



ENVIRONMENTAL SAFETY ELEMENT

Introduction and Purpose

The Environmental Safety Element focuses on reducing human injury, loss of life, property damage, and the economic and social dislocation caused by natural and human-made hazards. The policies included in this element are intended to provide a framework to address natural and human induced hazards through prevention and emergency response. This element seeks to guide the continuous development of preventative measures that address existing and potential hazards, while also providing contingent emergency response procedures in the instance of a local or regional emergency.

Issues of Local Significance

The following issues were identified as relevant to the City of Carmel-by-the-Sea and are addressed in the Goals, Objectives, and Policies and Supporting Information sections.

- Earthquakes
- Landslides
- Drainage/Flooding
- Fire
- Tsunami
- Disaster Preparedness

This element also includes some of the findings gathered through the Community Survey (Survey). The Survey was prepared as part of the public outreach process to gain a broader response from the community, property owners, and businesses on issues facing Carmel. The complete Survey report can be found in Appendix A.



Goals, Objectives and Policies

G8-1 Ensure there is adequate preparedness to respond to a disaster.

O8-1 Ensure emergency preparedness.

P8-1 Periodically update and test the effectiveness of the City's Emergency Operations Plan.

P8-2 Provide on-going training to City staff in emergency preparedness and procedures.

P8-3 Cooperate with other local agencies to ensure the availability and adequacy of emergency supplies.

P8-4 Ensure preparation for delivery of a reliable and safe potable water supply in an emergency.

P8-5 Identify and evaluate all emergency use facilities and their capacity to survive the intensity of a disaster.

P8-6 Designate alternative facilities for post disaster assistance in the event that primary facilities are not available for use.

P8-7 Ensure that water, gas, and sewage utilities serving critical facilities are in good condition and are engineered to withstand damage from disasters.

P8-8 Cooperate with local and regional jurisdictions to ensure adequate communication capabilities during a disaster.

P8-9 Coordinate emergency planning efforts with the Monterey County Office of Emergency Services.

P8-10 Support the services provided by relief organizations such as the Carmel Chapter of the American Red Cross.

O8-2 Respond to emergencies rapidly.

P8-11 Work with police and fire departments to periodically review data on calls for service, response times, and changing risk probabilities and



report critical issues/trends to the City Administrator as deemed necessary.

P8-12 Maintain the list of residents who require special assistance during emergencies.

P8-13 Maintain primary and secondary evacuation routes for the City of Carmel-by-the-Sea and its Sphere of Influence, in coordination with Monterey County Office of Emergency Services and the City's EOP.

O8-3 Provide public education about what to do in case of emergencies and means available to avoid or minimize their effects.

P8-14 Educate the public regarding seismic, geologic, flood, fire, tsunami, and other potential disasters, by preparing periodic news articles for local media outlets, such as Carmel Pine Cone.

P8-15 Publicize the system of emergency and evacuation routes serving the City.

P8-16 Encourage property owners to retrofit older structures with fire detection and/or warning systems.

G8-2 Provide protection from natural hazards.

O8-4 Prevent or reduce the potential for life loss, injury, and property damage from fire hazards.

P8-17 Avoid and discourage locating public structures and utilities in high severity fire hazard zone.

P8-18 Ensure adequate water supply for fire emergencies.

P8-19 Encourage new development located in or adjacent to fire hazard areas to incorporate fire preventative site design, access, landscaping and building materials, and other fire suppression techniques.

P8-20 Control excessive buildup of flammable vegetative material on vacant lots and within and adjacent to high severity fire hazard zones (such as Mission Trails and Pescadero Canyon – refer to Figure 8.4), especially following wet springs.



- P8-21** Develop and provide funding and/or incentives for removal of flammable vegetative material particularly in high fire severity areas around Mission Trails and Pescadero Canyon (e.g., free chipping day, free collection day for tree limbs).
- O8-5** Prevent or reduce loss of life, injury, and property damage from geologic and seismic disasters.
- P8-22** Consider potential seismic hazards.
- P8-23** Require dynamic ground motion analysis and responsive structural design for all new high occupancy structures (e.g. multi-family residential, hotels, etc.) and structures whose continued functioning is critical after a disaster.
- P8-24** Require adequate geotechnical investigations to be undertaken to provide necessary information and mitigation for any development locating substantial structures in areas subject to seismic hazards, ground failure, erosion, or landsliding.
- P8-25** Avoid placement of critical facilities and high occupancy structures (e.g. multi-family residential, hotels, etc.) in areas subject to ground failure during an earthquake.
- P8-26** Develop an un-reinforced masonry grant program that helps correct earthquake-risk non-masonry building problems, including chimney bracing and anchoring water heaters.
- O8-6** Prevent or reduce the potential for life loss, injury, and property damage from inundation due to flood or tsunami.
- P8-27** Require site planning and building design to address identified flood and tsunami inundation areas.
- P8-28** Encourage design features that address the tsunami splash effect on the structures located immediately adjacent to the tsunami inundation zone (e.g. Scenic Road), as illustrated on Figure 8.5.
- P8-29** Limit the amount of impervious surface in flood-prone areas.



- P8-30** Reduce flooding hazards in areas with flooding potential by improving drainage and minimizing the alteration of natural drainage and natural protective barriers that accommodate or channel floodwaters.
- P8-31** Prepare an adequate warning and evacuation plan for development and recreational uses that exist along the shoreline and other tsunami inundation areas identified on Figure 8.5.
- G8-3 Reduce potential impacts from hazardous materials.
- O8-7** Minimize the generation of hazardous waste within the City and ensure that hazardous waste is transported and disposed of in a proper manner.
- P8-32** Support implementation of the Monterey County Hazardous Waste Management Plan.
- P8-33** Periodically review the City's EOP for effectiveness in emergency response to hazardous waste spills.
- P8-34** Require a conditional use permit for all commercial uses that generate, handle or transport hazardous waste.
- P8-35** Require that all public buildings and associated landscaping use non-toxic materials as part of their maintenance, whenever possible.
- P8-36** Work with the Monterey County Health Services – Environmental Health Division and other agencies to establish an educational outreach program for businesses and residents regarding the safe use, recycling, and disposal of toxic materials; reducing the use of hazardous household wastes; and acceptable substitutes for toxic substances.
- P8-37** Investigate programs for pickup of household hazardous waste and identify possible collection locations that will accept household waste.
- O8-8** Ensure that resources are available to effectively respond to hazardous-waste emergencies.
- P8-38** Provide on-going training to City staff to quickly respond to hazardous-waste emergencies.



P8-39 Develop a list of businesses permitted to handle hazardous materials and assure that safe handling and use information for materials handled by these businesses are provided to fire protection and other safety and emergency response agencies.

G8-4 Control land uses siting to avoid exposure to excessive risk.

P8-40 Establish a program to evaluate existing structures and facilities to identify conditions that present excessive risk. Give priority to identification of critical and high occupancy facilities.

P8-41 Review areas proposed for annexation with respect to the hazards identified in this Element and the effect on existing and future provision of emergency services.

P8-42 Require structures for critical and high occupancy facilities to be located appropriate distances from active or potentially active fault traces shown on Figure 8.1, ground failure, erosion, coastal erosion, or landsliding unless mitigating measures are taken to limit damage to the levels of acceptable risk.

P8-43 Continue to require a conditional use permit for development on slopes of 30% or greater.



Supporting Information

Seismic Hazards

Historical Seismic Hazards

California is situated in a seismically active area that lies within the California Coast Ranges geomorphic and physiographic province. The region's geology is dominated by active tectonics on the margin between the Pacific and North American tectonic plates. Regional tectonic forces generate an estimated relative motion between the North American and Pacific plates of approximately two inches per year.

The entire California Coast and Coast Range area is prone to earthquakes. Based on history, the probability of a moderate or high magnitude earthquake occurring in the greater Monterey region in the next few decades is quite likely. [Table 8.1: Major Historical Earthquakes in the Region](#), summarizes the year, epicenter, and magnitude of major historical quakes that have affected the Monterey County region since 1900.

Table 8.1: Major Historical Earthquakes in the Region

Year	Epicenter	Richter Magnitude at Epicenter
1901	Parkfield	6.4
1906	San Francisco	8.3
1922	Parkfield	6.3
1934	Parkfield	6.0
1966	Parkfield	6.6
1983	Coalinga	6.5
1984	Morgan Hill	6.1
1989	Loma Prieta	7.1
2003	San Simeon	6.5
2004	Parkfield	6.0

Source: Draft Program EIR Monterey County 2006 General Plan, 2006.

Regional and Local Faults

Faults that could present a hazard to Carmel during an earthquake event include the following active or potentially active faults: San Andreas, San Gregorio-Palo Colorado, Chupines, Navy, and Cypress Point. The San Andreas and San Gregorio faults are two dominant faults within the Monterey County region that are considered active with evidence of historic or recent movement. [Figure 8.1: Regional and Local Faults of Significance](#), maps the location of faults that could



present a hazard to Carmel. Active and potentially active faults are mapped as lines rather than zones. It should be recognized that areas immediately adjacent to the mapped fault lines may include secondary or branch faults. Therefore, the active and potentially active fault lines shown on the maps should be treated as zones of approximately an eighth of a mile on either side of the fault lines. This corresponds with the width of Special Studies Zones established pursuant to the Alquist-Priolo Act. The hazard potentials along the active and potentially active faults include a high potential for ground rupture and a moderate to severe ground shaking potential near the fault.

Landslides

Landslide is a general term for the dislodgment and fall of a mass of soil or rocks along a sloped surface or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and slump-earth flows. Landslides may result from a wide range of combinations of natural rock, soil, or artificial fill. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also occur due to indiscriminate development of sloping ground or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions (Monterey County 2007).

Landslides often occur together with other natural hazards, thereby exacerbating conditions, as described below.

- Shaking due to earthquakes can trigger events ranging from rock falls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential (Ibid.).

Landslides in Carmel area historically have been caused by waterlogged soil rather than ground shaking due to an earthquake. As shown on [Figure 8.2: Areas Prone to Landslide](#), there are two areas historically prone to landslides within the City limits. The first area is located in the north-central portion of the City, which encompasses the Pescadero Canyon, including portions of 2nd, 3rd, and 4th Avenues, and Camino Del Monte Avenue, between 2nd and 3rd Avenues. The second area prone to landslides is located in the eastern portion of the City and encompasses the eastern portion of the Mission Trail Nature Preserve.



Flood Hazards

Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, or coastal body of water onto adjacent floodplains. Floodplains are lowlands adjacent to water bodies that are subject to recurring floods. Floods are natural events that are considered hazards only when people and property are affected (Monterey County 2007).

Physical damage from floods includes the following:

- Inundation of structures, causing water damage to structural elements and contents.
- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.
- Impact damage to structures, roads, bridges, culverts, and other features from high-velocity flow and from debris carried by floodwaters.
- Destruction of crops, erosion of topsoil, and deposition of debris and sediment on croplands.
- Release of sewage and hazardous or toxic materials as wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed.

Floods also cause economic losses through closure of businesses and government facilities, disrupt communications, disrupt the provision of utilities such as water and sewer service, result in excessive expenditures for emergency response, and generally disrupt the normal function of a community. In Monterey County two types of flooding occur: riverine flooding, also known as overbank flooding, due to excessive rainfall, and coastal flooding due to wave run-up (Monterey County 2007).

Carmel is located on a sloping terrain that offers good storm water runoff into both the Pacific Ocean and the Carmel River. As shown on [Figure 8.3: Flood Hazard Zones and Localized Flooding Areas](#), only a small portion of the City's southern tip is designated as a FEMA 100-year Flood Zone. Mission Fields, a residential area, is within the 100-year floodplain, as are the Carmel Center/Carmel Rancho shopping centers.

Coastal Flooding

Coastal flooding in Monterey County is generally caused by wave run-up. Pacific Ocean storms in the months of November through February in conjunction with high tides and strong winds can cause significant wave run-up. In addition to intense offshore storms, coastal flooding from the Pacific Ocean can also be attributed to seismic sea-waves or tsunamis that can occur at any



time of the year. As such, coastal flooding can be exacerbated by the physical characteristics of the continental shelf and shoreline.

Carmel Beach is subject to flooding during high tide and beach sand is lost yearly during winter storms. The beach is a clearly separated from adjacent roads and houses by a moderately steep hill. As shown in [Figure 8.3: Flood Hazard Zones and Localized Flooding Areas](#), due to that topographical feature, the coastal flooding rarely extends past the beach.

Localized Flooding

Localized flooding may occur outside of recognized drainage channels or delineated floodplains due to a combination of locally heavy precipitation, increased surface runoff, and inadequate facilities for drainage and stormwater conveyance. Such events frequently occur in flat areas and in urbanized areas with large impermeable surfaces. Local drainage may result in “nuisance flooding,” in which streets or parking lots are temporarily closed and minor property damage occurs (Monterey County 2007).

There are several areas of the City, which have been identified as being prone to localized flooding. The main area subject to localized flooding is located within the Mission Trail Nature Preserve (see [Figure 8.3: Flood Hazard Zones and Localized Flooding Areas](#)). The Mission Trail site is owned by the City and used as a park. This use mitigates some of the damage that would normally result from the retention of water on the site.

[Figure 8.3: Flood Hazard Zones and Localized Flooding Areas](#) also shows areas that are prone to periodic flooding during heavy rain events. These areas experience flooding when the City’s drainage system is overwhelmed by the amount of rain water. Historically, the City’s stormwater system has had sufficient capacity to accommodate a rainfall of up to two inches a week. However, several factors, such as an increased amount of debris and reduced ability for maintenance affect stormwater system capacity. The stormwater systems are maintained regularly, however, during storm events the maintenance often can’t keep up with the amount of debris entering the system. As a result, the system experiences serious failures during rainfall of approximately 10 inches in a week.

Erosion and Landslides

Erosion is a natural process caused by wind, water, and gravitational forces. This process generally creates two problems: the wear and removal of soil from one site and its deposit in another. The removal of soil can be damaging through gully erosion, wind blown erosion, the erosion of stream courses and banks, and the erosion of coastal dunes and beach area. Soil deposit damage affects flood plains, rivers, lakes, reservoirs and may clog drainage structures. Development activities frequently accelerate erosion related damages and losses.



Climate is another major contributor to potentially high erosion rates. This is due to a number of factors:

- Geologic studies indicate that erosion is highest in areas where annual precipitation is between 7" and 18". Annual precipitation on the Monterey Peninsula ranges from 12.7" on the coast to 17.7" at the higher elevations.
- Most of Carmel's rainfall occurs during the winter when temperatures are too low for rapid vegetative growth.

Erosion on sloped inland areas and at the shoreline (beach) has been a problem for much of Monterey County, including Carmel. A discussion of Carmel beach erosion is included in the Open Space/ Conservation/Scenic Highway Element. The hazards due to erosion are difficult to separate from those due to flooding and landsliding. In some cases, erosion is a result of flood and landslide conditions; in others, rapid water runoff and landsliding can occur in areas subject to prolonged erosion.

The preventive costs of erosion are generally included within flood control measures and the overall costs of hillside development. Adoption of the present state of the art procedures for erosion prevention in hillside areas will, in most cases, eliminate losses.

Losses due to coastal erosion can be reduced most economically by avoiding construction in areas subject to severe erosion. Erosion of the beach bluffs is addressed in the City's Shoreline Management and Emergency Operations plans.

Fire Hazards

Fire poses a significant threat to life and property. Fire prevention and safety measures must be evaluated in all land use and community wide decisions. Fire hazards in the Carmel planning area can be categorized by fires within urbanized areas, and fires within undeveloped areas or wildland fire areas.

Factors to Fire Susceptibility

There are several factors affecting the hazard potential of a wildland fire in the Carmel area: topography, weather conditions, and fire fuel (type of vegetative cover, type and intensity of land use).

The City of Carmel is located on a hillside. Steep slopes promote spreading of a fire and increase its speed due to preheating of vegetation. Canyons and hillsides also promote gusts of wind, which increase the unpredictable and uncontrollable nature of wildfires.



Carmel's topography also creates access issues. The unimproved and narrow roads are an obstacle to fighting fires. Fire fighting personnel as well as fire trucks and other heavy equipment have difficulty reaching some of the City's areas. Containment being a key objective, areas of limited accessibility have a correspondingly greater potential for fire spreading.

Weather is also a contributing factor to fire hazards. The central coast climate is characterized by dry summers with virtually no precipitation. As a result the vegetation during the fire prone summer/fall season is very dry, creating ideal conditions for faster fire spreading. A combination of a generous rainy season followed by a dry summer can result in large amounts of vegetation fire fuel. Wind direction and strength rival human proximity and vegetation as significant factors affecting fire hazard. The City experiences prevailing winds from the beach, which can potentially result in the spreading of a fire towards the City.

The most significant factor determining overall fire risk is human proximity. The majority of wildland fires are caused by people and the remaining fires are started primarily by lightning. New land development may suddenly cause drastic increases in the frequency of fires in areas that have had few fires in the past. The increase in activity of off road vehicles, such as motorcycles and mini-bikes, is becoming an ever-increasing source of brush fires as the trend continues toward more recreational pursuits.

Another contributing factor to wildlife fire potential is accidents related to spark discharges from transmission lines or leakage from pipelines carrying flammables in and adjacent to brush areas.

Wildland Fires

Carmel's land area is largely forested and contains a significant amount of open space. There are several areas in and around the City that qualify as wildland fire hazard areas. These areas are located to the north and east of the City boundaries and include: to the north, Pescadero Canyon, Forest Hill Park, and Del Monte Forest; and to east the Mission Trails Nature Preserve.

State Regulatory Context

Most land within the State of California has been designated as either a State Responsibility Area (SRA) or Local Responsibility Area (LRA). These designations refer to the agency or entity responsible for providing fire protection services, from either the local entity or the State's Department of Forestry and Fire Protection (CalFire). In a LRA, the local agency, which is typically a city, county, or district, is responsible for fire protection. In a SRA, the State bears the financial responsibility for preventing and suppressing wildland and forest fires.

Land designated by the State as a SRA is subdivided into three categories of Fire Hazard Severity Zones (FHSZs), either Moderate, High or Very High, based on the fire hazard level present. Moderate and High zones are currently treated identically in the State's codes and



regulations.¹ Very High zones are more stringently regulated and additional constraints on construction materials and other safety-related restrictions are applicable.²

Within land that has been designated as a LRA, CalFire may recommend that the local entity further designate land subject to a very high fire hazard as a Local Agency Very High FHSZ.³ In such zones, the more stringent codes designed for SRA Very High FHSZs will apply.

State Fire Code

Recently, the California Building Standards Commission in collaboration with CalFire adopted new building codes that apply in all land designated as a SRA. These new codes reduce the risk of burning embers pushed by wind-blown wildfires from igniting buildings through increased setbacks and vegetation clearance requirements. Roofing standards vary by the fire hazard zone rating of the site. The new building codes require siding, exterior doors, decking, windows, eaves wall vents, and enclosed overhanging decks to meet new test standards. These new codes apply throughout all SRAs regardless of the fire hazard severity ranking.⁴ A summary of these codes are provided below.

Chapter 7A Building Code §§ 701A-704A.5, Wildland-Urban Interface Building Standards: Materials and Construction Methods for Exterior Wildfire Exposure

Chapter 7A applies to building materials, systems, and assemblies used in the exterior design and construction of new buildings located within a wildland-urban interface fire area and in SRAs. Projects that apply for building permits after January 1, 2008 must comply with roofing, attic ventilation, exterior wall, decking, floor and under-floor protection, and inspection and certification requirements.

2007 California Fire Code, Chapter 47, Requirements for Wildland-Urban Interface Fire Areas, §§ 4701 – 4713

This Chapter includes roofing and attic ventilation requirements for construction within wildland-urban interface fire areas and in SRAs of any level of fire hazard severity zone and applies to building materials, systems, or assemblies used in the exterior design and construction

¹ Pub. Resources Code §§ 4125; 4291, *et seq.*

² See Building Code Chapter 7B.

³ Govt. Code § 51175, *et seq.*

⁴ Building Code Chapter 7A, § 701A.3.2; Fire Code Chapter 47.



of new buildings. While standards have only been set for roofing and attic ventilation, standards for exterior walls, decking, floors, and under-floor protection and ancillary buildings and structures may be promulgated in the future (these sections are currently "reserved" in the code).

Public Resources Code §§ 4202, 4291-4299

Revisions to these code sections (Senate Bill 1595, Kehoe, approved September 27, 2008) went into effect on January 1, 2009. Senate Bill 1595 amends §§ 4202 and 4291. The amendments to § 4202 change the designation process for SRA lands and the new § 4291 requires a 100-foot fire break around structures in lands within a SRA (or within a wildland-urban interface fire area) that are covered with flammable materials such as brush, trees, and grasslands. The section provides details regarding allowable vegetation within the fire break and structure maintenance requirements concerning flammable vegetative materials. It also includes details regarding rebuilding in an area previously damaged by fire. The section permits the State fire official to require construction of a larger fire break, up to 300 feet, around sensitive structures.

Sections 4292 through 4296 oblige owners or operators of electrical transmission lines through brush-covered areas to observe special maintenance protocols to reduce hazards from wildfire. The local utility provider would be responsible for compliance with transmission line fire break precautions.

California Code of Regulations, Title 14 §§ 1270-1299—CalFire SRA Fire Safe Regulations

These regulations set out basic wildland fire protection standards for building, construction, and development within SRAs. These regulations are silent regarding whether they are equally applicable within Wildland-Urban Interface Fire Areas. Measures include specifications for emergency access and road design, signage and building numbering, private water supply reserves for emergency fire use and vegetation modification. These regulations do not apply to existing structures, roads, streets, and private lanes or facilities.

Local jurisdictions approving construction within an SRA must provide the Director of Forestry and Fire Protection with notice of applications for building permits, tentative parcel maps, tentative maps, and use permits for construction or development within an SRA. The local jurisdiction must also ensure that applicable sections of the CalFire SRA Fire Safe Regulations become a condition of approval of any applicable construction or development permit or map.

Local Fire Hazard Severity Zones

Wildland fire protection in California is the responsibility of either the State, local government, or the federal government. Local responsibility areas include incorporated cities, cultivated agriculture lands, and portions of the desert. Local responsibility area fire protection is typically provided by city fire departments, fire protection districts, counties, and by Cal Fire under contract to local government.



California law requires Cal Fire to identify areas based on the severity of fire hazard that is expected to prevail there. These areas, or “zones,” are based on factors such as fuel (material that can burn), slope and fire weather. There are three zones, based on increasing fire hazard: medium, high and very high. To determine Local Responsibility Areas (LRAs), Cal Fire used an extension of the state responsibility area Fire Hazard Severity Zone model as the basis for evaluating fire hazard in an LRA. The local responsibility area hazard rating reflects flame and ember intrusion from adjacent wildlands and from flammable vegetation in the urban area.

California Department of Forestry and Fire Protection Fire Hazard Severity Zone Local Responsibility Areas (LRA) map for Carmel-by-the-Sea, identifies a large area encompassing northern and eastern portions of the City as a Very High fire hazard severity zone (see [Figure 8.4: State and Local Responsibility Area Fire Hazard Severity Zones](#)).

Local Responsibility Area Very High Fire Hazard Severity Zone maps are used to identify areas where ignition resistant building standards will be required for new construction, to identify properties requiring defensible space maintenance, and by sellers to disclose natural hazards at the time of property sale.

Urbanized Forest Fires

Carmel-by-the-Sea is often referred to as a village in the forest, due to its extensive urban forest. While this forest is a major community asset, it also poses a potential significant fuel source for a fire within the community. Fires can be a threat within built up areas of a community; there is the ever-present danger of rapidly spreading fire. The high density of structures within the Carmel residential areas and business district among numerous trees increase the fire hazard. Many buildings in the Commercial District are very closely located with a lot of the buildings having common walls.

Most construction within Carmel contains wood; most roofs are made of combustible materials, while some made of tile. While installation of fire sprinkler systems is required with substantial remodels, older structures in both the commercial and residential districts do not have this fire fighting system in place.

Fires in homes can result from a number of causes, though primarily through human carelessness. Other causes include faulty heating systems and substandard electrical wiring. In addition, high-density development, small setbacks and narrow roads limit the effectiveness of fire fighting efforts.

Fire Department

The City of Carmel-by-the-Sea Fire Department (Department) has one fire station equipped with two type-one engines and one rescue unit.



The Carmel-by-the-Sea Fire Department's response time goal for the first engine company is to meet the National Fire Protection Association (NFPA) standard of 5 minutes or less 90% of the time. The actual response times that include turnout time for the Department is four minutes or less 95% of the time. Carmel-by-the-Sea is also part of state and county wide contractual agreements to provide mutual and automatic aid to each other on an as needed basis.

Historic Fire Causes

Historically, the main causes of fire in Carmel have been caused by human element. Most of the fire related incidents are of small nature. Of the 960 incidents that the Carmel Fire Department responded to in 2008, there were eight structure fires, four trash fires, four vehicle fires, and three chimney fires. [Table 8.2: Carmel Fire Department Incident Report: 2008](#), summarizes the main types of events that the Department responded to during year 2008, including fire related events.



Table 8.2: Carmel Fire Department Incident Report: 2008

Type of Incident	Number of Incidents	Percent of Total Incidents ¹
Top 10 Incident Types		
1. Medical Emergency	361	37.60%
2. Mutual Aid ²	195	20.31%
3. Alarm Activation	86	8.96%
4. Public Service	78	8.13%
5. Water Problem	48	5.00%
6. Hazardous Condition	47	4.90%
7. Smoke or Odor Investigation/ Explosion	32	3.33%
8. Wires Down	25	2.60%
9. Vehicle Accident	17	1.77%
10. Natural Gas Leak	10	1.04%
Fire-Related Incidents		
Structure Fire	8	0.83%
Trash Fire	4	0.42%
Vehicle Fire	4	0.42%
Chimney Fire	3	0.31%
Notes:		
¹ The Carmel Fire Department recorded 960 incidents for the period of January 1, 2008 and December 31, 2008.		
² The Carmel Fire Department has Mutual Aid agreements with all adjoining jurisdictions (City of Monterey, Pebble Beach, and City of Pacific Grove). This line number represents all activities (including medical) that the Department undertook based on the Mutual Aid Agreement.		
Source: Carmel-by-the-Sea Fire Department, March 2009.		

Firefighting-Related Water Supply

The City of Carmel Fire Department requires a fire flow of 1,500 to 2,000 gallons per minute (gpm) for a time limit of two to four hours. The water system can currently meet this demand. One of the challenges that Carmel faced was related to a large number of failed hydrants. At the beginning of 2007, the City in cooperation with California American water (Cal-Am) identified 29 of 201 hydrants within the City limits that were found inadequate for fire protection (Cal-Am 2009).

Cal-Am took several actions to address these inadequacies. In several areas of the City experiencing low flow rates, Cal-Am replaced four inch flow mains with eight inch flow mains.



These larger underground mains are capable of delivering more water under higher pressure. In addition, Cal-Am reviewed the fire hydrant network to remove redundancies, address hydrants which experienced low flow, and assure adequate number and distribution of fire hydrants throughout the City. In total, 23 hydrants were removed, eight hydrants experiencing low flows were replaced and connected to the new eight-inch flow mains, and 15 new hydrants were installed. During this process, the remaining 172 operational hydrants were fully capable of supporting fire fighters throughout the City (Cal-Am 2009).

Fire Safety Proactive Measures

There are several measures that the City is undertaking in order to minimize the chance and/or spreading of a fire. The FPB department has an active pruning and removal of trees program that addresses safety concerns related to fire hazards and falling trees. Trees are evaluated during yearly tree surveys, city drives, and reports from City staff and the public. Once a tree is deemed a safety concern, it is pruned or removed completely. Preventative pruning minimizes damage from trees during storm events. The FPB also responds to reports of rocking trees during storms, and intervenes when possible. The Public Works department assists the FPB department with heavy equipment and staff. As part of the management for forest viability, the FPB department also controls forest disease (such as pitch canker) and implements pruning for structure, strength, and a healthy canopy as well as removal of dead trees. These measures successfully remove excessive fire fuel.

Sprinklers Requirements

Many of the buildings within the City are older and have minimal separation from adjacent buildings. The age of the structure often means that a fire prevention system, such as sprinklers was not installed. The commercial district contains many older structures, which also share common walls.

In an on-going process of remodeling and rebuilding of older structures, the renovations that pass a statutory threshold are required to include fire systems in their remodel. Of the approximately 250 commercial buildings in Carmel, more than half are equipped with fire alarm systems, and approximately 20 percent have automatic fire sprinkler systems. Fire alarm systems in Carmel are required to be Central Station Service fire systems, which are the most reliable systems referenced in the National Fire Alarm Code. These systems can monitor inputs from smoke detectors, heat detectors, manual fire alarm boxes, and fire sprinkler water flow switches.

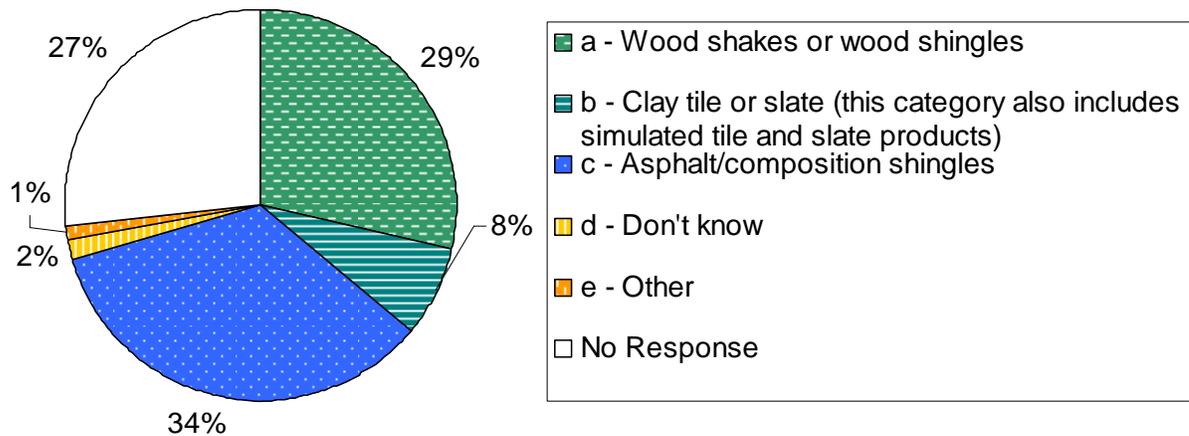
Roof Requirements

The Survey revealed that most respondents have wood shakes/shingles or asphalt/composition shingles as their roof material. Twenty nine percent of respondents reported as having wood shakes or wood shingles and 34 percent reported asphalt/composition shingles as their roof



material. Eight percent reported clay tile or slate (see Graph 8.1: Roofing Materials). In the “Other” category, the most often listed response was tar and gravel.

Graph 8.1: Roofing Materials in Carmel



The City’s Municipal Code Section 15.08.120 – Roofing Materials, requires that any new roof covering, or in the event of re-roofing of 25 percent or more of any existing roof, has to be made of fire-retardant material that meets or exceeds Class A. Class A is the highest fire-resistance rating for roofing and indicates roofing that is able to withstand severe exposure to fire originating from sources outside the building.

Tsunami

Tsunamis, also known as seismic sea waves, are a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite, with earthquakes being the most common cause. A tsunami spreads in all directions from its origin with speeds up to hundreds of miles per hour in the open ocean. As a wave approaches the shore, it builds in height and could become as high as 100 feet or more (FEMA 2006).

A single tsunami event may involve a series of waves, known as a train, of varying heights. In open water, tsunamis have extremely long periods of time (from minutes to hours) for the next wave top to pass a point after the previous one. Additionally, a tsunami wavelength can extend up to several hundred miles, very different from typical wind-generated swells on the ocean,



which might have a period of about 10 seconds and a wavelength of 300 feet (Monterey County 2007).

The actual height of a tsunami wave in open water is generally only 1 to 3 feet and is often practically unnoticeable to people on ships. The energy of a tsunami passes through the entire water column to the seabed, unlike surface waves, which typically reach only down to a depth of 30 feet or so. The tsunami wave travels across the ocean at speeds up to 700 miles per hour (mph). As the wave approaches land, the sea shallows and the wave no longer travels as quickly, so the wave begins to “pile up” as the wave-front becomes steeper and taller, and less distance occurs between crests. Therefore, the wave can increase to a height of 90 feet or more as it approaches the coastline and compresses. This steepening process is often compared to the sound of a cracking whip (Monterey County 2007). The height of a wave depends on the topography of the coastline, resulting in different hazard levels of closely located beaches with different topography. Areas at greatest risk are less than 25 feet above sea level and within a mile of the shoreline (FEMA 2006).

Hazards associated with tsunamis include: life loss, property damage, flooding, contamination of drinking water, and fires from gas lines or ruptured tanks (FEMA 2006).

Regional Setting

A tsunami not only affects beaches that are open to the ocean, but also bay mouths, tidal flats, and the shores of large coastal rivers. Tsunami waves can also diffract around land masses. And since tsunamis are not symmetrical, the waves may be much stronger in one direction than another, depending on the nature of the source and the surrounding geography. However, tsunamis do propagate outward from their source, so coasts in the shadow of affected land masses are usually fairly safe.

As shown in [Table 8.3: Historic Monterey County Tsunami Events: 1806-2006](#), over the last 200 years, eight observed tsunamis generated waves in Monterey County. Almost all of the tsunamis were produced by earthquakes and resulted in wave run-ups of 1 meter or less. A tsunami in 1960 produced severe currents in Monterey, Moss Landing, and Pacific Grove and is blamed for one death.



Table 8.3: Historic Monterey County Tsunami Events: 1806-2006

Date	Origin	Cause	Location of Effects	Wave Run-Up (Meters)
03/03/1901	N. California	Landslide	Monterey	Observed
04/01/1946	E. Aleutian Islands	Earthquake, Landslide	Monterey, Pacific Grove	Observed – 2.6 m
03/09/1957	Central Aleutian Islands	Earthquake	Monterey	0.6 m
05/22/1960	S. Central Chile	Earthquake	Monterey, Moss Landing, Pacific Grove	0.8 – 1.1 m
03/28/1964	Gulf of Alaska	Earthquake	Monterey, Moss Landing, Pacific Grove	Observed – 1.4 m
10/18/1989	N. California	Earthquake	Monterey, Moss Landing	0.4 – 1.0 m
04/25/1992	N. California	Earthquake	Monterey	<0.1 m
06/22/2001	Southern Peru	Earthquake	Monterey	0.15 m

Source: Multi-Jurisdictional Hazards Mitigation Plan, Monterey County 2007.

Tsunami Warning Systems

The West Coast/Alaska Tsunami Warning Center (WCATWC) issues warnings for the North America West Coast, including Monterey County. A tsunami warning is issued when a potential tsunami with significant widespread inundation is imminent or expected. To provide the earliest possible alert, initial warnings are based only on seismic information (Monterey County 2008).

When a warning has to be issued, the WCATWC notifies the California State Warning Center in Sacramento, which in turn notifies all coastal county Public Safety Answering Points. The WCATWC also notifies the National Weather Service (NWS) and federal defense interests. The NWS activates the Emergency Alert System (EAS), which is the method TV and radio media use to warn the public. These warnings produce an alert tone, then an audio message, or come across TV screens as a text scrolling across the screen (Monterey County 2008).

The Monterey County Emergency Communications Center is responsible for notifying local agencies, including all law and fire agencies, the office of Emergency Service, and the Emergency Medical Service Agency of any warnings issued by the WCATWC (Monterey County 2008).

Local Tsunami Hazards

As shown in Figure 8.5: Tsunami Hazard Areas, the City of Carmel would be minimally affected by a moderate to extreme tsunami event. According to the Multi-Jurisdictional Hazards Mitigation Plan, under a scenario of a 21-foot run-up, only nine people, seven residential



buildings, and two non-residential buildings are located within this hazards area along the southern portion of the City.

This can be accredited to coastal topography along Carmel's western boundary. The steep cliff, or a step-down in elevation between the Scenic Road and the beach, acts as a protective boundary during a tsunami event.

The relatively flat topography in the southern portion of the City and immediately adjacent to the City, on the other hand, lends itself to a more significant wave run-up. The most significantly affected is comparable to the area affected by the floods.

Tsunami Evacuation Areas

As discussed above, tsunami vulnerability in the City of Carmel is limited to its beachfront area and the southeastern most portion of town that is near the Mission Fields / Carmel River Lagoon area. If an evacuation is ordered, there are two areas that may need to be evacuated. The first is the Carmel Beach and the approximately 100 oceanfront homes along Scenic Rd. Although the oceanfront homes are above the tsunami evacuation zone, the homes could experience a "splash effect" should a tsunami strike the coast (Monterey County 2008).

The second area is near the Carmel Mission. This area would need to be evacuated in the event of a tsunami greater than five meters (17 feet). However, it is an area that may be populated by many visitors and nearby schoolchildren. Junipero Serra School / Carmel Mission is located just outside the evacuation zone, but may need to be evacuated out of precaution (Monterey County 2008).

The Carmel Police Department would be the lead agency in any evacuation. Evacuation will include clearing the beach of all people, to include swimmers and surfers. For evacuating the homes along Scenic Rd., notification by either door-to-door contact or police cruiser public address systems will be used to notify those in the evacuation zone (Monterey County 2008).

Although the tsunami vulnerability in Carmel is limited, that areas immediately south of the city limits have a much higher chance of being inundated. It is important that these areas be avoided during a tsunami warning. The Carmel River Lagoon and the Crossroads Shopping Center / Post Office are some of the areas that should be avoided (Monterey County 2008).

Hazardous Waste

A material is considered hazardous if it has been designated as such by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. The California Code of Regulations defines a hazardous material as a substance that, because of physical or chemical properties, its quantity, concentration, or other characteristics, may either (1) cause an increase in



mortality or an increase in serious, irreversible, or incapacitating illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed (22 CCR §66260.10 and California Health and Safety Code [HSC] §25501). Based on this definition, “hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (22 CCR §66260.10).

Chemical residuals in soil that are the result of the normal application of fertilizer, plant growth regulants, and pesticides for agricultural purposes do not constitute a release of hazardous substances under the California Hazardous Substances Account Act (HSC §25321 (d)). Similarly, the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) exempts parties from liability for the application of federally-registered pesticides (42 USC §9607(i)).

Regulation of hazardous materials and hazardous wastes occurs at the federal, state, and local levels of government. On the federal level, many hazardous materials-related regulations are promulgated by the EPA. Additional regulations pertaining to work place standards and for transportation of hazardous materials are enforced by the United States Department of Labor Occupational Health and Safety Administration (OSHA) and the United States Department of Transportation (DOT).

On the state level, the California Environmental Protection Agency (CalEPA), Department of Toxic Substances Control (DTSC), and Regional Water Quality Control Board (RWQCB) are responsible for overseeing many remediation and monitoring activities performed for sites in California with hazardous materials. Carmel is located within the jurisdiction of the Central Coast RWQCB. Regulations pertaining to work place standards and for transportation of hazardous materials are enforced by the State of California Division of Occupational Safety and Health (Cal-OSHA).

A summary of selected federal and state laws, regulations, and implementing agencies regarding hazardous materials and hazardous wastes are presented in [Table 8.4: Summary of Selected Hazardous Materials Laws and Regulations](#).



Table 8.4: Summary of Selected Hazardous Materials Laws and Regulations

Law/Regulation	Citation	Description	Implementing Agency
Federal Laws and Regulations			
Resource Conservation and Recovery Act/Hazardous and Solid Waste Amendments			
Framework for the Hazardous Materials Regulatory Setting	40 CFR 239-299	Creates the framework for the proper management of hazardous and non-hazardous solid waste.	EPA
Identification and Listing of Hazardous Wastes	40 CFR 261.1 – 261.41	Defines criteria for identifying the characteristics of hazardous waste. Identifies and lists hazardous wastes. Lists hazardous waste exclusions and exemptions. Identifies responsibilities of generators, transporters, and disposers of hazardous wastes.	EPA
Emergency Planning, and Community Right-to-Know Act			
Emergency Planning and Notification; Hazardous Chemical Reporting; Community Right-to-Know, Toxic Chemical Reporting; Community Right-to-Know, Toxic Release Inventory	40 CFR 302, 350, 355, 370, 372, and 374	Requires facilities to document, notify, and report information pertaining to the storage, use, release, disposal, and transfer of hazardous chemicals at the facility. Requires facility to prepare or have available an MSDS for all hazardous chemicals used or stored at the facility in quantities exceeding the designated threshold limits. Requires states to establish a State Emergency Response Commission, which designates a Local Emergency Planning Committee to develop an emergency response plan.	OSHA
Toxic Substances Control Act			
Control of Toxic Substances	40 CFR 700-766	Regulates the use and disposal of various industrial chemicals (including PCBs).	EPA
Lead Exposure Reduction	40 CFR 745	Requires EPA to identify sources of lead contamination in the environment, regulate amounts of lead allowed in products, including paint and toys, and establish state programs to monitor and reduce lead exposures.	
Hazardous Material Transportation Act			
Hazardous Materials and Oil Transportation	49 CFR 100 – 185	Designates specific materials as hazardous for the purpose of transportation. Classifies each material and specifies requirements pertaining to packaging, labeling, and transportation.	DOT
Federal Water Pollution Control Act (Clean Water Act), as Amended			
Regulation of Pollutant Discharge	40 CFR 122 - 125 41 CFR 129 - 136	Employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.	EPA



Law/Regulation	Citation	Description	Implementing Agency
National Pollutant Discharge Elimination System	40 CFR 122	Regulates point and non-point sources that discharge pollutants into surface waters, including conventional pollutants (i.e., biological oxygen demand (BOD), suspended solids, pH) and priority pollutants (i.e., certain chemicals).	EPA
California Toxics Rule	40 CFR 131.38	Regulates point and non-point sources that discharge pollutants into surface waters, including conventional pollutants (i.e., BOD, suspended solids, pH) and priority pollutants (i.e., certain chemicals).	EPA
Clean Air Act, as Amended			
Regulation of Pollutant Discharge	40 CFR 50 – 99	Requires major stationary sources to install pollution control equipment, to meet specific emissions limitations, and to obtain operating permits. Sets forth NAAQS and national emission standards for hazardous air pollutants (NESHAPs)	EPA
Safe Drinking Water Act, as Amended			
Standards and Regulations for Drinking Water	40 CFR 141 - 149	Designed to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. Includes specifications for drinking water treatment, source water protection, operator training, funding for water system improvements, and public information.	EPA
California Law and Regulations			
Hazardous Waste Control Act			
Division 20, Chapter 6.5	HSC 25100 – 25250.28 22 CCR 66250 – 69214	Authorizes the DTSC and local certified unified program agencies to regulate facilities that generate or treat hazardous waste. Sets forth standards applicable to generators and transporters of hazardous waste, standards for owners and operators of hazardous waste transfer, treatment, storage, and disposal facilities.	DTSC
Proposition 65 – Safe Drinking Water and Toxic Enforcement Act			
Division 20, Chapter 6.6	HSC 25249.5 – 25249.13	Requires the Governor to publish, at least annually, a list of chemicals known to the State to cause cancer or reproductive toxicity. Prohibits the discharge of such chemicals into sources of drinking water, and requires that warnings be given to individuals exposed to them.	OEHHA
Porter-Cologne Water Quality Control Act			
Water Quality Control Basin Plan (Basin	Central Coast Water	Identifies beneficial water uses in the Central Coastal Basin.	RWQCB (Central Coast



Law/Regulation	Citation	Description	Implementing Agency
Plan)	Quality Control Basin Plan	Sets forth water quality objectives for surface water and groundwater. Lists thresholds for organic and inorganic chemical constituents in groundwater. Sets forth discharge prohibitions.	Region)
SWRCB Resolution No. 88-63	--	States that all surface and ground waters are considered a suitable, or potentially suitable, water supply, unless the waters contain TDS in excess of 3,000 mg/L, contain high levels of contamination or is not capable of producing 200 gal/day.	RWQCB (Central Coast Region)
SWRCB Resolution No. 92-49	--	Establishes policies and procedures for investigation and remediating chemical releases that affect or threaten water quality.	RWQCB (Central Coast Region)
California Land Environmental Restoration and Reuse Act of 2001 (SB 32, 2001)			
California Human Health Screening Levels (CHHSLs)	Use of California Human Health Screening Levels in Evaluation of Contaminated Property (Cal EPA, 2005).	Screening values developed for 54 hazardous substances to evaluate soil and groundwater contamination for residential and commercial/industrial uses.	Cal EPA
California Safe Drinking Water Act			
California Laws and Regulations pertaining to Public Drinking Water Wells	22 CCR 60400 – 64710	Sets forth MCLs and other requirements for various compounds, including organic, inorganic chemicals, radionuclides, VOCs, and SVOCs in drinking water.	DHS
California Clean Air Act			
California Air Pollution Control Laws – Air Toxics	17 CCR 93000 – 93110	Resulted in development of state ambient air quality standards for particulate matter, sulfur dioxide, ozone, visibility reducing particles, nitrogen dioxide, lead, sulfates, hydrogen sulfide, carbon monoxide, and vinyl chloride. Specifies procedures for mitigating potential impact from naturally occurring asbestos and prohibiting asbestos in rock used for surfacing applications.	Cal EPA
Notes: "BOD" = Biological Oxygen Demand "CAA" = Clean Air Act "CalEPA" = California Environmental Protection Agency		"MSDS" = Material Safety Data Sheet "NAAQS" = National Ambient Air Quality Standards "OEHHA" = Office of Environmental Health Hazard Assessment	



Law/Regulation	Citation	Description	Implementing Agency
"CCR" = California Code of Regulations "CFR" = Code of Federal Regulations "CHHSLs" = California Human Health Screening Levels "DHS" = California Department of Health Services "DOT" = Department of Transportation "DTSC" = California Department of Toxics Substances Control "EPA" = United States Environmental Protection Agency "gal/day" = gallons per day "HSC" = California Health and Safety Code "mg/L" = milligrams per liter			"OSHA" = United States Department of Labor, Occupational Safety and Health Administration "PCBs" = polychlorinated biphenyls "RCRA" = Resource Conservation and Recovery Act "RWRCB" = California Regional Water Resources Control Board "SB" = Senate Bill "SWRCB" = State Water Resources Control Board "TDS" = total dissolved solids "TSCA" = Toxic Substances Control Act

The City of Carmel-by-the-Sea has no facilities for permanent storage or transfer of hazardous waste. The City has no industrial zone or zoning district compatible with a hazardous waste site. The City is not in the vicinity of any pipeline, nor on the route of an airline transporting potentially hazardous materials. As such the most probable exposure would be due to transport of hazardous materials on state highways.

In Carmel-by-the-Sea, hazardous waste is generated by households (paint products, motor oil, solvents, pesticides, oven cleaners and disinfectants), and a small number of commercial generators (dry cleaners, service stations, and photo processing).

Compared to County-wide waste generation, Carmel’s community generates relatively little hazardous waste because of the small population and limited number of waste-generating commercial businesses. Future additional hazardous waste generation will primarily be from an increase in the number of households. Land use policies of the City limit the expansion of commercial uses, so that future additional commercial sources of waste will be limited.

Household generators must dispose of materials individually. Frequently, materials are improperly disposed of through the regular trash pickup or poured down the storm drains. Long-term storage on residential sites creates a health and safety hazard.

A portion of the City located east of Junipero Avenue is located within the one mile hazards corridor along Highway 1. Residents and structures located within this buffer would potentially be exposed to hazardous materials if there was an incident during transport of such materials on Highway 1.

In the event of hazardous material incidents in the City, the *Monterey County Hazardous Materials Incident Plan* (2007) would govern field operations and response. The City of



Carmel-by-the-Sea is one of many jurisdictions within Monterey County participating in this response plan.

The purpose of this plan is to establish specific emergency management policies and procedures for coordinating Monterey County's integrated response to hazardous materials incidents, in accordance with California Code of Regulations as it relates to the implementation of the requirements of the California Health and Safety Code. The Plan establishes procedures for response to hazardous material incidents, clean up and cost recovery as well as other post-incident operations, preparedness and training (Monterey County 2007b).

Disaster Preparedness

Regional Emergency Preparedness

The City of Carmel-by-the-Sea has adopted by resolution the *Multi-Jurisdictional Hazard Mitigation Plan, Monterey County, CA (2007)*. The plan profiles hazards, assesses risks and capabilities, as well as develops mitigation strategies for various hazards in the Monterey County and local communities, including Carmel. Hazards addressed in this plan include:

- Coastal erosion;
- Dam failure;
- Earthquake;
- Flood;
- Hazardous materials events;
- Landslide;
- Tsunami;
- Wildland fire; and
- Windstorm.

The plan discusses these hazards in the context of the entire Monterey County as well as jurisdictions within the County. In addition to Carmel-by-the-Sea, the plan also includes discussion of hazards for the cities of Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, and Sand City. Each of the jurisdictions has adopted the plan by a local jurisdiction (Monterey County 2007).

The mitigation strategy included within the plan provides a blueprint for reducing the potential life and property losses identified in the risk assessment of each of the hazards. For the countywide mitigation strategy, the plan provides a list of mitigation goals and actions based upon the findings of the vulnerability analysis. Such measures include preventive actions,



property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities (Monterey County 2007).

Community-specific mitigation strategies, including capability assessments, are provided for each of the participating jurisdictions. Where appropriate, mitigations described in the plan related to hazards within the City of Carmel-by-the-Sea were incorporated into the Goals, Objectives, and Policies section of this element.

Local Emergency Preparedness

Carmel's Emergency Operation Plan (CEOP) 2008, incorporates the policies and principles of the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS), which were originally developed and employed by the State of California. The purpose of CEOP is to provide guidelines for operations during all hazard emergencies that could affect the City (Carmel 2008).

In times of emergency, the CEOP is implemented by the Carmel Emergency Operations Center (CEOC). The primary purpose of the CEOC is to provide a centralized focal point for the effective management of all emergency response operations. Specifically, the activation of the CEOC facilitates and centralizes the following activities:

- Decision making and command authority;
- Coordination of all emergency functions;
- Management of information;
- Warning dissemination;
- Resource application; and
- Resource support and procurement (Carmel 2008).

The CEOC primary facility is located in the basement of the Carmel Police Department, on the southeast corner of Junipero and 4th Avenues. The alternate CEOC is located in the Carmel Fire Station, on Sixth Avenue between Mission and San Carlos Streets and will be used in the event that the primary CEOC is not usable. The design and organization of the CEOC creates centralized management of all operational and support components, allowing the most efficient use of available resources within a framework of supporting strategies and response objectives (Carmel 2008).

The CEOP describes the function of each of the seven sections involved in operation of the CEOC, which are described in brief below:



- The Mayor and City Council set the overall policies for emergency management and support the Emergency Services Manager in their duties. The Mayor and City Council can also serve as an effective means of communication between residents and the CEOC staff;
- The Command Section is responsible for overall management of any disaster response and recovery operations for the City. The Emergency Services Director leads the Command Section and CEOC staff;
- The operations section is responsible for coordinating response and recovery operations;
- The Planning/Intelligence Section is responsible for all operational, strategic, and demobilization planning, disaster intelligence collection, assessment, and processing, report preparation, and incident documentation;
- The Logistics Section is responsible for establishment and management of the logistics efforts, including providing logistical information to the Director, managing and coordinating the provisions, and allocation and use of essential resources and services to support emergency operations;
- The Finance/Administration Section is responsible for providing, monitoring, and analyzing all elements of direct financial and administrative support to the CEOC staff; and
- The Public Information Section coordinates the origination and dissemination of all public information for the City (Carmel 2008).

To activate the emergency disaster aid a “Declaration of Local State of Emergency” has to be proclaimed by one of the authorized individuals. For the City of Carmel, the following individuals have the authority to proclaim a local emergency:

- The Emergency Service Director (City Administrator), requested when the City Council is in session;
- The Mayor or the Emergency Service Director, requested when the City Council is not in session; and
- The Director of Public Safety in the absence of the Mayor and the Emergency Service Director (Carmel 2008).

Following the ratification of proclamation of local emergency by the City Council, a designated City Hall personnel contacts the Library (Main and Park branches), Community Services Department, and the Information Systems Department that the CEOC has been activated (Carmel 2008).



Communication During Emergencies

In 2008, the City has implemented a Telephone Emergency Notification System (TENS). The unique TENS technology allows rapid dissemination of emergency and non-emergency information to the residents by phone. The phone company sends the District monthly updates of local phone numbers, and the system allows the District to develop call lists in advance based on a certain criteria (i.e. residents who need assistance during an evacuation) or real-time by using computerized maps (Carmel 2008).

In case of declared emergencies, the TENS can be activated by the City's Incident Commanders, who contact the Watch supervisor at the Monterey County Emergency Communications Center or Monterey County Office of Emergency Services. The Incident Commander can specify which areas, on a street by street basis, need to be evacuated.

The fire departments also maintain an on-going list of residents that are known to require special assistance during times of emergency. This list allows the emergency responders to quickly address the needs of those residents who usually require additional time and resources during an evacuation.

Evacuation Routes

In certain emergencies or disaster, e.g., tsunami, there will be a definite need for Carmel residents to move quickly to other areas that are beyond the danger zone. While not all Carmel residents may be affected by any one disaster, with the possible exception of a major earthquake, an overall evacuation plan established in conjunction with the adopted Emergency Operation Plan should be available to the residents of Carmel. [Figure 8.6: Evacuation Routes](#), shows the designated operational area and city evacuation routes. Evacuations are typically situation-dependent and may be designated by the Incident Commander. However, these pre-designated evacuation routes should result in expedient evacuation of the City.

In case of mass evacuation all the City field personnel would be summoned for evacuation assistance. In addition to City staff, active citizen volunteers, who are employed under the Volunteers in Policing (VIP) program would be summoned, as needed. The Police Department is also in the process of developing an ancillary volunteer program known as Emergency Volunteer Assistance Program (EVAP), which will seek to employ volunteers solely for the purpose of assisting in major emergencies. These volunteers would fall under the command and control of the Police Department and would assist with numerous emergency-related tasks, including assistance with evacuation.

Emergency Service Delivery

The major day-to-day emergency services are provided by the Carmel-by-the-Sea Police and Fire Departments. Emergency medical aid and transportation is provided by the Fire Department



within the district with major emergency medical services provided at the Monterey Peninsula Community Hospital located on Highway 68, approximately three miles from Carmel. The American Red Cross (Dolores Street and Eighth Avenue) provides disaster preparedness training, first aid training, and shelter and feeding during a disaster.

Emergency Services are described in more detail in Public Facilities and Services Element.

Challenges to the Disaster Response

There are several challenges to the provision of emergency services in the City of Carmel-by-the-Sea. The City is mostly developed and is often characterized as a village among the forest. While this is one of the key attributes of the City, the village layout creates access challenges for the emergency vehicles. Many of the roads in the residential districts are very narrow and lack adequate turnaround space for larger emergency vehicles, such as fire trucks. In addition to access, the tightly knit community of houses and trees doesn't provide adequate fuel breaks throughout the City.

Another aspect of the "village" character that creates an obstacle to emergency response is lack of addresses. The lack of house numbers in response to emergencies such as fire, or flooding may not have a significant impact on the ability of emergency responders to find a property, as these are usually highly visible events. However, in case of a medical emergency, lack of the house number may delay the arrival of the medical team.

As discussed in the Public Facilities and Services Element, the water supply is one of the biggest challenges for Carmel and other Monterey Peninsula Cities. The City and its emergency responders have a limited supply of water. In case of a large, regional fire incident, where adjoining cities would be also drawing on water supply, the City of Carmel may experience inadequate water supply to fight fires.



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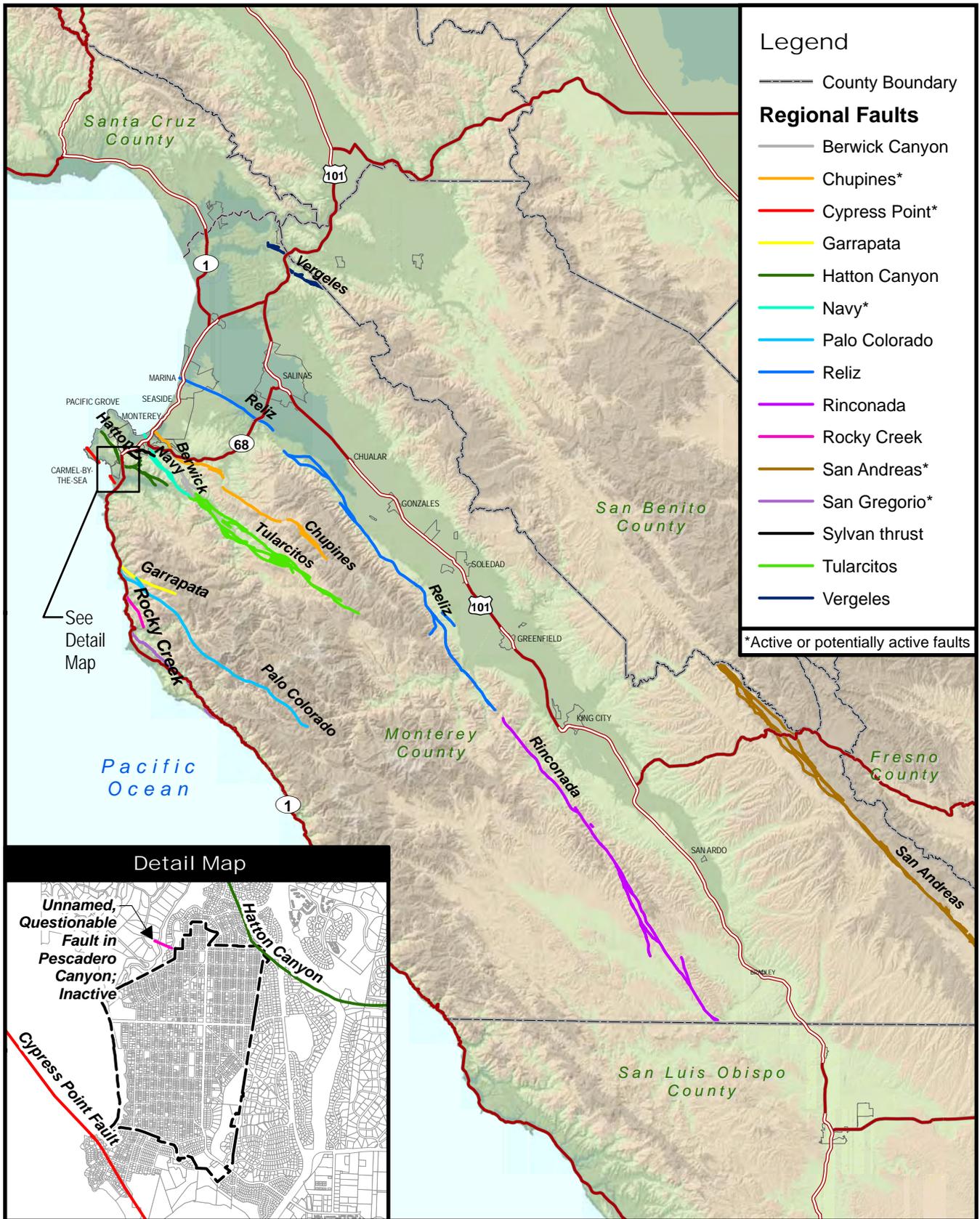
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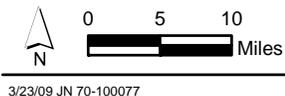
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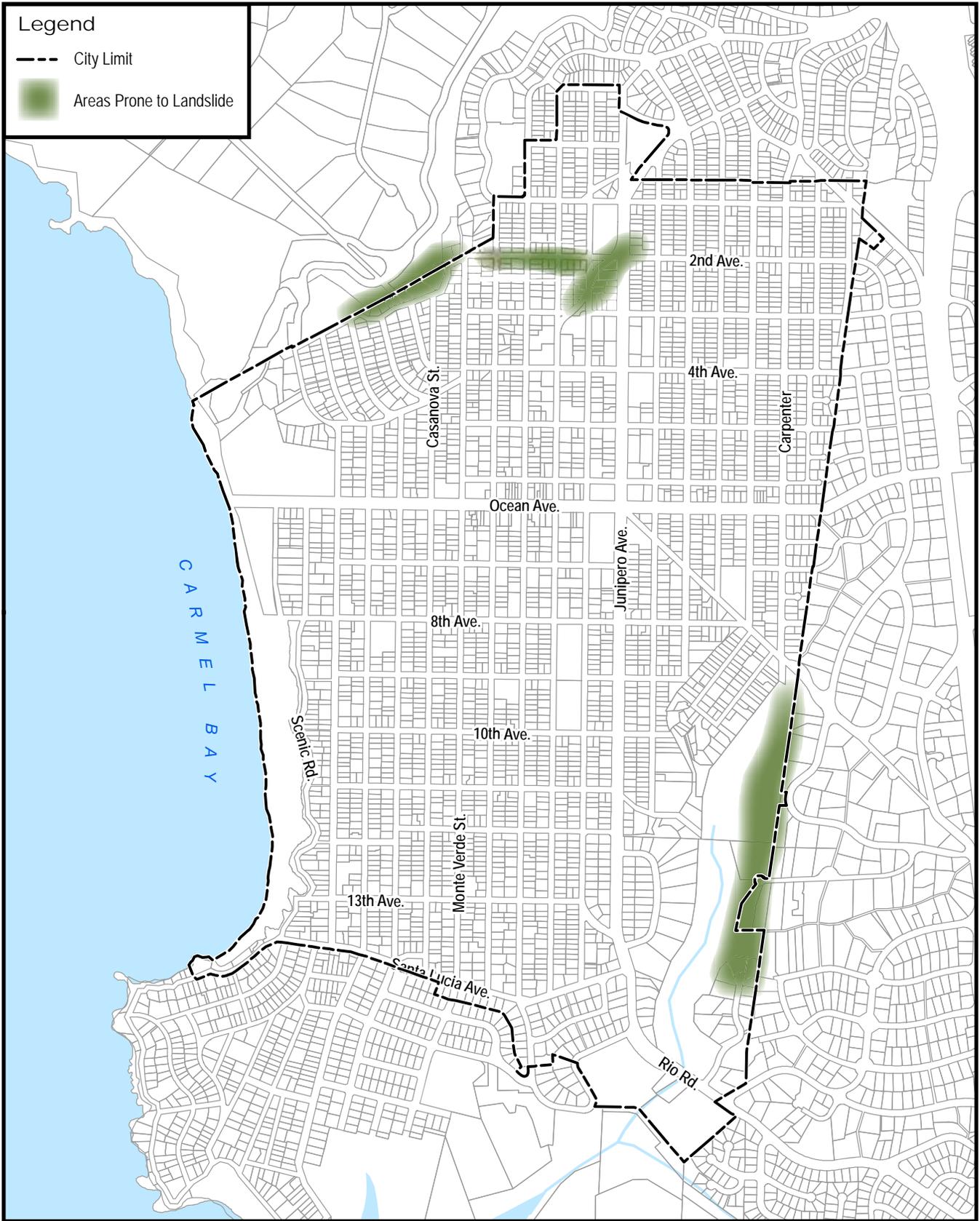


Source: Rosenberg, L.I. (2001)



CARMEL-BY-THE-SEA GENERAL PLAN UPDATE
Regional & Local Faults of Significance

Figure 8.1



Source: City of Carmel-by-the-Sea (2009)

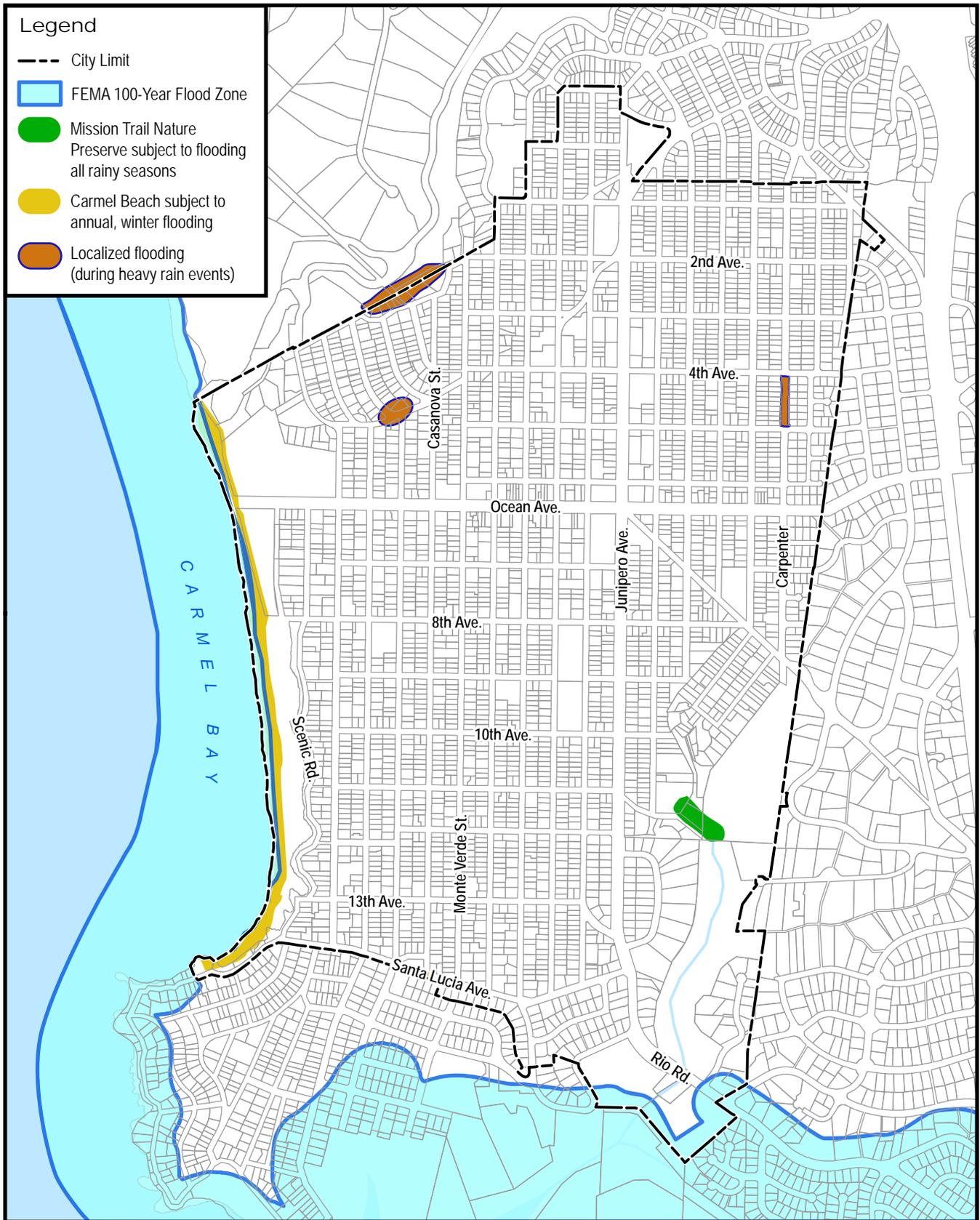


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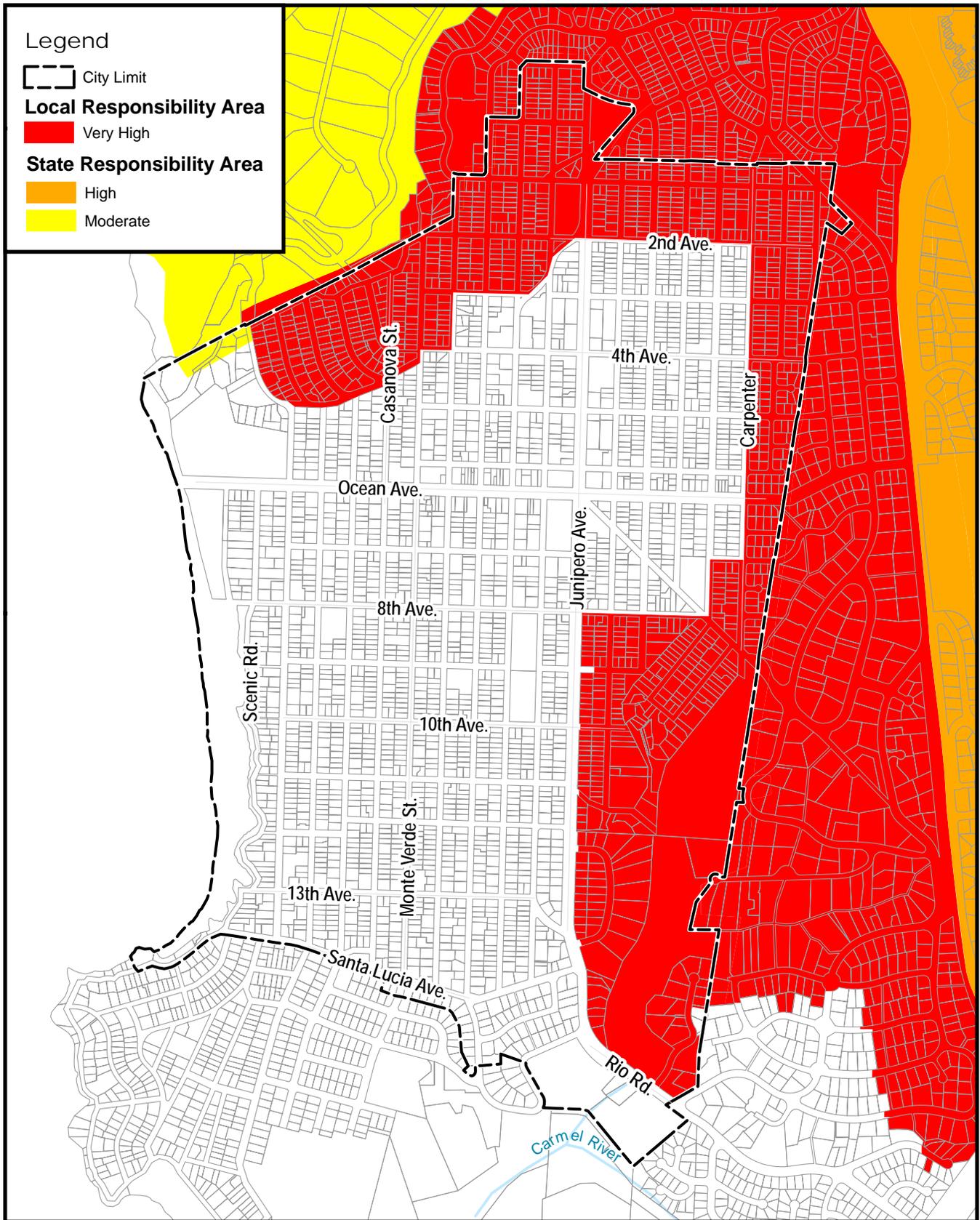
CARMEL-BY-THE-SEA GENERAL PLAN UPDATE

Areas Prone to Landslide

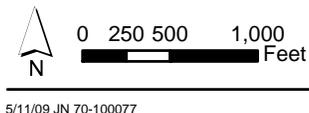
Figure 8.2



Source: City of Carmel-by-the-Sea (2009), and Federal Emergency Management Agency (2009)

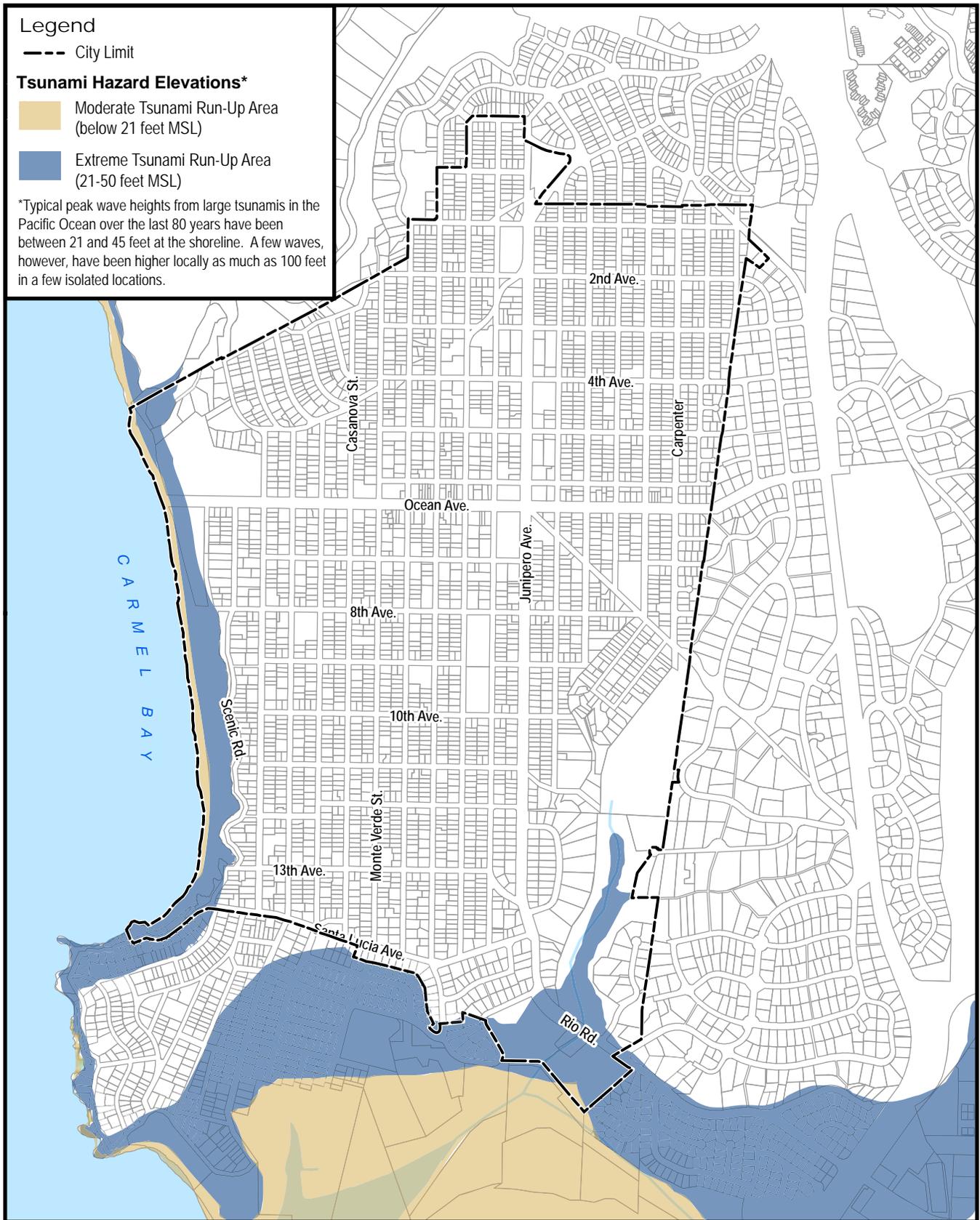


Source: FRAP (2007), & ESRI Data and Maps/StreetMap USA (2002)

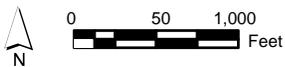


CARMEL-BY-THE-SEA GENERAL PLAN UPDATE
**State and Local Responsibility Area
 Fire Hazard Severity Zones**

Figure 8.4



Source: Monterey County Multi-Jurisdictional Hazard Mitigation Plan (2007)

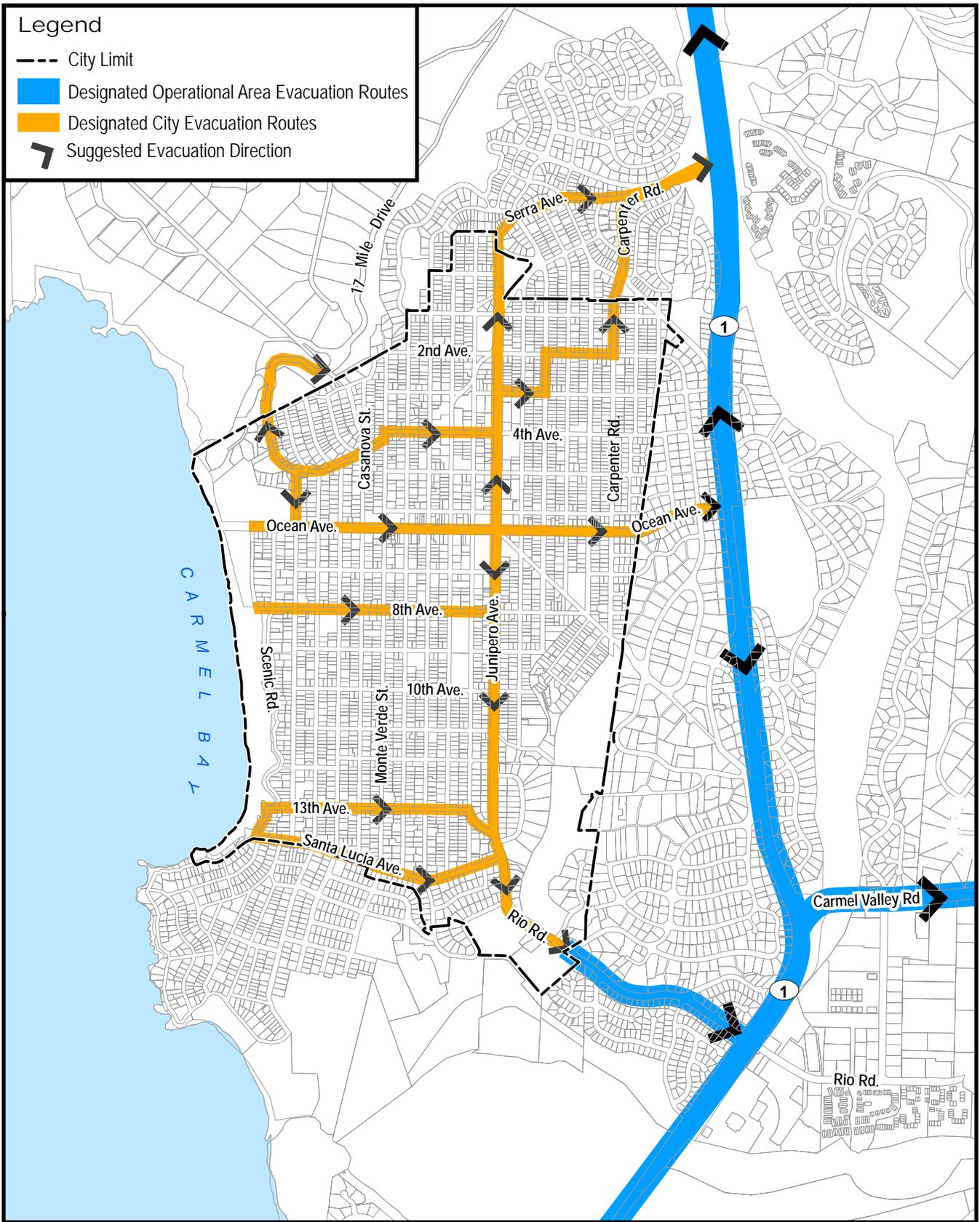


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CARMEL-BY-THE-SEA GENERAL PLAN UPDATE

Tsunami Hazard Areas

Figure 8.5



Source: City of Carmel-by-the-Sea (2009)



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CARMEL-BY-THE-SEA GENERAL PLAN UPDATE
Evacuation Routes

Figure 8.6