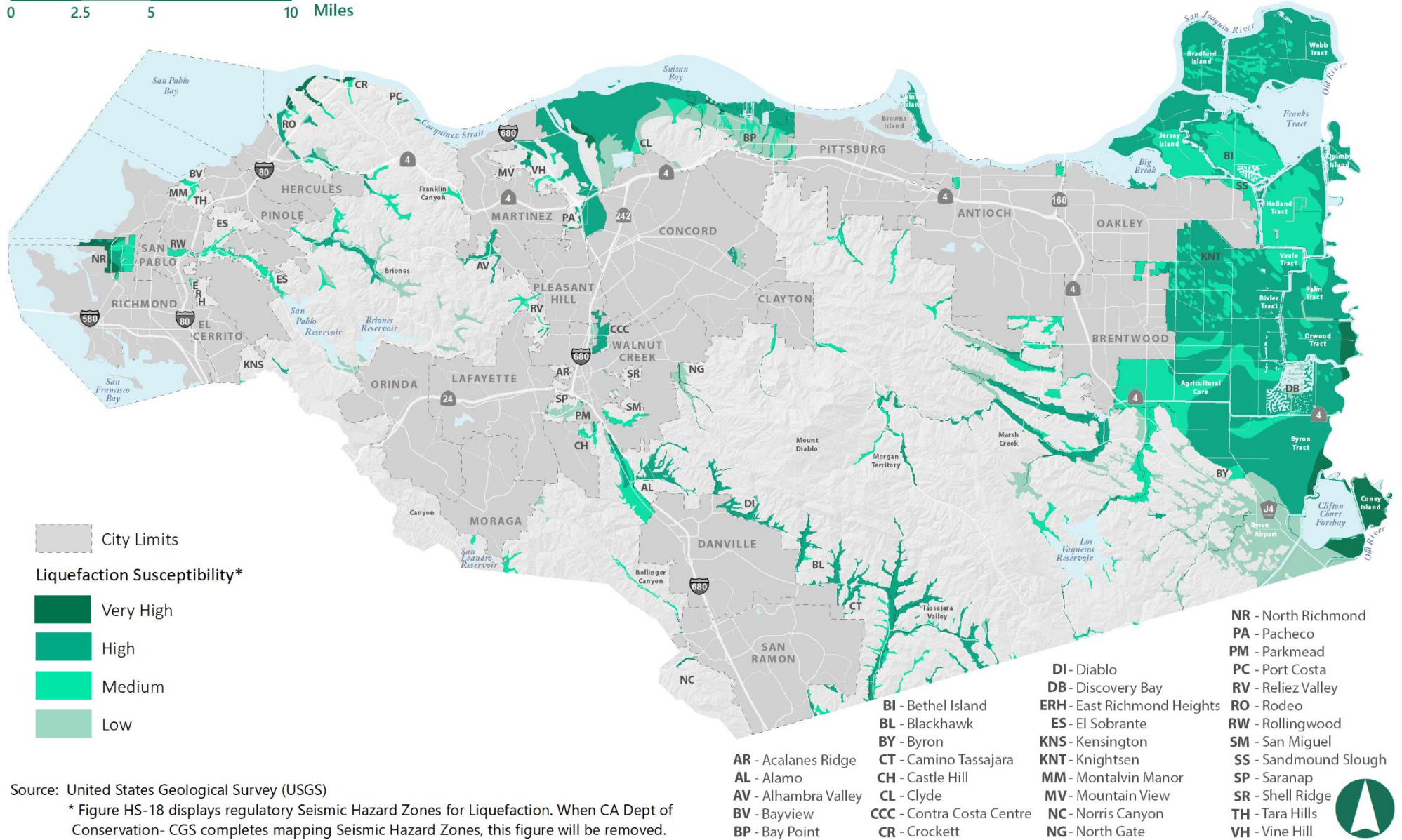
Source: California Department of Conservation- California Geological Survey (CGS)'s Seismic Hazard Zones  
 United States Geological Survey (USGS)'s Probabilistic Seismic Hazard Assessment  
 Uniform California Earthquake Rupture Forecast, Version 3





FIGURE HS-18A LIQUEFACTION SUSCEPTIBILITY

0 2.5 5 10 Miles



Source: United States Geological Survey (USGS)

\* Figure HS-18 displays regulatory Seismic Hazard Zones for Liquefaction. When CA Dept of Conservation- CGS completes mapping Seismic Hazard Zones, this figure will be removed.



Other geologic hazards are landslides and erosion, which can occur gradually and continuously or very suddenly, often with disastrous results. In Contra Costa County, landslides are usually triggered by heavy rain, so the potential for landslides largely coincides with severe storms that saturate steep, loose soils. Earthquakes can also trigger landslides, with upland areas in Contra Costa County being highly susceptible, as shown in Figure HS-18b. Erosion, or the geological process in which earthen materials are worn away and transported by natural forces like water or wind, causes the soil to deteriorate. Highly erosive soils can damage roads, bridges, buildings, and other structures.

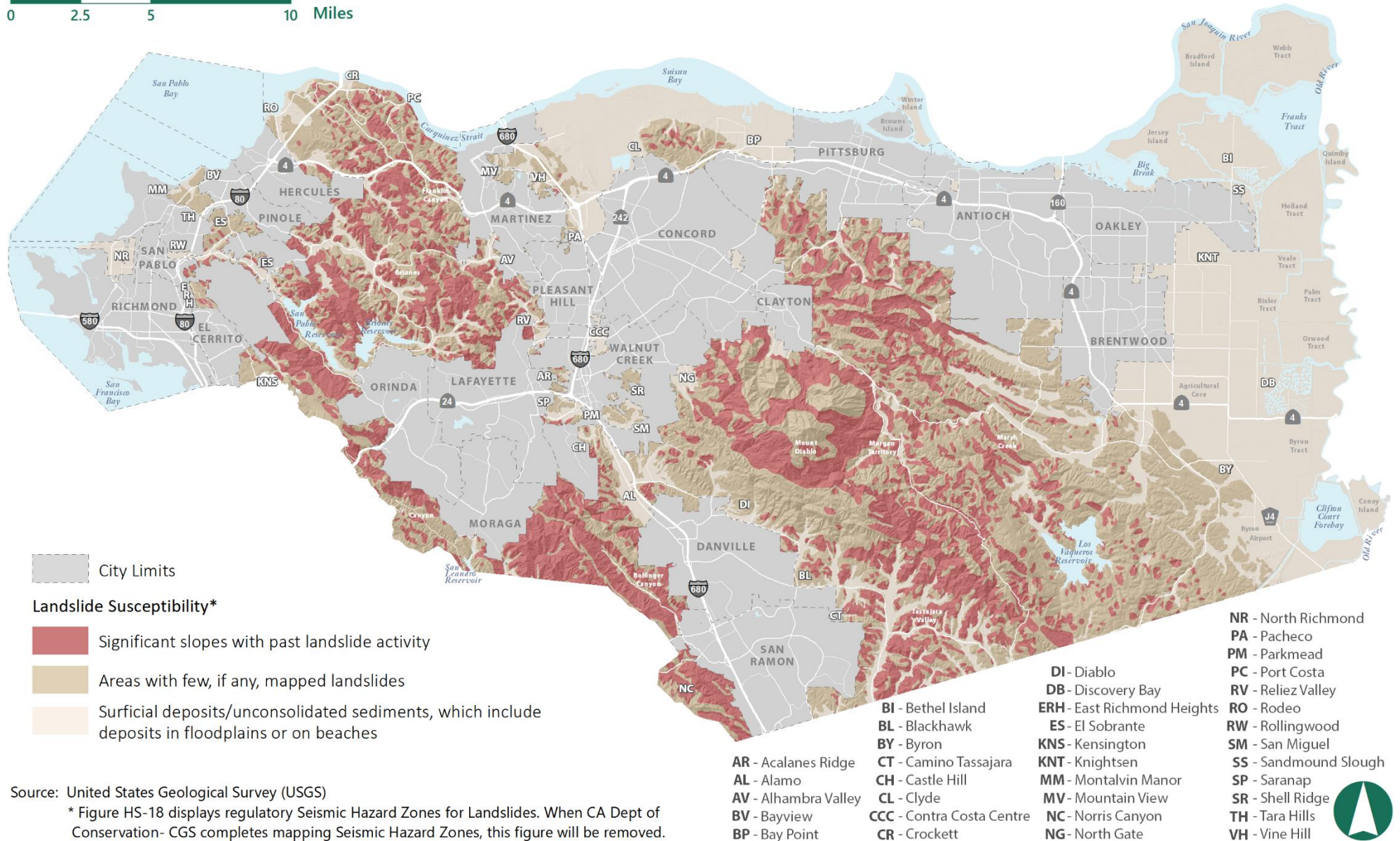
Liquefaction and landslide threats are addressed by the Seismic Hazard Zone (SHZ) Mapping Act of 1990, which closely resembles the Alquist-Priolo Act. The SHZ Act authorizes the California Geologic Survey to delineate seismic hazard zones (lands subject to lateral or vertical displacement under conditions of strong earthquake ground shaking) and provide guidelines and regulations for evaluating adverse conditions. Projects located in a SHZ, as shown on Figure HS-18, must conduct an investigation performed by a licensed geotechnical engineer or engineering geologist. When adverse conditions are confirmed present, effective mitigation must be provided to control/avoid the damage potential. Virtually all development applications that would lead to construction of buildings for human occupancy (i.e., rezonings, subdivisions, land use permits, development plans, building permits) are subject to the provisions of the SHZ Act.



*Earthquakes can cause significant damage, especially to buildings that do not meet modern seismic safety standards.*

**FIGURE HS-18B LANDSLIDE HAZARDS**

0 2.5 5 10 Miles



Source: United States Geological Survey (USGS)  
 \* Figure HS-18 displays regulatory Seismic Hazard Zones for Landslides. When CA Dept of Conservation- CGS completes mapping Seismic Hazard Zones, this figure will be removed.



## Goal HS-11

Communities and infrastructure that are protected from seismic and geologic hazards, including severe ground shaking, fault rupture, liquefaction, landslides, and unstable slopes.

## Policies

### HS-P11.1

For projects in Alquist-Priolo Earthquake Fault Zones or Seismic Hazard Zones (areas considered to be at risk of earthquake triggered liquefaction or landslide displacement) delineated by the California Geological Survey, as well as any other areas of steep slopes or areas of suspected ground failure known to the County, require submittal of appropriately detailed engineering geologic or geotechnical investigations. The reports must be compliant with State Guidelines and include:

- (a) A map showing the outline of any geologic or potentially hazardous soil condition and areas subject to inundation.
- (b) Recommended means of mitigation of any adverse condition representing a hazard to improvements.
- (c) Recommendations to assure proper implementation of mitigation measures during construction.\*

### HS-P11.2

Prohibit construction of buildings intended for human occupancy in areas where seismic and other geologic hazards (e.g., landslides, liquefaction, and fault lines) cannot be adequately mitigated.\*

### HS-P11.3

Discourage construction of critical facilities and buildings intended for human occupancy in Alquist-Priolo Fault Zones and encourage earthquake retrofitting where such development already exists. If there is no feasible alternative to siting critical facilities and buildings intended for human occupancy in the Fault Zones, buildings must be sited, designed, and constructed to withstand the anticipated seismic stresses.\*

### HS-P11.4

Refer geotechnical and engineering geologic reports to the County Peer Review Geologist for evaluation of their adequacy, as required by State Law for projects in State-designated hazard zones. Reports deemed inadequate will require further engineering analysis and revision until the findings/opinions of the Peer Review Geologist have been addressed to the County's satisfaction.

### HS-P11.5

Discourage development on slopes exceeding 15 percent, and prohibit development on slopes of 26 percent or greater, to avoid slope instability, unnecessary grading, and extensive land disturbance, and facilitate long-term control of erosion and sedimentation. Exceptions may be considered for infrastructure projects and development on existing legal lots where no other feasible building sites exist.



### HS-P11.6

Require projects to form a Geologic Hazard Abatement District (GHAD) or join an existing GHAD whenever necessary to adequately mitigate anticipated or residual geologic hazards.

### HS-P11.7

Do not accept public road dedications or allow construction of private roads on unstable hillsides or in landslide hazard areas unless potential hazards have been mitigated to the County's satisfaction. All private roads constructed in such areas must be fully compliant with private road standards adopted by the County and fire protection district with jurisdiction.\*

*See the Land Use Element for additional policies and actions related to development in hazard areas.*

## EMERGENCY PREPAREDNESS, RESPONSE, AND EVACUATION ROUTES

### Preparedness, Response, and Recovery

Contra Costa County is committed to preservation of life, property, and the environment during emergencies. The County prepared the most recent Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 and the Federal Emergency Management Agency's (FEMA) LHMP policy guidance. The County collaborated with local agencies, including 16 incorporated cities and towns and 25 special districts in the Contra Costa County planning area, to prepare the LHMP. Contra Costa County's LHMP process is one where hazards are identified and profiled, the people and facilities at risk are analyzed, and

mitigation actions are developed to reduce or eliminate hazard risk. Implementation of these mitigation actions, which include short- and long-term strategies, involves planning, policy changes, programs, projects, and other activities. Local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance.

The LHMP and Health and Safety Element address similar issues, but the Health and Safety Element provides a higher-level framework and set of policies that pertain to the long-term safety of the county, while the LHMP focuses on more specific mitigation actions to enable jurisdictions to better protect lives, property, and natural systems. The LHMP, certified by FEMA, is incorporated into the Health and Safety Element by reference, as permitted by California Government Code Section 65302.6, and can be accessed at [www.contracosta.ca.gov/6415/Local-Hazard-Mitigation-Plan](http://www.contracosta.ca.gov/6415/Local-Hazard-Mitigation-Plan).

Multiple agencies within the county, along with State and federal agencies, are involved with emergency preparedness and response. The County has adopted the State of California Emergency Plan issued by the Governor's Office of Emergency Services (CAL OES). The State Plan outlines ways to prepare for and respond to various disasters, such as earthquakes, floods, and fires, and specifies which State-level department will be responsible for recovery efforts. Contra Costa County also participates in the California Disaster and Civil Defense Master Mutual-Aid Agreement, under which the State and local governments will work together to respond to emergencies. CAL OES Coastal Region (Mutual Aid Region II) serves the counties on the coast from Del Norte to Monterey and the counties surrounding San Francisco Bay.

The County has its own Emergency Operations Plan developed by the Sheriff's Office of Emergency Services in collaboration with emergency management partners (fire districts, law enforcement agencies, etc.), and has prepared additional plans addressing earthquake response, disaster debris



management, and airport emergencies. The County also maintains the Emergency Operations Center, which is activated as needed to communicate with emergency management partners and coordinate responses to incidents. In addition, the County and many of the incorporated cities offer Community Emergency Response Team (CERT) training to help residents be prepared for disasters. The intent of these plans and actions is to proactively safeguard life, property, and the environment, facilitate effective emergency response, and accelerate recovery when disasters happen.

### Goal HS-12

Communities and local economies that continue to function during all hazards and have coordinated and effective response and recovery procedures.



The County's Emergency Operations Center monitors hazardous events as they unfold and coordinates the response.

## Policies

### HS-P12.1

Continue implementing the *Contra Costa County Local Hazard Mitigation Plan*, which was adopted by the Board of Supervisors and certified by FEMA and is incorporated by reference into this Health and Safety Element.

### HS-P12.2

Locate facilities and uses on the County's designated critical facilities list outside of identified hazard areas whenever possible, accounting for how climate change may increase frequency and intensity of hazards. If critical facilities must be in hazard areas, ensure these facilities and their access routes are protected from the hazard risks inherent to each location.\*

### HS-P12.3



Coordinate with cities, school districts, recreation and park districts, and community-based organizations to ensure adequate emergency shelters, community resilience centers, and alternate care sites are available when natural disasters and other highly hazardous conditions, such as industrial accidents, occur.

### HS-P12.4



Ensure there are adequate identified locations for alternate care sites, especially in Impacted Communities.

### HS-P12.5

Ensure the designs for new and significantly renovated community-oriented County facilities allow for flexible uses and support multiple community purposes, including being used as community resilience centers.

### HS-P12.6

Support residents' ability to safely shelter-in-place, with appropriate air exchange rates and protection from contaminants.

## Actions

### HS-A12.1

Update the *Contra Costa County Local Hazard Mitigation Plan* as necessary to remain compliant with State and federal laws and reflect changing climate conditions.

### HS-A12.2

Incorporate the assessments and projections for future emergency service needs from the most recent Municipal Services Reviews into updates of the *Contra Costa County Local Hazard Mitigation Plan*.

### HS-A12.3

At least once every eight years, evaluate the effectiveness of and update the public safety, preparedness, and hazard mitigation policies in this Health and Safety Element, with consideration given to changing climate conditions.

### HS-A12.4

Identify and, as feasible, retrofit critical County-owned buildings and facilities in areas prone to flooding (including sea level rise and emergent flooding), seismic hazards, landslides and debris flows, tsunamis, or wildfires to maximize defensible space and outdoor fireproofing, improve drainage systems, stabilize nearby slopes, and take other actions as appropriate to minimize the hazard.

### HS-A12.5



Identify and map existing community facilities, such as libraries, gymnasiums, community centers, and auditoriums, that can serve as community resilience centers and support people with access and functional needs during hazard events. Work with the owners of these facilities to identify and implement upgrades, prioritizing facilities in Impacted Communities.

### HS-A12.6



Establish standardized triggers (temperature, air quality, etc.) for opening County-operated community resilience centers.

### HS-A12.7



Conduct a comprehensive energy resilience needs assessment for critical County facilities and pursue funding opportunities to meet identified needs.

### HS-A12.8

Install backup power and water resources at critical County facilities, emergency shelters, community resilience centers, and cooling centers.\*



### HS-A12.9



Coordinate with transit providers to identify and advertise ways for individuals with restricted mobility to reach resilience centers, cooling centers, and alternate care sites.

### HS-A12.10

Partner with community-based organizations, homeowners associations, and neighborhood groups to communicate with community members about human-caused, natural, and climate change-induced hazards, how to prepare for them, and what to do when a shelter-in-place or evacuation order is issued. Make this information widely available in various formats and languages to all community members, with special effort aimed at reaching unsheltered people and people with special access and functional needs.

### HS-A12.11

Continue to provide alerts about developing and ongoing emergency situations in languages and formats appropriate to affected county residents through the Joint Information Center.

### HS-A12.12

Continue providing CERT training programs and encourage the Contra Costa CERT Coalition to provide updated training on hazards and related risks identified in the Contra Costa County Vulnerability Assessment or the best-available climate science data.

## Evacuation Routes and Plans

With advanced warning, evacuation can be effective in reducing injury and loss of life during a catastrophic event. Figure HS-19 shows the evacuation routes throughout the county, which include highways and major surface streets. Preferred evacuation routes during any individual evacuation order will depend on the characteristics of the emergency. Contra Costa County has identified evacuation zones to support efficient communication with community members regarding evacuation warnings and orders.

Some parts of the county face evacuation constraints, particularly those far from major roadways. Some areas have only one viable evacuation route, which could be disastrous if it becomes blocked or congested. State law requires counties to identify evacuation constraints in hazard-prone residential areas. Figure HS-20 maps residential parcels with evacuation constraints. All areas identified are more than a half-mile from a major roadway and/or have access to only one emergency evacuation route. In most cases it is not feasible to retrofit existing neighborhoods to eliminate physical evacuation constraints such as lack of evacuation routes or insufficient roadway capacity. The County will nonetheless strive to improve peoples' ability to evacuate from these constrained areas.

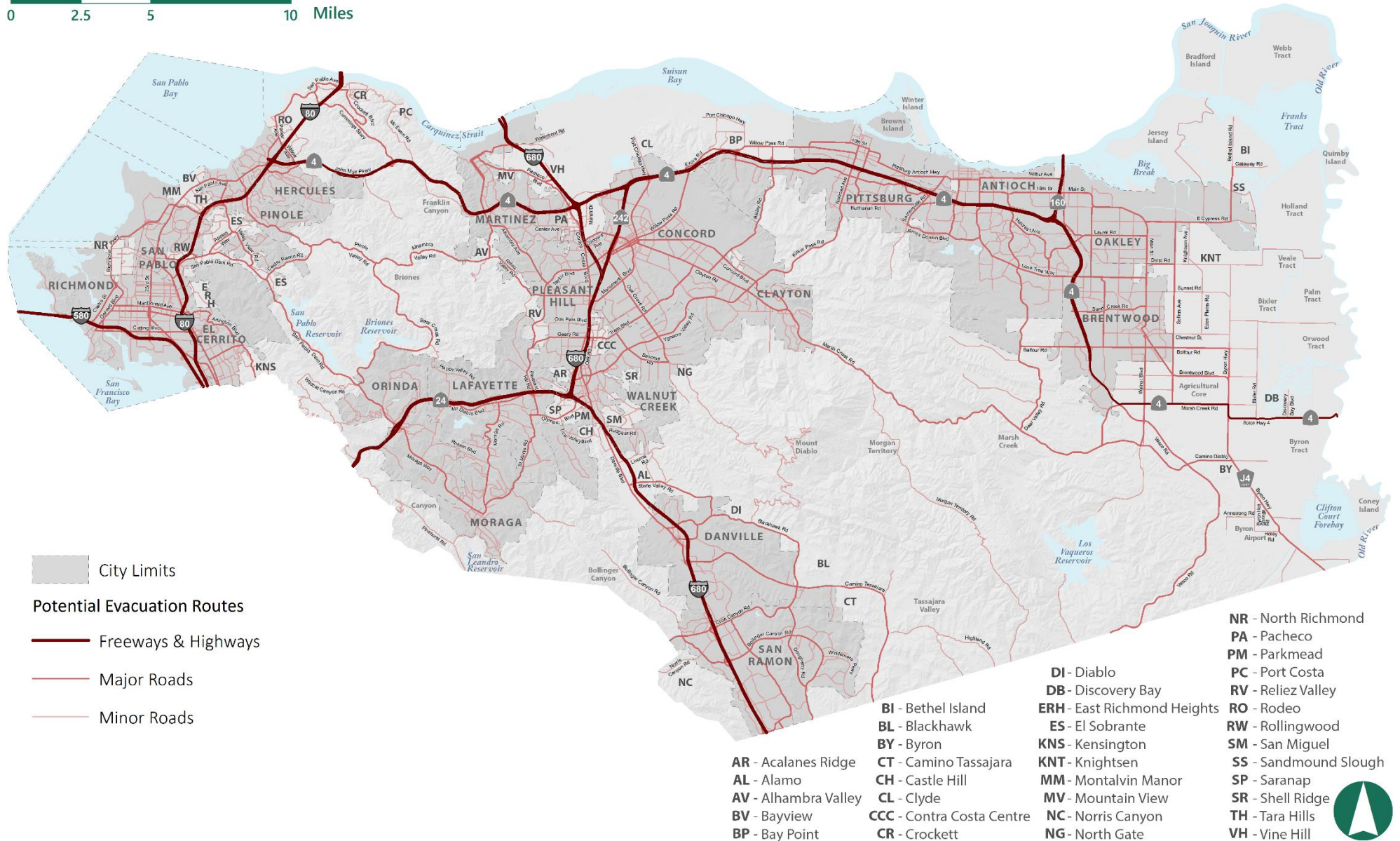
### Goal HS-13

Effective evacuation capacity and capabilities throughout the county in response to emergencies and major hazards of concern.



FIGURE HS-19 EVACUATION ROUTES

0 2.5 5 10 Miles



City Limits

- Potential Evacuation Routes
- Freeways & Highways
  - Major Roads
  - Minor Roads

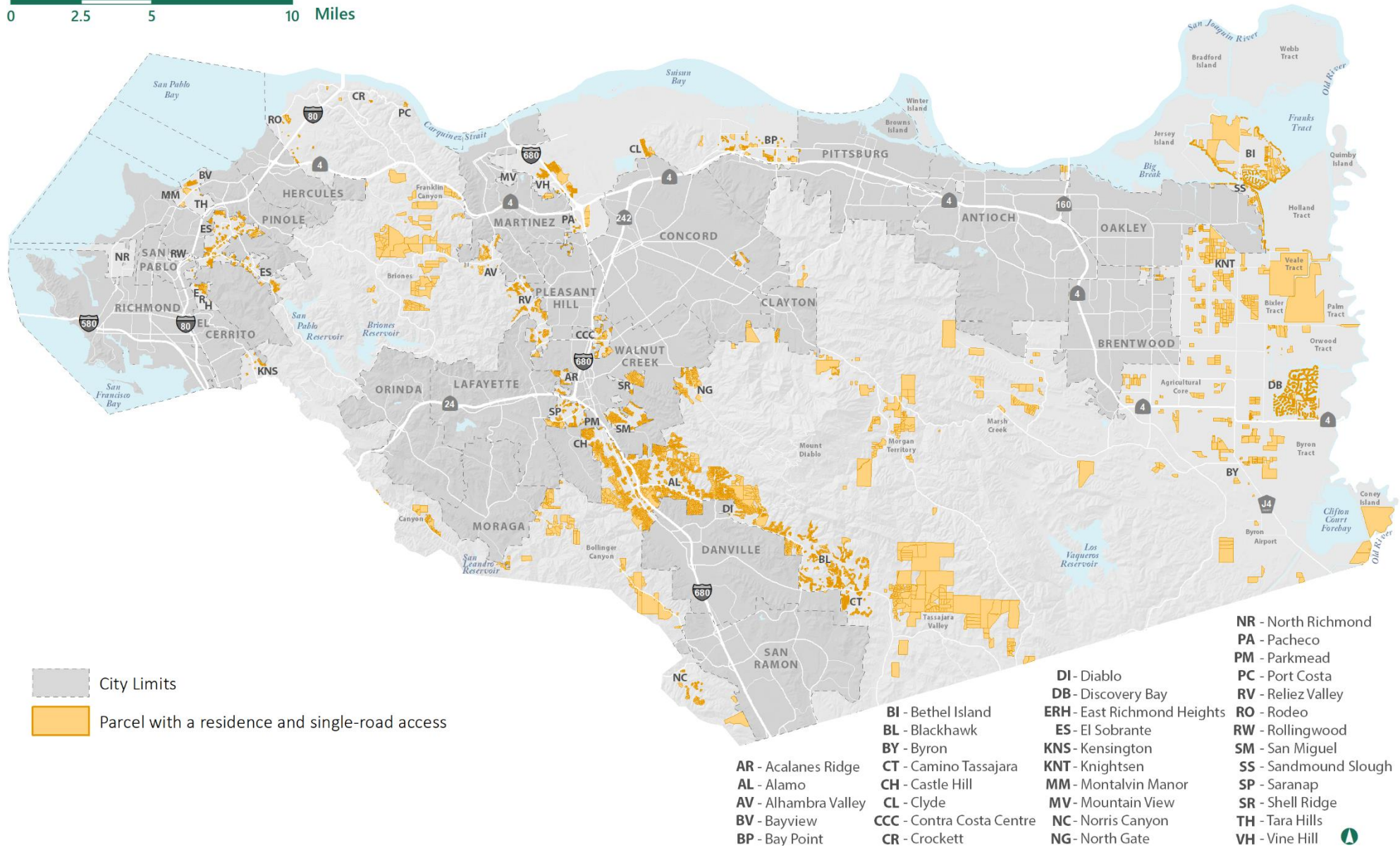
- AR - Acalanes Ridge
- AL - Alamo
- AV - Alhambra Valley
- BV - Bayview
- BP - Bay Point
- BI - Bethel Island
- BL - Blackhawk
- BY - Byron
- CT - Camino Tassajara
- DI - Diablo
- DB - Discovery Bay
- ERH - East Richmond Heights
- ES - El Sobrante
- KNS - Kensington
- KNT - Knightsen
- MM - Montalvin Manor
- MV - Mountain View
- CCC - Contra Costa Centre
- CR - Crockett
- NC - Norris Canyon
- NG - North Gate
- NR - North Richmond
- PA - Pacheco
- PM - Parkmead
- PC - Port Costa
- RV - Reliez Valley
- RO - Rodeo
- ES - El Sobrante
- RW - Rollingwood
- SM - San Miguel
- SP - Saranap
- SR - Shell Ridge
- TH - Tara Hills
- VH - Vine Hill
- DI - Diablo
- DB - Discovery Bay
- ERH - East Richmond Heights
- ES - El Sobrante
- KNS - Kensington
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- SM - San Miguel
- SP - Saranap
- SR - Shell Ridge
- TH - Tara Hills
- VH - Vine Hill





**FIGURE HS-20 SINGLE-ACCESS ROAD RESIDENTIAL AREAS**

0 2.5 5 10 Miles





## Policies

### HS-P13.1

Except for infill sites, require new development in High and Very High Fire Hazard Severity Zones, the WUI, and 100-year or 200-year floodplains to have access to at least two emergency evacuation routes, and encourage the same for existing development.\*

### HS-P13.2

Coordinate with transit agencies and community service and faith-based organizations to assist with evacuation efforts and ensure that evacuation services are made available to vulnerable people, including those with limited English proficiency or limited access to transportation, communication, and other lifeline resources and services.

## Actions

### HS-A13.1

Partner with cities and public protection agencies to delineate evacuation routes, identifying their capacity, safety, and viability under different hazard scenarios, as well as emergency vehicle routes for disaster response, and where possible, alternate routes where congestion or road failure might reasonably be expected to occur. Update as new information and technologies become available.

### HS-A13.2

At least once every five years, update maps identifying neighborhoods with only one emergency evacuation route.\*

### HS-A13.3

Coordinate with local fire districts to develop and maintain minimum roadway, ingress, and egress standards for evacuation of residential areas in Very High Fire Hazard Severity Zones.\*

### HS-A13.4

Develop an evacuation education program to help inform community members about the Contra Costa County Community Warning System and recommended approaches to evacuation.

*See the Public Facilities and Services Element for policies and actions related to emergency medical services.*

## NOISE AND VIBRATION

Sounds are disturbances created by a vibrating object, transmitted by pressure waves, that are capable of being detected by a human ear or microphone. Noise includes sounds that are unpleasant or unwanted. Like noise, vibration is transmitted in waves, but through the earth or solid objects. Unlike noise, vibration is typically felt rather than heard. Vibration can be natural, such as from earthquakes or landslides, or human-caused, such as from machinery or trains.

Noise and vibration can significantly impact peoples' lives. Depending on their source and intensity, noise and vibration can be painful, interrupt sleep, cause distraction or confusion, and physically damage the inner ear. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA (i.e., the A-weighted sound level, which correlates to how the human ear perceives sound). Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure, functions of the heart, and



the nervous system. Extended periods of noise exposure above 90 dBA can result in permanent hearing damage. When the noise level reaches 120 dBA, even short-term exposure causes a tickling sensation in the ear, called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation becomes painful, called the threshold of pain. Table HS-2 shows typical noise levels from familiar noise sources.

Some types of noise and vibration, such as from construction and maintenance activities, are temporary. While these types of noise and vibration can be long-term, they will end with completion of the activity. Other types of noise and vibration are permanent, including from mobile sources such as cars, trains, and planes, and stationary sources, like continual noise from machinery at an industrial site. These sources require the County to ensure that certain land uses, especially "sensitive receptors" like homes and schools, are not brought too close to the permanent source of noise and vibration without incorporating reduction measures like thicker walls and windows.

State law requires general plans to use the Community Noise Equivalent Level (CNEL) or the Day/Night Average Sound Level (DNL) to describe the community noise environment (in decibels, "dB") and its effects on the population. Contra Costa County land use compatibility standards for noise are shown in Table HS-3, and the future 2045 roadway noise conditions are depicted graphically on Figure HS-21.

**TABLE HS-2 TYPICAL A-WEIGHTED SOUND LEVELS**

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment
Near Jet Engine	140	Deafening
Civil Defense Siren	130	Threshold of pain
Hard Rock Band	120	Threshold of feeling
Accelerating Motorcycle at a Few Feet Away	110	Very loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very loud
Ambulance Siren; Food Blender	95	Very loud
Garbage Disposal	90	Very loud
Freight Cars; Living Room Music	85	Loud
Pneumatic Drill; Vacuum Cleaner	80	Loud
Busy Restaurant	75	Moderately loud
Near Freeway Auto Traffic	70	Moderately loud
Average Office	60	Moderate
Suburban Street	55	Moderate
Light Traffic; Soft Radio Music in Apartment	50	Quiet
Large Transformer	45	Quiet
Average Residence Without Stereo Playing	40	Faint
Soft Whisper	30	Faint
Rustling Leaves	20	Very faint
Human Breathing	10	Very faint

**TABLE HS-3 MAXIMUM ALLOWABLE NOISE EXPOSURE BY USE**

Land Use Type	Noise Level, DNL (dB)						
	0-55	56-60	61-65	66-70	71-75	75-80	>81
Residential <sup>a, b</sup>							
Urban Residential Infill							
Schools, Libraries, Hospitals, Religious Institutions, Extended Care Facilities							
Hotels, Motels							
Auditoriums, Concert Halls, Amphitheatres							
Playgrounds, Local Parks							
Sports Arenas, Outdoor Spectator Sports							
Golf Courses, Riding Stables, Water Recreation (e.g., water parks), Cemeteries							
Office, Commercial, and Professional Buildings (i.e., uses that are generally indoors and not noise sensitive)							
Industrial, Manufacturing, Mining, Utilities, Agriculture							

	<b>Normally Acceptable.</b> Specified land use is satisfactory based on the assumption that any buildings involved are of normal, conventional construction, without any special noise insulation requirements.
	<b>Conditionally Acceptable.</b> New construction or development should be undertaken only after a detailed analysis of the noise-reduction requirements is made and needed noise insulation features have been included in the design.
	<b>Unacceptable.</b> New construction or development should not be undertaken.

<sup>a</sup> A DNL of 60 dB or less may not be achievable in all residential areas due to environmental, economic, or aesthetic constraints. One example is small balconies associated with multiple-family housing. In this case, second- and third-story balconies may be difficult to control to the standard. A common outdoor use area that meets the goal can be provided as an alternative.

<sup>b</sup> If the primary noise source is passing trains, the standard for outdoor noise levels in residential areas is a DNL of 70 dB.

**Goal HS-14**

An acceptable noise environment in all areas of the county.

**Policies**

**HS-P14.1**



Require projects that would locate noise-sensitive land uses in areas where the projected ambient noise level is greater than the “normally acceptable” noise level indicated in Table HS-3 to provide an acoustical analysis that recommends appropriate mitigation to meet the noise compatibility standards.\*

**HS-P14.2**



Require new housing developments, hotels, and motels exposed to a DNL of 60 dB or greater to provide a detailed acoustical analysis describing how the project will provide an interior DNL of 45 dB or less.\*

**HS-P14.3**



Require new nonresidential uses exposed to a DNL of 65 dB or greater to provide a detailed acoustical analysis describing how the project will provide an interior sound level of 50 Leq (1-hr).\*



FIGURE HS-21 2045 ROADWAY NOISE CONTOURS

0 2.5 5 10 Miles





### HS-P14.4



Require new residential development in areas exposed to a DNL in excess of 65 dB due to single events, such as train operation, to provide an acoustical analysis describing how indoor noise levels from these single events will not exceed a maximum A-weighted noise level of 35 dB in bedrooms and 55 dB in other habitable rooms. In areas exposed to a DNL in excess of 65 dB, use an indoor residential noise-level threshold of 45 dB CNEL.\*

### HS-P14.5



Protect noise-sensitive land uses listed in Table HS-3 from adverse noise impacts by requiring mitigation to the degree feasible for projects that would increase long-term noise in excess of the following thresholds, when measured at the sensitive use's property line:

- (a) Greater than 1.5 dBA DNL increase for ambient noise environments of 65 dBA DNL and higher.
- (b) Greater than 3 dBA DNL increase for ambient noise environments of 60 to 64 DNL.
- (c) Greater than 5 dBA DNL increase for ambient noise environments of less than 60 dBA DNL.\*

### HS-P14.6



Design County projects to minimize long-term noise impacts on existing residents and follow best practices to minimize short-term impacts from construction noise.\*

### HS-P14.7



Condition entitlements to limit noise-generating construction activities to the following:

- (a) Weekdays and non-holidays unless site-specific conditions warrant exceptions.
- (b) Within 1,000 feet of noise-sensitive uses: 7:30 a.m. to 5:00 p.m.
- (c) Over 1,000 feet from noise-sensitive uses: 7:00 a.m. to 6:00 p.m.\*

### HS-P14.8



Require a traffic noise analysis for development projects where the project would generate more than 40 percent of daily trips over existing average daily traffic (ADT) on impacted roadway segments. Projects below this threshold are assumed to have no significant traffic noise impact because they would increase noise levels by less than 1.5 dBA DNL, which is the most restrictive threshold for determining a significant traffic noise impact. This screening policy does not apply to projects involving a substantial number of new operational truck trips (e.g., warehouses).\*

### HS-P14.9



Require effective measures along major transportation facilities/corridors to reduce impacts on adjacent noise-sensitive land uses.\*

### HS-P14.10



Require new development to evaluate noise impacts on the natural environment, including impacts on wildlife, whenever appropriate.



### HS-P14.11



When reviewing proposals for new vibration-sensitive uses near an existing railroad or Bay Area Rapid Transit (BART) line, use Table HS-4 to evaluate whether the sensitive uses could be exposed to excessive groundborne vibration. Projects with sensitive uses within the screening distances identified in the table will require preparation of a groundborne vibration and noise evaluation that is consistent with Federal Transit Administration-approved methodologies.

**TABLE HS-4: RAIL VIBRATION SCREENING DISTANCES**

Type of Rail	Distance in Feet		
	Land Use Category 1	Land Use Category 2	Land Use Category 3
Conventional Commuter Rail or Rapid Transit (BART)	600	200	120

**Notes:**

Land Use Category 1: Vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, universities conducting vibration-sensitive research, concert halls, TV and recording studios, and theaters.

Land Use Category 2: Residential, hotels/motels, and hospitals without vibration-sensitive equipment.

Land Use Category 3: Institutional uses such as schools, churches, and medical offices without vibration-sensitive equipment.

## Actions

### HS-A14.1



Study the feasibility of adopting a noise ordinance establishing maximum exterior noise levels at sensitive receptors for noise generated by permanent and temporary stationary, non-transportation sources and construction sources.

### HS-A14.2



Pursue federal Quiet Zone status for rail crossings that are a noise nuisance to nearby residential areas and other noise-sensitive land uses.

## HEALTH AND SAFETY ELEMENT PERFORMANCE MEASURES

To track progress in achieving the major goals of this Element, every five years, the County will collect data to assess its performance against the following measures. Progress will be tracked relative to the prior performance review and the baseline year of 2024. Based on the findings from the five-year review, the County may adjust policies, actions, or the approach to implementing them to improve performance, as needed.

- Reduced rate of emergency department visits for asthma.
- Increased tree canopy on public property in Impacted Communities.
- Increased number of County facilities in hazard-prone areas that are retrofitted against hazards.
- Reduced number of people in hazard-prone areas that are constrained by having only one evacuation route.