City of Carmel-by-the-Sea Potential Adaptation Strategies

Background

Carmel-by-the-Sea (City) is currently experiencing, and will continue to experience, climate change impacts, including stronger storms, increased wildfire risk, sea level rise, extended drought conditions, and increased temperature. The City developed a Climate Adaptation Plan to increase resilience of the community and assets in Carmel-by-the-Sea. In September 2019, a Climate Committee was convened to develop and guide the preparation of the Climate Adaptation Plan. The City published a Climate Change Vulnerability Assessment in July 2021. The Vulnerability Assessment characterizes climate hazards that will impact the community and City-owned assets, describes the community's major climate vulnerabilities, and identifies work that has already been done by the City to improve resilience.

This workbook provides the City's Climate Adatpation Goals, Policies and Actions to take to improve the resilience of its community members, natural environment, infrastructure and built environment. The adaptation goals, policies, and actions were developed to address all priority assets at risk in the City's Vulnerability Assessment. The **All Goals, Policies & Actions** tab shows all adaptation goals, policies and actions developed. The **Near-Term**, **Mid-Term**, and **Long-Term** tabs provides actions to be completed in the near term, mid-term, and long-term, respectively (organized by goal and policy) to support implementation.

Definitions

Goals: Broad statements describing community desires. The Carmel-by-the-Sea adaptation goals are modeled after the Adaptation Vision and Principles developed by the California Governor's Office of Planning and Research (OPR) Integrated Climate Adaptation & Resiliency Program (ICARP). Each goal is focused on increasing the resilience of one of the following broad asset categories: community, natural assets, and infrastructure and the built environment.
Policies: Specific position statements that support the achievement of goals and serve as guides to City Council, Planning Commission, and city staff, when making decisions.
Actions: Specific methods to implement and achieve policies and goals.

City of Carmel-by-the-Sea Adaptation Strategies

Goal/Policy/Action	Climate Hazard	Asset	Metric	Timeframe	Implementation Lead	Cost	Source
Goal 1. A Healthy, Safe, and Resilient Community							
Policy 1.1. Provide effective emergency preparedness and response in anticipation of potential climate-related disasters				Near-term (1-2 years); Mid-term (3-5 years); Long-term (5-10 years)		$-Low (<$50K); $$-Medium ($50K - $100K); $$$-High (>$100K)	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 1.1.1. Maintain and Update Evacuation Plan. Maintain and update an Evacuation Plan every 8 years at a minimum to account for all types of emergencies. The plan should focus on the most vulnerable groups including the elderly community and persons with disabilities.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Evacuation Plan updated every 8 years, with the first update by 2023	Near-term (by 2024) and Ongoing	Police & Fire	$	Suggested by Climate Committee Members
Action 1.1.2. Update Emergency Preparedness. Incorporate climate change risk and impact considerations into Carmel-by-the-Sea CERT programming and materials to promote emergency preparedness at a neighborhood block-by-block scale. CERT to promote block-by-block scale emergency preparedness by organizing City by blocks and recruiting Block Captains.	All	Residents, Local Businesses, Second Homes	Number of block captains formed, climate change risk incorporated into CERT materials	Near-term (by 2024)	Police & Fire	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.1.3. Collaborate with Monterey Fire. Collaborate with Monterey Fire on its inspection and outreach efforts to reduce fire risks. Continue to coordinate with the CERT program and reach out to new potential outreach partners such as local businesses, community groups, and utilities to help distribute information to increase resident and homeowner awareness and knowledge of how to prepare for emergencies.	Wildfire	Residents, Local Businesses, Second Homes	Number of meetings held with Monterey Fire and CERT program; educational materials distributed	Near-term (by 2024)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 1.1.4. Publicize Local Evacuation Routes. Publicize both City and Monterey County evacuation routes for the community on the City's website, and in the newsletter and brochures. Target additional outreach to the most vulnerable such as the elderly and people with disabilities in the event of a wildfire or other disaster.	All	Elderly Population and People with Disabilities, Residents	Educational materials distributed	Near-term (by 2024)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 1.1.5. Evaluate Evacuation Route Capacity. Evaluate evacuation route capacity, safety, and viability under a range of emergency scenarios and identify and implement mitigating actions in 2022, in accordance with Assembly Bill 747.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Analysis evaluating evacuation route capacity completed	Mid-term (by 2027)	Police & Fire	$$	Assembly Bill 747 Requirement
Action 1.1.6. Evacuation Alternatives and Access. Identify neighborhoods that have single ingress/egress, pursuant to Senate Bill 99, and develop and employ evacuation alternatives, such as a gathering facility, and/or alternative emergency access routes in those neighborhoods. Evaluate potential congestion issues in the event of an evacuation and develop and maintain a list of residents who may have difficulty evacuating. Evaluate options to provide evacuation, such as a shuttle service, for residents with mobility challenges.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Analysis identifying neighborhoods that have single ingress/ egress and evacuation alternatives completed; List of limited-mobility residents developed	Mid-term (by 2027)	Police & Fire	$$	Senate Bill 99 Requirement
Action 1.1.7. Develop Local Partnerships to Increase Resistance to Wildfire Structural Damage. Work with local community groups to publicize the Firewise Community Certification program (e.g., on the City website and in the newsletter and brochures) and encourage resident involvement.	Wildfire	Residents, Second Homes	Number of meetings held to publicize Firewise Community Certification	Mid-term (by 2027)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Policy 1.2. Focus adaptation efforts and engagement on the most vulnerable populations.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 1.2.1. Establish a Resilience Hub. Formally designate a physical resilience hub, such as the Youth Center or Public Library, and make it available during extreme heat events, poor air quality, severe weather events, and other highly hazardous conditions for use by the community. Provide the following essential resources in the resilience hub(s): health programming and resources, food, refrigeration, charging stations, basic medical supplies, and other emergency supplies. Electrified heating and cooling paired with backup power sources like battery storage provides redundancy and continues services in the event of a power outage. Designate a virtual resilience hub on the City website where residents can access information about the physical resilience hub and resilience efforts.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Resilience Hub established; Existing facilities upgraded to provide all essential resources	Near-term (by 2024)	Public Works / Police & Fire / Library	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.2.2. Limit the Impacts of Climate Change on the Most Vulnerable Populations. Develop a framework to define equity in Carmel-by-the-Sea and develop adaptation approaches that are equitably implemented.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Carmel-by-the-Sea Equity Framework developed	Mid-term (by 2027)	Community Planning & Building	$	Inspired by the City of Berkeley Existing Building Electrification Strategy
Action 1.2.3. Engage the Community. Develop educational materials notifying the community about the resilience hub and how to access it by sharing updates across city and community channels. Partner with the CERT program and block captains, and community groups, to prioritize disadvantaged/marginalized communities including the elderly and individuals with disabilities.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Community engagement plan developed	Near-term (by 2024)	Library / City Hall / Police Department	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions

Action 1.2.4. Social Support Network. Collaborate with the Carmel Foundation and other community-based organizations (e.g., Carmel Residents Association) to develop an inventory of locations with isolated elderly residents and people with disabilities and develop a plan for a social support network to increase resilience to climate change, for example by promoting home electrification.	All	Elderly Population and People with Disabilities	Social support network created; Inventory of locations created	Mid-term (by 2027)	Police Department / CERT / Community Planning & Building	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.2.5. Back-up Power for Vulnerable Populations. Coordinate with 3CE, PG&E, and emergency management services to establish backup power and emergency grid shutdown protocols that protect the most vulnerable populations.	All	Elderly Population and People with Disabilities	Number of households with backup power established	Long-term (by 2032)	Police & Fire / Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Policy 1.3. Minimize health impacts of climate change.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 1.3.1. Partner with Monterey County Health Department. Coordinate with Monterey County Health Department to develop and enhance disaster and emergency early warning systems to incorporate objective data and information for potential health threats such as heat-illness, and illnesses complicated by low air quality due to climate change hazards. Include information on early warning systems and other resilience efforts on the City's virtual resilience hub (Action 1.2.1.)	All	Elderly Population and People with Disabilities, Residents, Local Businesses, Service Industry Workers	Emergency early warning systems updated	Near-term (by 2024)	Police & Fire	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.3.2. Initiate a Heat Pump Retrofit Program. Create a program to help fund property owners to convert HVAC units to heat pumps, which provide water heating and space heating in addition to cooling and can improve indoor air quality and community adaptation to extreme heat. Include a microgrid energy storage component to increase power reliability. Prioritize at-risk populations for retrofit incentives.	Wildfire, Increased Temperature	Elderly Population and People with Disabilities, Residents, Local Businesses, Service Industry Workers	Number of heat pumps installed; Number of heat pumps serving at risk residents	Mid-term (by 2027)	Community Planning & Building	$$	Inspired by the City of Berkeley Existing Building Electrification Strategy
Action 1.3.3. Invest in Improving Resilience in Critical Facilities. Invest in sustainable backup power sources to provide redundancy and continued services for critical facilities, including City Hall, Carmel Police Department, Carmel Fire Department, the Libraries, and assisted living facilities, in the event of a power outage triggered by a climate event.	All	Elderly Population and People with Disabilities, Residents	Number of critical facilities with sustainable backup power sources.	Mid-term (by2027)	Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.3.4. Conduct a Feasibility Study for Existing Building Electrification and Back-up Power. Perform an electrification feasibility study/existing building analysis in order to understand the potential for, and associated costs of, electrification retrofitting, including heat pumps, along with on-site energy generation and battery storage to provide a more resilient back-up power supply. Establish a plan for reducing or eliminating natural gas from existing buildings, potentially through a reach code, and building resilience to potential electrical grid shutoffs.	Wildfire, Increased Temp	Elderly Population and People with Disabilities, Residents	Feasibility Study for Existing Building Electrification and Back-up Power completed	Mid-term (by 2027)	Public Works	$$	Inspired by the City of Berkeley Existing Building Electrification Strategy
Action 1.3.5. Improve Resilience in Existing Building Stock. Develop a program for identifying funding and incentives to weatherize residential and commercial buildings that addresses severe weather protection, energy efficiency, indoor air quality improvements, and other housing improvements. Include an outreach	All	Elderly Population and People with Disabilities, Residents	Nubmer of retrofitted structures	Long-term (by 2032)	Community Planning & Building	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies (City of Placentia policy) Passive House Principles
Action 1.3.6. Promote Funding Opportunities. Work with partners like 3CE and PG&E to identify and promote potential resilience opportunities and accessible funding and financing mechanisms to pay for building electrification, weatherization, and battery backups.	All	Elderly Population and People with Disabilities, Residents, Local Businesses	Funding identified and promoted to community; Number of projects initiated with incentives	Near-term (by 2024)	Community Planning and Building/Police and Fire/Public Works	$	Inspired by the City of Pacifica All-Electric Reach Code
Policy 1.4. Increase economic resilience.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 1.4.1. Develop Partnerhsips to Provide Support to Displaced Workers. Work in partnership with the Monterey County Workforce Development Board and the Carmel Chamber of Commerce to develop a plan to provide support for displaced workers that establishes education and training partnerships for workers displaced or workers negatively impacted by climate change or climate adaptation policies.	All	Service Industry Workers, Local Businesses	Commitment from business community to develop a plan to support displaced workers	Near-term (by 2024)	Community Planning & Building / City Hall	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 1.4.2. Establish Partnerships to Develop a Resilient Economy. Partner with the County of Monterey Economic Development Department, Carmel Chamber of Commerce, and the Monterey County Workforce Development Board, to develop more integrated strategies for protection of jobs, economic sustenance, and for the protection of vulnerable populations more at-risk of temporary or permanent job dislocation due to climate change.	All	Service Industry Workers, Local Businesses	Number of meetings held to develop strategies for job protection	Mid-term (by 2027)	Community Planning & Building / City Hall	$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 1.4.3. Business Resilience Outreach Program. Collaborate with businesses in the city to better understand shared climate risks and identify opportunities to advance shared climate resilience priorities. Partner with the Carmel Chamber of Commerce and Visit Carmel to pilot and implement a local business resilience initiative to build small business capacity before a time of crisis by increasing the awareness of, and preparedness for, business continuity risks faced by the city's local businesses, providing a toolkit of intervention to help local businesses manage risks and enhance business resilience, and conducting outreach campaigns to engage leaders from the business, government, and community sectors to enhance preparedness for economic resilience.	All	Service Industry Workers, Local Businesses	Toolkit of intervention developed to help support local businesses manage risks and enhance resilience	Near-term (by 2024)	Community Planning & Building / City Hall	$$	Adapted from Gateway Cities Climate Adaptation Model General Plan Language (December 2018)
Action 1.4.4. Hire a Grant Writer/Climate Coordinator. Hire a grant writer/Climate coordinator to pursue available grants to fund climate adaptation implementation and track progress.	All	All	Grant writer/climate coordinator hired	Near-term (by 2024)	City Hall	$$$	Suggested at the 11/18/2021 public meeting
Goal 2. A Natural Environment Resilient to Climate Hazards							
Policy 2.1. Protect and restore climate-vulnerable habitat and ecosystems.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions

Action 2.1.1. Increase Funding for Climate Adaptation. Earmark Capital Improvement Program (CIP) funding for design, permitting, and implementation of adaptation projects and strategies, such as those in the 2021 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) and Integrated Regional Watershed Management Program (IRWMP).	All	Urban Forest, Mission Trail Nature Preserve, North Dunes, Carmel Beach, Water Supply	Number of adaptation projects funded through CIP	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.2. Increase Urban Forest Resilience. Update and implement the Forest Management Plan to: 1. Review and consider modifications to the preferred urbanized tree species that would result in improved resilience in the context of the expected climate of the second half of the century, reduce wildfire hazard, and that takes into account aesthetics and the ecological benefits of natives or near-native (e.g., native species from the Southwestern US or Mexico would likely be preferred to European species). 2. Include planting and maintenance guidelines to improve tree health, particularly in the public right-of-way 3. Incorporate tree species that have greater drought and wildfire resistance 4. In addition to drought-tolerant landscaping, include landscaping guidelines that reduce wildfire hazard on private property. 5. Enhance carbon sequestration potential Update of the Plan should include collaboration and engagement with stakeholders, such as the Monterey Pine Forest Watch, California State University, Monterey Bay, and vulnerable communities.	Drought, Increased Temp, Wildfire	Urban Forest	Forest Management Plan Updated	Near-term (by 2024) and Ongoing	Public Works Forestry Division / Forest and Beach Commission	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.3. Increase Resilience of the Mission Trail Nature Preserve and Pescadero Canyon. Update and implement the Mission Trail Nature Preserve Master Plan to consider the potential impacts of climate change and to reduce wildfire risk for neighboring private properties. Coordinate with CAL FIRE and the Monterey Fire Departments to incorporate Best Practices into an annual maintenance plan, including cost estimates for implementation and revenue sources for implementation. Continue to coordinate with CalFire and the Pebble Beach Community Services District on wildfire mitigation in Pescadero Canyon.	All	Mission Trail Nature Preserve	Mission Trail Nature Preserve Master Plan updated	Mid-term (by 2027) and Ongoing	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.4. Increase Resilience of the North Dunes. Continue to fund maintenance and monitoring at the North Dunes to determine how the changing climate will affect dune habitats. Implement enhancement efforts to improve resilience of the North Dunes.	All	North Dunes	Regular maintenance and monitoring occurring at North Dunes	Ongoing	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.5. Increase Resilience to Stronger Storms. When designing projects in the city, including those recommended in the Mission Trail Stream Stability Study, size improvements to handle larger storms consistent with best available climate change projections.	Stronger Storms	Mission Trail Nature Preserve	Number of projects sizing improvements to handle larger storms.	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.6. Beach Sand Monitoring Program. Reinstate beach sand monitoring program described in the Shoreline Management Plan.	Sea Level Rise	Carmel Beach	Active beach sand monitoring program in place	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 2.1.7. Carmel Cove Sand Supply. Partner with local researchers (e.g., California State University Monterey Bay) or other sources to conduct Carmel Cove sand supply dynamics analysis.	Sea Level Rise	Carmel Beach	Carmel Cove sand supply dynamics analysis completed	Long-term (by 2032)	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Goal 3. Resilient Infrastructure and Built Environment							
Policy 3.1. Support greater resilience, redundancy, and reliability of local and regional infrastructure and the built environment.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 3.1.1. Underground Utilities in Fire Hazard Zones. Determine the feasibility of, and community support for, undergrounding power lines in the Mission Trail Nature Preserve, designated evacuation routes, and in other high priority areas in the Very High Fire Hazard Severity Zone. Develop a plan for undergrounding utilities based on results from the feasibility study and begin implementation in the most vulnerable communities.	Wildfire	Water Supply, Sanitary Sewer System, Power Grid, Overhead Communication, PG&E/Communication Underground Lines-gas, cable	Feasibility Study completed; Plan developed based on Feasibility Study; Number of utilities moved underground	Near-term (by 2024)	Community Planning & Building and Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.2. Increase Green Infrastructure. Modify Capital Improvement Program (CIP) project design to consistently evaluate the potential for green infrastructure to be incorporated in CIP projects in the public right-of-way and on public lands. Identify and develop a green infrastructure pilot project that will reduce runoff volume and capture and infiltrate stormwater, based on projected changes in precipitation amounts due to climate change, and incorporates tree and shrub planting to increase carbon sequestration in the city.	Stronger Storms, Increased Temp, Wildfire	Urban Forest, Storm Drain System	Change in impervious surface coverage.	Near-term (by 2024)	Public Works	$$	Adapted from the Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.3. Public Building Electrification. Identify opportunities to incorporate electrification of City facilities and buildings, including solar photovoltaic power system and battery backup installation, into the Capital Improvement Program (CIP). As an initial step, identify and develop a pilot project to electrify a city building or facility, including the installation of a photovoltaic power system.	Stronger Storms, Wildfire	Power grid, City facilities	Public building electrification pilot project completed	Mid-term (by 2027)	Public Works	$$$	Suggested by City Council
Action 3.1.4. Reduce Stormwater Runoff. Reduce stormwater runoff through implementation of stormwater diversion and infiltration projects that reduce pollution problems caused by more frequent and intense storms and more extreme flooding events.	Stronger Storms	Storm Drain System, Carmel Beach	Stormwater diversion project implemented	Long-term (by 2032)	Public Works	$$$	Suggested by Climate Committee Members

Action 3.1.5. Storm Drain Repair Funding and Improvements. Earmark Capital Improvement Program (CIP) funding for design, permitting and implementation of storm drain repairs. Include strategies in the 2021 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for potential regional funding. Upsize Storm Drain Master Plan (SDMP) improvements, especially when making repairs in the lower reaches of watersheds, to handle larger storms.	Stronger Storms	Storm Drain System	Number of adaptation projects funded through CIP	Near-term (by 2024)	Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.6. Retrofit Existing Critical Buildings and Related Infrastructure. Conduct an evaluation of all first-responder and municipal facilities to determine retrofits that may be needed for long-term resilience to climate change hazards including sea-level rise related flooding and erosion, increased wind/storm events, an increase in high heat days, and/or wildfire depending upon location and risk factors. Develop a budget and schedule for retrofits based on the findings of the municipal facilities. Retrofit existing critical buildings as detailed in the program schedule.	All	Emergency Response Facilities – Fire station, EOC, PD, PW, City Hall, etc., Hospital and Emergency Medical Care Facilities	List of critical buildings and related infrastructure requiring retrofits	Near-term (by 2024)	Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 3.1.7. Water Conservation. Partner with the Monterey Peninsula Water Management District to reduce water demand and increase water recycling, such as stormwater capture and grey water reuse, through education and outreach. Provide information and incentives for residential water use reduction, focusing engagement on vulnerable communities first.	Drought	Water Supply	Water demand reduced, incentives for grey water reuse developed and shared	Near-term (by 2024)	Community Planning & Building and Public Works	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.8. Bluff Structural Monitoring Program. Implement bluff structural monitoring program and do follow-up monitoring post-storm to identify additional footing stability issues.	Sea Level Rise	Carmel Beach	Bluff structural monitoring program implemented	Mid-term (by 2027)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.9. Sea Level Rise Coastal Vulnerability Study. Hire coastal engineer with experience in planning for climate change to: 1. Conduct research and prepare a Sea-Level Rise Vulnerability Study to further assess the risks to the city's coastal assets, including the beach, sea walls, revetments, bluffs, stairs and access, public bathrooms, parking areas, drainage infrastructure, and utilities. 2. Determine adaptation measures and Local Coastal Program policy options, including but not limited to: a) Mostly natural, unarmored North Dunes area; b) mostly armored bluffs along Scenic Roach south of 8th Avenue; c) Unarmored dunes along private property between 8th Avenue and Del Mar Parking Lot; d) Armored private properties on the bluffs at the north end of the City (Pescadero Canyon area). 3. Evaluate the use of thresholds for phasing adaptation projects based on changing coastal conditions. Consider applying an adaptive pathways approach which establishes trigger thresholds for different adaptive measures based on the severity of the impact from flooding and erosion associated with sea-level rise.	Sea Level Rise	Carmel Beach, Shoreline Access Infrastructure, Seawall and Revetments	Sea-level rise vulnerability study completed	Near-term (by 2024)	Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.1.10. Wastewater Treatment. Collaborate with the Carmel Area Wastewater District (CAWD) to increase the facility's resilience to sea level rise and stronger storms. Maintain staff/council personnel as liaisons to CAWD.	Sea Level Rise, Stronger Storms	Water Supply, Storm Drain System	Number of collaboration meetings with CAWD regarding facility's resilience	Near-term (by 2024) and Ongoing	Community Planning & Building and Public Works	$	Suggested by Climate Committee Members
Policy 3.2. Incorporate climate change adaptation into relevant plans and standards.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions
Action 3.2.1. Development Standards. Evaluate City's development standards for consistency with best practices for reducing climate change risk (e.g., wildfire risk) for both new and existing development, including but not limited to incorporating defensible space design in landscaping guidelines and permitting the use of fire-resistant building materials that may conflict with current Design Guidelines. Develop a project checklist for building and site adaptation measures. The checklist, included with permit applications, should serve to provide education to permit applicants on modifications to site plans and structures that can improve a project's resilience to existing and potential future climate change hazards.	All	Residents, Local Businesses, Second Homes	Number of projects implementing adaptation measures, City development standards consistent with best practices for reducing wildfire risk	Mid-term (by 2027)	Community Planning and Building	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.2.2. Update City Planning Guidelines. Update the City's municipal code to maintain consistency with current California codes (California Building Code Chapter 7 and California Residential Code R337) throughout the City.	Wildfire, Stronger Storms, Wildfire	Residents, Local Businesses, Second Homes	City municipal code consistent with current California codes	Near-term (by 2024)	Community Planning and Building	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)
Action 3.2.3. Incorporate Climate Change Adaptation into Local Plans. Prioritize the update of local plans, including the Climate Change Vulnerability Assessment, Local Coastal Program, General Plan, Mission Trails Nature Reserve Master Plan, Del Mar Master Plan, Shoreline Management Plan, and drought planning to promote climate change resilience as new information is available.	All	All	Number plans updated to incorporate adaptation	Mid-term (by 2027)	Community Planning & Building / Public Works	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies
Action 3.2.4. Update Shoreline Management Plan. Update Shoreline Management Plan and Local Coastal Program based on results of Sea-level Rise Vulnerability Study.	Sea Level Rise	Carmel Beach	Shoreline Management Plan and Local Coastal Program updated	Long-term (by 2032)	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)

Action 3.2.5. Multi-Jurisdictional Hazard Mitigation Plan. Maintain a comprehensive list of projects, based on existing plans and gaps identified in the Vulnerability Assessment, to provide to Monterey County during updates to the Monterey County Multi-Jurisdictional Hazard Mitigation Plan in 2022 and beyond.	All	All	Number of adaptation projects included in the Multi-Jurisdictional Hazard Mitigation Plan	Near-term (by 2024)	Community Planning & Building, Police, and Public Works	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)

City of Carmel-by-the-Sea Near-Term/Ongoing Adaptation Strategies

Goal/Policy/Action	Climate Hazard	Asset	Metric	Timeframe	Implementation Lead	Cost	Source	Status	Notes
Goal 1. A Healthy, Safe, and Resilient Community									
Policy 1.1. Provide effective emergency preparedness and response in anticipation of potential climate-related disasters				Near-term (1-2 years); Mid-term (3-5 years); Long-term (5-10 years)		$-Low (<$50K); $$-Medium ($50K - $100K); $$$-High (>$100K)	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.1.1. Maintain and Update Evacuation Plan. Maintain and update an Evacuation Plan every 8 years at a minimum to account for all types of emergencies. The plan should focus on the most vulnerable groups including the elderly community and persons with disabilities.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Evacuation Plan updated every 8 years, with the first update by 2023	Near-term (by 2024) and Ongoing	Police & Fire	$	Suggested by Climate Committee Members		
Action 1.1.2. Update Emergency Preparedness. Incorporate climate change risk and impact considerations into Carmel-by-the-Sea CERT programming and materials to promote emergency preparedness at a neighborhood block-by-block scale. CERT to promote block-by-block scale emergency preparedness by organizing City by blocks and recruiting Block Captains.	All	Residents, Local Businesses, Second Homes	Number of block captains formed, climate change risk incorporated into	Near-term (by 2024)	Police & Fire	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 1.1.3. Collaborate with Monterey Fire. Collaborate with Monterey Fire on its inspection and outreach efforts to reduce fire risks. Continue to coordinate with the CERT program and reach out to new potential outreach partners such as local businesses, community groups, and utilities to help distribute information to increase resident and homeowner awareness and knowledge of how to prepare for emergencies.	Wildfire	Residents, Local Businesses, Second Homes	Number of meetings held with Monterey Fire and CERT program; educational materials distributed	Near-term (by 2024)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	5%	Monterey Fire and Fire Safety Council for Monterey County both attended Earth Day 2023, where they brought information for FireSafe Communities for residents
Action 1.1.4. Publicize Local Evacuation Routes. Publicize both City and Monterey County evacuation routes for the community on the City's website, and in the newsletter and brochures. Target additional outreach to the most vulnerable such as the elderly and people with disabilities in the event of a wildfire or other disaster.	All	Elderly Population and People with Disabilities, Residents	Educational materials distributed	Near-term (by 2024)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)		
Policy 1.2. Focus adaptation efforts and engagement on the most vulnerable populations.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.2.1. Establish a Resilience Hub. Formally designate a physical resilience hub, such as the Youth Center or Public Library, and make it available during extreme heat events, poor air quality, severe weather events, and other highly hazardous conditions for use by the community. Provide the following essential resources in the resilience hub(s): health programming and resources, food, refrigeration, charging stations, basic medical supplies, and other emergency supplies. Electrified heating and cooling paired with backup power sources like battery storage provides redundancy and continues services in the event of a power outage. Designate a virtual resilience hub on the City website where residents can access information about the physical resilience hub and resilience efforts.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Resilience Hub established; Existing facilities upgraded to provide all essential resources	Near-term (by 2024)	Public Works / Police & Fire / Library	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions	0%	
Action 1.2.3. Engage the Community. Develop educational materials notifying the community about the resilience hub and how to access it by sharing updates across city and community channels. Partner with the CERT program and block captains, and community groups, to prioritize disadvantaged/marginalized communities including the elderly and individuals with disabilities.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Community engagement plan developed	Near-term (by 2024)	Library / City Hall / Police Department	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions	0%	
Policy 1.3. Minimize health impacts of climate change.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.3.1. Partner with Monterey County Health Department. Coordinate with Monterey County Health Department to develop and enhance disaster and emergency early warning systems to incorporate objective data and information for potential health threats such as heat-illness, and illnesses complicated by low air quality due to climate change hazards. Include information on early warning systems and other resilience efforts on the City's virtual resilience hub (Action 1.2.1.)	All	Elderly Population and People with Disabilities, Residents, Local Businesses, Service Industry Workers	Emergency early warning systems updated	Near-term (by 2024)	Police & Fire	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 1.3.6. Promote Funding Opportunities. Work with partners like 3CE and PG&E to identify and promote potential resilience opportunities and accessible funding and financing mechanisms to pay for building electrification, weatherization, and battery backups.	All	Elderly Population and People with Disabilities, Residents, Local Businesses	Funding identified and promoted to community; Number of projects initiated with incentives	Near-term (by 2024)	Community Planning and Building/Police and Fire/Public Works	$	Inspired by the City of Pacifica All-Electric Reach Code	5%	Energy Efficiency Study (Willdan); Electric Heat Pumps in City Facilities; 3CE - sweeper (Rob); PG&E EV Chargers (Javier)
Policy 1.4. Increase economic resilience.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 1.4.1. Develop Partnerhsips to Provide Support to Displaced Workers. Work in partnership with the Monterey County Workforce Development Board and the Carmel Chamber of Commerce to develop a plan to provide support for displaced workers that establishes education and training partnerships for workers displaced or workers negatively impacted by climate change or climate adaptation policies.	All	Service Industry Workers, Local Businesses	Commitment from business community to develop a plan to support displaced workers	Near-term (by 2024)	Community Planning & Building / City Hall	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies	0%	Although not related to this specific topic, CCC helped organize our inaugural Earth Day event in 2023; this can be considered development of this partnership
Action 1.4.3. Business Resilience Outreach Program. Collaborate with businesses in the city to better understand shared climate risks and identify opportunities to advance shared climate resilience priorities. Partner with the Carmel Chamber of Commerce and Visit Carmel to pilot and implement a local business resilience initiative to build small business capacity before a time of crisis by increasing the awareness of, and preparedness for, business continuity risks faced by the city's local businesses, providing a toolkit of intervention to help local businesses manage risks and enhance business resilience, and conducting outreach campaigns to engage leaders from the business, government, and community sectors to enhance preparedness for economic resilience.	All	Service Industry Workers, Local Businesses	Toolkit of intervention developed to help support local businesses manage risks and enhance resilience	Near-term (by 2024)	Community Planning & Building / City Hall	$$	Adapted from Gateway Cities Climate Adaptation Model General Plan Language (December 2018)	0%	
Action 1.4.4. Hire a Grant Writer/Climate Coordinator. Hire a grant writer/Climate coordinator to pursue available grants to fund climate adaptation implementation and track progress.	All	All	Grant writer/climate coordinator hired	Near-term (by 2024)	City Hall	$$$	Suggested at the 11/18/2021 public meeting	0%	
Goal 2. A Natural Environment Resilient to Climate Hazards									
Policy 2.1. Protect and restore climate-vulnerable habitat and ecosystems.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 2.1.1. Increase Funding for Climate Adaptation. Earmark Capital Improvement Program (CIP) funding for design, permitting, and implementation of adaptation projects and strategies, such as those in the 2021 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) and Integrated Regional Watershed Management Program (IRWMP).	All	Urban Forest, Mission Trail Nature Preserve, North Dunes, Carmel Beach, Water Supply	Number of adaptation projects funded through CIP	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	
Action 2.1.2. Increase Urban Forest Resilience. Update and implement the Forest Management Plan to: 1. Review and consider modifications to the preferred urbanized tree species that would result in improved resilience in the context of the expected climate of the second half of the century, reduce wildfire hazard, and that takes into account aesthetics and the ecological benefits of natives or near-native (e.g., native species from the Southwestern US or Mexico would likely be preferred to European species). 2. Include planting and maintenance guidelines to improve tree health, particularly in the public right-of-way 3. Incorporate tree species that have greater drought and wildfire resistance 4. In addition to drought-tolerant landscaping, include landscaping guidelines that reduce wildfire hazard on private property. 5. Enhance carbon sequestration potential Update of the Plan should include collaboration and engagement with stakeholders, such as the Monterey Pine Forest Watch, California State University, Monterey Bay, and vulnerable communities.	Drought, Increased Temp, Wildfire	Urban Forest	Forest Management Plan Updated	Near-term (by 2024) and Ongoing	Public Works Forestry Division / Forest and Beach Commission	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	30%	Update of Urban Forest Master Plan in progress, community survey almost closed and draft is completed

Action 2.1.4. Increase Resilience of the North Dunes. Continue to fund maintenance and monitoring at the North Dunes to determine how the changing climate will affect dune habitats. Implement enhancement efforts to improve resilience of the North Dunes.	All	North Dunes	Regular maintenance and monitoring occurring at North Dunes	Ongoing	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	80%	ND project has been onging since 2016 with CDP renewed til Aug. 2016; DD&A recently contracted to continue restoration work
Action 2.1.5. Increase Resilience to Stronger Storms. When designing projects in the city, including those recommended in the Mission Trail Stream Stability Study, size improvements to handle larger storms consistent with best available climate change projections.	Stronger Storms	Mission Trail Nature Preserve	Number of projects sizing improvements to handle larger storms.	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	5%	
Action 2.1.6. Beach Sand Monitoring Program. Reinstate beach sand monitoring program described in the Shoreline Management Plan.	Sea Level Rise	Carmel Beach	Active beach sand monitoring program in place	Near-term (by 2024)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	Coastal Engineering Adaptation Project underway
Goal 3. Resilient Infrastructure and Built Environment									
Policy 3.1. Support greater resilience, redundancy, and reliability of local and regional infrastructure and the built environment.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.1.1. Underground Utilities in Fire Hazard Zones. Determine the feasibility of, and community support for, undergrounding power lines in the Mission Trail Nature Preserve, designated evacuation routes, and in other high priority areas in the Very High Fire Hazard Severity Zone. Develop a plan for undergrounding utilities based on results from the feasibility study and begin implementation in the most vulnerable communities.	Wildfire	Water Supply, Sanitary Sewer System, Power Grid, Overhead Communication, PG&E/Communication Underground Lines-gas, cable	Feasibility Study completed; Plan developed based on Feasibility Study; Number of utilities moved underground	Near-term (by 2024)	Community Planning & Building and Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	
Action 3.1.2. Increase Green Infrastructure. Modify Capital Improvement Program (CIP) project design to consistently evaluate the potential for green infrastructure to be incorporated in CIP projects in the public right-of-way and on public lands. Identify and develop a green infrastructure pilot project that will reduce runoff volume and capture and infiltrate stormwater, based on projected changes in precipitation amounts due to climate change, and incorporates tree and shrub planting to increase carbon sequestration in the city.	Stronger Storms, Increased Temp, Wildfire	Urban Forest, Storm Drain System	Change in impervious surface coverage.	Near-term (by 2024)	Public Works	$$	Adapted from the Carmel-by-the-Sea Vulnerability Assessment (July 2021)	5%	Prepared stormwater management plan Initiated stormwtaer projects
Action 3.1.4. Storm Drain Repair Funding and Improvements. Earmark Capital Improvement Program (CIP) funding for design, permitting and implementation of storm drain repairs. Include strategies in the 2021 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for potential regional funding. Upsize Storm Drain Master Plan (SDMP) improvements, especially when making repairs in the lower reaches of watersheds, to handle larger storms.	Stronger Storms	Storm Drain System	Number of adaptation projects funded through CIP	Near-term (by 2024)	Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	5%	Prepared stormwater management plan Initiated stormwtaer projects
Action 3.1.5. Retrofit Existing Critical Buildings and Related Infrastructure. Conduct an evaluation of all first-responder and municipal facilities to determine retrofits that may be needed for long-term resilience to climate change hazards including sea-level rise related flooding and erosion, increased wind/storm events, an increase in high heat days, and/or wildfire depending upon location and risk factors. Develop a budget and schedule for retrofits based on the findings of the municipal facilities. Retrofit existing critical buildings as detailed in the program schedule.	All	Emergency Response Facilities – Fire station, EOC, PD, PW, City Hall, etc., Hospital and Emergency Medical Care Facilities	List of critical buildings and related infrastructure requiring retrofits	Near-term (by 2024)	Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies	0%	
Action 3.1.6. Water Conservation. Partner with the Monterey Peninsula Water Management District to reduce water demand and increase water recycling, such as stormwater capture and grey water reuse, through education and outreach. Provide information and incentives for residential water use reduction, focusing engagement on vulnerable communities first.	Drought	Water Supply	Water demand reduced, incentives for grey water reuse developed and shared	Near-term (by 2024)	Community Planning & Building and Public Works	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	5%	MPWMD attended Earth Day 2023 and provided outreach to attendees
Action 3.1.8. Sea Level Rise Coastal Vulnerability Study. Hire coastal engineer with experience in planning for climate change to: 1. Conduct research and prepare a Sea-Level Rise Vulnerability Study to further assess the risks to the city's coastal assets, including the beach, sea walls, revetments, bluffs, stairs and access, public bathrooms, parking areas, drainage infrastructure, and utilities. 2. Determine adaptation measures and Local Coastal Program policy options, including but not limited to: a) Mostly natural, unarmored North Dunes area; b) mostly armored bluffs along Scenic Roach south of 8th Avenue; c) Unarmored dunes along private property between 8th Avenue and Del Mar Parking Lot; d) Armored private properties on the bluffs at the north end of the City (Pescadero Canyon area). 3. Evaluate the use of thresholds for phasing adaptation projects based on changing coastal conditions. Consider applying an adaptive pathways approach which establishes trigger thresholds for different adaptive measures based on the severity of the impact from flooding and erosion associated with sea-level rise.	Sea Level Rise	Carmel Beach, Shoreline Access Infrastructure, Seawall and Revetments	Sea-level rise vulnerability study completed	Near-term (by 2024)	Public Works	$$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	15%	Coastal Engineering Adaptation Project underway
Action 3.1.9. Wastewater Treatment. Collaborate with the Carmel Area Wastewater District (CAWD) to increase the facility's resilience to sea level rise and stronger storms. Maintain staff/council personnel as liaisons to CAWD.	Sea Level Rise, Stronger Storms	Water Supply, Storm Drain System	Number of collaboration meetings with CAWD regarding facility's resilience	Near-term (by 2024) and Ongoing	Community Planning & Building and Public Works	$	Suggested by Climate Committee Members	30%	Pipe-bursting underway, CAWD sent 60% proposal and aim for 90% soon
Policy 3.2. Incorporate climate change adaptation into relevant plans and standards.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.2.2. Update City Planning Guidelines. Update the City's municipal code to maintain consistency with current California codes (California Building Code Chapter 7 and California Residential Code R337) throughout the City.	Wildfire, Stronger Storms, Wildfire	Residents, Local Businesses, Second Homes	City municipal code consistent with current California codes	Near-term (by 2024)	Community Planning and Building	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)		
Action 3.2.5. Multi-Jurisdictional Hazard Mitigation Plan. Maintain a comprehensive list of projects, based on existing plans and gaps identified in the Vulnerability Assessment, to provide to Monterey County during updates to the Monterey County Multi-Jurisdictional Hazard Mitigation Plan in 2022 and beyond.	All	All	Number of adaptation projects included in the Multi-Jurisdictional Hazard Mitigation Plan	Near-term (by 2024)	Community Planning & Building, Police, and Public Works	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	

City of Carmel-by-the-Sea Mid-Term Adaptation Strategies

Goal/Policy/Action	Climate Hazard	Asset	Metric	Timeframe	Implementation Lead	Cost	Source	Status	Notes
Goal 1. A Healthy, Safe, and Resilient Community									
Policy 1.1. Provide effective emergency preparedness and response in anticipation of potential climate-related disasters				Near-term (1-2 years); Mid-term (3-5 years); Long-term (5-10 years)		$-Low (<$50K); $$-Medium ($50K - $100K); $$$-High (>$100K)	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.1.5. Evaluate Evacuation Route Capacity. Evaluate evacuation route capacity, safety, and viability under a range of emergency scenarios and identify and implement mitigating actions in 2022, in accordance with Assembly Bill 747.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Analysis evaluating evacuation route capacity completed	Mid-term (by 2027)	Police & Fire	$$	Assembly Bill 747 Requirement		
Action 1.1.6. Evacuation Alternatives and Access. Identify neighborhoods that have single ingress/egress, pursuant to Senate Bill 99, and develop and employ evacuation alternatives, such as a gathering facility, and/or alternative emergency access routes in those neighborhoods. Evaluate potential congestion issues in the event of an evacuation and develop and maintain a list of residents who may have difficulty evacuating. Evaluate options to provide evacuation, such as a shuttle service, for residents with mobility challenges.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Analysis identifying neighborhoods that have single ingress/egress and evacuation alternatives completed; List of limited-mobility residents developed	Mid-term (by 2027)	Police & Fire	$$	Senate Bill 99 Requirement		
Action 1.1.7. Develop Local Partnerships to Increase Resistance to Wildfire Structural Damage. Work with local community groups to publicize the Firewise Community Certification program (e.g., on the City website and in the newsletter and brochures) and encourage resident involvement.	Wildfire	Residents, Second Homes	Number of meetings held to publicize Firewise Community Certification	Mid-term (by 2027)	Police & Fire	$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)		
Policy 1.2. Focus adaptation efforts and engagement on the most vulnerable populations.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.2.2. Limit the Impacts of Climate Change on the Most Vulnerable Populations. Develop a framework to define equity in Carmel-by-the-Sea and develop adaptation approaches that are equitably implemented.	All	Elderly Population and People with Disabilities, Residents, Service Industry Workers	Carmel-by-the-Sea Equity Framework developed	Mid-term (by 2027)	Community Planning & Building	$	Inspired by the City of Berkeley Existing Building Electrification Strategy		
Action 1.2.4. Social Support Network. Collaborate with the Carmel Foundation and other community-based organizations (e.g., Carmel Residents Association) to develop an inventory of locations with isolated elderly residents and people with disabilities and develop a plan for a social support network to increase resilience to climate change, for example by promoting home electrification.	All	Elderly Population and People with Disabilities	Social support network created; Inventory of locations created	Mid-term (by 2027)	Police Department / CERT / Community Planning & Building	$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Policy 1.3. Minimize health impacts of climate change.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.3.2. Initiate a Heat Pump Retrofit Program. Create a program to help fund property owners to convert HVAC units to heat pumps, which provide water heating and space heating in addition to cooling and can improve indoor air quality and community adaptation to extreme heat. Include a microgrid energy storage component to increase power reliability. Prioritize at-risk populations for retrofit incentives.	Wildfire, Increased Temperature	Elderly Population and People with Disabilities, Residents, Local Businesses, Service Industry Workers	Number of heat pumps installed; Number of heat pumps serving at risk residents	Mid-term (by 2027)	Community Planning & Building	$$	Inspired by the City of Berkeley Existing Building Electrification Strategy	5%	We have promoted 3CE's electric heat pump rebate programs but I don't believe we have created our own
Action 1.3.3. Invest in Improving Resilience in Critical Facilities. Invest in sustainable backup power sources to provide redundancy and continued services for critical facilities, including City Hall, Carmel Police Department, Carmel Fire Department, the Libraries, and assisted living facilities, in the event of a power outage triggered by a climate event.	All	Elderly Population and People with Disabilities, Residents	Number of critical facilities with sustainable backup power sources.	Mid-term (by2027)	Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions	5%	Police building renovation proj has been initiated; City Hall improvements
Action 1.3.4. Conduct a Feasibility Study for Existing Building Electrification and Back-up Power. Perform an electrification feasibility study/existing building analysis in order to understand the potential for, and associated costs of, electrification retrofitting, including heat pumps, along with on-site energy generation and battery storage to provide a more resilient back-up power supply. Establish a plan for reducing or eliminating natural gas from existing buildings, potentially through a reach code, and building resilience to potential electrical grid shutoffs.	Wildfire, Increased Temp	Elderly Population and People with Disabilities, Residents	Feasibility Study for Existing Building Electrification and Back-up Power completed	Mid-term (by 2027)	Public Works	$$	Inspired by the City of Berkeley Existing Building Electrification Strategy	5%	Wallace Group conducted energy efficiency study Heat pumps placed in PW, libraries, FD, City Hall
Policy 1.4. Increase economic resilience.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 1.4.2. Establish Partnerships to Develop a Resilient Economy. Partner with the County of Monterey Economic Development Department, Carmel Chamber of Commerce, and the Monterey County Workforce Development Board, to develop more integrated strategies for protection of jobs, economic sustenance, and for the protection of vulnerable populations more at-risk of temporary or permanent job dislocation due to climate change.	All	Service Industry Workers, Local Businesses	Number of meetings held to develop strategies for job protection	Mid-term (by 2027)	Community Planning & Building / City Hall	$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Goal 2. A Natural Environment Resilient to Climate Hazards									
Policy 2.1. Protect and restore climate-vulnerable habitat and ecosystems.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 2.1.3. Increase Resilience of the Mission Trail Nature Preserve and Pescadero Canyon. Update and implement the Mission Trail Nature Preserve Master Plan to consider the potential impacts of climate change and to reduce wildfire risk for neighboring private properties. Coordinate with CAL FIRE and the Monterey Fire Departments to incorporate Best Practices into an annual maintenance plan, including cost estimates for implementation and revenue sources for implementation. Continue to coordinate with CalFire and the Pebble Beach Community Services District on wildfire mitigation in Pescadero Canyon.	All	Mission Trail Nature Preserve	Mission Trail Nature Preserve Master Plan updated	Mid-term (by 2027) and Ongoing	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	
Goal 3. Resilient Infrastructure and Built Environment									
Policy 3.1. Support greater resilience, redundancy, and reliability of local and regional infrastructure and the built environment.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.1.3. Public Building Electrification. Identify opportunities to incorporate electrification of City facilities and buildings, including solar photovoltaic power system and battery backup installation, into the Capital Improvement Program (CIP). As an initial step, identify and develop a pilot project to electrify a city building or facility, including the installation of a photovoltaic power system.	Stronger Storms, Wildfire	Power grid, City facilities	Public building electrification pilot project completed	Mid-term (by 2027)	Public Works	$$$	Suggested by City Council	0%	
Action 3.1.8. Bluff Structural Monitoring Program. Implement bluff structural monitoring program and do follow-up monitoring post-storm to identify additional footing stability issues.	Sea Level Rise	Carmel Beach	Bluff structural monitoring program implemented	Mid-term (by 2027)	Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	30%	Coastal Engineering study related Phase I, Task I
Policy 3.2. Incorporate climate change adaptation into relevant plans and standards.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.2.1. Development Standards. Evaluate City's development standards for consistency with best practices for reducing climate change risk (e.g., wildfire risk) for both new and existing development, including but not limited to incorporating defensible space design in landscaping guidelines and permitting the use of fire-resistant building materials that may conflict with current Design Guidelines. Develop a project checklist for building and site adaptation measures. The checklist, included with permit applications, should serve to provide education to permit applicants on modifications to site plans and structures that can improve a project's resilience to existing and potential future climate change hazards.	All	Residents, Local Businesses, Second Homes	Number of projects implementing adaptation measures, City development standards consistent with best practices for reducing wildfire risk	Mid-term (by 2027)	Community Planning and Building	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)		
Action 3.2.3. Incorporate Climate Change Adaptation into Local Plans. Prioritize the update of local plans, including the Climate Change Vulnerability Assessment, Local Coastal Program, General Plan, Mission Trails Nature Reserve Master Plan, Del Mar Master Plan, Shoreline Management Plan, and drought planning to promote climate change resilience as new information is available.	All	All	Number plans updated to incorporate adaptation	Mid-term (by 2027)	Community Planning & Building / Public Works	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies	10%	Coastal Engineering study related Phase II received CCC grant funding

City of Carmel-by-the-Sea Long-Term Adaptation Strategies

Goal/Policy/Action	Climate Hazard	Asset	Metric	Timeframe	Implementation Lead	Cost	Source	Status	Notes
Goal 1. A Healthy, Safe, and Resilient Community									
Policy 1.2. Focus adaptation efforts and engagement on the most vulnerable populations.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.2.5. Back-up Power for Vulnerable Populations. Coordinate with 3CE, PG&E, and emergency management services to establish backup power and emergency grid shutdown protocols that protect the most vulnerable populations.	All	Elderly Population and People with Disabilities	Number of households with backup power established	Long-term (by 2032)	Police & Fire / Public Works	$$$	Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions	0%	
Policy 1.3. Minimize health impacts of climate change.							Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies		
Action 1.3.5. Improve Resilience in Existing Building Stock. Develop a program for identifying funding and incentives to weatherize residential and commercial buildings that addresses severe weather protection, energy efficiency, indoor air quality improvements, and other housing improvements. Include an outreach campaign as part of this program to advertise the benefits of weatherizing and	All	Elderly Population and People with Disabilities, Residents	Nubmer of retrofitted structures	Long-term (by 2032)	Community Planning & Building	$$	Adapted from the Southern California Adaptation Planning Guide, Appendix F - General Plan and Local Coastal Plan Model Policies (City of Placentia policy) Passive House Principles	0% 0%	
Goal 2. A Natural Environment Resilient to Climate Hazards									
Policy 2.1. Protect and restore climate-vulnerable habitat and ecosystems.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 2.1.7. Carmel Cove Sand Supply. Partner with local researchers (e.g., California State University Monterey Bay) or other sources to conduct Carmel Cove sand supply dynamics analysis.	Sea Level Rise	Carmel Beach	Carmel Cove sand supply dynamics analysis completed	Long-term (by 2032)	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	
Goal 3. Resilient Infrastructure and Built Environment									
Policy 3.1. Support greater resilience, redundancy, and reliability of local and regional infrastructure and the built environment.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.1.3. Reduce Stormwater Runoff. Reduce stormwater runoff through implementation of stormwater diversion and infiltration projects that reduce pollution problems caused by more frequent and intense storms and more extreme flooding events.	Stronger Storms	Storm Drain System, Carmel Beach	Stormwater diversion project implemented	Long-term (by 2032)	Public Works	$$$	Suggested by Climate Committee Members	5%	
Policy 3.2. Incorporate climate change adaptation into relevant plans and standards.							Adapted from the Southern California Adaptation Planning Guide, Appendix B Matrix of Adaptation Strategies and Actions		
Action 3.2.4. Update Shoreline Management Plan. Update Shoreline Management Plan and Local Coastal Program based on results of Sea-level Rise Vulnerability Study.	Sea Level Rise	Carmel Beach	Shoreline Management Plan and Local Coastal Program updated	Long-term (by 2032)	Community Planning & Building and Public Works	$$	Carmel-by-the-Sea Vulnerability Assessment (July 2021)	0%	