

HAZARD MITIGATION GRANT PROGRAM PLANNING SUBAPPLICATION

DISASTER NUMBER:

DR-4353

JURISDICTION NAME:

City and County of San Francisco

PLAN TITLE:

San Francisco Local Hazard Mitigation Plan
2019 Update

CONTROL NUMBER:

0171

THE CONTROL NUMBER IS RECEIVED AT TIME OF SUCCESSFUL NOI SUBMITTAL



Cal OES

**GOVERNOR'S OFFICE
OF EMERGENCY SERVICES**

**Notice of Interest (NOI) approved subapplications
are due postmarked to Cal OES by:**

DR-4344: July 2, 2018

DR-4353: September 4, 2018

HAZARD MITIGATION GRANT PROGRAM (HMGP) INTRODUCTION

INTRODUCTION

As a result of the declaration of a major federal disaster, the State of California is eligible for HMGP funding. The State has established priorities to accept subapplications from subapplicants statewide, state agencies, tribal governments, local governments, and private non-profits.

Hazard mitigation activities are aimed at reducing or eliminating future damages. Activities include hazard mitigation plans approvable by the Federal Emergency Management Agency (FEMA).

HMGP is successful in meeting the FEMA requirements to qualify as an Enhanced State Hazard Mitigation Plan (ESHMP) state. ESHMP accreditation has resulted in additional millions of dollars available for local agencies' hazard mitigation plan and project funding. In order to maintain ESHMP status, further information is requested by FEMA. This information is requested as a means of assessing the pro-activity of your community or agency.

REGULATIONS

Federal funding is provided under the authority of the [Robert T. Stafford Disaster Relief and Emergency Assistance Act \(Stafford Act\)](#) through FEMA and the California Governor's Office of Emergency Services (Cal OES). Cal OES is responsible for identifying program priorities, reviewing subapplications and forwarding recommendations for funding to FEMA. FEMA has final approval for activity eligibility and funding.

The federal regulations governing HMGP are found in Title 44 of the Code of Federal Regulations (44 CFR), Part 201 (Planning) and Part 206 (Projects), and in Title 2 of the Code of Federal Regulations (2 CFR), Part 200 (Uniform Administrative Requirements).

The subapplicant is responsible for complying with the regulations set forth in the California Environmental Quality Act (CEQA) (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387) and any other state/local permits or requirements.

FEMA GUIDANCE

FEMA requires that all plans adhere to the [Local Mitigation Planning Handbook March 2013](#) and [Hazard Mitigation Assistance Unified Guidance February 2015](#).

QUESTIONS

Submit all HMGP subapplication questions to the following mailbox: HMGP@caloes.ca.gov

SUBAPPLICATION FORMAT INSTRUCTIONS

Cal OES requires the following format to be used for all HMGP subapplications. Two complete subapplications must be submitted to Cal OES. Each subapplication must be in separate binders. The first copy is logged and retained for Cal OES records. The second copy will be forwarded to FEMA for review and final determination.

COMPLETE SUBAPPLICATION PACKAGE CONSISTS OF THE FOLLOWING:

- ☒ **TWO** identical printed subapplications must be provided in 3-ring binders:
 - Each binder section must be tabbed in the format outlined below.
 - Each binder must be large enough to hold all of the contents.
 - The use of additional binders is permitted as needed.
 - All printed attachments must be clearly titled.
- ☒ **TWO** identical CD-RWs must include functional electronic versions of all documents/attachments:
 - Attachments must be in one of the following formats: Microsoft Word version 2007 (or newer), Microsoft Excel or Adobe PDF.
 - All electronic attachments must be clearly titled.

ORGANIZATION OF THE BINDER SECTIONS MUST BE TABBED IN THE FOLLOWING FORMAT:

0. Table of Contents
1. Subapplication
2. Scope of Work
3. Schedule (Additional documentation work schedule components, Gantt chart, etc.)
4. Budget ([HMGP Cost Estimate Spreadsheet](#) and cost estimate narrative in Microsoft Word)
5. Match ([Local Match Commitment Letter Template](#))
6. Letters of Commitment **for Multi-Jurisdictional Local Hazard Mitigation Plans only** ([Letter of Commitment Template](#))
7. Supporting Docs (Any extra supporting documentation)

MAIL OR DELIVER COMPLETED SUBAPPLICATIONS TO:

California Governor's Office of Emergency Services
Hazard Mitigation Grants Program Unit
Attention: HMGP
3650 Schriever Avenue
Mather, CA 95655

PLANNING SUBAPPLICATION FORM

SUBAPPLICANT INFORMATION

1. **SUBAPPLICANT:**
NAME OF STATE AGENCY, TRIBAL GOVERNMENT, LOCAL GOVERNMENT, OR SPECIAL DISTRICT APPLYING FOR FUNDING.

2. **TYPE:** STATE/LOCAL GOVERNMENT FEDERALLY RECOGNIZED TRIBE SPECIAL DISTRICT

3. **FIPS #:** IF YOU DO NOT KNOW YOUR FEDERAL IDENTIFICATION PROCESSING SYSTEM NUMBER (FIPS #), REQUEST BY EMAILING THE HMGp@CALOES.CA.GOV MAILBOX.

4. **DUNS #:** IF YOU DO NOT KNOW YOUR DATA UNIVERSAL NUMBERING SYSTEM (DUNS) #, CALL DUN & BRADSTREET (D&B) @ 1-866-705-5711 OR VISIT WWW.SAM.GOV.

5. **POLITICAL DISTRICT NUMBERS:**

CONGRESSIONAL:	12
STATE ASSEMBLY:	17 19
STATE LEGISLATIVE:	11

PROVIDE ONLY THE NUMBERS OF THE POLITICAL DISTRICTS FOR THE SUBAPPLICANT.

6. **PRIMARY CONTACT:**
POINT OF CONTACT FOR YOUR PLAN. CAL OES WILL CONTACT THIS PERSON FOR QUESTIONS AND/OR REQUESTS FOR INFORMATION.

NAME: Mr. Ms. **FIRST:** **LAST:**

TITLE:

ORGANIZATION:

ADDRESS:

CITY: **STATE:** **ZIP CODE:**

TELEPHONE: **FAX:**

EMAIL:

7. **ALTERNATIVE CONTACT:**
BACK-UP POINT OF CONTACT FOR YOUR PLAN. CAL OES WILL CONTACT THIS PERSON IF PRIMARY CONTACT IS UNAVAILABLE

NAME: Mr. Ms. **FIRST:** **LAST:**

TITLE:

ORGANIZATION:

ADDRESS:

CITY: **STATE:** **ZIP CODE:**

TELEPHONE: **FAX:**

EMAIL:

LOCAL HAZARD MITIGATION PLAN INFORMATION

8. PLAN TYPE:

A. ACTIVITY TYPE:

Planning activity types are classified as one of the choices listed below. Pick **one** of the following choices that best describes the type of plan this subapplication will deliver:

1.	<input type="checkbox"/>	New Single Jurisdiction Local Hazard Mitigation Plan Select for single jurisdictions that have no existing hazard mitigation plan.	
2.	<input checked="" type="checkbox"/>	Update to Single Jurisdiction Local Hazard Mitigation Plan Select for single jurisdiction that have a FEMA approved plan in place.	FEMA APPROVAL DATE 11/4/2014
3.	<input type="checkbox"/>	New Multi-Jurisdictional Local Hazard Mitigation Plan Select if there is no existing plan, and multiple jurisdictions will be included.	
4.	<input type="checkbox"/>	Update to Multi-Jurisdictional Local Hazard Mitigation Plan Select for multi-jurisdictions that have a FEMA approved plan in place.	FEMA APPROVAL DATE
5.	<input type="checkbox"/>	New Tribal Mitigation Plan (in accordance with 44 CFR Section 201.7) Select for tribal federally recognized tribes that have no existing hazard mitigation plan.	
6.	<input type="checkbox"/>	Update to Tribal Mitigation Plan (in accordance with 44 CFR Section 201.7) Select for federally recognized tribes that have a FEMA approved plan in place.	FEMA APPROVAL DATE
7.	<input type="checkbox"/>	Other Planning-Related Activities Describe planning activities: <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div>	



COMPLETE SECTION B IF YOU SELECTED 8.A.2., 8.A.4., OR 8.A.6. ABOVE:

B. PLAN UPDATES:

Describe why the update to your plan is needed and describe how the update will build on your existing approved mitigation plan.

The goal of this work is to update the San Francisco 2014 Hazard Mitigation Plan (HMP) to better include the impact of climate change on natural hazards risks, while also continuing a robust assessment and mitigation of our non-climate hazards, such as seismic hazards. We will conduct a vulnerability assessment and develop adaptation strategies using best practices identified in the CA Adaptation Planning Guide as well as the recent update to the CA General Plan Guidance. This approach will allow for the 2019 HMP to support the City and County in completing an SB 379-compliant Safety Element update. Our goal is for this plan to become a key strategic guiding document for the City and County of San Francisco and for it to serve as a model for other cities on how to update their own local HMP in a manner complying with SB 379.

Our more specific objectives for improvements from the 2014 HMP include:

- (1) Improving our hazard profiles to incorporate how hazards are changing in frequency, extent, and intensity due to climate change using the Association of Bay Area Government's (ABAG's) FEMA-funded Risk Landscapes Report, the most up to date CA Sea Level Rise Guidance, CalAdapt, the state's fourth climate change assessment and the 2018 Update to Safeguarding California.
- (2) Defining sectors and asset categories in the asset inventory and developing an agreed upon list of citywide critical assets using the approach in ABAG's Local Hazard Mitigation and Adaptation Risk Assessment and Strategy Development Process Handbook and the Bay Conservation and Development Commission's (BCDC's) Adapting to Rising Tides (ART) Program.
- (3) Developing vulnerability and risk profiles by asset category;
- (4) Identifying strategy implementation steps using similar resources as described above.



COMPLETE SECTION C IF YOU SELECTED 8.A.3 OR 8.A.4 ABOVE:

C. MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN INFORMATION:



If your plan type is multi-jurisdictional, a Letter of Commitment (LOC) from each participating jurisdiction is required. Use the template [here](#). A separate LOC must be executed by each participating jurisdiction and submitted to the lead agency and Cal OES jointly. The subapplication must include an LOC for each identified jurisdiction clearly stating commitment to participate in the development of the plan. Being recognized as a member of an approved multi-jurisdictional plan verifies a local agency's eligibility for hazard mitigation grant funds as long as they meet the participation criteria set forth in the letter.

- Enter the names of all the jurisdictions that will be included in your plan.
- Enter the county name included in the plan.
- Enter all the congressional district(s) within plan jurisdictions from <https://www.census.gov/mycd/>.
- Enter the exact title of the Letter of Commitment (LOC) electronic file that will be included on the required CD-RW Discs and place hard copies of each LOC in the LOC tabbed section of the binder.
- Identify the population of the jurisdiction applying for the planning grant using current census data.

#	JURISDICTION	COUNTY	CONGRESSIONAL DISTRICT #	TITLE OF ATTACHED LOC	POPULATION
1.					
2.					
3.					
4.					
5.					
6.					
7.					
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9.					
10.					
11.					
12.					
13.					

14.					
15.					



If more than 15 jurisdictions will be participating in your multi-jurisdictional plan attach all information on a separate sheet and type the name of the attachment in box 1.

PLANNING INFORMATION

9. SCOPE OF WORK (SOW):

STATE EXACT SOW DOCUMENT TITLE: Scope of Work - 2019 Hazard Mitigation Plan Update

- Describe the entire SOW of planning in clear, concise detail.
- Must provide a thorough description of **all activities** to be undertaken.
- Must be written in sequential order from start to finish of the plan.
- Describe method and schedule of monitoring, evaluating, and updating the plan within the 5-year cycle.



INSERT THIS DOCUMENT IN THE SOW SECTION OF THE BINDER.

WORK SCHEDULE INFORMATION

10. PLANNING WORK SCHEDULE:

The intent of the work schedule is to provide a realistic appraisal of the time and components required to complete the plan.

- Describe the major milestones and the duration of time to complete each one.
- Show activity duration in months.
- The work schedule must include six months for State and FEMA review/revisions/approval, appropriate time for local adoption and 90 days for grant close-out.

WORK SCHEDULE EXAMPLE		
#	DESCRIPTION	TIMEFRAME
1.	Procure a consultant	3 months
2.	Develop planning team	2 months
3.	Community and stakeholder outreach	3 months
4.	Planning process for hazard identification	3 months
5.	Planning process for risk assessment	3 months
6.	Mitigation strategy	2 months
7.	Maintenance plan development	1 month
8.	Plan draft (with community/stakeholder input)	3 months
9.	Cal OES/FEMA Review/Revisions	6 months
10.	Local Plan Adoption	2 months
11.	Grant Close-out	3 months
TOTAL MONTHS:		31 months



TOTAL PLANNING DURATION (INCLUDING CLOSE-OUT) CANNOT EXCEED A 36 MONTH PERIOD OF PERFORMANCE (POP).

#	DESCRIPTION	TIMEFRAME
1.	Develop and Engage Planning Team	1 month
2.	Develop Stakeholder and Public Engagement Strategy	3 months
3.	Implement Stakeholder and Public Engagement Strategy	8 months
4.	Update Hazard Profiles	3 months
5.	Vulnerability and Risk Assessment	6 months
6.	Mitigation Strategy Development	3 months
7.	Maintenance Plan Development	1 months
8.	Develop Draft Plan	3 months
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.	STANDARD VALUE (DO NOT CHANGE) Cal OES/FEMA Review/Revisions	6 months
17.	Local Plan Adoption	2 months
18.	STANDARD VALUE (DO NOT CHANGE) Grant Close-out	3 months
TOTAL MONTHS:		31

If more lines are needed than provided, indicate the title of document in box 1 and attach a separate work schedule in the schedule section of binder.

HAZARD INFORMATION

11. HAZARD & RISK ANALYSIS:

A. HAZARD ANALYSIS TYPE:

Select the hazard(s) below that this plan will address. Select as many as needed.

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> BIOLOGICAL | <input checked="" type="checkbox"/> EARTHQUAKE | <input type="checkbox"/> LAND SUBSIDENCE | <input checked="" type="checkbox"/> TERRORIST |
| <input type="checkbox"/> CHEMICAL | <input checked="" type="checkbox"/> FIRE | <input checked="" type="checkbox"/> MUD/LANDSLIDE | <input type="checkbox"/> TORNADO |
| <input type="checkbox"/> CIVIL UNREST | <input type="checkbox"/> FISHING LOSSES | <input type="checkbox"/> NUCLEAR | <input type="checkbox"/> TOXIC SUBSTANCES |
| <input checked="" type="checkbox"/> COASTAL STORM | <input checked="" type="checkbox"/> FLOOD | <input type="checkbox"/> SEVERE ICE STORM | <input checked="" type="checkbox"/> TSUNAMI |
| <input type="checkbox"/> CROP LOSSES | <input type="checkbox"/> FREEZING | <input type="checkbox"/> SEVERE STORM(S) | <input checked="" type="checkbox"/> WINDSTORM |
| <input type="checkbox"/> DAM/LEEVE BREAK | <input type="checkbox"/> HUMAN CAUSE | <input type="checkbox"/> SNOW | <input checked="" type="checkbox"/> OTHER (describe below): |
| <input checked="" type="checkbox"/> DROUGHT | <input type="checkbox"/> HURRICANE | <input type="checkbox"/> SPECIAL EVENTS | Extreme Heat, Pandemic,
Hazardous Materials Release,
Cyberterror |

B. DESCRIBE PAST AND FUTURE PROBLEMS/HAZARDS/RISKS:

- Describe the problem(s) this plan is attempting to solve and the expected outcome. Describe in detail how the plan will reduce the effects of hazards and how the plan will eliminate or reduce risks.

Through this effort, vulnerability to natural hazards will be mitigated, including ground shaking, liquefaction, earthquake-induced landslide, tsunamis, drought, flood, heat, poor air quality, landslide, and wildfire. The impacts of sea level rise, higher temperatures, and changing precipitation patterns due to climate change on the frequency, extent, and intensity of natural hazards will be considered. San Francisco is anticipated to experience more frequent and severe hazard events in the future as a result of a changing climate. The record-breaking and unprecedented extreme heat and wildfire-driven poor air quality events of Fall 2017 are just two examples of the hazards that San Francisco needs to plan for and mitigate in a strategic way. In addition, San Francisco will continue to mitigate the risks of well-known and existing hazards, such as earthquakes.

This plan will reduce risks by developing mitigation strategies that directly inform capital planning and prioritization, area planning, policy, and program development.

- History: Describe the past hazards, risk to life and risk to safety in the community. Describe the type, location and extent of hazards. Include previous occurrences (repetitive losses) and the probability of future events.

Earthquakes:
Earthquakes represent one of the most significant sources of risk and vulnerability for San Francisco in terms of recent history and the probability of future events. Historically, the San Andreas fault system is the most active fault system in northern California and is capable of generating very strong earthquakes of M 7.0 or greater. The last major earthquake on the northern portion of the fault occurred in 1906. Known as the Great San Francisco earthquake, this event lasted 45 to 60 seconds at an estimated Richter magnitude of 8.3. The San Andreas and other regional faults,

including the Hayward fault, have generated 69 recorded M 5.0 or greater earthquakes since 1800.

In 2014, the Working Group on California Earthquake Probabilities (WGCEP) issued its Third Uniform California Earthquake Rupture Forecast (UCERF3). UCERF3 indicates there is a 72 percent chance that an earthquake of moment magnitude 6.7 or greater will strike the nine-county San Francisco region over a 30-year period (2014–2043) along one of the Bay Area fault systems identified in the forecast.

Liquefaction occurs when vibrations from an earthquake cause soil particles to lose contact with each other and may lose the ability to support weight, resulting in structural damage, including cracking of foundations, damage to support structures, and even collapse, potentially causing injuries and leaving structures unusable. The United States Geological Survey (USGS) has mapped liquefaction occurrences in San Francisco for earthquakes occurring in 1838, 1852, 1865, 1868, 1906, 1954, and 1989.

The 1906 earthquake generated more than 10,000 landslides throughout the region, killing 11 people and causing substantial damage to buildings and infrastructure. Landslides from the Loma Prieta earthquake were reported in San Francisco, in the Lake Merced area, in the weakly-cemented sand, silt, and clay of the Merced Formation.

Floods:

Historical flood data indicates that San Francisco has experienced 12 flood events from 1996 through July 2013. Coastal flood hazards affect the Pacific Ocean coast and the shoreline of San Francisco Bay. Flooding from the bay also affects Treasure Island. Most of San Francisco's Pacific coastline consists of bluffs, beaches, and sand dunes and the Great Highway is frequently closed during storm events and was severely damaged during a storm in 2010. Based on previous flood occurrences, San Francisco can expect to experience at least one flood event every 15 months. With sea level rise, the number and intensity of these inundations are likely to increase. Surrounded on three sides by water, San Francisco is particularly vulnerable to rising sea levels. Sea level rise has been increasing globally for the past century. As global temperatures increase, the rate of sea level rise will increase accordingly. Using conservative modeling with emission scenarios, the California Climate Change Center estimated in 2009 that the number of San Franciscans at risk to a 100-year flood will increase from 190 to 3,800 individuals, assuming a 1.4 meter (55 inch) rise in sea level by 2100.

Drought:

According to the Climate Readiness Institute at UC Berkeley, 10-year droughts occurred across the west in previous millennia. Statewide droughts have been declared in 1976-1977, 1987-1992, 2008, and 2013-2016. In the winter of 2013,

California experienced record warmth and dryness with some locations in northern California experiencing 50 consecutive days with no measurable precipitation. In San Francisco, the primary impact of drought is reduced availability of water for residential and commercial use. During the drought of 2013-2016, the San Francisco Public Utilities Commission called on its retail customers to reduce water use by at least 10 percent. Mayor Edwin M. Lee also issued an executive directive requiring all City departments to develop individual water conservation plans and take immediate steps to achieve a mandatory 10 percent reduction in their water consumption. Long-term climate forecast models suggest that a warming planet will lead to changes in precipitation distribution, including a reduced Sierra snowpack and earlier melting of the snowpack. With projected drier conditions and increasing population, a greater number of water users will lead to greater water demand and a reduction in water supplies, increasing the challenge of managing drought in San Francisco.

Extreme Heat:

Using data from the National Weather Service (NWS) since 1875, San Francisco's daily temperature has exceeded 100 degrees only 12 times. However, during the 2017 Labor Day weekend, San Francisco experienced the highest temperature ever recorded, with temperatures of 106 degrees observed. It is estimated that during this event, at least three people died and 50 people were hospitalized due to heat-related illness in the city. The number of 911 calls overwhelmed ambulances and forced San Francisco to request mutual aid from neighboring counties. A California Energy Commission study indicates that over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined. Historically, San Francisco has experienced temperatures in excess of 85 degrees six to seven days per year, generally between May and October. Climate change is expected to increase the frequency and severity of extreme heat events. Average yearly temperatures are projected to increase between 1.3°F and 3.1°F by mid-century 3.3°F and 5.5°F by end-of-century. Annual extreme heat days are expected to increase from about six currently, to 15-40 by 2050, up to 90 per year by 2100.

Fire:

The largest fire to affect San Francisco to date occurred as a result of the Great San Francisco Earthquake of 1906. Within two hours of the quake, 52 fires had ignited within San Francisco. San Francisco's most recent large urban fire occurred as a result of the Loma Prieta earthquake on October 17, 1989 when a total of 41 fires were reported in San Francisco. Gas pipe and main ruptures ignited 27 fires within the City, including a major blaze in the Marina District that destroyed four buildings and claimed the lives of five people.

The Rim Fire, which began on August 17, 2013, in Tuolumne County, burned over 257,000 acres, and threatened the Hetch Hetchy Regional Water System, which provides approximately 85 percent of San Francisco's total water needs. The Rim Fire reached the edges of the Hetch Hetchy Reservoir watershed, but did not impact

water quality or water delivery operations. However, the fire did cause damage to San Francisco-owned property and infrastructure in the area.

Landslides:

Non-earthquake-induced landslides in San Francisco generally occur during or after prolonged winter rainstorms. On January 3-5, 1982, a catastrophic rainstorm in the Central California coast triggered landslides in San Francisco, which resulted in approximately \$399,000 in damages. Landslides also occurred in February 1998, as a result of El Niño storms. In 2007, after three days of rainfall, a 75-foot-wide mass of Telegraph Hill slid down a granite and sandstone slope above Broadway Street. Approximately 120 people from a 45-unit condominium were evacuated until the property owner stabilized the hillside. Similarly, in January 2012, extensive rainfall resulted in a rockslide on Telegraph Hill, which crushed a car and required the partial evacuation of a condominium complex. Based on previous occurrences, San Francisco can expect to experience a landslide every seven to 10 years, particularly during winters in which a strong El Niño increases the frequency and intensity of Pacific storms.

Wind:

In San Francisco, high winds generally between the months of November through March. Data from the Golden Gate Weather Service on some of the larger high wind storm events in San Francisco occurred in 1955, 1962, 1982, 1995, 2002, 2008, and 2009. Based on previous wind events, San Francisco can continue to expect to experience at least one winter wind storm annually.

San Francisco as a whole is subject to strong southeasterly winds associated with powerful winter cold fronts. However, strong sea winds from the Pacific Ocean generally have a greater impact on the west side of San Francisco. Each year, at least one winter storm typically results in closure of the Great Highway on San Francisco's western boundary, when wind gusts deposit large amounts of sand on the roadway.

Tsunami:

A tsunami is a series of waves generated in a body of water by a disturbance that vertically displaces the water. Tsunamis not only affect beaches open to the ocean, but also may cause damage to ports, harbors, bays, tidal flats, and the shores of large coastal rivers. Since 1850, 53 tsunamis have been recorded or observed in San Francisco Bay. A 4-inch wave run-up was recorded at the Presidio gauge station shortly after the 1906 earthquake.

Areas within San Francisco shown to be subject to tsunami inundation include coastal areas of Lake Merced, the Sunset and Richmond Districts; and bayside areas of Sea Cliff, the Presidio, the Marina District, North Waterfront, Fisherman's Wharf, China Basin, Mission Bay, Potrero Hill, Bayview, and Hunter's Point Districts. In addition, tsunami inundation may affect Treasure Island, and portions of Yerba Buena Island and SFO that are adjacent to San Francisco Bay.

3. Describe the vulnerability to identified hazards. Include an overall summary of each hazard and its effect on the community, including a general description of types of structures affected by each hazard.

Earthquakes:

The 2014 Uniform California Earthquake Rupture Forecast indicated that there is a 72 percent chance that a major earthquake of moment magnitude 6.7 or greater will strike the nine-county Bay Area region over a 30-year period. The impact of an earthquake of this magnitude may include: slight damage in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse; damage great in poorly-built structures; fall of chimneys, factory stacks, columns, monuments, walls; and heavy furniture overturned.

After the 1989 Loma Prieta earthquake, liquefaction in the Marina District caused vertical settlement, lateral displacement of buildings, buckling of sidewalks, cracking of asphalt pavement, and breaking of water pipes and gas lines. Over 70 sand boils were reported in garages and backyards; some sand boils were nearly four feet in depth. Liquefaction during the Loma Prieta quake also impacted the Auxiliary Water Supply System (AWSS), which provides the City with water for firefighting purposes.

Floods:

Along the bay shoreline, inundation may close roadways and cause damage to nearby structures; wave action can damage waterfront facilities. Operation of the stormwater system may also be disrupted when vegetation or other debris blocks inlets or pipes. In these situations, runoff may “pond” in low-lying areas, such as street intersections, or may enter nearby structures. In addition to causing flood damage, stormwater ponding can create a pollution problem when floodwaters carry debris, chemicals, trash, and other pollutants that have collected on streets. Areas of severe stormwater ponding have been identified by the Department of Public Works and include the ocean-front areas of the Lakeshore, Outer Parkside, and Outer Sunset neighborhoods, and portions of the Lake District, Mission Bay, North Waterfront, Inner Mission, Bayview District, Bernal Heights, and Mission Terrace neighborhoods. In addition, during winter storms, coastal flooding often occurs in the South Beach and Rincon Hill neighborhoods along The Embarcadero near Pier 14 and Rincon Park and at the foot of Mission Street.

Sea level rise will increase flooding hazards in many coastal areas of San Francisco, including Ocean Beach, the Marina, the Embarcadero, and the entire bayside edge, as well as parts of Treasure Island. Flooding from sea level rise will likely damage buildings and roads in these areas. In addition, salt water intrusion will likely cause damage to underground infrastructure, such as pipes and foundations. Coastal flooding also presents a risk to major transportation infrastructure in the region, especially to the Port of San Francisco and to San Francisco International Airport (SFO).

Drought:

Drought is not localized to San Francisco, but occurs simultaneously across the region, and may extend statewide or across a larger expanse of western states. The majority of San Francisco's water is brought to the city from the Hetch Hetchy watershed located in the Sierra Nevada mountains through a complex series of reservoirs, tunnels, pipelines, and treatment systems. As a result, shortages in precipitation in the Sierra Nevada impacts the water supply in the Bay Area. Because so much of the city's water is generated from outside of the City, drought must be considered a regional hazard that is not confined to a single geographic area. Drought has impacts on San Francisco's residential, commercial, and industrial customers.

Heat:

Given that San Francisco has such a relatively mild climate, a sudden spike in temperatures has a much greater impact on local residents compared with noncoastal communities. Though air conditioning is the leading protective factor against heat-related illness and death, most residential units in San Francisco lack air conditioning. Though an excessive heat event in San Francisco would impact all areas of the city, it would not affect all San Franciscans equally. The elderly, the very young, and those with chronic health problems are most at risk when extreme heat occurs. Using socioeconomic and census tract data for the entire city, the San Francisco Department of Public Health has developed a Heat Vulnerability Index to determine neighborhoods with the highest concentration of residents at risk in excessive heat events.

Fire:

In 2013, the San Francisco Department of Emergency Management mapped fire hazards and rated neighborhoods from very low to extreme. This analysis considered building construction material, land use, and structural age as primary factors for fire danger. Wood frame structures are assumed to be more vulnerable to fire than other construction types. Commercial and industrial land use are calculated as a higher fire risk. Older buildings were built to different fire code standards, thus making them more susceptible to fires. Based on this analysis, most of the City is considered at moderate risk for fire hazard.

The most likely scenario leading to widespread fires in San Francisco is a severe earthquake in the Bay Area, particularly on the North San Andreas Fault zone. Because San Francisco's building stock is composed predominantly of wood, the fires resulting from such earthquakes may cause far more damage. Given the strong likelihood of a major earthquake in the San Francisco Bay Area within the next 30 years, fire must be considered as a possible risk. Fire can destroy buildings and damage infrastructure, including utilities.

Landslide:

Landslides may result in property damage, closure of roadways and loss of life. The areas most susceptible to landsliding in San Francisco are steep slopes on hills and

cliffs. These landslide-prone areas include the Outer Richmond, Sea Cliff, Lake Shore, Bayview Heights, Midtown Terrace, Twin Peaks, Clarendon Heights, Golden Gate Heights, Forest Hills, Diamond Heights, Eureka Valley/Castro, Dolores Heights, and Noe Valley neighborhoods, the Presidio, and Yerba Buena Island. Landslides can damage buildings and infrastructure, including utilities and roads.

High Winds:

During the summer months in San Francisco, temperature and pressure differences between the Pacific Ocean and the interior valleys of California create strong afternoon and evening sea breezes. San Francisco's hilly terrain breaks up strong winds, but occasionally strong storms with significant wind gusts halt normal activity in the city, and cause widespread power line damage and electrical outages due to toppled trees and broken limbs.

Storms combining strong winds with heavy rain have the largest impact on San Francisco during the winter months. Sustained winds of more than 50 mph have been recorded in San Francisco during various Pacific Storms. During isolated storm incidents, gusts may peak at more than 100 mph along the coast and at higher elevations. In such conditions, Bay Area bridges become hazardous, especially for big rig trucks that may overturn on bridges during high wind events. High winds can damage overhead utilities, resulting in power outages.

Tsunamis:

Tsunamis may travel across the ocean at speeds of about 500 miles per hour. The height or amplitude of a tsunami wave in deep water is generally one to three feet or less, and thus may not be noticeable to people on ships. However, as tsunami waves approach land, and as the ocean shallows, the waves slow to around 30 to 60 miles per hour, but grow significantly in height.

The inundation modeling used to create the 2009 inundation maps estimates that maximum tsunami wave run-up elevation at the Golden Gate would be 13 feet at the shoreline, with run-up to 19 feet along northern portions of San Francisco near Crissy Field (National Geodetic Vertical Datum). This wave run-up would dissipate as it moved east, north, and south, out of the gate, and into San Francisco Bay. By the time it reached the eastern shoreline of the Bay at Alameda, run-up would be 13 feet. Maximum wave heights at SFO from the scenarios used to create the inundation maps are below three feet. A tsunami would cause significant damage to buildings and infrastructure.

4. List improvements to the community that eliminated or reduced hazards/risks for at least the last 25 years.

Completed Projects:

Community Action Plan for Seismic Safety (CAPSS) Project (2010)
San Francisco Unified School District (SFUSD) Capital Improvements (2010)
SFO Upper Viaduct Seismic Retrofit (2011)
Critical Infrastructure Buffer Zone (2013)
Public Safety Building (2014)

San Francisco General Hospital (SFGH) Seismic Rebuild (2015)
San Francisco International Airport (SFO) Air Traffic Control Tower Replacement Project (2015)
SFO Shoreline Protection Feasibility Study (2015)
SFO Terminal 3 Improvement Projects (2015)
SFO Runway Safety Area (RSA) Enhancement (2015)
Neighborhood Fire stations and Support Facilities (2017)

Current and Ongoing Projects:

Sewer System Improvement Program
Auxiliary Water Supply System Upgrade
Seawall Earthquake Safety Program
Unreinforced Masonry Building (UMB) Retrofit Program (1992 – Present)
Soft Story Retrofit Program (2013- present)
Earthquake Safety and Emergency Response (ESER) Bond Program (2006 – Present)
CCSF Participation in National Flood Insurance Program (NFIP) (2010 – Present)
Sewer System Improvement Program (2012-2032)
National Weather Service (NWS) TsunamiReady and StormReady Status (2008 – Present)
Sea Level Rise Vulnerability and Consequences Assessment (2017 - present)

5. Describe types and numbers of existing and future structures and facilities that have the potential to incur damages and an estimate of potential dollar losses.

Many billions of dollars of assets are at risk to natural hazards in San Francisco. According to a 2015 study by Risk Management Solutions, approximately \$77 billion of private and public property is at risk of flooding from a 100-year storm with 66" of sea level rise. A HAZUS analysis conducted by the Office of Resilience and Capital Planning estimates the potential for \$1.9 billion in economic losses just from General Fund public buildings in a M7.2 earthquake on the San Andreas Fault. Under the same scenario, a 2010 study by the Applied Technology Council estimated the total cost to repair or replace buildings damaged by shaking at \$30 billion. The actions stemming from this planning effort will help reduce the amount of assets at risk from natural hazards.

6. Describe mitigation goals and objectives to reduce or avoid long-term vulnerabilities to the identified hazards.

For this 2019 plan update, our preliminary goals to reduce or avoid long-term vulnerabilities are as follows:

- Protect the public health, safety, quality of life, environment, and economic and social capital of San Francisco by reducing the risk of damage and disruption from current and future hazards.
- Build and support the capacity of City government and the greater San Francisco community to prevent, protect against, respond to, mitigate, and recover from current and future hazards.

- Advance local, regional, state, federal, private, and community collaboration and partnerships to deliver actionable, effective, innovative risk reduction solutions and data to support decisions.
- Proactively seek to eliminate racial, health, and economic inequities of current and future hazard impacts and advance equity through the just distribution of risk reduction and resilience benefits.
- Increase public awareness of current and future hazards, risks, and city action to build resilience through education, empowerment, and engagement.

COST ESTIMATE INFORMATION

12. HMGP COST ESTIMATE SPREADSHEET:

A. COST ESTIMATE INSTRUCTIONS:

Using the [HMGP Cost Estimate Spreadsheet](#), provide a detailed cost estimate breakdown.

- Cost estimate describes the anticipated costs associated with the SOW for the proposed mitigation plan.
- Cost estimates must include detailed estimates of cost item categories.
- Only include costs that are directly related to performing the mitigation activity.
- Documentation that supports the cost estimate must be added to the budget section of the binder.
- Eligible costs must be included in both the cost estimate spreadsheet and the Scope of Work to be reimbursed.

COST ESTIMATE SPREADSHEET EXAMPLE				
ITEM NAME	UNIT QTY	UNIT	UNIT COST	COST EST TOTAL
PLAN INITIATION	80	HR	\$120	\$9,600
PUBLIC ENGAGEMENT	40	HR	\$60	\$2,400
REVIEW OF PLANS	140	HR	\$80	\$11,200
HAZARD/RISK ASSESSMENT	100	HR	\$150	\$15,000
LOCAL PLAN UPDATES	200	HR	\$67	\$13,400
COMPILE DRAFT	120	HR	\$120	\$14,400
REVIEW OF DRAFT	67	HR	\$120	\$8,040
APPROVAL/ADOPTION	50	HR	\$150	\$7,500
PLANNING CLOSE-OUT	80	HR	\$150	\$12,000
TOTAL COST ESTIMATE:				\$93,540



**DO NOT COPY EXAMPLE
TO SUBAPPLICATION**

B. INELIGIBLE COSTS:

The following are ineligible line items:

- Lump Sums
- Contingency Costs
- Miscellaneous Costs
- “Other” Costs
- Indirect Charges
- Overhead Costs
- Cents (must use whole dollar amounts, round unit prices up to whole dollars)

C. PRE-AWARD COSTS:

Eligible pre-award costs are costs incurred after the disaster date of declaration, but prior to grant award. Pre-award costs directly related to developing the application may be funded.

- Submission of subapplication
- Workshops or meetings related to development



SUBAPPLICANTS WHO ARE NOT AWARDED FUNDS WILL NOT RECEIVE REIMBURSEMENT FOR PRE-AWARD COSTS.

D. COST ESTIMATE NARRATIVE:

FEMA requires a cost estimate narrative that explains all projected expenditures in detail. The cost estimate narrative must mirror the cost estimate spreadsheet and should include a full detailed narrative explaining and supporting the costs listed in the Cost Estimate Spreadsheet. If your cost estimate includes city, county, or state employees’ time, include personnel titles and salary/hourly wages plus benefits for a total hourly cost. Detailed, functional timesheets must be retained.

Title the document “Cost Estimate Narrative” and include in the budget section of binder.

13. FEDERAL/NON-FEDERAL SHARE INFORMATION:

A. FUNDING RESTRICTIONS:



HMGP funding is restricted to a maximum of \$150,000 for each single jurisdictional planning subapplication and up to \$250,000 if multi-jurisdictional. FEMA will contribute up to 75% of the total planning cost. A minimum of 25% of the total eligible costs must be provided from a non-federal source. State does not contribute to local cost share.



A jurisdiction may contribute an amount greater than the 25% non-federal share.

B. TOTAL PLANNING COST ESTIMATE:

202,352

Enter total cost formulated on [HMGP Cost Estimate Spreadsheet](#)

ENTER \$ IN BOX ABOVE



FEDERAL SHARE (75% MAXIMUM)	REQUESTED AMOUNT:	150,000
		ENTER \$ IN BOX ABOVE
	PERCENTAGE AMOUNT:	74%
		ENTER % IN BOX ABOVE
NON-FEDERAL SHARE (25% MINIMUM)	REQUESTED AMOUNT:	\$52,352
		ENTER \$ IN BOX ABOVE
	PERCENTAGE AMOUNT:	26%
		ENTER % IN BOX ABOVE

VERIFY ALL AMOUNTS ENTERED ARE ACCURATE.

INCORRECT AMOUNTS WILL DELAY PROCESSING OF YOUR SUBAPPLICATION.

C. NON-FEDERAL MATCH SOURCE - MATCH COMMITMENT LETTER:



Use the [Local Match Commitment Letter Template](#) to complete this section and add completed letter to the match section of the binder.

- A signed Match Commitment Letter must be provided on agency letterhead.
- The non-federal source of matching funds must be identified by name and type.
- If "other" is selected for funding type, provide a description.
- Provide the date of availability for all matching funds.
- Provide the date of the Funding Match Commitment Letter.
- Funds must be available at the time of submission unless Cal OES prior approval has been received.
- If there is more than one non-federal funding source, provide the same information for each source on an attached document.
- Match funds must be in support of cost items listed in the cost estimate spreadsheet.
- Requirements for donated contributions can be found in 2 CFR 200.306.

PRINT THIS PAGE – ORIGINAL SIGNATURE IS REQUIRED

AUTHORIZATION

The undersigned does hereby submit this subapplication for financial assistance in accordance with the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) and the State Hazard Mitigation Administrative Plan and certifies that the subapplicant (e.g., organization, city, or county) will fulfill all requirements of the program as contained in the program guidelines and that all information contained herein is true and correct to the best of our knowledge.

Subapplicant Authorized Agent

NAME: Kenneth Bukowski

TITLE: Chief Financial Officer

ORGANIZATION: Office of the City Administrator, City and County of San Francisco

SIGNATURE: _____

DATE: 8/28/2018