



Executive Summary:

2014 City and County of San Francisco Hazard Mitigation Plan

The City and County of San Francisco (City) has developed a 2014 Hazard Mitigation Plan (2014 HMP) to assess risks to CCSF from natural and human-caused hazards, and to develop mitigation strategies for reducing the impact of those risks. The 2014 HMP represents the City's commitment to San Francisco to take action to help reduce risk and create a safer, more resilient community. The plan also serves as a guide for City decision-makers as they commit resources to reduce the effects of hazards on our people and property.

The 2014 HMP updates and replaces the HMP approved by FEMA in 2009. The City prepared the 2014 HMP in accordance with the requirements of the federal Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (the Stafford Act), and the provisions of the Code of Federal Regulations implementing the Stafford Act. The San Francisco Department of Emergency Management (DEM) coordinated preparation of the 2014 HMP in cooperation with 20 City departments. Federal Emergency Management Agency (FEMA) approval of local hazard mitigation plans is a prerequisite for local eligibility for several federal disaster relief grants, such as pre- and post-disaster hazard mitigation grants, and National Flood Insurance Act Grant Programs.

Hazard Mitigation Planning Requirements

In general, hazard mitigation is work done to minimize the impact of a future disaster before it occurs. Mitigation planning allows local governments to identify their hazards, develop a plan to reduce losses from those hazards, and establish a process for implementing that plan. Though local hazard mitigation plans are only required to cover natural hazards, the 2014 HMP contains coverage of both natural and human-caused hazards, as did the 2009 HMP. The City's HMP Planning Team determined that omitting coverage of human-caused hazards from the 2014 HMP would represent a step backwards in planning for and developing strategies to mitigate hazards and threats in San Francisco. Thus, for example, the 2014 HMP includes climate change and cyberterrorism among the hazards profiled.

2014 Hazard Mitigation Plan Highlights

The Planning Area

The Planning Area covered by the 2014 HMP includes assets within the City and County of San Francisco, as well as City-owned assets located outside of the City and County boundaries. The 2014 HMP begins this integration process by identifying essential out-of-county assets, such as the San Francisco International Airport and County Jail #5 - San Bruno Complex. Future plan updates will incorporate out-of-county assets into the vulnerability analysis and other sections of the plan as well.

The Planning Process

In July 2013, DEM assembled a 2014 HMP Planning Team composed of representatives from 20 City departments and organizations with key roles in community planning, regulating



development, public works, transportation, parks, enforcing building codes, and emergency management. Member departments included those with responsibility for, and expertise in, implementing mitigation strategies selected by the Planning Team. Planning Team members participated in four full team meetings from July through September 2013, and in additional smaller meetings to address specific plan topics. Team activities included selecting the hazards to be profiled, updating the list of essential City assets to be included in the plan, updating the status of 2009 HMP mitigation strategies, and determining possible mitigation strategies for the 2014 HMP. The Planning Team also assisted in developing and implementing a plan for reaching out to the public and to stakeholders such as businesses, nongovernmental organizations, academic institutions, and nearby counties, to publicize the City's HMP update efforts, and to get public and stakeholder feedback on the draft 2014 HMP.

From September through November, the Planning Team reviewed and provided comments on drafts of the 2014 HMP. On December 3, 2013, a public version of the 2014 HMP was made available on the DEM website for a 15-day public comment period. DEM submitted the revised draft 2014 HMP to the California Governor's Office of Emergency Services (Cal OES) for initial review on December 19, 2013. On March 6, 2014, Cal OES forwarded the 2014 HMP to FEMA Region IX for review. On November 4, 2014, FEMA issued final approval of the 2014 HMP following its local adoption by the San Francisco Board of Supervisors and Mayor Edwin M. Lee.

Hazard Analysis

After reviewing the hazards identified in the 2009 HMP, the San Francisco General Plan, the 2009 Emergency Response Plan (ERP), the City's disaster history, and other literature related to potential future hazards, the Planning Team decided to profile the following hazards in the 2014 HMP: Seismic hazards, including ground shaking, landslide, liquefaction, and tsunami; weather-related hazards, including climate change, drought, coastal flooding and stormwater ponding, heat, non-seismically induced landslide, and wind; and other hazards, which includes pandemic, reservoir failure, wildfire, urban conflagration, and human-caused hazards. Human-caused hazards covered in the 2014 HMP include hazardous materials, energy supply disruptions, and terrorism. Hazard profiles include a description of the nature, history, location, extent, and probability of future events for each hazard in terms of its impact in San Francisco County.

Vulnerability Analysis

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a particular intensity in a given area, allowing the City to identify and prioritize potential mitigation strategies by focusing attention on areas with the greatest risk of damage. The 2014 HMP includes a quantitative vulnerability analysis for seismic ground shaking and ground failure, tsunami, flood, reservoir failure, wildfire, and urban conflagration. For each of those hazards, the vulnerability analysis identifies potentially vulnerable assets, including people, residential, nonresidential, and essential facilities and infrastructure within the City. The analysis was done by assessing the potential impacts from each hazard using geographic information system data.



Seismic hazards pose the greatest risk of loss to San Francisco's people, buildings, and infrastructure. Approximately 100 percent of the City's population, building stock, and essential facilities and infrastructure are located within the very violent and violent shaking intensity hazard areas for a magnitude 7.9 earthquake along the northern segment of the San Andreas Fault. Similarly, nearly 100 percent of the City's population and essential facilities and infrastructure are located in the violent and strong shaking intensity hazard areas for a magnitude 6.9 earthquake on the northern segment of the Hayward Fault.

Urban conflagration also poses a risk to the City. Two square miles of the City are within the high urban conflagration hazard area, including an estimated 51,566 people who are at risk (6%). This area includes one square mile of residential buildings (6.5%), 0.2 square miles of mixed residential/commercial buildings (23%), and 0.13 square miles of commercial buildings (5%). In addition, 59 essential facilities and infrastructure (5.62%) are located in the high urban conflagration hazard area. Over 29,000 people (4%) are located within the very high urban conflagration hazard area, which encompasses 1.78 square miles (4%), and includes 0.9 square miles of residential buildings (5%), 0.13 square miles of mixed residential/commercial buildings (16 percent), 0.12 square miles of commercial buildings (5%), and 88 essential facilities and infrastructure (8%).

Reservoir failure inundation maps provided by the San Francisco Public Utilities Commission for state-regulated Sutro, Sunset North and South, and University Mound North and South dams indicate that an estimated 23,886 people (3%) reside in areas at risk for inundation due to reservoir failure. This includes 0.74 square miles of residential buildings (4%), 0.03 square miles of commercial buildings (1%), and 16 essential facilities and infrastructure (1%), which makes up 1.4 square miles (3%) of San Francisco County.

In addition, an estimated 21,875 people in the City (3%) reside within the tsunami inundation area defined by Cal OES and the California Geological Survey in their 2009 Tsunami Inundation Map. The tsunami inundation area encompasses approximately three square miles or seven percent of San Francisco County, and includes 156 essential facilities and infrastructure (15%), 0.18 square miles of residential buildings (1%), 0.01 square miles of mixed residential/commercial buildings (1%), and 0.13 square miles of commercial buildings (5%).

Mitigation Strategy, Goals, and Action Plan

The mitigation strategy is the blueprint chosen by the City to reduce or prevent losses stemming from the hazards identified in the risk assessment. The Planning Team reviewed and revised the 2009 HMP's mitigation goals and strategy to create an updated list of hazard mitigation projects that may be undertaken by the City during the life of the 2014 HMP.

Mitigation goals are general guidelines that explain what a community wants to achieve in terms of hazard and loss mitigation. The goals provide a framework for identifying, prioritizing, and implementing actions to reduce the community's risk to hazards. The 2014 HMP Planning Team's mitigation goals are as follows: (1) implement disaster-resistant measures in San Francisco's existing and future built environment; (2) build and support local capacity to enable the City government and the greater San Francisco community to prepare for, respond to, and recover from disasters; (3) reduce the possibility of damages and losses due to seismic hazards,



including ground shaking, ground failure, and tsunami; (4) reduce the possibility of damages and losses due to weather-related hazards, including drought, flood, heat, landslide, wind, and climate change; and (5) reduce the possibility of damages and losses due to other hazards, including pandemic, reservoir failure, wildfire, urban conflagration, and human-caused hazards.

Mitigation actions are specific activities, projects, measures, or processes a community can take to reduce or eliminate risk to people and property from hazards. As part of the 2014 HMP planning process, the Planning Team developed a list of 44 potential mitigation strategies based on the 2009 HMP's list of potential mitigation strategies, and the 2014 HMP vulnerability analysis. The Planning Team then reviewed and revised the criteria used in 2009 to evaluate and prioritize potential mitigation strategies, choosing the following criteria: (1) ability to reduce expected future damages and losses (cost-benefit); (2) ability to be implemented during the five-year lifespan of the 2014 HMP; (3) current or potential support from the public, the Mayor, or the San Francisco Board of Supervisors; (4) local department or agency champion; and (5) increased resiliency of the City and its residents. The Planning Team then used the revised evaluation criteria to prioritize the list of 44 potential mitigation actions, and to select the strategies to be included in the 2014 HMP mitigation action plan. The 22 strategies chosen as a result of the prioritization process make up the 2014 HMP mitigation action plan, which appears in Table 8-4 of the 2014 HMP.

Plan Maintenance

The 2014 HMP includes a formal maintenance process selected by the Planning Team to ensure that the Plan remains a viable, living document. The plan maintenance process provides procedures for annual review and evaluation of mitigation action plan implementation, for continued public involvement in the HMP planning process, and for updating the 2014 HMP within the five-year cycle required by federal law. As part of the annual review process, each department or agency administering a mitigation project as part of the 2014 mitigation action plan will be asked to complete a progress report on the status of implementation of the projects included in the action plan.