| Committee Item N | lo.  _ | <u>1</u> |  |
|------------------|--------|----------|--|
| Board Item No.   |        |          |  |

# **COMMITTEE/BOARD OF SUPERVISORS**

AGENDA PACKET CONTENTS LIST

| Committee: _(                    | Government Audit and Oversight   | Date:                        | July 16, 2020    |
|----------------------------------|--|------------------------------|------------------|
| <b>Board of Supe</b>             | rvisors Meeting:   | Date:                        |                  |
| Cmte Board                       | _  |                              |                  |
|                                  | otion esolution rdinance egislative Digest udget and Legislative Analyst F outh Commission Report troduction Form epartment/Agency Cover Letter OU rant Information Form rant Budget ubcontract Budget ontract/Agreement orm 126 – Ethics Commission ward Letter pplication ublic Correspondence | •                            | oort             |
| OTHER                            |  |                              |                  |
| $\square$ $\square$ $\square$    | SFPUC Report – June 25, 2020   |                              |                  |
|                                  | Reso. No. 484-19   |                              |                  |
|                                  | COB Letter – Transmitting Reso. I  |                              | October 15, 2020 |
|                                  | SFPUC Presentation – Septembe  |                              |                  |
|                                  | Mayor Consolidated Response - S  | _                            | 6, 2019          |
|                                  | SFPUC Response – September 1   |                              | 2010             |
|                                  | <u>Fire Commission Response – Sep</u><br>Civil Grand Jury Report – July 17,  |                              | 2019             |
|                                  | COB Letter – July 24, 2019   | 2013                         |                  |
|                                  | Response Matrices  |                              |                  |
|                                  | Fransmittal Letters  |                              |                  |
| Prepared by: _<br>Prepared by: _ | <u>.</u>   | Pate: <u>July 1</u><br>Pate: | 10, 2020         |





DATE:

June 25, 2020

TO:

Angela Calvillo, Clerk of the Board of Supervisors

FROM:

Harlan L. Kelly Jr., General Manager of the SFPUC

Jeanine Nicholson, Chief of the Department, San Francisco Fire

Department

SUBJECT:

Fiscal Year 2019-2020 Annual Emergency Firefighting Water

System Report

Pursuant to Resolution No. 484-19, the San Francisco Public Utilities Commission and San Francisco Fire Department hereby provide the following report on the City's Emergency Firefighting Water System (EFWS). Resolution No. 484-19 urges the departments provide a consolidated annual report to the Board of Supervisors, "... on the state of the City's EFWS preparedness for a major earthquake and fire and planned funding from the ten-year Capital Plan."

This report addresses the information requested in Resolution No. 484-19 and provides an update on the City's EFWS preparedness.

#### Program Background

The San Francisco EFWS is vital for protecting against the loss of life resulting from multi-alarm fires, as well as the loss of homes and businesses by providing an additional layer of fire protection. The system is used throughout the year for the suppression of multiple-alarm fires. The system delivers water at high pressure to the SFFD for firefighting purposes. The primary source of water is the SFPUC's Hetch Hetchy Regional Water System, which supplies water to one reservoir and two storage tanks. The water is subsequently supplied from the reservoirs and tanks into 135 miles of pipelines. The secondary source of water for the EFWS is the San Francisco Bay. There are two seawater pump stations that can supply seawater into the pipelines, as well as 35 suction connections along the northeastern waterfront, which allow fire engines to pump water from the Bay. Finally, two fireboats are available to supply seawater by pumping into any of the five manifolds connected to pipelines.

In 2010, 2014, and 2020, San Francisco voters approved three Earthquake Safety and Emergency Response (ESER) General Obligation Bonds, allowing

the City to make critical public safety investments and upgrades to emergency response facilities and infrastructure, including the EFWS.

With the passage of each ESER bond, the SFPUC, SFFD, Public Works, and the Office of Resilience and Capital Planning in the City Administrator's Office have made it a high priority to evaluate, plan, repair, upgrade, and expand EFWS infrastructure throughout San Francisco. In addition to ESER funded upgrades, large development projects in San Francisco have also installed EFWS infrastructure within and adjacent to project boundaries.

#### 2020 Earthquake Safety and Emergency Response Bonds

In March of this year, San Francisco voters approved the 2020 Earthquake Safety and Emergency Response General Obligation Bond. That bond's programming included \$153.5 million for the Emergency Firefighting Water System. That funding will be allocated to replace, extend and seismically upgrade system components to increase the ability to provide adequate water throughout the City for firefighting following a major earthquake and during multiple-alarm fires.

With the ESER funding, many upgrades will focus on improving EFWS capabilities in the City's western neighborhoods. The results and recommendations of the 2018 Westside Emergency Firefighting Water System Options Analysis planning study will help to inform the selection and design of specific projects to be funded through ESER 2020. Upon the completion of required environmental review, construction will proceed for selected projects.

#### Capital Projects: Fiscal Year 2019 – 2020

During Fiscal Year 2019-2020, ESER bond funds were utilized on a total of 10 capital projects, funding the installation of EFWS infrastructure and/or funding engineering and planning work in advance of installing the infrastructure. Please refer to Table 1 for more information.

Table 1: ESER Bond Funded EFWS Projects

| Project                              | Status                             |
|--------------------------------------|------------------------------------|
| Ashbury Bypass EFWS Pipeline         |                                    |
| Terry Francois & Mariposa EFWS       |                                    |
| Pipeline                             | Completed                          |
| Pump Station No. 1                   |                                    |
| Irving Street EFWS Pipeline          |                                    |
| Pump Station No. 2 Upgrades          | Under Construction                 |
| Terry Francois/Mission Rock/Warriors |                                    |
| Way EFWS Pipeline                    | Construction will begin FY 2020-21 |
| Clarendon Supply EFWS Pipeline       |                                    |
| 19th Ave. EFWS Pipeline              |                                    |
| Potable Emergency Firefighting Water | Planning and Design                |
| System                               |                                    |
| Street Valve Motorization            | Bidding                            |

| Technical Studies | Sharman Shar |
|-------------------|--------------|
| Administration    | Continuing   |

#### <u>Development Projects: Fiscal Year 2019 – 2020</u>

Additionally, the SFPUC and SFFD coordinate with project sponsors of large development projects to ensure the installation of EFWS infrastructure within and adjacent to their respective projects. Please see Table 2 for development projects that installed or committed to install EFWS infrastructure this Fiscal Year.

Table 2: Development Projects: EFWS

| Project               | Status                          |  |  |
|-----------------------|---------------------------------|--|--|
| Pier 70               | Installed EFWS Infrastructure   |  |  |
| HopeSF Sunnydale      | CARRIED DUSTE                   |  |  |
| Potrero Power Station | EFWS Infrastructure included in |  |  |
| 3333 California       | Approved Development Agreement. |  |  |
| Balboa Reservoir      | EFWS Infrastructure included in |  |  |
|                       | Development Agreement (Pending  |  |  |
|                       | Approval)                       |  |  |

Active Fires, Trainings, and Inspections: Fiscal Year 2019-2020
Additionally, the SFFD, SFPUC, and other agencies used EFWS infrastructure for trainings and active fires, performed routine inspections, and held joint meetings to discuss emergency response planning and project priorities. A summary of the SFFD's EFWS activities and partners for Fiscal Year 2019-

Table 3: Summary of SFFD EFWS Activity

2020 is provided in Table 3.

| Date       | Participants  | Activity   |
|------------|---|--|
| 11/20/2019 | SFFD: Fireboat St. Francis,<br>E35, E08, E29, B03, D3,<br>ADC Michael Cochrane,   | Pier 90 salt-water inlet manifold<br>drill   |
|            | Deputy Chief Victor Wyrsch,<br>Water Supply Officer Brent<br>Stuckert, Division of Training<br>Staff and members of the<br>Bureau of Equipment. | The Fireboat St. Francis supplied salt water to a portion of the EFWS that had been isolated by the SFPUC to operate multiple high-pressure hydrants and a deck gun. |
|            | SFPUC: EFWS Superintendents, Utility Plumbers, Hydrant Gatemen, plumbers and members of the engineering Department                              |  |
| 12/12/2019 | SFFD: Deputy Chief Victor<br>Wyrsch, Deputy Chief Jose<br>Velo, Assistant Deputy Chief<br>Dawn DeWitt, Assistant Chief                          | Joint Agency Q&A and group discussion  Improvements made to the EFWS   |

| Date       | Participants                             | Activity                                       |
|------------|--|--|
|            | Brook Baker; Assistant Chief             | since the 1989 earthquake,                     |
|            | Robert Postel, Water Supply              | strategies to further improve the              |
|            | Officer Captain Brent                    | system in its current configuration,           |
|            | Stuckert, Division of Training           | agency response plans in the event             |
|            | Staff and numerous Battalion             | of a large-scale disaster, and                 |
|            | Chiefs                                   | interagency drills that will be                |
|            | Chilore                                  | conducted on a quarterly basis.                |
|            | SFPUC: Rich Gonzales,                    | goriadotod en a quartony bacie.                |
|            | Sean Duffy, Kevin O'Connor               |  |
|            | and Ryan Gabriel.                        |  |
| 02/29/2020 | SFFD: 4th Alarm Fire at                  | Structure Fire                                 |
| 02/25/2020 | Toland St. / Evans St.                   | Structure The                                  |
|            | Toland Ot. 7 Evans Ot.                   | EFWS system used for ladder pipe               |
|            | SFPUC: Gatemen                           | operations for this 4 <sup>th</sup> Alarm Fire |
|            | SFFOC. Gatemen                           | operations for this 4. Alarm Fire              |
| 3/03/2020  | <b>SFFD</b> : E01, E35, B03, Water       | Bay Bridge Pump Station and                    |
|            | Supply Officer Captain                   | Standpipe drill                                |
|            | Stuckert.                                |  |
|            |  | This was a joint operation that                |
|            | SFPUC: Superintendent Rich               | required close coordination                    |
|            | Gonzales, Utility Plumbers               | between the SFFD and the SFPUC                 |
|            | and Hydrant Gatemen,                     | and satisfied recommendation R10               |
|            | Superintendent of Facilities             | of the 2019 Civil Grand Jury Report            |
|            | Operations Brahman Conci                 | on the EFWS. The drill simulated a             |
|            | Operations Brahman Conor                 | large-scale fire event on the west             |
|            |  | span of the Bay Bridge that would              |
|            |  | require more water than the 500                |
|            |  | gallons that are carried by a single           |
|            |  | SFFD engine. This was the first                |
|            |  | time a drill of this nature has been           |
|            |  | performed and resulted in new                  |
|            |  | standard operating procedures for              |
|            |  | disaster events on the Bay Bridge.             |
| 05/23/2020 | SFFD: 4 <sup>th</sup> Alarm Fire at Pier | Structure Fire                                 |
| JUIZUIZUZU | 45                                       | Structure Fill G                               |
|            |  | EFWS system used for ladder pipe               |
|            | SFPUC: Gatemen                           | operations and to supply 5" hose               |
|            |  | provide by the hose tenders.                   |
|            |  |  |
|            | W S                                      | The St. Francis Fireboat was put               |
|            |  | into operation and saved the                   |
|            |  | historic Liberty Ship SS Jeremiah              |
| _          |  | O'Brien from being destroyed by                |
|            | ·  | this 4 <sup>th</sup> Alarm Fire.               |
| 10/26/2019 | SFFD: Multiple engine                    | 5" Hose drills                                 |
| 11/16/2019 | companies and Battalion                  |  |
| 12/21/2019 | Chiefs                                   | Regularly scheduled drill using 5"             |
| 12/28/2019 |  | hose tenders and high pressure                 |
|            |  | hydrants, ladder pipes and/or                  |

| Date         | Participants   | Activity   |
|--------------|--|--|
| 02/15/2020   | patik caradi podepara                                | monitor nozzles/deck guns.   |
| 05/04/2020   | Transferred contents to being                        |  |
| 05/09/2020   | all of all a braydleb mod                            |  |
| 05/16/2020   | w Letoporico of Rwitims                              |  |
| 1.03         | was a cus another n                                  |  |
| In Progress  | SFFD: Water Supply Officer<br>Captain Brent Stuckert | Joint Agency Discussion  |
| V - E - E    | V  | SFFD has contacted Rec and Parks   |
| 04) 15 456   | Rec & Park: David Iribarne                           | asking them to consider adding   |
| the state of | Mark To 1849 Guedlon Cumped                          | more hydrants inside Golden Gate   |
| 100          | a aut Euror perions sur l'about                      | Park. The Urban Tree Canopy is   |
|              | Prencusos Misterfront 10                             | now being taken into consideration   |
| 08.3         | d obay avs anothermos                                | in the latest Fire Following   |
| 10 EW D      | ab of astrogeneo unique                              | Earthquake models, and Golden  |
|              | gulf entiment ;                                      | Gate Park has a large amount of  |
| -            | Ambigin in Lagorith Spirit                           | both surface and canopy fuel loads.  |
| In Progress  | SFFD: Water Supply Officer                           | Bay Dredging near salt-water   |
| nerse net    | Captain Brent Stucker                                | inlet manifold.  |
| better       | Port: Shannon Alford                                 | SFFD has been working with the   |
|              | Not place of FO and STRUC                            | SF Port to schedule dredging   |
| on men in    | ring   collectively interect in the                  | adjacent to the salt-water inlet   |
|              | misse 9 full that only                               | manifold located on piers to ensure  |
|              | With City  | the St. Francis fireboat has   |
|              |  | adequate draft to perform pump   |
|              | pring  | operations through a complete 24-  |
|              | Division (2005) of the service                       | hour tidal cycle. SFFD has also  |
|              | If half musical entitles succession                  | requested the area near the Pump   |
|              | dies a mythin e manning a ke                         | Station No. 1 inlet tunnel to be   |
|              |  | included in Port's dredging  |
|              |  | boundary. This inlet tunnel must be  |
|              | 7  | kept clear to allow the Pump Station   |
|              | methodical Commission of the                         | to provide seawater to the EFWS.   |
| In Progress  | SFFD: Water Supply Officer                           | SFFD-SFPUC Joint 5" Hose Drill   |
|              | Captain Brent Stuckert, B07,                         | E STONE CONTROL OF A STONE OF THE STONE OF T |
|              | 5" Hosetender  | Preparations have begun for a 5"   |
|              | To break a conference of the control of the          | Hose Tender Drill involving SFFD   |
|              | SFPUC: Manager Bill                                  | and SFPUC. SFPUC will assist with  |
| Distrib      | Teahan, Superintendent Rich                          | measuring exact pressures and  |
|              | Gonzales, CDD Engineers.                             | water flow in the 5" lines to  |
|              | .,   | determine optimal placement of the   |
|              | · ·  | 5" hose and engines for relay  |
|              |  | pumping operations.  |
|              |  | Relay pumping will be required to  |
|              |  | deliver water long distances and to  |
|              | rate by the  | the higher elevations of San   |
|              | 140  | Francisco. These preparations will   |
|              |  | increase the City's resilience by  |
|              |  | morease the Oity a resilience by   |

| Date        | Participants                | Activity   |
|-------------|-----------------------------|--|
|             |                             | mitigating the projected multiple post seismic ignitions. (This drill has been delayed due to the pandemic and will be conducted when normal operations can be resumed.) |
| In Progress | SFFD: Water Supply Officer  | Bay Suction Connection   |
| ,           | Captain Brent Stuckert      | Inspection Program   |
| π'          | SFPUC: Manager Bill         | Inspection and maintenance of the  |
|             | Teahan, Superintendent Rich | 35 Bay Suction Connections that  |
| ŧ           | Gonzales, CDD Engineering.  | are situated along the San   |
| A.          | ħ .                         | Francisco Waterfront. These  |
|             |                             | connections are used by SFFD   |
|             |                             | engine companies to draft water  |
|             |                             | from the Bay.  |
| In Progress | SFFD: SFFD engine           | High Pressure Hydrant  |
|             | companies, Water Supply     | Inspection Program   |
| 21          | Officer Captain Stuckert.   |  |
|             | SFPUC: Manager Bill         | A High Pressure Hydrant Inspection program has been implemented.   |
|             | Teahan, Superintendent Rich | The SFFD and SFPUC are   |
|             | Gonzales, CDD Engineering.  | collectively inspecting and repairing the 1,644 High Pressure Hydrants   |
|             |                             | in the City.   |

#### Maintenance Projects: Fiscal Year 2019 - 2020

Over the past year, the City Distribution Division (CDD) of the SFPUC completed numerous important maintenance activities to ensure that the EFWS is in a state of good repair. A summary of maintenance activities can be found in Table 4 of this report (page 7).

#### Update on Memorandum of Understanding

In 2015, the SFPUC and SFFD signed the *Memorandum of Understanding Regarding the Operation and Maintenance of San Francisco Water Supply Systems Related to Fire Suppression*. The SFPUC and SFFD are actively collaborating to update this Memorandum of Understanding to better detail and memorialize annual emergency response exercises, including simulated disaster and earthquake drills involving the EFWS. The timeline on this update has been delayed due to Coronavirus response; however, SFPUC and SFFD expect this update to be completed in 2020.

Table 4: Summary of Maintenance Activities

|                                |          |  | Astem Valvo Bonovol  | us-bencing  |                              | Date Range:<br>019 - June 15, 2020                    |
|--------------------------------|----------|--|--|---|------------------------------|---|
| Facility<br>Type               | Facility | Activity Category  | Type of Activity   | Typical Frequency   | Work Performed (Labor Hours) | Total Quantity of Maintenance Activities              |
|                                |          |  | Hydrant Inspections  | Collect Data and<br>Inspect Condition<br>Hydrant and<br>Auxiliary Valve | 296                          | Quantity inspected available upon request             |
|                                |          | Sould as and it shew little in<br>Pings<br>Historiae and Bandwi<br>Hydran Legals | Condition Assessment*- College Hill Pressure Zone Hydrants and Valves      | May 5, 2019<br>through July 16,<br>2019                                 | 556                          | 932   |
|                                |          | Salar HADARIA  | Hydrant Corrective Maintenance<br>& Preventative Maintenance<br>Activities | Ongoing   | 2,413                        | 538   |
| Hydrants Low Pressure Hydrants | Pressure | ressure  | Replace Caps & Chains and Service Hydrants                                 | SFFD Requests   | 2,513                        | Quantity serviced and repaired available upon request |
|                                |          |  | Hit Hydrants   | As Needed   | 483                          | 57  |
|                                |          |  | Preventative Maintenance   | Ongoing by AWSS<br>District   | 708                          | Quantity serviced available upon request              |
|                                |          | Auxiliary Gate Valve Maintenance   | Remove Debris and<br>Uncover Aux. Gate<br>Valves                           | 515.5   | 98                           |   |
|                                |          | New Hydrants Installed   | Replace/Install/Relocate Hydrants  | As Needed   | N/A                          | 233   |

|       |                                      |                                    | Hydrant Inspections   | Collect Data and<br>Inspect and<br>Document<br>Condition of King<br>Valves | 1,793 | Quantity inspected available upon request                                       |
|-------|--------------------------------------|------------------------------------|---|--|-------|---|
|       | High<br>Pressure                     | Maintenance                        | Hydrant Maintenance   | Upon SFFD Request and Proactive Follow up Work from Inspections            | 2,966 | 508   |
|       | Hydrants                             |                                    | Rebuild High Pressure Hydrants and Scrap  | Corrective - to<br>support CM and<br>Service Hydrant<br>Program            | 2,015 | N/A   |
|       | Julianistani<br>1500 miliani<br>Prim | New Hydrants Installed             | Install New High Pressure Hydrants  | Redevelopment<br>Projects  | N/A   | 3   |
|       | Combined<br>Low/High<br>Pressure     | Paint Hydrants                     | Paint Hydrant - Vandalism and Reported by SFFD  | Ongoing  | 4,836 | Labor based on<br>Standing Work Orders  |
| Cycto | m Dinas                              | Replace and Renew Main Pipes       | Main Pipe Leaks   | As-needed  | 332   | 2   |
| Syste | em Pipes                             | Replace and Renew<br>Hydrant Leads | Hydrant Leads   | As-needed  | 860   | 5   |
|       |                                      |                                    | Exercise Critical Valves  | Once every 2 years   | 0*    | Exercised 63 Critical<br>Valves FY 18/19; To<br>Exercise all valves FY<br>20/21 |
| Va    | alves                                | Maintenance                        | Valve Vault Maintenance, Pump<br>Flooded Vaults, Electrical and<br>Mechanical Inspections | Corrective<br>Maintenance based<br>on FY 17/18 Survey                      | 273   | Location Details<br>Available Upon<br>Request                                   |
|       |                                      |                                    | System Valve Renewal  | As-needed  | 783   | 6   |
|       |                                      |                                    | Altitude Valve Inspections  | As-needed  | 15    | -   |

|               |                         |                                | Inspect, Test, and Repair Valves/Actuators                      | As-needed  | 0     | <b>E</b> ,                                |  |
|---------------|-------------------------|--------------------------------|---|--|-------|---|--|
|               |                         | Ames Valve Testing             | Test Ames Valves  | Ongoing  | 476   | Quantity inspected available upon request |  |
| Pump          | PS1                     | Maintenance                    | Pump Testing and Backup Generator                               | Monthly  | 934   | -   |  |
| Stations      | PS2                     | Maintenance                    | Pump Testing and Emergency<br>Backup Generator                  | BiMonthly  | 16    | -   |  |
|               |                         |                                | Tank Inspections  | Monthly  | 16    |   |  |
| Tanks         | Jones Tank              | Maintenance                    | Pump Testing and Backup<br>Generator                            | Monthly  | 16    | -   |  |
|               | Ashbury                 |                                | Tank Inspections  | Monthly  | 16    | - ~                                       |  |
|               | Tank                    | Maintenance                    | Pump Testing  | BiMonthly  | 4     | -   |  |
| Reservoir     | Twin Peaks<br>Reservoir | Maintenance                    | Inspect & Fill Twin Peaks Reservoir                             | As-needed  | 90    |   |  |
| Cis           | sterns                  | Maintenance & Inspections      | Repair/Replace Cistern Handles, Fill Cisterns                   | As-needed  | 357   | 173                                       |  |
|               | onnections & nifolds    | Maintenance                    | Connection/Manifold Inspections and SFFD Dive Team Assistance   | As-needed  | 0**   | PM program<br>scheduled for<br>FY20/21    |  |
| Ма            | nifold                  | Maintenance                    | Fire Boat Testing/Training                                      | As-needed  | 185   | -   |  |
| Other Support |                         |                                | Instrumentation and Controls Calibration at all AWSS Facilities | Monthly  | 305   | -   |  |
|               |                         | Maintenance/Operations Support | Planning Support and Administration                             | Field Staff Planning<br>and Supervisorial<br>(Non-Management<br>Labor) | 2,057 | -   |  |
|               |                         |                                | Landscaping & Pest Management                                   | Quarterly  | 692.5 | _   |  |

|  | Materials Management | As-needed (Includes only Non- Warehouse Staff Labor Charges) | 767 | - |
|--|----------------------|--|-----|---|
|--|----------------------|--|-----|---|

#### Notes

<sup>\*</sup> AWSS critical valves were exercised in FY18/19 and are scheduled to be exercised in FY20/21 (two-year cycle)

<sup>\*\*</sup> Bay suction manifolds preventative maintenance program is scheduled for FY20/21

[Declaring a State of Urgency - Expanding the City's Emergency Firefighting Water System]

Resolution declaring a State of Urgency to rapidly expand the City's Emergency Firefighting Water System (EFWS) to protect all neighborhoods in the event of a major earthquake and fire, and calling for a comprehensive EFWS action plan to expand the City's EFWS to cover all unprotected neighborhoods by 2034; to expand the Fire Department's firefighting apparatus such as portable hose tenders to provide interim protection to neighborhoods not currently covered by the EFWS; and to require an annual report to the Board of Supervisors on the state of the City's EFWS preparedness for a major earthquake and fire.

WHEREAS, The United States Geological Survey (USGS) estimates that the probability an earthquake magnitude 6.0 or larger will occur in the San Francisco region before 2043 is 98 percent, the probability of at least one earthquake of magnitude 6.7 or larger is 72 percent, and the probability of at least one earthquake of magnitude 7.0 or larger is 51 percent; and

WHEREAS, In San Francisco, the most densely populated city in California, over 90 percent of buildings are constructed from wood, many of them directly touching their neighbor buildings, and earthquakes in places with this type of construction have caused the two largest peacetime urban fires in history: in 1906 in San Francisco and in 1923 in Tokyo, and San Francisco remains highly vulnerable to fire after an earthquake, as explained in a 2008 article for the *International Association for Fire Safety Science*; and

WHEREAS, The San Francisco Fire Department (SFFD), the San Francisco Public Utilities Commission (SFPUC), and this Board of Supervisors share a common goal of increasing the firefighting capabilities of all areas of San Francisco; and

WHEREAS, The EFWS is a high-pressure and volume fire suppression water system that can be utilized during large fires and is vital for protection against the loss of life, homes, and businesses from fire following a major earthquake and non-earthquake multiple-alarm fires; and

WHEREAS, The EFWS does not cover large parts of nor adequately protect Supervisorial Districts 1, 4, 7, and 11, roughly one-third of the City's developed area, which also have the fewest cisterns, and each fewer than ten miles of EFWS mains and fewer than 50 EFWS fire hydrants; and

WHEREAS, In June 2003, the 2002-2003 Civil Grand Jury recommended that the EFWS be extended "to serve all parts of the City," and 16 years later many neighborhoods still do not have new EFWS pipelines; and

WHEREAS, The SFPUC is developing a preliminary list of potential projects for various parts of the City where there is currently limited access to the EFWS, as well as other projects to reinforce or otherwise improve the existing EFWS; and

WHEREAS, The City does not have an agreed-upon timeline to fund and complete development of EFWS for all areas of the City, including neighborhoods that historically have not been as well protected as other areas of the City; and

WHEREAS, Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before some parts of the City have a high-pressure and volume, multi-sourced, seismically safe emergency firefighting water supply; and

WHEREAS, While the amount of money needed to implement EFWS citywide is estimated to be in the hundreds of millions of dollars, the potential loss of life and potential property damage could be far greater if an extremely large earthquake strikes San Francisco; and

WHEREAS, Based on the City's current pace of issuing ESER Bonds, it could take approximately 35 years or more to build out EFWS pipelines to serve all neighborhoods, unless the timing of the ESER Bond issuances are expedited or other sources of funding are identified; and

WHEREAS, SFPUC and SFFD are in the process of analyzing the best method for bringing a robust and resilient high-pressure and volume firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and are examining several options for the Westside, including potential development of a potable EFWS with over 14 miles of new EFWS pipelines and two new pump stations that could be supplied by four water sources; and

WHEREAS, To best utilize the existing EFWS and serve areas where the EFWS is lacking, it is critical that the SFFD obtain new updated Hose Tenders; and

WHEREAS, SFFD hose tenders are specialized apparatus designed for pumping and transporting large volumes of water from any source, are recognized worldwide for their ability to successfully move large amounts of water to a fire at high-pressures and volumes for firefighting, and are the ideal solution for areas with limited access to the EFWS because these vehicles can be dynamically deployed to any area of the City; and

WHEREAS, The SFFD currently has five Hose Tenders, three from 1973, one from 1987, and one from 1992, all of which are two-wheel drive, and do not have the capacity to draft or pump water; and

WHEREAS, In FY2019-2020 SFFD submitted a request for funding to purchase 20 Portable Water Supply System (PWSS) hose tenders, the Board of Supervisors and Mayor funded four new PWSS hose tenders, and the State of California funded one; and

WHEREAS, On October 8, 2019, Supervisor Gordon Mar requested the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board no later than December 31, 2020 (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term; and

WHEREAS, On October 1st, 2019, the San Francisco Board of Supervisors adopted a Resolution responding to the Presiding Judge of the Superior Court on the findings and recommendations contained in the 2018-2019 Civil Grand Jury Report, entitled "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System," on file with the Clerk of the Board of Supervisors in File No. 190786, which is hereby declared to be a part of this Resolution as if set forth fully herein; now, therefore, be it

RESOLVED, That the Board of Supervisors hereby declares a State of Urgency to rapidly expand the City's EFWS to protect all neighborhoods in the event of a major earthquake and fire, given that the vulnerability of the City poses a serious and urgent threat to the well-being of San Francisco and the safety of its inhabitants and environment; and be it

FURTHER RESOLVED, That the Board of Supervisors urges the SFPUC, SFFD and the Office of Resilience and Capital Planning to develop a comprehensive EFWS action plan, including funding sources, to install a high-pressure and volume, multi-sourced, seismically safe emergency water system to fight fires in the event of a major earthquake in all the parts of the City where it is lacking by June 30, 2034, to be submitted to the Board of Supervisors by December 31, 2021; and, be it

FURTHER RESOLVED, That the Board of Supervisors urges the SFPUC and SFFD to complete a study for adding an EFWS saltwater pump station on the Westside of San Francisco to be presented to the Board no later than June 30, 2021; and, be it

FURTHER RESOLVED, That the Board of Supervisors urges the SFPUC to continue its efforts to complete more detailed analysis of emergency firefighting water needs by neighborhood and prepare a completed analysis by June 30, 2021; and, be it

FURTHER RESOLVED, That by June 30, 2022, the City should analyze whether to propose a separate bond for the development and implementation of EFWS projects for areas of the City with limited EFWS access as part of the City's regular capital planning process; and, be it

FURTHER RESOLVED, That the Board of Supervisors urges the Mayor to prioritize funding for the purchase of new PWSS hose tenders, apparatus, and equipment to replace and expand SFFD's currently inadequate inventory within the next three Fiscal Years; and, be it

FURTHER RESOLVED, That the Board of Supervisors urges the Department of Emergency Management, SFPUC, SFFD, and the Office of Resilience and Capital Planning to provide a consolidated annual report to the Board of Supervisors on the state of the City's EFWS preparedness for a major earthquake and fire and planned funding from the ten-year Capital Plan for EFWS by June 30 of each year, with the first report due June 30, 2020.



### City and County of San Francisco Tails

City Hall 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102-4689

#### Resolution

File Number:

191029

Date Passed: November 19, 2019

Resolution declaring a state of urgency to rapidly expand the City's Emergency Firefighting Water System (EFWS) to protect all neighborhoods in the event of a major earthquake and fire, and calling for a comprehensive EFWS action plan to expand the City's EFWS to cover all unprotected neighborhoods by 2034; to expand the Fire Department's firefighting apparatus such as portable hose tenders to provide interim protection to neighborhoods not currently covered by the EFWS; and to require an annual report to the Board of Supervisors on the state of the City's EFWS preparedness for a major earthquake and fire.

November 08, 2019 Public Safety and Neighborhood Services Committee -RECOMMENDED

November 19, 2019 Board of Supervisors - AMENDED, AN AMENDMENT OF THE WHOLE BEARING SAME TITLE

> Ayes: 11 - Brown, Fewer, Haney, Mandelman, Mar, Peskin, Ronen, Safai, Stefani, Walton and Yee

November 19, 2019 Board of Supervisors - ADOPTED AS AMENDED

Ayes: 11 - Brown, Fewer, Haney, Mandelman, Mar, Peskin, Ronen, Safai, Stefani, Walton and Yee

File No. 191029

I hereby certify that the foregoing **Resolution was ADOPTED AS AMENDED** on 11/19/2019 by the Board of Supervisors of the City and County of San Francisco.

> Angela Calvillo Clerk of the Board

Unsigned

London N. Breed Mayor

11/27/19

**Date Approved** 

I hereby certify that the foregoing resolution, not being signed by the Mayor within the time limit as set forth in Section 3.103 of the Charter, or time waived pursuant to Board Rule 2.14.2, became effective without her approval in accordance with the provision of said Section 3.103 of the Charter or Board Rule 2.14.2.

Feggy Newin

For Angela Calvillo

Clerk of the Board

Date

File No. 191029

#### **BOARD of SUPERVISORS**



City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 554-5227

October 15, 2019

The Honorable Garrett L. Wong Presiding Judge Superior Court of California, County of San Francisco 400 McAllister Street, Department 206 San Francisco, CA 94102

RE: Civil Grand Jury Report - Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System

#### Dear Judge Wong:

The Board of Supervisors' Government Audit and Oversight Committee conducted a public hearing on September 19, 2019, to review the findings and recommendations of the 2018-2019 Civil Grand Jury report, entitled "Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System."

Prior to the Committee meeting, the following City Departments submitted required responses to the Civil Grand Jury:

- Office of the Mayor: Received September 16, 2019;
- General Manager of the San Francisco Public Utilities Commission: Received September 16, 2019;
- Public Utilities Commission: Received September 11, 2019
- Fire Commission: Received September 12, 2019;
- Fire Department: Received September 16, 2019;
- City Administrator: Received September 16, 2019; and
- Department of the Environment Received September 16, 2019.

2018-2019 Civil Grand Jury Board Response Transmittal October 15, 2019 Page 2

During the September 19, 2019 meeting, the Government Audit and Oversight Committee prepared a resolution responding to the requested findings and recommendations identified in the report. The response was prepared by Resolution No. 422-19, enacted on October 11, 2019.

By this message, the Office of the Clerk of the Board of Supervisors is transmitting Resolution No. 422-19 to your attention.

If you have any questions, please contact John Carroll, Government Audit and Oversight Committee Clerk at (415) 554-4445, or via email to john.carroll@sfgov.org.

Sincerely,

Angela Calvillo

Clerk of the Board

Sophia Kittler, Mayor's Office Kanishka Karunaratne Cheng, Mayor's Office Andres Power, Mayor's Office Sally Ma, Mayor's Office Rebecca Peacock, Mayor's Office Jon Givner, Office of the City Attorney Ben Rosenfield, City Controller Todd Rydstrom, Office of the Controller Peg Stevenson, Office of the Controller Tonia Lediju, Office of the Controller Mark de la Rosa, Office of the Controller Alisa Somera, Office of the Clerk of the Board Debra Newman, Office of the Budget and Legislative Severin Campbell, Office of the Budget and

Legislative Analyst

Reuben Holober, Office of the Budget and Legislative

Jennifer Millman Tell, Office of the Budget and Legislative Analyst

Rasha Harvey, 2018-2019 Foreperson, San Francisco Civil Grand Jury

Ettore Leale, 2019-2020 Foreperson, San Francisco Civil Grand Jury

Naomi M. Kelly, City Administrator, Office of the City Administrator

Lvnn Khaw. Office of the City Administrator Brian Strong, Office of the City Administrator Debbie Raphael, Director, Department of the Environment

Peter Gallotta, Department of the Environment Charles Sheehan, Department of the Environment Jeanine Nicholson, Chief, Fire Department Theresa Ludwig, Fire Department

Stephen Nakajo, President, Fire Commission

Maureen Conefrey, Fire Commission

Harlan L. Kelly, Jr., General Manager, San Francisco **Public Utilities Commission** 

Juliet Ellis, San Francisco Public Utilities Commission John Scarpulla, San Francisco Public Utilities Commission

Christopher Whitmore, San Francisco Public Utilities Commission

Ann Moller Caen, President, San Francisco Public Utilities Commission

Donna Hood, San Francisco Public Utilities Commission



# City and County of San Francisco Certified Copy

City Hall
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102-4689

#### Resolution

190786

[ Board Response - Civil Grand Jury Report - Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System ]

Sponsor: Mar

Resolution responding to the Presiding Judge of the Superior Court on the findings and recommendations contained in the 2018-2019 Civil Grand Jury Report, entitled "Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System;" and urging the Mayor to cause the implementation of accepted findings and recommendations through his/her department heads and through the development of the annual budget. (Clerk of the Board)

10/1/2019 Board of Supervisors - ADOPTED

Ayes: 11 - Brown, Fewer, Haney, Mandelman, Mar, Peskin, Ronen, Safai, Stefani, Walton and Yee

10/11/2019 Mayor - RETURNED UNSIGNED

STATE OF CALIFORNIA CITY AND COUNTY OF SAN FRANCISCO CLERK'S CERTIFICATE

I do hereby certify that the foregoing Resolution is a full, true, and correct copy of the original thereof on file in this office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the offical seal of the City and County of San Francisco.

October 15, 2019

Date

Angela Calvillo

# AMENDED IN COMMITTEE 9/19/19

FILE NO. 190786

RESOLUTION NO. 422-19

[Board Response - Civil Grand Jury Report - Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System]

Resolution responding to the Presiding Judge of the Superior Court on the findings and recommendations contained in the 2018-2019 Civil Grand Jury Report, entitled "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System;" and urging the Mayor to cause the implementation of accepted findings and recommendations through his/her department heads and through the development of the annual budget.

WHEREAS, Under California Penal Code, Section 933 et seq., the Board of Supervisors must respond, within 90 days of receipt, to the Presiding Judge of the Superior Court on the findings and recommendations contained in Civil Grand Jury Reports; and

WHEREAS, In accordance with California Penal Code, Section 933.05(c), if a finding or recommendation of the Civil Grand Jury addresses budgetary or personnel matters of a county agency or a department headed by an elected officer, the agency or department head and the Board of Supervisors shall respond if requested by the Civil Grand Jury, but the response of the Board of Supervisors shall address only budgetary or personnel matters over which it has some decision making authority; and

WHEREAS, Under San Francisco Administrative Code, Section 2.10(a), the Board of Supervisors must conduct a public hearing by a committee to consider a final report of the findings and recommendations submitted, and notify the current foreperson and immediate past foreperson of the civil grand jury when such hearing is scheduled; and

WHEREAS, In accordance with San Francisco Administrative Code, Section 2.10(b), the Controller must report to the Board of Supervisors on the implementation of

recommendations that pertain to fiscal matters that were considered at a public hearing held by a Board of Supervisors Committee; and

WHEREAS, The 2018-2019 Civil Grand Jury Report, entitled "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" ("Report") is on file with the Clerk of the Board of Supervisors in File No. 190785, which is hereby declared to be a part of this Resolution as if set forth fully herein; and

WHEREAS, The Civil Grand Jury has requested that the Board of Supervisors and the Budget and Legislative Analyst respond to Finding Nos. F6, and F11, as well as Recommendation No. R3, contained in the subject Report; and

WHEREAS, Finding No. F6 states: "Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply;" and

WHEREAS, Finding No. F11 states: "The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods;" and

WHEREAS, Recommendation No. R3 states: "The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020;" and

WHEREAS, The Civil Grand Jury has requested that the Board of Supervisors respond to Finding Nos. F4, and F5, as well as Recommendation Nos. R1, R2, R4, R6, R7, and R8, contained in the subject Report; and

WHEREAS, Finding No. F4 states: "The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake;" and

WHEREAS, Finding No. F5 states: "A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City;" and

WHEREAS, Recommendation No. R1 states: "By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake;" and

WHEREAS, Recommendation No. R2 states: "The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034;" and

WHEREAS, Recommendation No. R4 states: "As an interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory;" and

WHEREAS, Recommendation No. R6 states: "The SFPUC, the SFFD, and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations

from this study should be presented to the Board of Supervisors by no later than June 30, 2021;" and

WHEREAS, Recommendation No. R7 states: "The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021;" and

WHEREAS, Recommendation No. R8 states: "By no later than June 30, 2022, the Mayor and Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034;" and

WHEREAS, In accordance with California Penal Code, Section 933.05(c), the Board of Supervisors must respond, within 90 days of receipt, to the Presiding Judge of the Superior Court on Finding Nos. F4, F5, F6, and F11, as well as Recommendation Nos. R1, R2, R3, R4, R6, R7, and R8 contained in the subject Report; now, therefore, be it

RESOLVED, That the Board of Supervisors reports to the Presiding Judge of the Superior Court that they agree with Finding No. F4; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports to the Presiding Judge of the Superior Court that they agree with Finding No. F5; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports to the Presiding Judge of the Superior Court that they agree with Finding No. F6; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports to the Presiding Judge of the Superior Court that they agree with Finding No. F11; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R1 has not been implemented but will be implemented no later than December 31, 2021,

and urges the Mayor, the SFPUC, the SFFD, and Office of Resilience and Capital Planning to jointly present a detailed plan to the Board of Supervisors by no later than December 31, 2021; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R2 has not been implemented but will be implemented by December 31, 2021, and urges the Departments to include in its detailed plan a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one by no later than June 30, 2034; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R3 has not been implemented but will be implemented in the future, and Supervisor Gordon Mar will issue a request for a Budget and Legislative Analyst report no later than December 31, 2019, and will direct the Budget and Legislative Analyst to issue the completed report no later than December 31, 2020; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R4 will not be implemented because while funding for five hose tenders was allocated for FY2019-2020 though both local and state-level actions, implementation of the recommendation in its entirety will depend on the appropriation actions of a future Mayor and Board of Supervisors; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R6 has not been implemented but will be implemented in the future, and urges the completion of a study for adding a salt-water pump stations to be presented to the Board of Supervisors by no later than June 30, 2021, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R7 has not been implemented but will be implemented in the future, and urges that a

completed analysis be presented to the Board of Supervisors by no later than June 30, 2021; and, be it

FURTHER RESOLVED, That the Board of Supervisors reports that Recommendation No. R8 has not been implemented but will be implemented in the future, and will analyze by June 30, 2022, in coordination with the Mayor, whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034; and, be it

FURTHER RESOLVED, That the Board of Supervisors urges the Mayor to cause the implementation of the accepted findings and recommendations through his/her department heads and through the development of the annual budget.



## City and County of San Francisco Tails

City Hall 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102-4689

#### Resolution

File Number:

190786

Date Passed: October 01, 2019

Resolution responding to the Presiding Judge of the Superior Court on the findings and recommendations contained in the 2018-2019 Civil Grand Jury Report, entitled "Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System;" and urging the Mayor to cause the implementation of accepted findings and recommendations through his/her department heads and through the development of the annual budget.

September 19, 2019 Government Audit and Oversight Committee - AMENDED, AN AMENDMENT OF THE WHOLE BEARING SAME TITLE

September 19, 2019 Government Audit and Oversight Committee - RECOMMENDED AS AMENDED

October 01, 2019 Board of Supervisors - ADOPTED

Ayes: 11 - Brown, Fewer, Haney, Mandelman, Mar, Peskin, Ronen, Safai, Stefani, Walton and Yee

File No. 190786

I hereby certify that the foregoing Resolution was ADOPTED on 10/1/2019 by the Board of Supervisors of the City and County of San Francisco.

> ← Angela Calvillo Clerk of the Board

Unsigned

London N. Breed Mayor

10/11/2019

Date Approved

File No. 190786

I hereby certify that the foregoing resolution, not being signed by the Mayor within the time limit as set forth in Section 3.103 of the Charter, or time waived pursuant to Board Rule 2.14.2, became effective without her approval in accordance with the provision of said Section 3.103 of the Charter or Board Rule 2.14.2.

Angela Calvillo Clerk of the Board



525 Golden Gate Avenue, 13th Floor San Francisco, CA 94102 T 415.554.3155 F 415.554.3161 TTY 415.554.3488

September 11, 2019

Sent via U.S. Mail and email to CGrandJury@sftc.org

The Honorable Garrett L. Wong
Presiding Judge
Superior Court of California, County of San Francisco
400 McAllister Street, Room 008
San Francisco, CA 94102-4512

Dear Judge Wong:

In accordance with Penal Code Sections 933 and 933.05, and pursuant to the request of Mr. Rasha Harvey, Foreperson of the City and County of San Francisco 2018-19 Civil Grand Jury, attached please find the response of the San Francisco Public Utilities Commission to the 2018-2019 Civil Grand Jury Report, *Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System.* At its regularly scheduled public meeting of September 10, 2019, the Commission voted to approve the attached responses by Resolution No. 19-0178.

The response of the General Manager of the San Francisco Public Utilities Commission is being sent under separate cover.

The Commission would like to thank the members of the 2018-2019 Civil Grand Jury for their service and their interest in our vital water infrastructure that supports firefighting in all communities in San Francisco.

Sincerely,

Ann Moller Caen

President

San Francisco Public Utilities Commission

CC:

Harlan Kelly, SFPUC General Manager

Mayor London Breed

London N. Breed Mayor

Ann Moller Caen

President

Francesca Vietor

Vice President

Anson Moran

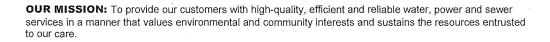
Commissioner

Sophie Maxwell Commissioner

Tim Paulson

Commissioner

Harlan L. Kelly, Jr. General Manager





#### PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO.

|      |    |        |   |      |        | *       |              |           |      |            |       |          |           |
|------|----|--------|---|------|--------|---------|--------------|-----------|------|------------|-------|----------|-----------|
|      | WH | EREAS. | O | n Ju | ily 17 | , 2019. | the 2018-201 | 9 Civil G | rand | Jury relea | sed a | report ( | entitled. |
| "Act |    |        |   |      |        |         | Aggressively |           |      | •          |       |          |           |
|      |    |        | _ |      |        |         |              |           |      |            |       |          |           |

"Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System," a copy of which is on file with the Commission Secretary and has been provided to this Commission for review; and

WHEREAS, The Civil Grand Jury requires written responses from this Commission to the Report's Findings Nos. 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, and 13, and Recommendations Nos. 1, 2, 6, 7, 9, and 10; and

WHEREAS, California Penal Code §933(c) requires such written responses be submitted to the Presiding Judge no later than September 15, 2019; and

WHEREAS, Attached hereto are the Commission's responses to the above stated Findings and Recommendations in the 2018-19 Civil Grand Jury Report; now, therefore be it

RESOLVED, That this Commission hereby approves the Commission's responses, attached hereto, to the relevant findings and recommendations of the July 17, 2019 Civil Grand Jury Report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" and authorizes and directs the Commission President to submit the response to the Presiding Judge of the Civil Grand Jury by September 15, 2019, as required by California Penal Code §933(c).

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of September 10, 2019.

Secretary, Public Utilities Commission

| Report Title<br>[Publication Date]   | F#   | Finding<br>(text may be duplicated due to spanning and<br>multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date]                            | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#] | Recommendation (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date]                            | Recommendation<br>Response<br>(implementation) | Recommendation Response Text  |
|--|------|--|---|--------------------------------------|--|----------------|---|---|--|---|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F1 . | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.  | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Agree with the finding               |  | (for F1-F6)    | By no later than December 31, 2020, the Mayor, the SFPLC, the SFPLC, the SFPC, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight first in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) |  | Ensuring that San Francisco has the Infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan, Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline will the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F1   | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.  | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] | Agree with the finding               |  | [for F1-F6]    | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.               | President, San Francisco<br>Pobile Utilities Commission<br>(September 15, 2019) | Requires further                               | The commitment of sources for specific uses on specific timelines for San Francisco's public Infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning to consider the most of the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure postportiol is and across San Francisco's resilience challeness. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered; (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic enests; and (3) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to a naive per inority funding a chique projects and programs and identify sources to advance those priorities. Committing to entrely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F2 . | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake. | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Disagree, partially                  | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) inlitated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the \$5.48. billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it so one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's seismic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service. |                | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.           | Public Utilities Commission<br>[September 15, 2019]                             | Will be Implemented                            | Ensuring that San Francisco has the Infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1.d each odd-numbered year for approval no later than May 1. The requested presentation would be delivered than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resillence challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline mutil the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) | F2 | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  | President, San Francisco Di Didic Utilities Commission (September 15, 2019)          |                          | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the SPPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 55 incluty projects within the 54.8 Billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's sessinic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service.   | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sessinically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | ,                            | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principies to guide the prioritization of public infrastructure lowestments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.   |
|--|----|---|--|--------------------------|--|-------------|--|---|------------------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Auxillary Water Supply System (AWSS), does not cover large parts of Supervisional Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco A<br>Public Utilities Commission fi<br>[September 15, 2019] | vgrae with the<br>inding | The SFPUC, SFFD, and San Francisco Public Works (SFFW) are committed to Increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the city would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900, and the City Intends to use the best possible technology available to meet the performance standards of the SFFD. | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Recilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | President, San Francisco Public Utilities Commission [September 15, 2019]       | Will be Implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes, For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Auxillary Water Supply System (AWS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  | President, San Francisco Public Utilities Commission fi [September 15, 2019]         | Agree with the<br>Inding | The SFPUC, SFFD, and San Francisco Public Works (SFFW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bend in 2010, the three agencies have been implementing projects to improve the AWSs system's selsmic reliability and range of coverage. Enhancing the AWSs range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrant, and selsmic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. |             | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sessimically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are litered: (1) address legal and/or regulatory mandates; (2) ensure public asfety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 100-lear Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstrading and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |

|  |    | <u> </u>   |   |                        |  |             |  |   |                     |   |
|--|----|--|---|------------------------|--|-------------|--|---|---------------------|---|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-poured, seismically safe emergency firelighting water supply will be costly but is essential to protect the City.   | President, San Francisco  Jobile Utillites Commission  [September 15, 2019]     | Agree with the finding | As the City considers what is essential to protect San Francisco, it is Important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient 5 strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordsbillty, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their proparty, and their ability to make a life in the city, in making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFFO, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design.         | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Resillence and Capital Planning should Jointly, present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | President, San Francisco Public Utilities Commission [September 15, 2019]       |                     | Ensuring that San Francisco has the Infrastructure and resources to be well prepared to Fight free in all jurats of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Undetes available on this timeline would be included. The City cannot discuss the project and timeline until the SESR 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) | F5 | A high-pressure, multi-sourced, seismically safe emergency fireflighting water supply will be costly but is essential to protect the City.   | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Agree with the finding | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient SF strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise (Cimitent Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Francisceans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts is similarneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, essimically safe EVWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFPD, SFP ubblic Works have been implementing projects to improve the system's selsmic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design. | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, satismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.     | Public Utilities Commission   |                     | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan immeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiredic: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades [i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply. | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  |             | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] | Will be Implemented | Ensuring that San Francisco has the Infrastructure and resources to be well prepared to fight fires In all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered a part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timedine would be included. The City cannot discouss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |

| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019] |      | be several decades (i.e., after the USGS predicts   | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  | (for F1-F6)  |   | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) |                     | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital plan infinite many strengths of the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or reguldatory mandates; (2) pursure publics safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will contine to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
|---|------|---|---|------------------------|--|--|---|---|---------------------|---|
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fleefighting Water<br>System<br>[July 17, 2019]  | FB . | Redundancy is an important feature of an<br>emergency firefighting water system.  | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] | Agree with the finding |  | [for F8-F9]  | The SFPUC, the SFFD and the SF Department of<br>the Environment should study adding salt-water<br>pump stations to improve the redundancy of<br>water sources, especially on the west side.<br>Findings and recommendations from this study<br>should be presented to the Board of Supervisors<br>by no later than June 30, 2021. |   | Will be implemented | SFPUC and SFFD will complete this study by June 30, 2021.  .  |
| Act Now Before it is<br>Too Late:<br>Aggress/wely Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019)  | F9   | Current plans to extend protections to the western part of the City do not include any high-pressure water sources north of Golden Gate Park. | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Disagree, partially    | While it is true that the SFPUC and SFFD are studying four potential water sources proposed to supply a potable EFWS on the west side of the City which are not located north of Golden Gate Park, which by no means would reduce the proposed system's resillency, reliability, performance, or ability to provide abundant high-pressive water for fire suppression to the Richmond District after a selsmic event. San Francisco is unique in that there are 11 in-city reservoirs, with a total water capacity of approximately 413,000,000 gallons. Additionally, Lake Merced, also located within City (Limits, has an additional approximately 1,000,000,000 gallons. The potable EFWS system for the Westside of San Francisco that is being developed and analyzed would provide that the new EFWS pipeline in the Sunset and Richmond Districts could be supplied from four sources of water at two locations. The first two water sources could be supplied to the EFWS pipeline in the twinsity of Lake Merced, which has a water supply of approximately one billion gallons, and 60° seismically resilient SFPUC Hetch Hetch Regional Water System pipeline. The proposed potable EFWS also is analyzing the inclusion of a second 30,000 gallons per minute pump station in the vicinity of the SFPUC'S Sunset Reservoir that could be supplied water by two sources: (1) the 90 million gallon north basin of the Sunset Reservoir, which recently the SFPUC Hetch Hetch Regional Water System pipeline. | A POPULATION AND A POPU | the Environment should study adding sait-water  | [September 15, 2019]  | Will be implemented | SFPUC and SFFD will complete this study by June 30, 2022.   |

|                      |     |  |                             |                     | I   |           | In 1 1111                                       | I                           | Laurer a            | Table 1  |
|----------------------|-----|--|-----------------------------|---------------------|---|-----------|---|-----------------------------|---------------------|--|
| Act Now Before It is | F10 | The "reliability scores" being used by the SFPUC |                             | Disagree, partially | Fire Response Areas (FRAs) were utilized by SFPUC and SFFD in the planning    | R7        | The SFPUC should (a) continue its efforts to    | President, San Francisco    | Will be implemented | SFPUC and SFFD will complete this analysis by June 30, 2021. |
| Too Late:            |     | impart an overly optimistic impression of the    | Public Utilities Commission |                     |   | [for F10] | complete a more detailed analysis of emergency  | Public Utilities Commission |                     |  |
| Aggressively Expand  |     | protection provided.                             | [September 15, 2019]        |                     | by the SFFD for initial alarm response and were called Fire Response Areas    |           | firefighting water needs (including above the-  | [September 15, 2019]        |                     |  |
| and Enhance Our      |     |  |                             |                     | (FRAs). Probable fire demands were developed for each FRA using 1000 sets     |           | median needs) by neighborhood, and not just     |                             |                     | 1  |
| High-Pressure        |     |  |                             |                     | of fire demands generated by Charles Scawthorn, PhD using a Monte Carlo       |           | by FRA, and (b) present a completed analysis to |                             |                     |  |
| Emergency            |     |  | ĺ                           |                     | analysis of fire ignitions and fire growth using the ground motions from the  |           | the Board of Supervisors by no later than       | I                           |                     |  |
| Firefighting Water   |     |  |                             | }                   | design earthquake (7.8 magnitude). The fire Ignitions were generated using    |           | June 30, 2021.                                  |                             |                     | !  |
| System               |     |  |                             |                     | methods similar to those used for the Community Action Plan for Seismic       |           |   |                             |                     | !  |
| [July 17, 2019]      |     |  |                             | 1                   | Safety (CAPSS) study (ATC 2010). The fire Ignitions subsequently were used    |           |   |                             |                     | !  |
| }                    |     |  |                             |                     | to develop water demands that were aggregated into the likely fire            |           |   |                             |                     | 1  |
| 1                    |     |  |                             |                     | demands for each FRA. The water supplies for each FRA were developed          |           | į   |                             |                     | 1  |
|                      |     |  |                             |                     | using the reliability modeling tool GIRAFFE, developed at Cornell University  |           |   |                             |                     | !  |
|                      |     |  |                             |                     | by Professor Thomas D. O'Rourke. GIRAFFE performs internal Monte Carlo        |           |   | 1                           |                     |  |
|                      |     |  |                             |                     | analysis to damage pipes in the system for multiple scenarios. The water      |           |   |                             |                     | !  |
|                      |     |  |                             | }                   | supplies developed by GIRAFFE were aggregated into the likely water           |           |   |                             |                     |  |
|                      |     |  | 1                           |                     | supplies for each FRA. It should be noted that the likely water supplies for  |           |   | 1                           |                     | !  |
|                      |     |  | 1                           |                     | each FRA assumed no water from the City's municipal water system              |           |   |                             |                     | !  |
|                      |     |  |                             |                     | (MWSS), which is quite conservative and highly unlikely even after a seismic  |           |   |                             |                     | ,  |
|                      |     |  |                             |                     | event. The reliability score for each FRA is calculated using the sum of all  |           |   |                             |                     | !  |
|                      |     |  |                             |                     | water supplies for each FRA and dividing it by the FRA water demand. The      |           |   |                             |                     | !  |
|                      |     |  |                             |                     | reliability scores do exactly that - estimate how much EFWS water will be     |           |   |                             |                     | !  |
|                      |     |  |                             |                     | available for firefighting demands in a given FRA. The reliability scores are |           |   |                             |                     |  |
|                      |     |  |                             |                     | not meant to represent an estimate of the fire protection for a given house,  |           |   |                             | i                   | 1  |
|                      |     |  | 1                           |                     | block, or blocks. Rather it is a measure of the EFWS capacity and demand.     |           |   |                             |                     | ,  |
|                      |     |  |                             |                     | The SFPUC recognizes the need to analyze potential EFWS demands on a          |           |   |                             |                     |  |
| i                    |     |  |                             |                     | more detailed level, and the agency began the process of doing so.            |           |   |                             |                     |  |
|                      |     |  |                             |                     |   |           |   |                             |                     | !  |
|                      |     |  | 1                           |                     |   |           |   |                             |                     | !  |
|                      |     |  |                             |                     |   |           |   |                             |                     |  |
|                      |     |  |                             |                     | T) POLICE ( 1) 6 11 4000 dd 1 1 10 1 11 1 11 11                               |           |   |                             | -                   | <u> </u>   |
| Act Now Before It Is | F11 | The City does not have a timeline to fund and    | President, San Francisco    | Disagree, partially | The EFWS was built after the 1906 earthquake, and its location, primarily in  |           |   |                             |                     |  |
| Too Late:            |     | complete development of a high-pressure, mult    |                             |                     | the northeast portion of San Francisco, corresponds to the location of the    |           |   |                             |                     |  |
| Aggressively Expand  | İ   | sourced, seismically safe emergency water        | [September 15, 2019]        |                     | majority of the city's population at that time. Since 2010, the SFPUC, SFFD,  |           | 1   |                             |                     |  |
| and Enhance Our      |     | supply for all parts of the City, including poor |                             |                     | and Public Works have made critical improvements to the existing EFWS         |           |   |                             |                     |  |
| High-Pressure        |     | neighborhoods that historically have not been    |                             |                     | system. Expanding the EFWS prior to ensuring that the existing EFWS is        |           |   |                             |                     |  |
| Emergency            | İ   | as well protected as the downtown business       |                             |                     | resilient and reliable would have contradicted best engineering practices.    |           |   |                             |                     |  |
| Firefighting Water   |     | district and many richer neighborhoods.          |                             |                     | The SFPUC and SFFD are developing plans that would implement a resilient,     |           |   |                             |                     |  |
| System               |     |  |                             |                     | robust, and redundant potable EFWS for the Westside of San Francisco. The     |           | 1   |                             |                     |  |
| [July 17, 2019]      |     |  |                             |                     | potable EFWS that is being developed and analyzed would propose the           |           |   |                             |                     |  |
|                      |     |  |                             |                     | best method for bringing a robust and resilient high-pressure firefighting    |           |   | 1                           |                     |  |
| ł                    |     |  |                             |                     | water system to the Western neighborhoods in San Francisco that is            |           |   |                             |                     |  |
|                      |     |  |                             |                     | capable of providing water to the SFFD firefighters at the high-pressure      |           |   |                             |                     |  |
|                      |     |  |                             |                     | needed for firefighters to combat large fires after a seismic event, and is   |           |   |                             |                     |  |
|                      | l   |  |                             |                     | likely to include over 14 miles of new EFWS pipelines and potentially two     |           |   |                             |                     |  |
|                      |     |  |                             |                     | new pump stations likely to be supplied by four water sources. The SFPUC      |           |   |                             |                     |  |
|                      |     |  |                             |                     | and SFFD's potable EFWS is being designed in a manner that allows for         |           |   |                             |                     |  |
|                      |     |  |                             |                     | agility and the flexibility to add new technologies and water sources, and in |           |   |                             |                     |  |
|                      |     | 1  |                             |                     | a manner that allows the piping network to be extended in the future to       | 1         |   |                             | ľ                   |  |
|                      |     |  |                             |                     | serve additional areas.   | 1         |   |                             |                     |  |
|                      |     | 1  |                             |                     |   |           |   | 1                           |                     |  |
|                      | 1   | 1  |                             | 1                   |   |           |   |                             |                     |  |
|                      | 1   |  |                             |                     |   | I         |   |                             |                     |  |
|                      |     |  |                             |                     |   |           |   |                             |                     |  |
| 1                    | 1   | I .  | 1                           | 1                   |   | I         |   | 1                           | 1                   |  |

| act Now Before it is on Late: loggressively Expand loggressively Expand loggressively Expand lifth-Pressure lifth-Pressure loggressively loggr | F12 | The SPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention. | President, San Francisco<br>Public Utilities Commission<br>(September 15, 2019) | Disagree, wholly   | Since taking over maintenance responsibilities, SFPUC has completed significant maintenance activities. For example, on a monthly basis, saff from the SFPUC test both Pump Station #3 and Pump Station #2. There are finalintenance recommendations provided in the CS-199 study as shown below in Table 7-1 from CS-199. The SFPUC has developed several of the routine maintenance plans recommended in the report or has determined the recommended maintenance practice is not necessary (i.e. flushing of a non-potable water system).                                | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFFD, should (a) Implement "best practices" for the maintenance of AWSS assets, and (b) radefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. | Public Utilities Commission | Has been<br>Implemented | (a) SFPUC Implements "best practices" for the maintenance of AWS3 assets in collaboration with SFPD, and consistent with the terms of the Memorandum of Understanding Regarding Operation and Maintenance of San Francisco Water Supply Systems Related to Fire Suppression (MOU), SFPUC will seek SFPD's written approval for "any modifications that could compromise" the system's function as a high pressure firefighting system (MOU, page 2). |
|--|-----|--|---|--|---|---|-----------------------------|-------------------------|--|
|  |     |  |   | and the second s | Maintenance Recommendations, CS. 199 Task 11 TM: Maintenance Recommendation 1: Confirm that all AWSS assets are entered into CDD's asset management system and PM's are established SFPUC Response: All AWSS asset locations are entered into CDD's Maximo and GIS databases. PM's are established for regular maintenance.   |   |                             |                         | (b) The AWSS critical valves have been identified and will be exercised every year through the AWSS Critical Valve Exercise Program.   |
| al Paris   |     |  |   | ·  | Maintenance Recommendation 2: Perform Regular maintenance and testing<br>SPPUC Response: According to SFPUC Maximo maintenance/testing<br>records, regular maintenance and testing is performed in accordance with<br>maintenance plans.  |   |                             |                         |  |
|  |     |  |   | de de la companya de  | Maintenance Recommendation 3: Check, flush and repair all suction connections regularly SFPUC Response: All suction connections were assessed 4-5 years ago. Some were cleaned as needed at that time. A high-pressure jetting machine was recently purchased, and personnel is being trained on its use.   |   |                             |                         |  |
|  |     |  |   |  | Maintenance Recommendation 4: Establish pipeline flushing program for AAVS5 SFPUC Response: Non-potable fire-fighting water systems are not typically flushed as part of regular flushing maintenance program. However, flushing naturally occurs when the AAVS5 is utilized approximately 20 times per year.   |   |                             |                         |  |
| -  |     |  |   |  | Maintenance Recommendation S: Establish leak detection program and a<br>pipeline leak database to monitor potential hot spots<br>SFPUC Response: SFPUC maintenance activities have helped reduced EFWS<br>leakage by over 500,000 gallons per day, improving system performance<br>while reducing water waste. A condition assessment project was<br>implemented using Smart 8 all technology. In addition, the system water<br>supply sources are regularly monitored for water levels/filling requirements<br>which will indicate potential leaks in the pipeline system. |   |                             |                         |  |
|  |     | ·  |   |  | Maintenance Recommendation 6: Establish a cistern inspection, filling and testing program SFPUC Response: A cistern inspection and testing program has been developed for implementation in 2019. In addition, a filling procedure has been established with SFFD.  |   |                             |                         |  |
| 1  |     |  |   |  | As part of the AWSS Critical Valve Exercise Program, CDD has identified 66 AWSS valves as "critical" (66 of 1,685 valves, or approximately 4 percent (source: CDD GIS). Critical valves for AWSS were defined based on the following criteral for operational importance:  • Tank bypass valves   |   |                             |                         |  |
|  |     |  |   |  | Tank supply valve from higher pressure to lower pressure tank supply source     Closed control valves to isolate piping within an infirm area     Distribution system divide gate valve, manual operation (sillows higher pressures area to feed that hower pressures area within the distribution.)  |   |                             |                         |  |

|  |                               |     |   |   |                     | System)  **Obstribution system divide gate valve, motorized operation (allows higher pressure zone to feed into lower pressure zone within the distribution system)  **Open control valves to allow a single supply source to feed an infirm area a Balancing valve, TP reservoir only (allows the two TP reservoir basins to equalize in level)  **Critical Valves:**  **Critical Valves:**  **These EFWS critical valves are broken down by type below. All 66 of the AW35 critical valves were exercised in 2018-2019 and will be exercised every year.  **Valve Type (# of Critical Valves per type):  **Ashbury Tank By-Pass Valves (10)  **Ashbury Tank By-Pass Valves (10)  **Ashbury Tank Supply Valve #1 (Ashbury to Jones) (1)  **Close Control Gate Valve (13)  **Division Gate Valve (13)  **Division Gate Valve (14)  **Jones Street Tank By-Pass Valves (10)  **Motorized Division Gate Valve or Motorized Line Gate Valve (6)  **Open Control Gate Valve (14)  **Divin Peaks Reservoir Ealancing Valve (13)  **Twin Peaks Reservoir Balancing Valve (13)  **Twin Peaks Reservoir Balancing Valve (14)  **Twin Peaks Reservoir Balancing Valve (15)  **Total AWSS Critical Valves (66) |                  |  |   |                     | ·                        |                         |  |
|--|-------------------------------|-----|---|---|---------------------|--|------------------|--|---|---------------------|--------------------------|-------------------------|--|
| A  | ct Now Before It is           | F13 | In the 2015 MOU between the SFFD and the        | President, San Francisco                                | Dicagron partially  | There are no formal protocol outlining appoints labet AMCS oversions as delike   | 210              | Duran laboration de 2020 de 2017 MONT  | B   |                     |                          |                         |  |
|  | on Late:                      | LTD | SFPUC, the two agencies agreed to conduct       | President, San Francisco<br>Public Utilities Commission | Disagree, partially | There are no formal protocol outlining specific joint AWSS exercises or drills in the MOU; however, there are multiple opportunities to train together   | R10<br>(for F13) | By no later than June 30, 2020, the 2015 MOU<br>between the SFPUC and the SFFD should be | President, San Francisco<br>Public Utilities Commission | Will be implemented | SFFD and SFPUC will work | together to amend the M | NOU by   |
|  | ggressively Expand            |     | joint AWSS trainings annually, but there is no  | [September 15, 2019]                                    |                     | during operation, maintenance, and construction of improvement projects  | (in LT2)         | amended to include a detailed roadmap for  | [September 15, 2019]                                    |                     | June 30, 2020.           |                         | 1  |
| a  | nd Enhance Our                |     | formal protocol outlining specific joint AWSS   | ,   |                     | for the AWSS facilities as previously described in the response to the Grand   |                  | annual emergency response exercises, including   | [ockerimer 13, 2015]                                    |                     |                          |                         |  |
|  | ligh-Pressure                 |     | exercises or drills using hypothetical disaster |   |                     | Jury questions sent in May 2019.   |                  | simulated disaster and earthquake drills   |   |                     |                          |                         |  |
|  | mergency<br>irefighting Water |     | scenarios, such as a major earthquake.          |   |                     |  |                  | involving the AWSS and the PWSS.   |   |                     |                          |                         |  |
|  | rengnting water<br>ystem      |     |   |   |                     | The SFFD and SFPUC have had multiple field training opportunities during the maintenance and start-up testing of AWSS facilities in the last 5 years.  |                  |  |   |                     |                          |                         |  |
|  | uly 17, 2019]                 |     | 1   | 1   |                     | For example, on December 20, 2018, SFFD and SFPUC personnel conducted  |                  | 1  |   | 1                   |                          |                         | 1  |
| l"   | ,                             |     |   |   |                     | emergency generator start-up procedures for Pump Station No. 2 (PS2). On   |                  |  |   |                     |                          |                         |  |
|  |                               |     |   | 1   |                     | April 5, 2018 SFPUC and SFFD performed joint-department full-scale test of   |                  |  |   |                     | •                        |                         |  |
|  | Į                             |     |   |   |                     | AWSS Pump Station No. 1 (PS1) including pumping seawater into an   |                  |  |   |                     |                          |                         |  |
|  |                               |     | 1   |   |                     |  |                  |  |   |                     |                          |                         | 1  |
| - 1  |                               |     |   |   |                     | isolated section of the AWSS distribution through system hydrants. On  |                  |  |   |                     |                          |                         | I  |
| - 1  |                               |     |   |   |                     | August 29, 2018, SFPUC, SFFD and DPW personnel conducted a seawater  |                  |  |   |                     |                          |                         |  |
| -  |                               |     |   |   |                     | August 29, 2018, SFPUC, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier   |                  |  |   |                     |                          |                         |  |
|  |                               |     |   |   |                     | August 29, 2018, SFPUC, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to   |                  |  |   |                     |                          |                         |  |
| ***************************************  |                               |     |   |   |                     | August 29, 2018, SFPUC, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier   |                  |  |   |                     |                          |                         |  |
| ***************************************  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in  |                  |  |   |                     |                          |                         |  |
| THE PARTY OF THE P |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2018 at Islais Creek, which involved the Phoenix Fireboat pumping  |                  |  |   |                     |                          |                         |  |
|  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and ploin-tagency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islas Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via   |                  |  | ·   |                     |                          |                         | The state of the s |
| and a partie of the same of th |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islais Creek, which involved the Phoenix Freboat pumping sea water directly into an isolated section of the Jones pressure system via AWS5 manifold connection. Sea water discharged from select hydrants  |                  |  |   |                     |                          |                         | - 1 (1000) - 1 - 1 (1000)  |
| The state of the s |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and plont-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the hones pressure system via AWSS manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were  |                  |  |   |                     |                          |                         | The state of the s |
|  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2018 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AWSS manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.   |                  |  |   |                     |                          |                         | industry of a 1 milest ministry  |
|  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and ploin-tagency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AWS5 manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.  The SFFD uses their Disaster Response Manual and Water Supply Manual to   |                  |  |   |                     |                          |                         | industry or a to a distribution of   |
|  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2018 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AMSS manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.  The SFFD uses their Dissater Response Manual and Water Supply Manual to provide guidelines for training. Training occurs throughout the year and is  |                  |  |   |                     |                          |                         | e 'Support's à la "Application de  |
| Apple to the second sec |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and ploin-tagency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islais Creek, which involved the Pheomic Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AWS5 manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.  The SFFD uses their Disaster Response Manual and Water Supply Manual to provide guidelines for training. Training occurs throughout the year and is ongoing, in March 2018, the SFPUC sponsored at abbelot pdrill Coversed on   | ,                |  |   |                     |                          |                         | e de l'agrande de  |
| A A A A A A A A A A A A A A A A A A A  |                               |     |   |   |                     | August 29, 2018, SFPUc, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2018 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AMSS manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.  The SFFD uses their Dissater Response Manual and Water Supply Manual to provide guidelines for training. Training occurs throughout the year and is  |                  |  |   |                     |                          |                         |  |

|  |  | respond to a hypothetical earthquake event (determine ICS, formulate specific objectives, and document findings). It is anticipated that this tabletop exercise will be repeated at least every other year, and that a larger scale simulation of post-earthquake response will be conducted within the next two years for SFFD and SFPUC joint-exercise.   |  |  |                        |
|--|--|---|--|--|------------------------|
|  |  | In February 2018 the SFPUC and SFFO staff convened to review the SFPUC's<br>Division Emergency Operations Plan (DEOP), the CDD's Emergency Action<br>Plan (EAP), and the CDD's Emergency Response Plan (ERP). The ERP<br>overview focused on the incident Command structure specific to CDD staff<br>responsibilities, communication methods, critical facilities and assets, first<br>responders for each facility (PWS and AWSS) and updated "critical facilities<br>map" for all major pressure zones. |  |  |                        |
|  |  |   |  |  | Accessed to the second |

| Report Title [Publication Date] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] |    | Finding (text may be duplicated due to spanning and multiple respondent effects)  Files resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco. | Respondent Assigned by<br>CGJ<br>[Response Due Date]<br>President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Finding Response<br>(Agree/Olsagree)<br>Agree with the<br>finding | Finding Response Text  | (for F1-F6) | Recommendation (text may be duplicated due to spanning and multiple respondent effects).  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | Respondent Assigned by<br>GGI<br>[Response Due Date]<br>President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Recommendation<br>Response<br>(Implamentation)<br>Will be implemented | Recommendation Response Text  Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than Mayor 1 deach odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
|--|----|---|---|---|--|-------------|--|---|---|--|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019)         |    | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]   | Agree with the finding  |  | (for F1-F6) | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sestinically sade emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | President, San Francisco<br>Fire Commission<br>(September 15, 2019)   | Requires further<br>analysis  | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan milenier. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resillence challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resillence; 3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those profrites. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment vould be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]         | F2 | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.                            | President, San Francisco<br>Fire Commission<br>[September 15, 2019]   | Oisagree, partially   | The MWSS has been significantly upgraded in the last 15 years through the Water Supply improvement Program (WSIP) initiated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the 64.6 billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's selsmic reliability, and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service. | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.   |   | Will be implemented   | Ensuring that San Francisco has the Infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reson, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F2 | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.   | Fire Commission  | Disagree, partially    | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and Increase overall water system reliability. There were 35 in-city projects within the 45 ab Billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's selsmic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic level of Service. |                  | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sestincially safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.                      | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public Infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysts, will be done on the capital plan them line. The capital planning process gathers, documents, and balances planned funding for needs across the public Infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public Infrastructure investments. These Investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.                                |
|--|----|--|--|------------------------|--|------------------|---|---|------------------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F3 | Approximately 30 disterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fightling fires following a major earthquake. | President, San Francisco<br>Fire Cornmission<br>[September 15, 2019] | Agree with the finding | Cisterns serve as one of many important tools for use by the SFFD in response to a disaster. Cistern locations are strategically located in the City in the event of a major confligaration to assist as a "Demarcation line" on some of The City's major thoroughfares. This was realized after the 1906 earthquake. With work accomplished through the ESFR bond program, disterns have been seismically improved throughout the City and the overall number of cisterns has increased to approximately 230, providing the Fire Department access to millions of gallons of water in an emergency.   | (for F1-F6)      | By no later than December 31, 2020, the Mayor,<br>the SFPUC, the SFFD, and the Office of Resillence<br>and Capital Planning should jointly present to<br>the Board of Supervisors a detailed plan to<br>ensure the City is well prepared to fight fires in<br>all parts of San Francisco in the event of a 1906-<br>magnitude (7.8) earthquake. |   | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to light fires in all parts of San Francisco is something that will be a focus of the next 10-year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-umbred year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressour<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F3 | Approximately 30 cisterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  | Agree with the finding | Cisterns serve as one of many important tools for use by the SFFD in response to a disaster. Cistern locations are strategically located in the City in the event of a major configaration to assist as a "Demarcation line" on some of the City's major thoroughfares. This was realized after the 1906 earthquake. With work accomplished through the ESFR bond program, cisterns have been selsmically improved throughout the City and the overall number of cisterns has increased to approximately 230, providing the Fire Department access to millions of gallons of water in an emergency.  | R2<br> for F1-F6 | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seasonically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.                      | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrestructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are stered: (1) address legal and/or regulatory mandates; (2) ensure public after standard programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to analyze priority projects and programs and identify sources to analyze priority projects and programs and identify sources to analyze priority projects and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |

AWSS Page 2 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>(July 17, 2019) | F4 | The City's high-pressure emergency water supply system, known as the Auxillary Water Supply System (AWSS), does not over large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquiste Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. |                   | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Resilience and Capital Planning should Jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. |   | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the SER 2020 plan passes, for this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
|---|----|---|---|------------------------|--|-------------------|--|---|------------------------------|---|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System [July 17, 2019]     | F4 | The City's high-pressure emergency water supply system, known as the Auxillary Water Supply system (AWSs), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's selsmic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that Improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1000s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD.  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sessimically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on 1 will be acknowledged in the Capital Plan, and based on 1 analysts, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These Investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that folion, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019)  | F4 | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD.  | R5<br>(for F4)    | The SFPB should strategically locate the majority of the PWSS hose tenders in areas that at present only have low-pressure hydrants and/or cisterns.   | Fire Commission   | Will be implemented          | The Department is currently finalizing specifications for these units, after which they will go out to hid through the City's procurement processes before construction. It is anticipated the Department will take receipt of these units in the second half of 2020/early 2021. These hose tenders are a heavy-duty apparatus designed to be able to be deployed and moved throughout the City depending on need, giving the Department needed operational flexibility in its response.   |

AWSS Page 3 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>(July 17, 2019) | A high-pressure, multi-sourced, seismically safe emergency fireflighting water supply will be costly but is essential to protect the City.  | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | finding | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resillence challenges. These challenges are documented in the Resillent 5F strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make at life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, dientify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, selsmically safe EPWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SPFUC, SFFD, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage, The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design.   |                   | By no later than December 31, 2020, the Mayor, the SFPUC, the SFPD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. |   | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |
|---|---|---|---------|--|-------------------|--|---|------------------------------|---|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | A high-pressure, multi-sourced, seismically safe emergency fireflighting water supply will be costly but is essential to protect the City.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | finding | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient'S F strategy (2016) and underlie the strategic efforts of our cepital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity, All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPLC, SFPLO, | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-ressure, multi-sourced, selsmically safe emergency water system for those parts of the City hat don't currently have one, i.e., by no later than June 30, 2034.      | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation I will be acknowledged in the Capital Plan and based on analysis, will be done on the capital plan in almost planning process gathers, documents, and balances planned funding for needs across the public infrastructure poerfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and gromote sustainability! (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | Unless the City Increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high pressure, multi-sourced, seismically safe emergency fire lighting water supply. | Fire Commission<br>[September 15, 2019]                             |         | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  |                   | By no later than December 31, 2020, the Mayor, the SFBUC, the SFED, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1905-magnitude (7.8) earthquake. |   | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.0,0 that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |

| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |    |   | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | R2<br>{for F1-F6} | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, sessincially safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] |                              | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan, and based on analysis, will be done on the capital plan mineline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resillence; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
|--|----|---|---|------------------------|---|-------------------|--|---|------------------------------|---|
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, selsmirally safe emergency firefighting water supply.  | Fire Commission<br>[September 15, 2019]                             | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | R4<br>[for F6-F7] | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further<br>analysis | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multi-year term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for procurement of the apparatus. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and priority.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressive<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) | F7 | The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSS hose tenders would provide a relatively guick, cost-effective interim means to improve praction of the southern and western parts of the City until a high-pressure, multi-sourced, seismirally safe emergency water supply can be developed in those areas. | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Agree with the finding | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. While the Department currently has five older hose tenders spread-out throughout the City, these new units are much more modern and provide the Department with a number of operational benefits, including the following; the capability of pumping and drafting water from any water source; extending the current AWSS system infrastructure; carrying 5,000 feet of hose for deployment; a S,500 gallon per minute (GPM) on-board water pump and a 3,000 GPM portable submersible water pump; on-board monitor with a \$25 foot reach; and four wheel drive. In addition, the Department has been successful in advocating and receiving Federal grant funds to assist with purchasing various PWSS equipment (valves, hose, ramps, etc.), and will continue to advocate for alternative sources of funding to increase the inventory of PWSS equipment. |                   | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Requires further<br>analysis | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multivear term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for procurement of the apparatus. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and priority.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F8 | Redundancy is an important feature of an emergency firelighting water system.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding |   | R6<br>(for F8-F9  | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-wate pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisor by no later than June 30, 2021.              | Fire Commission<br>[September 15, 2019]                             | W⊪ be Implemented            | SFPUC and SFFD will complete this study by June 30, 2021.   |

Page 5 of 7

| Act Now Before It Is | F9  | Current plans to extend protections to the        | President, San Francisco | Disagree, partially | While it is true that the SFPUC and SFFD are studying four potential water        | R6          | The SFPUC, the SFFD and the SF Department of    | President, San Francisco | Will be Implemented | SFPUC and SFFD will complete this study by June 30, 2021. |
|----------------------|-----|---|--------------------------|---------------------|---|-------------|---|--------------------------|---------------------|---|
| Too Late:            | 1.5 | western part of the City do not include any high- | Fire Commission          | Disagree, partially | sources proposed to supply a potable EFWS on the west side of the City, which     |             |   | Fire Commission          | will be implemented | SPFOC BIRD SFFD WIII COMPLETE MIS STORY BY JUNE 50, 2021. |
| Aggressively Expand  |     | pressure water sources north of Golden Gate       | [September 15, 2019]     |                     | are not located north of Golden Gate Park, which by no means would reduce         | fint to (a) |   | [September 15, 2019]     |                     |   |
| and Enhance Our      |     | Park.   | [September 15, 2015]     |                     | the proposed system's resiliency, reliability, performance, or ability to provide |             | water sources, especially on the west side.     | (September 15, 2015)     |                     |   |
| High-Pressure        |     | F DI K.   |                          |                     | abundant high-pressure water for fire suppression to the Richmond District        | ļ           | Findings and recommendations from this study    |                          |                     |   |
| Emergency            |     |   |                          |                     | after a seismic event. San Francisco is unique in that there are 11 in-city       |             | should be presented to the Board of Supervisors |                          |                     | i   |
| Firefighting Water   |     |   |                          |                     | reservoirs, with a total water capacity of approximately 413,000,000 gallons.     |             | by no later than June 30, 2021.                 |                          |                     |   |
| System               |     |   |                          |                     | Additionally, Lake Merced, also located within City Limits, has an additional     |             | by 110 later than Julie 30, 2021.               |                          |                     |   |
|                      |     |   |                          |                     | approximately 1,000,000,000 gailons. The potable EFWS system for the              |             |   |                          |                     | 1   |
| [July 17, 2019]      |     |   |                          |                     | Westside of San Francisco that is being developed and analyzed would provide      |             |   |                          |                     |   |
| 1                    |     |   |                          |                     |   |             |   |                          |                     |   |
| 1                    |     |   |                          |                     | that the new EFWS pipeline in the Sunset and Richmond Districts could be          | 1           |   |                          |                     |   |
|                      |     |   |                          |                     | supplied from four sources of water at two locations. The first two water         |             |   |                          |                     |   |
| 1                    |     |   |                          |                     | sources could be supplied to the EFWS pipeline via a 30,000 gallon per minute     |             |   |                          |                     |   |
|                      |     |   | 1                        |                     | pump station in the vicinity of Lake Merced, The two sources being studied for    | ŀ           |   |                          |                     |   |
|                      |     |   |                          |                     | this pump station are Lake Merced, which has a water supply of approximately      |             |   |                          |                     |   |
|                      |     |   |                          |                     | one billion gallons, and a 60" seismically resilient SFPUC Hetch Hetchy Regional  |             |   |                          |                     |   |
| 1                    |     |   |                          |                     | Water System pipeline. The proposed potable EFWS also is analyzing the            |             |   |                          |                     |   |
|                      |     |   |                          |                     | Inclusion of a second 30,000 gallons per minute pump station in the vicinity of   |             |   |                          |                     |   |
| 1 ' 1                |     |   |                          |                     | the SFPUC's Sunset Reservoir that could be supplied water by two sources: (1)     | i           |   |                          |                     |   |
|                      |     |   |                          |                     | the 90 million gallon north basin of the Sunset Reservoir, which recently         |             |   |                          |                     |   |
|                      |     |   |                          |                     | underwent a \$64 million seismic retrofit, and (2) a 54" seismically resilient    |             |   |                          |                     |   |
|                      |     |   |                          | i                   | SFPUC Hetch Hetchy Regional Water system pipeline.                                |             |   |                          | 1                   |   |
|                      |     | 1   |                          |                     |   |             |   |                          |                     |   |
| Act Now Before It Is | F10 | The "reliability scores" being used by the SFPUC  | President, San Francisco | Disagree, partially | Fire Response Areas (FRAs) were utilized by SFPUC and SFFD in the planning        |             |   |                          | <del> </del>        |   |
| Too Late:            | 120 | Impart an overly optimistic impression of the     | Fire Commission          | Disagree, partially | study CS-199. This study divided the City into areas based on those defined by    |             |   |                          |                     |   |
| Aggressively Expand  |     | protection provided.                              | [September 15, 2019]     |                     | the SFFD for initial alarm response and were called Fire Response Areas (FRAs).   |             |   |                          |                     |   |
| and Enhance Our      |     | protection provided,                              | [Jepternoe: 13, 2019]    |                     | Probable fire demands were developed for each FRA using 1000 sets of fire         | 1           |   |                          |                     |   |
| High-Pressure        |     |   |                          | 1                   | demands generated by Charles Scawthorn, PhD using a Monte Carlo analysis of       |             |   |                          |                     |   |
| Emergency            |     |   |                          |                     | fire Ignitions and fire growth using the ground motions from the design           |             |   |                          |                     |   |
| Firefighting Water   |     |   |                          |                     | earthquake (7.8 magnitude). The fire ignitions were generated using methods       |             |   |                          |                     |   |
| System               |     | <b>.</b>  |                          |                     | similar to those used for the Community Action Plan for Seismic Safety (CAPSS)    |             |   |                          |                     |   |
| [July 17, 2019]      |     |   |                          |                     | study (ATC 2010), The fire ignitions subsequently were used to develop water      |             |   |                          |                     |   |
| [july 17, 2019]      |     |   |                          |                     | demands that were aggregated into the likely fire demands for each FRA. The       |             |   |                          |                     |   |
| 1 1                  |     |   |                          | İ                   |   |             |   |                          |                     |   |
|                      |     |   |                          |                     | water supplies for each FRA were developed using the reliability modeling tool    |             |   |                          |                     |   |
|                      |     |   |                          |                     | GIRAFFE, developed at Cornell University by Professor Thomas D. O'Rourke.         |             |   |                          |                     |   |
|                      |     |   |                          |                     | GIRAFFE performs internal Monte Carlo analysis to damage pipes in the system      |             |   |                          |                     |   |
|                      |     |   |                          |                     | for multiple scenarios. The water supplies developed by GIRAFFE were              |             |   |                          |                     |   |
|                      |     |   |                          |                     | aggregated into the likely water supplies for each FRA. It should be noted that   |             |   |                          |                     |   |
|                      |     |   | 1                        |                     | the likely water supplies for each FRA assumed no water from the City's           | 1           |   |                          |                     |   |
|                      |     |   | 1                        |                     | municipal water system (MWSS), which is quite conservative and highly             |             |   |                          |                     |   |
| 1                    |     |   |                          | 1                   | unilkely even after a seismic event. The reliability score for each FRA is        | 1           |   |                          |                     | '   |
|                      |     |   |                          |                     | calculated using the sum of all water supplies for each FRA and dividing it by    |             |   |                          | 1.                  |   |
|                      |     |   |                          |                     | the FRA water demand. The reliability scores do exactly that - estimate how       | 1           |   |                          | 1                   |   |
|                      |     |   |                          | 1                   | much EFWS water will be available for firefighting demands in a given FRA. The    | 1           |   |                          |                     |   |
|                      |     |   |                          |                     | reliability scores are not meant to represent an estimate of the fire protection  |             |   |                          |                     |   |
|                      |     |   |                          | 1                   | for a given house, block, or blocks. Rather it is a measure of the EFWS capacity  |             |   |                          | i                   |   |
|                      |     |   |                          | 1                   | and demand. The SFPUC recognizes the need to analyze potential EFWS               |             |   |                          |                     |   |
|                      |     |   | 1                        | 1                   | demands on a more detailed level, and the agency began the process of doing       | 1           |   |                          |                     |   |
|                      |     |   | 1                        | 1                   | so.   | 1           |   |                          |                     |   |
| 1                    |     |   |                          | 1                   |   | 1           |   |                          |                     |   |
| 1 1                  |     |   | 1                        |                     |   | 1           |   |                          |                     |   |
| 1 1                  |     |   |                          | 1                   |   |             |   |                          |                     |   |
|                      |     |   |                          |                     |   |             |   |                          |                     |   |

AWSS

Page 6 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) | F11 | complete development of a high-pressure, multi- | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | Disagree, partially | The EFWS was built after the 1906 earthquake, and its location, primarily in the northeast portion of San Francisco, corresponds to the location of the majority of the city's population at that time. Since 2010, the SFPUC, SFPD, and Public Works have made critical improvements to the existing EFWS system. Expanding the EFWS prior to ensuring that the existing EFWS is resilient and reliable would have contradicted best engineering practices. The SFPUC and SFFO are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The Epotable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFO fireflighters at the high-pressure needed for firefighters to combat large fires after a selsmic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in a manner that allows the piping network to be extended in the future to serve additional areas. |   |   |             |   |
|--|-----|---|---|---------------------|--|---|---|-------------|---|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fierlighting Water<br>System<br>[July 17, 2019] |     |   |   |                     |  | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFPD, should (a) implement "hest practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. | President, San Francisco<br>Fire Commission<br>(September 15, 2019) | implemented | (a) SFPUC Implements "best practices" for the maintenance of AWS5 assets in collaboration with SFED, and consistent with the terms of the Memorandum of Understanding Regarding Operation and Maintenance of San Francisco Water Supply Systems Related to Fire Suppression (MOU), SFPUC will seek SFPIS written approval for "any modifications that could compromise" the system's function as a high pressure lifterlighting system (MOU), page 2). (b) The AWSS critical Valve San Valve Exercised every year through the AWSS Critical Valve Exercise Program. |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) |     |   |   |                     |  | By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | ·           | The Fire Department conducts weekly hose/hose tender drills that it rotates through companies throughout the City. The Fire Department will work with the SFPUC to have them in attendance and participate in these drills. SFPD will also commit to working with the PUC to enhance the scope and frequency of trainings in the future for improved collaboration. SFPD and SFPUC will work together to amend the MOU by June 30, 2020.  |

AWSS Page 1

#### Office of the Mayor San Francisco



LONDON N. BREED MAYOR

September 16, 2019

The Honorable Garrett L. Wong Presiding Judge, Superior Court of California, County of San Francisco 400 McAllister Street, Room 008 San Francisco, CA 94102-4512

Dear Judge Wong,

In accordance with Penal Code 933 and 933.05, the following is in response to the 2018-2019 Civil Grand Jury Report, Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System. We would like to thank the members of the 2018-2019 Civil Grand Jury for their interest in disaster preparedness and in improving the resiliency of our critical public safety infrastructure to provide robust emergency firefighting to all communities in San Francisco.

San Francisco continues to improve our City's resiliency each day through our ongoing investments in public infrastructure and equipment. Our Capital Planning Program coordinates much of these investments by conducting strategic long-term planning across major programs and projects, including the Emergency Firefighting Water System and Earthquake Safety and Emergency Response (ESER). The ESER bonds approved by voters in 2010 and 2014 have funded improvements to cisterns, pipelines, and critical public facilities that improve the City's ability to respond in emergencies and to fight fires. In addition, through the City's annual budgeting process, we will continue weighing resources to improve public safety and the operational readiness and emergency response capabilities of our departments. For example, our most recently adopted FY 2019-20 budget includes funding for five new hose tenders to replace and enhance the Fire Department's aging equipment.

In March 2020, the voters of San Francisco will once again vote on a new \$628.5 million ESER bond measure. Included in the proposal is an investment of an additional \$153.5 million for the Emergency Firefighting Water System.

We appreciate the opportunity to comment on the Civil Grand Jury report findings and recommendations. Moving forward, and as appropriate, the City plans to analyze many of the recommendations as part of our next 10-Year Capital Plan.

A detailed response from the Mayor's Office, City Administrator's Office, Fire Department, Public Utilities Commission, and the Department of the Environment is attached.

Each signatory prepared its own responses and is able to respond to questions related to its respective part of the report.

Andre Brown

London N. Breed Mayor

Harla 2 Talloff

Harlan L. Kelly Jr. General Manager, Public Utilities Commission Jeanine Nicholson Chief, Fire Department

Naomi Kelly City Administrator

Deborah Raphael Director, Department of the Environment

|  |     |  |  |                                      | 1  | ı ——              |  | T  | - 1:   |  |
|--|-----|--|--|--------------------------------------|--|-------------------|--|--|--|--|
| Report Title<br>[Publication Date]   | Fif | Finding (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>(for F#)    | Recommendation  (text may be duplicated due to spanning and multiple respondent effects)  By no later than December 31, 2020, the Mayor,   | Respondent Assigned by CGJ [Response Due Date] Mayor | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text Ensuring that San Francisco has the   |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Enregency<br>Fire flighting Water<br>System<br>[July 17, 2019] | F4  | The City's high-pressure emergrancy water supply system, forms at the Auxillary Water Supply system (MWSS), does not cover large super all Supple system (MWSS), does not cover large super all Supple system (MWSS), does not cover large super all supple systems (MWSS), does not supple suppl | Mayor<br>(September 15, 2019)                        | Agree with the finding               | The SFPLA, SFPL, and San Francisco Public Works (SFPV) are committed to increasing the protection throughout San Francisco. Since the protection throughout San Francisco. Since the property of the first Capacity of Sept. (Sept. Sept.  | R1<br>(for F1-F6) | the SFPLC, the SFSD, and the Office of<br>Installines and of Capit Divaning should jointly<br>present to the Board of Supervisors a detailed<br>joint to ensure the City will prepared to all<br>plan to ensure the City will prepared to<br>the Capit Divanish of Capit Capit Capit<br>(the plan all parts of San Francisco in the event of<br>a 1360-magnitude (7,8) earthquake.   | [September 15, 2019]                                 | Wal So Employmented Implemented                | returning that safe reflection has been will informationar and reconstruct to be well informationar and reconstruct to be well informationar to the safe of the sa |
| Act Now Before It is Too Late: Too Late: Aggressively Expand and Enhance Our High-Pensure FireIlghafing Water System [July 17, 2019]                           | F-4 | The City's high-resoure emergency water supply system, forms at the Auditary Water Supply system (MWSS), does not cover large super of Supply system (SWSS), does not cover large super of Supple system (SWSS), does not cover large super of Supple system (SWSS), does not cover large super of Supple system (SWSS), does not super of SWSS), as a result, these districts are not adequately protected from fires after a major earthquake.   | Mayor<br>(Beptember 15, 2019)                        | Agree with the                       | The SFPLC, SFPL, and San Francisco Public Versic SFPV) are committed to increasing fire protection throughout 3 in Francisco. Since the protection throughout 3 in Francisco. Since the sassage of the first Entimelulae Seld yet and assaged that the same same self-self-self-self-self-self-self-self-  | 92<br>[for F1-F6] | The plan discussed in Recommendation R1 in- broad include a dealed proposal, including  flanning pourses, for the installation within 15  greated a high-pressure, mail-to succeed,  success of a high-pressure, mail-to succeed,  for  the success of the flanning that  for  those parts of fine City that don't currently have  one, i.e., by no later than June 30, 2034.  | Mayor<br>(Baptember 15, 2019)                        | rodgetta urbs<br>analysis                      | specific browless for San Francisco's public infestivatives its be wolf of the 10-Year Capital Plan. The plant discussed in Network of the 10-Year Capital Plan. The plant discussed in Network Plant San Barbard San San San San San San San San San San  |
| Act Now Before It Is<br>Too Later<br>Aggressively Expand<br>and Einhane Our<br>High-Pressure<br>Emergency<br>System and Water<br>System<br>[July 17, 2019]     | FS  | A high-measure, multi-acurent, estemically safe emergency firefiling water supply will be costly but it assential to protect the City.   | Mayor<br>(Engtember 15, 2019)                        | Agree with the finding               | As the City considers what is essential to protect sine Francis, it is important to advanced the protect sine Francis, it is important to advanced the protect sine Francis, it is important to advanced the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francis (and the protect sine francisco), the city of the protect sine francis (and the protect sine francis (and the protect sine francisco), the city of the protect sine francis (and in the protect sine francisco), the city has taken (applicant stops afrom 2000 the protect sine francisco must keep an open and forther similarmously). The city has taken (applicant stops afrom 2000 the protect sine francisco must keep an open and forther similarmously). The city has taken (applicant stops afrom 2000 the protect similar sine francisco) and from the protect similar similar significant scannic (applicant stops afrom 2000 the protect similar significant scannic (applicant scannic significant scannic significant scannic scannic scannic calculation and protect metal-protect scannic calculation and protect metal-protect scannic scannic calculation and protect metal-protect scannic scannic calculation and protect metal-protect scannic scannic calculation and protect metal-protect scannic protect scannic calculation and protect metal-protect scannic calculation and protect metal-protect scannic calculation and protect scannic scannic calculation and protect scannic scannic calculation and protect scannic scannic calculation and protect scannic scannic calculation and protect scannic scannic calculation and protect scannic calculation and protect scannic calculation and protect scannic calculation and protect scannic calculation and protect scannic calculation and protect scannic calc | R1<br>[for F1-F6] | the SFPU, the SFPD, and the Office of Reciliance and Capital Planning should jointly present to the Board of Supervisions a detailed and the September of Supervisions and the September of Supervisions and the September of Sept | Nayer<br>(September 15, 2019)                        | Wil be   | Resuring 64t San Francisco has the ininfrastructure and resources to be well propaged to fight fires in all parts of San francisco is semething that will be a feasure of Americanico is semething that will be a feasure of Administrative Coule 3.20, that Plan must be constituted to the Mayor and Sbaard no later than March 1 of each odd-numbered year for grapmoral in later than May 1. The respected procentation would be delivered as part of that proporal in later than May 1. The respected procentation would be delivered as part of that the control of the con |
| Act Now Before it Is<br>Too Late:<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Possure<br>Fireflighting Water<br>System<br>[July 17, 2019]   | FS  | A high-pressure, multi-sourced, scennically set on empressive from the management (might paster supply with the costly but is essential to protect the City.   | Mayor<br>(September 15, 2019)                        | Agree with the finding               | As the City consider was constraint to present sin Francisco. It is important to acknowledge our multiple, compiler resilience and consideration of the cons | R2<br>(far F1.F6) | The plan discussed in Recommendation fit and building financing sources, for the installation within 15 years of a little plant of a little plant of a little plant of a little plant of a little plant of a little plant or man of a little plant of a little plant or man of a little plant of a little pl | Mayor<br>(Suppember 15, 2019)                        | Requires kirther analysis                      | The commitment of sources for specific tuses on pucility turnings for San Franchook public inflations. Gain Franchook public inflations. San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. The San Franchook public inflations. San Franchook public inflations. The San Franchook public inflations. San Franchook |

| Act Now Before It is<br>Too late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Priedighting Water<br>System<br>[July 17, 2019]               | rs . | A high-resizance, multi-sourced, petermically a Serverger or the control of the control of the control of the control of the cost of the c | Mayor<br>(September 15, 2019) | Agree with the finding | As the CIR's considers what is excented to present send reaction, it is important to acknowledge our muldiple, compiler resilience and consideration of the contraction of the send reaction of the contraction of the send residence of the contraction of the send residence of the contraction of the c | [for FS, FG, F11]          | By no later than June 30, 2022, the Mayer and the Board of Superiors should analyze whether to propose a separate bond for the development of a light-research, malifi-account, and should be superior to the Control of | Mayor (Geptember 15, 1019)    | Will be implemented          | The enable)s will be performed as part of the CTy 3 Dever Calpul Plan development<br>(CTy 3 Dever Calpul Plan development<br>process. The next full update to the Capital Plan<br>till be submitted to the Mayer and Stoppen<br>to the Capital Plan<br>later than March 1, 2011, for approved no later<br>than May 1, 2021.  |
|---|------|--|-------------------------------|------------------------|--|----------------------------|--|-------------------------------|------------------------------|--|
| Act Now Befare It Is<br>Too Lates:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Energency<br>Freelighting Water<br>System<br>[July 17, 2019] |      | unites the City Increases hundre levels; I will be several cleased; I.e., after the USIGS predicts one or more major earthquakes will occur) before the counterparts of the City have a high-pressure, multi-sourced, selamically safe emergency fireflighting water supply.   | Mayor<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding<br>levels of fixeus ESE bonds and other<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.  | [for F1-F6]                | By no later than December 31, 2000, the Mayor, the SPILVI, the SPILVI, the SPILVI, the SPILVI, the SPILVI, the SPILVI, the SPILVI, the SPILVI, the SPILVI process to the Geodesia of Supervisors a detailed plan to ensure the CBIV is well prepared to flight likes hall plant to SPILVI provided the event of a 1900-magnitude (7.8) carthquak to 1900-magnitude (7.8) carthquak to  | [September 15, 2019]          | Will be<br>Implemented       | Ensuring that San Franchico has the<br>infestructure and recourses to be well<br>prepared to fight fires in all parts of San<br>Franchicos is pomeling that will be a focus of<br>the next 10-Year Capital Plan. Per<br>Administrative Code 3.20, that Plan must be<br>submitted to the Nayor and Board no later<br>to have been also also that the<br>submitted to the Nayor and Board no later<br>to provide the second of the provided of the<br>supervision of the second of the<br>supervision of the second of the<br>supervision of the second of the<br>supervision of the second of the<br>supervision of the<br>supervision of the second of the<br>supervision of the<br>supervision of the<br>supervision of the<br>supervision of the<br>supervision of the<br>supervision of the<br>supervision of the<br>supervision of<br>supervision of<br>supe |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency Market<br>Sweet Market<br>July 17, 2019]            | F6   | Unlets the City increases funding levels, I well be served ideaded; i.e., after the USGs predicts one or more major earthquakes will occur) belong the server in the control of the contro | Mayor (September 15, 2019)    | Diagree, wholly        | Decisions about pregramming and funding levels of flume SER bonds and other complementary sources that could support the complementary sources that could support the capanish of the AMSS have yet to be made.  | R2<br>(far F1-F6)          | The plan discussed in Recommendation fit about finding a depaid or process, including financing courses, for the Installation within 15 years of a high-pressure, mark-boutcome, and the source of the pressure of the pressure of a high-pressure, mark-boutcome for the pressure of the pres | Mayor<br>(September 15, 2019) | Requires further analysis    | The commitment of sources for specific uses a<br>specific dimellion for San Francisco's public<br>infrastructure is the work for San Francisco's public<br>infrastructure is the work of the 20 New Capita.<br>The plan discussed in Recommendation<br>in the plan discussed in Recommendation<br>in the plan discussed in Recommendation<br>based on analysis, will be done on the capital<br>lands discussed in the capital planning process<br>gathers, documents, and balances planned<br>infrastructure portfolia and across San<br>Francisco's relience dislanges. The Capital<br>reliancies of the plan discussed in the capital<br>lands of the profession of the plan discussed<br>plants of the profession of the plants of the<br>substance planned and prognational control<br>procession of the plants of the<br>substance planned and prognational control<br>procession of the plants of the<br>substance planned and prognational control<br>procession of the plants of the<br>substance planned and prognational control<br>procession of the plants of the<br>substance planned and prognation and those that follow<br>the City will control this. Committing to entire<br>fundings a single prognam and feasity sources or<br>dance to the profession. Committing to entire<br>fundings a single prognam out of context and<br>control to the trade-wife of the<br>City is longstanding and highly regarded capital<br>planning process and likely create significant<br>valuerabilities deewhere in the portfolio.   |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>(July 17, 2019) | F6   | Unless the City increases funding levels, it will be several discases (i.e., after the USGS predicts once or mare major sarthquake will occur) before the southern parts of the City have a high-pressure, midscareds, sebrically safe omergency firetighting water supply.  | Mayor<br>[September 15, 2019] | Olsogree, wholly       | Decident about programming and funding<br>levels of fuure ESFS bonds and other<br>complementary bonners that could support the<br>expansion of the AWSS have yet to be made.   | R4<br>{for F6-F7}          | As interfin measure, by no later than June 30, 2021, the City should purchase the 20 new 1995 Shoet under body requested by the 3973, to replace and espand to currently inadequate inventory.   | Mayor<br>(September 15, 2019) | Requires further<br>analysis | The fire Department has been ellocated<br>landing by purches he units through funds<br>from the PTI9-30 City budge and an alocation<br>from the STI8 The Department is currently<br>working with the Office of Contract<br>Administration to Department is currently<br>working with the Office of Contract<br>Administration to develop a multi-year term<br>contract for hose tenders so in the case the<br>additional funding is seamed in future years,<br>the Department will be able to reduce the<br>apparatus. Each hose tender cast SI million<br>out, and we need to welph purchase<br>of additional hose tenders to other budget<br>request and priority.   |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[Judy 17, 2019]  | f6   | Unless the City Increases funding levels, it will be several decades (i.e., after the USGS predict one or more major enafthysises will occur) before the southern parts of the City have a high-pressure, multi-sourced, seleminally sife emergency fireflighting water supply.  | Mayor<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding<br>levels of future EEER bonds and other<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.   | R8<br>[for F5, F6,<br>F11] | By no later than tune 80, 2012, the Mayor and the Board of Supendrose should analyze whether to propose a seenante bond for the development of a high-pressure, multi-sourced, scatteriolarly said emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.   | Mayor<br>[September 15, 2019] | Will be<br>implemented       | The analysis will be performed as part of the<br>(IV)s 10-Yes Capital Plan devolopment<br>process. The next full update to the Capital Plan<br>will be submitted to the Mayer and Board no<br>later than March 1, 2021, for approval no late<br>than fixed than 1, 2021.   |
| Act New Before It is<br>Too late:<br>Aggressively Expand<br>and Enhance Out 16th - Pressure<br>Emergency<br>Fireffighting Water<br>System<br>(July 17, 2019)  | F11  | The City does not have a timefare to find and complete development of a high-processor of a high-processor, make some processor of a high-processor, make some processor of the processor of the complete development of the City Christoffe poor relighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.  | Major<br>(September 15, 2019) | Diagree, partially     | The EYEV see built after the SDIG earthweaks, and to location, primarily the the northeest portion of San Francisco, corresponds to the contain of the melging of the city's population at that titine. Since 2010, the SPIPUC, SPTD, and SPIEV see the SPIEV spieves are stored to the costs of BYM spieves are suiting that the cabing the SPIEV spieves are suiting the title cabing the SPIEV spieves are suiting that the cabing the SPIEV spieves are suiting that the cabing the SPIEV spieves are suiting that the cabing the SPIEV spieves are considered to the SPIEV spieves and spieves that the cold implement an endline, no-bust, and redundant postable EYEV spieves the SPIEV spieves are suiting the spieves of the SPIEV spieves are suited proposed the SPIEV spieves and canalyzed volume and cellent high-pressure finelighting values and resilient high-pressure on the SPIEV spieves and the spieves of the SPIEV spieves and spieves the SPIEV spieves and spieves the SPIEV spieves and spieves the SPIEV spieves and spieves the SPIEV spieves and spieves the SPIEV spieves and spieves that allows for agifty wand the finalistify to add new technologies and water sources, and is in amanore that allows for agifty and the finalistify and did more technologies and water sources, and in a manner that allows for agifty and the finalistify and did more technologies and water sources, and in a manner that allows the pliping network to be catended in the future to serve additional areas.  | #8<br>[for F5, F6,<br>F11] | by no laster than June 20, 2022, the Mayor and the Board of Superiors should analyze whether to propose a separate bond for the development of a high-pressure, multi-ourced, solitorisally sale emergency water system for this part of the City that don't nurnershy have one, with a target date of completing construction by no later than June 30, 2014.   | Mayor<br>(September 15, 2019) | Will be Implemented          | The analysis will be performed as part of the CITY's 10 Year Capital Pland development process. The next full update to the Capital Will be submitted to the Mayor and Board in a later than March 1, 2021, for appreval no list than May 1, 2021.   |
|   |      |  |                               |                        |  |                            |  |                               |                              |  |
|   |      |  |                               |                        |  |                            |  |                               |                              |  |

| Report Title   |    | Finding  | Respondent Assigned by   | Finding Response       |  | Raf               | Recommendation   | Respondent Assigned by   | Recommendation<br>Response | Recommendation Response Text   |
|--|----|--|--|------------------------|--|-------------------|--|--|----------------------------|--|
| [Publication Date]   | F# | (text may be dupilcated due to spanning and<br>multiple respondent effects)  | (GS) [Response Due Date]   | (Agree/Disagree)       | Finding Response Yext  | [for F#]          | (text may be duplicated due to spanning and<br>multiple respondent effects)  | CGJ<br>[Response Due Date]   | (Implementation)           | Ensuring that San Francisco has the  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>FireInghiting Water<br>System<br>[July 17, 2019]              | F1 | Fives resulting from an earthquake represents -<br>specificant risk of bidespread damage and<br>potential loss of life in San Francisco.   | General Manager, San<br>Francisco Public Utilites<br>Commission<br>(September 15, 2019)  | Agree with the finding |  | 81<br>[for P1-F6] | By no later than December 31, 2020, the Major, the SPUC, the SPIC, and the Office of Recillence and Capital Planning through global Planning through global Planning and Global Planning a | General Manager, San<br>Frandsco-Pulife Utilitet<br>Commission<br>(September 15, 2019)   | implemented                | Informativativa and recovaries to the well<br>separed to fight five, and jump to Sian<br>Franchos to stored-hing that will be a focus of<br>the next 30-Vera Classifi Plan. Fer<br>Administrative Code 3.20, that Plan must be<br>submitted to the Mayer and Board on later<br>than March 10 resh odd-numbered year for<br>supervise in later than May 1. The recented<br>precentation would be delivered as part of the<br>supervise in later than May 1. The recented<br>precentation would be delivered as part of the<br>precentation would be delivered as part of the<br>United States of the project<br>and timeline until the SERR 2020 plan passes.<br>For the resizes, the forward in the<br>recommendation with the Capital Plan. and<br>published. The City Will ying this<br>the commendation with the Capital Plan. and<br>published the United States 2020 plan<br>passes.  |
| Act Now Before It is<br>Too late;<br>Too late;<br>Aggresolvely Espand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019] | F2 | Fives exclusing from an earthquake represent a<br>significant risk or indicarporal damage and<br>petendial less of life in San Francisco.  | General Manager, San<br>Francisco Public Hillites<br>Garmitosion<br>(Suptember 15, 2019) | Agree with the finding |  | R2<br>[for P1-P6] | The plan ideusated in Recommendation fit I while Mindle Mindle Geolegic Proposal, Mindleng Renarding Sources, for the Installation within 15 years of a high-pressym, multi-sources, circle installation within 15 years of a high-pressym, multi-sources, discimically sale emergency water system for those parts of the City That don't currently have one, i.e., by no later than June 30, 2014.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Regules further analysis   | The commitment of sources for specific transition for Sources for specific transitions for Sources for specific transitions for Sources fo   |
| Act Now Before It is<br>Too Lake:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Friedighting Water<br>System<br>(July 17, 2019)               | F2 | The municipal water supply system (MWSS) is<br>highly voluneable to damage from a new<br>earthquake and is mot a reliable source for<br>water supply for firefighting after a major<br>earthquake.   | General Manager, San<br>Francisca Public Utilities<br>Commission<br>(September 15, 2019) | Disagree, partially    | The MWSA has been significantly upgraded in the last 15 years through the Water Supply Inspresement Program (MSP) inlitated by the SPOUL. The gala of WSP included or reduce values allowed the water system to damage from earth quades and increase oreself water with the most program of the spoul of the water system of the wate | R1<br>[for F1-F6] | By no later than Describer \$1,2000, the Mayor, the SPULP, the SPILP, and the Office of Recillence and Capital Planning should jointly represent to the Sear of Supervisors a detailed plan on excess the Capital Planning should jointly represent to the Search of Supervisors a detailed plan on excess the City is well presented to flight less that plan on the Farnancian in the event of a 1500 magnitude (7.3) earthquakts.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Will be                    | Ensuring that San Francisco has the inforstruture and recourses to be well prepared to fight first in all parts of San Francisco is smerting that will be a locus of the next 15 or Grapha 10 or   |
| Act Now Before it is<br>Too late:<br>Appressively Expand<br>and Enhance Our<br>High-Pressure<br>High-Pressure<br>Emergency<br>System<br>(July 137, 2019)                   | F2 | The municipal water supply system (MWSS) is highly witherable to damage from a major activates and star activates and six as reliable source for water supply for fireflighting after a mujor earthquake.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Dkagee, pardahy        | The MWS5 has been zignificantly upgraded in the last IS years through the Water Supply in the last IS years through the Water Supply in the last IS years through the Water Supply in the last IS years through the WSF Included by relative to the SPUIC. The pask of WSF Included for reduce of the WSF Included | R2<br>[far F1-F6] | The plan discussed in Recommendation R1 should include a detailed prepasal, including the characteristic propersity including the characteristic properties of the insulation within 15 colonically of the properties of the characteristic properties of the characteri | General Manager, San<br>Franchico Public Lettities<br>Commissian<br>(September 15, 2019) | Requires further analysis  | The commitment of source for specific uses on specific transfaces from the commitment of the production of the productio   |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019]              | F4 | The City's high-pressure emergency water supply system, known as the Audilary Water supply system, known as the Audilary Water Supply System (Most), does not cover large parts of System's class (System's Audilary City System's | General Manager, San<br>Franctico Public Utilities<br>Commission<br>(September 15, 2019) | Agree with the finding | The SFPLIC, SFPD, and San Francisco Public Works (BFVV) are committed to intreasing file works (BFVV) are committed to intreasing file to the stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014 are set of the City would are agree of our section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The stage of the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Section 2014. The Section 2014 are staged to the Next Section 2014. The Section 2014 are staged to the Section 2014 are staged to the Section 2014. The Section 2014 are staged to the Section 2014 are staged to the Section 2014. The Section 2014 are staged to the Section 2014 are staged to the Section 2014. The Section 2014 are staged to the Section 2014 are staged to the Section 2014. The Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Section 2014 are staged to the Sectio |                   | by no later than December 31, 2010, the Mayor, the SIFUC, his SPC, build be Officed of the SIFUC, his SPC, build be Officed of the SIFUC, his SPC, build be Officed of the SIFUC, his SPC, build fill being should jointly present to the Beach of Signerthorn a design did not be some of the SIFUC of SIFUC of the SIFUC of  | General Manager, San<br>Francisco Pullic L'Ullibre<br>Commission<br>(September 15, 2019) | Will be Implemented        | Easting that San Francisco has the<br>infortraturation and recourses to the well<br>proposed to flight first in all parts of San<br>Francisco is something that will be a focus of<br>the next SOYear Capital Plan. Per<br>Administrative Code 3.00, that Plan must be<br>submitted to the Mayer and Board no later<br>than March 1 of each odd-numbered year for<br>approval no later than May 1. The requested<br>prevenession would be delivered as part of that<br>Plant's submission to something all<br>proposed proposed on the company of the<br>proposed of the company of the<br>proposed of the company of the<br>proposed of the company of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of the<br>proposed of<br>proposed of<br>proposed of<br>proposed of<br>proposed of<br>proposed of<br>proposed of<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>proposed<br>propo |

| Jack Now Before It Is<br>Too Lates:<br>Too Lates:<br>Aggresslevly Expand<br>and Enhance Out High-Pressure<br>Emergency<br>Fireflipfing Water<br>System<br>(July 17, 2018)  | F4 | The City's high-pressure emergency water supply vactors, mouses the Auxiliary Water Supply vactors, mouses the Auxiliary Water Supply vactors of Supprecisional Districts 1, 4, 7 and 13, roughly one-child of the City's developed area. As a result, thereaft in the City's developed area. As a result, thereaft water are not developed processed from fires after a mujor earthquake. | Seneral Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019)   | Agree with the finding  | The SPELC, SPEL, and San Francisco Public Works (SPEV) are committed to Interesting the protection throughout San Francisco. Since the prosecotion throughout San Francisco. Since the prosecotion throughout San Francisco. Since the prosecotion of San San San San San San San San San San  | R2<br>(for F1-F6) | The plan discussed in Recommendation III actually including includ | General Managor, San<br>Francisco Public Utilifer<br>Commission<br>(September 15, 2019)  | Requires further analysis | The commitment of sources for specific toxes on specific timeline, for San Franciscos y sublic infrastructure is the work of the 30 Year Capital infrastructure is the work of the 30 Year Capital infrastructure is the work of the 30 Year Capital infrastructure is the work of the 30 Year Capital Film, and bear the same of the 30 Year Capital planning the 30 Year Capital planning process graphers, (document, and bearines shared particle, side-convent, of the shared particle, side-convents |
|--|----|--|--|-------------------------|--|-------------------|--|--|---------------------------|--|
| Act Now Before It is<br>Too Late:<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Firedighting Water<br>System<br>(July 17, 2019)               | 75 | A fligh-insessive, multi-sourced, scientically as be emergency. The flighting water supply to be costly but it is essential to protect the City.   | General Manager, San<br>Francisco Public Utilide<br>Garmitistian<br>(September 12, 2019)   | Agree with the (finding | As the CITY considers what is exemital to present San Franchico, it is important protects fair Franchico, it is important protects fair Franchico, it is important protects fair Franchico, it is important protection of the Real Pr | R1<br>[for FI-F6] | By no later than December 31, 2010, the Mayor, the SPUP, the SPIP, and the Office of Rodifleron and Capital Planning thould jointly represent to the Second of Supervisions a detailed represent to the Second of Supervisions a detailed for the SPIP of Second | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2015) | Will be                   | Ensuring that san Fonction has the Ininfrattructura and recovers to be well prepared to fight fire in all parts of San rearrandous I somewhat per war will be a focus of Administrative Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to Code 8.20, that Plan must that has the code of the Code 8.20, that Plan must be understand to Code 8.20, that Plan must be understand to San San San San San San San San San San   |
| Act Now Before It is<br>Yoo Late:<br>Aggressively Expanded<br>and Enhance Gurf<br>and Enhance Gurf<br>infight-Pressure<br>Enhancement Worter<br>Systems<br>[July 17, 2019] |    | A high-mesone, multi-sauced, scientially afe-<br>erregroup (fine)ing water supply will be<br>costly but is essential to protect the City.  | General Manager. San<br>Francisco Public Utilisies.<br>Commissioni<br>(September 15, 2019) | Agree with the finding  | As the CEV presention what is exential to presented suffrances, list important to acknowledge our multiple, compiler resilience suffaces, list important to acknowledge our multiple, compiler resilience and the continuence of the continuence  | R2<br>[for F1-F6] | The plan discussed in Recommendation fit is<br>chould include a desided proposal, including<br>finanding sources, for the Installation within 15<br>years of a high-pressure, multi-sources,<br>caterinally safe emergency water system for<br>particularly fe safe safe safe safe safe safe<br>particular safe safe safe safe safe safe<br>particular safe safe safe safe safe<br>particular safe safe safe safe safe safe<br>particular safe safe safe safe safe safe<br>particular safe safe safe safe safe safe<br>particular safe safe safe safe safe<br>particular safe safe safe safe safe safe safe<br>particular safe safe safe safe safe safe safe<br>particular safe safe safe safe safe safe safe<br>particular safe safe safe safe safe safe safe safe  | General Managor, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Requires further analysis | the commishment of sources for specific turning in 5 can Francisco y public infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital infrastructure in 10-Year Capital infrastructure poerfolio and earness sanders in 10-Year Capital infrastructure poerfolio and earness San Francisco for recliners challenges. The Capital infrastructure poerfolio and earness San Francisco for recliners challenges. The Capital pulse of the Proteinstance of the 10-Year Capital infrastructure poerfolio and earness San Francisco for recliners challenges. The Capital pulse for the proteinstance of proteins infrastructure received in the 10-Year Capital infrastructure investments. These investments are stored: (1) address steps and/or regulatory mandates; (2) preserve assets and promote sustativability of preserve assets and promote sustativability of preserve assets and promote sustativability of the 10-Year Capital Pika and those that follow, the City will conduct to enalize proteins. Committing the center and workers of preserve and programs and feedryl sources to advance those pricinities. Committing the center of the 10-Year Capital Pika and those that follow, the City will conduct to enalize proteins.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Emergency<br>Friefighting Water<br>System<br>[July 17, 2019]  | F6 | Unless the City normance handing levels, it will be several ideaceds [i.e., after the IASS predicts on extended and in the several ideaceds will occur be ordered parts of the City have a high-pressure, mutit-sourced, schmidelly safe emergency fireflighting water supply.   | General Manager, San<br>Frandscar Public Utilies<br>Commission<br>(September 15, 2019)     | Disagree, wholly        | Decisions about programming and funding<br>levels of future SES bonds and other<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.  | [for F1-F6]       | Redillence and Capital Planning chould Jointy represent to the Beach of Supervisors a detailed plan to ensure the City Is well prepared to flight feer, in all past of San Francisco in the event of a 1500-magnitude (7.8) earthquake.  | Francisco Public Utilities<br>Commission<br>[September 15, 2019]                         | Will be<br>Implemented    | Ensuring but San Francisco has the initiatraturary and resources to be well prepared to fight first in all part of San Francisco to fight first in all part of San Francisco is something that will be a focus of the next 10/vear Capital Plan. Per Administrative (ced San, that Plan must be submitted to the Mayor and Board no later than March 1, of each odd-numbered year for approval in later than May 1. The requested presentation would be deviceed as part of that service that the service of the service of the part of the contract of the service of the servic |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Fredighting Water<br>System<br>[July 17, 2019]                             | P6 | Unlets the City heresees funding levels, I well to several decades []. After the USSS predicts one or more major earthquakes will occup before the southern parts of the City have a high-pressure, multi-sourced, schmically safe emergency fireflighting water supply.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 25, 2019)   | Disagree, whelly        | Decisions about programming and funding levels of time SES bonds and other complementary sources that could support the complementary sources that could support the repansion of the AWSS have yet to be made.  | R2<br>[for F1-#6] | The plan discussed in Recommendation R1.<br>Including the advantage opposed, including financing sources, for the inputation within 15<br>years of a high-pressure, multi-sources, calculation within 15<br>years of a high-pressure, multi-sources, calculation levels and the plan of the City May don't currently have<br>once, i.e., by no later than name 30, 2094.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2015) | Requires further analysis | The commitment of sources for specific twose no specific twendings for San Franciscos y subility infrastructure is the work of the LOYect Casiol Infrastructure is the work of the LOYect Casiol Infrastructure is the work of the LOYect Casiol Film, and the LOYect Casiol Film, and the LOYect Casiol Film, and better of analysis, will be done on the capital planning process graphers, document, and balances planned subtract on analysis, and balances planned partners, document, and balances planned process graphers, document, and balances planned process grantees, document, and balances planned process grantees of sequences challenges. The Capital Plan has foregated for funding funding principles to programs. These investments are tiernet; (1) quadretic special partners of special principles with the capital planned and programmatic receits and programmatic evolution and programmatic conditions of the case of th |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure   | F8  | Redundancy is an important feature of an<br>emergency firelighting water system.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019]                                | Agree with the finding |   | R6<br>(for F8-F9) | The SPPUC, the SFFD and the SF Department of<br>the Environment should atudy adding salt-<br>water pump stations to improve the<br>redundancy of water sources, especially on the<br>west side. Findings and recommendations from  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Will be<br>Implemented | SFPUC and SFFD will complete this study by June 30, 2021.  |
|--|-----|--|---|------------------------|---|-------------------|--|--|------------------------|--|
| Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]<br>Act Now Before It Is   | F9  | Current plans to extend protections to the   | General Manager, San  | Disagree, partially    | While It is true that the SEPUC and SEFD are  | R6                | this study should be presented to the Board of<br>Supervisors by no later than June 30, 2021.  The SFPUC, the SFFD and the SF Department of  | General Manager, San   | Will be                | SFPUC and SFFO will complete this study by   |
| Ace New Metorie Elsa<br>Too Late: Too Late: Too Late: Head<br>and Enhance Our<br>High Presume<br>Emergency<br>Fireflighting Water<br>System<br>(July 17, 2029)   | 29  | western par of the City do not include any high-<br>pressure water sources north of Golden Gate<br>Park.   | Francisco Public Utilities<br>Commission<br>[Bestember 15, 2019]  |                        | sudying four patiental water sources proposed to supply a patient EVFG on the work citied of the City, which are not located north of Golden Gate Park, which no means would recibe the proposed systems' resiliency, reliability, performance, and ability to provide abundant of the city of the cit  | [for F8-F9]       | the Environment should soully define salf-<br>water pump salfonts to Improve the<br>results of the Section of the Section of the<br>redundancy of water sources, specially on the<br>west table. Fidding and recommendations from<br>this study should be precented to the Board of<br>Supprivious by no later than time 30, 2021.   | Francisco Public Utilities<br>Commission<br>(September 15, 2019)                         | implemented            | hune 20, 2021.   |
| Act Now Before it is Too Late: Too Late: Aggressively Expand and Enhance Our Migh-Pressure Free Infection of the Control of th | F10 | The reliability across being used by the SFPUC<br>Impact an overly administic Impression of the<br>protection provided.  | General Kanager, San<br>Francisco Public Utilider<br>Commission<br>(September 15, 2019)                                 | Chapee, partially      | Fine Reposition & Average (FRA) were sulfised by SPEVL and SPTO in the planning study (C-1936. This study divided the City Into areas based on those defined by the SPTO for fridat all surface and were called fine the property of the company of th  | 87<br>[for F10]   | The SPEUs hould (a) continue to efforts to complete a more decided analysis of unexpensive from the continue to the continue t | General Manger, San<br>Francisco Public Utilitie<br>Commission<br>(September 15, 2019)   | Will Ee                | SPUC and SPTD will complete this analysis. by June 3 0, 2021.  |
| Act Now Before It is<br>Tow Late:<br>Tow Late:<br>Aggresolvely Espand and Binhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>(July 17, 2019)   | F11 | The City does not have a binefile to find and complete one fundament of a high pressure of a high pressure of a high pressure of a high pressure, and the complete of the comp | General Manager, San<br>Francisco Public Julilles<br>Generalisco Public Julilles<br>Generalisco<br>(September 15, 2019) | Otiagree, partially    | In ENEW was built after the 1900 eerthquakt port of a door in location, primarily in the northeast portion of San Francisco, corresponds to the constant of the majority of the city's population at that time. Since 2010, the SPIPUL, SPIPL, and Public Works have made critical improvements to the existing ETWS system. Beparallog the STWS point or ensuring that the existing ETWS is reallest and reliable would have controlled the strengthen of the strength of the  |                   |  |  |                        |  |
| Act. New Before 115 Too Late: Aggressively Expanse Aggressively Expanse Aggressively Expanse Aggressively Expanse Expa | F12 | The SEPL has not developed a number of the roution maintenance given recommending plan recommending plan recommending and policy report (CS-199), and has not adequately defined which AVES views are "fortical" and therefore require increased attention.  | General Manager, San<br>Francisco Public Utillities<br>Cammissian<br>(September 15, 2019)                               | Chagree, wholly        | Sone siking over maintenance responsibilities,<br>SPUCh has completed digilization maintenance activities. For example, on a monthly basis, staff num the SPUC test both Pump Station #1 and Pump Station #2. There are 6 maintenance recommendations provided in the CS-198 study as shown blowl in Table 7-1 from CS-198. The SPUCh has developed overeind of the recipit realization pulsar recommendation of world of the CS-198 that was a shown blowl in Table 7-1 from CS-198. The SPUCh has developed overeind of the responsibilities and the stationary flat maintenance plants recommendation in Confirm that an internationary particles for the recording flat Table 7-1 from the Maintenance Recommendation I. Confirm that all AWSS assets to entered into COO's asset management system and PM-3 are established SPUC Response. Al AWSS assets to show a control file COO's Mainten and CG distalbates. PM-3 are established for register maintenance of the COO's Mainten and CG distalbates. PM-3 are established for register maintenance and testing to preformed in a considerance of the confirmation and considerance of the confirmation and considerance and constitutions on the confirmation and considerance and constitutions on the considerance of the confirmation and considerance of the considerance | R9<br>[for £12]   | By no laster Phan December 31, 2020 the SPPU. Of the SPPU. Of the SPPU. Chould (a) Implement "Test practices" for the maintenance of AWSS assets, and of the SPPU. Chould (a) Implement "Test practices" for the maintenance of AWSS assets, and the SPPU. Chould (a) Implement "Test practices" of "Test practices" and "Test pract | General Managor, San<br>Francisco Public Utilibra<br>Commission<br>(September 15, 2019)  | Ns been<br>implemented | (a) SPIVC (Implements "best practices" for the maintenance of Not Sease the collaboration with SFE), and consistent with the terms of the Memoranthum of Inderstanding Regerflam (Progression and Maintenance of Son Francisco Water Supply System Related to File Suppression NOV), SFPC will see Sease of Suppression NOV, SFPC with section as a high pressure fireflying system (MOUL, page 2).  (b) The ANYSS critical valves have been (scarlided and will be exercised every year through the AWSS Critical Valve Exercise Program. |

| Act Now Before it is | F1.3 | In the 2015 MOU between the SFFD and the        | General Manager, San       | Disagree, partially | There are no formal protocol putlining specific     | R10       | By no later than June 30, 2020, the 2015 MOU   | General Manager, San       | Will be     | SFFD and SFPUC will work together to amend |
|----------------------|------|---|----------------------------|---------------------|---|-----------|--|----------------------------|-------------|--|
| Too Late:            | l    | SFPUC, the two agencies agreed to conduct       | Francisco Public Utilities | 1                   | joint AWSS exercises or drills in the MOU;          | [for F13] | between the SFPUC and the SFFD should be       | Francisco Public Utilities | Implemented | the MOU by June 30, 2020.                  |
| Aggressively Expand  | l    | joint AWSS trainings annually, but there is no  | Commission                 | 1                   | however, there are multiple apportunities to        | 1         | amended to include a detailed roadmap for      | Commission                 |             |  |
| and Enhance Our      |      | formal protocol outlining specific joint AWSS   | [September 15, 2019]       | 1                   | train together during operation, maintenance,       |           | annual emergency response exercises, including | [September 15, 2019]       |             | [  |
| High-Pressure        | l    | exercises or drills using hypothetical disaster |                            |                     | and construction of improvement projects for        |           | simulated disaster and earthquake drills       |                            |             |  |
| Emergency            |      | scenarios, such as a major earthquake.          |                            |                     | the AWSS facilities as previously described in      |           | Involving the AWSS and the PWSS.               |                            |             | 1  |
| Firefighting Water   |      |   |                            |                     | the response to the Grand Jury questions sent       | 1         |  |                            |             | 1  |
| System               | 1    |   | i                          | 1                   | In May 2019.  |           |  |                            |             |  |
| [July 17, 2019]      | 1    |   |                            | l                   |   |           | Ī  |                            |             | 1  |
|                      | Į.   | 1   | l .                        |                     | The SFFD and SFPUC have had multiple field          |           | 1  |                            |             | i l  |
|                      |      |   |                            | 1                   | training opportunities during the maintenance       |           | 1  |                            |             | ł i  |
| 1                    | 1    | }   | 1                          | 1                   | and start-up testing of AWSS facilities in the last | 1         | 1  |                            |             | 1  |
|                      | 1    |   |                            |                     | 5 years. For example, on December 20, 2018,         |           |  |                            | [           | 1  |
|                      | i    |   |                            |                     | SFFD and SFPUC personnel conducted                  | 1         |  |                            |             |  |
|                      |      |   |                            |                     | emergency generator start-up procedures for         |           |  |                            |             | .  |
|                      |      |   | 1                          |                     | Pump Station No. 2 (PS2). On April 5, 2018          |           |  |                            |             | J  |
|                      | i    |   | 1                          |                     | SFPUC and SFFD performed joint-department           | 1         |  |                            |             |  |
|                      |      |   |                            |                     | full-scale test of AWSS Pump Station No. 1 (PS1)    | i         |  |                            |             |  |
|                      |      |   |                            |                     | Including pumping seawater into an isolated         |           |  |                            |             |  |
|                      |      |   | 1                          |                     | section of the AWSS distribution through            |           |  |                            |             |  |
| 1                    |      | }   | 1                          | ļ                   | system hydrants. On August 29, 2018, SFPUC,         | 1         |  |                            |             |  |
|                      |      |   | i                          |                     | SFFD and DPW personnel conducted a seawater         |           |  |                            | ſ           | í  |
| 1                    |      |   | 1                          |                     | drafting drill and confirmation test from the       |           |  |                            |             |  |
|                      |      |   | 1                          |                     | new suction connection at Pier 50. In addition,     | 1         |  |                            |             |  |
|                      |      |   | 1                          |                     | SFFD and SFPUC periodically test different          |           |  |                            |             |  |
| 1                    |      |   |                            |                     | facilities to assure systems are in good working    |           |  |                            |             | i I  |
| ,                    |      |   | 1                          |                     | order, and to train personnel on operations and     | 1         |  |                            |             |  |
|                      |      |   | 1                          |                     | Joint-agency communications. For example, a         |           |  |                            |             |  |
|                      |      |   | 1                          |                     | full-scale emergency exercise was performed         |           |  |                            | 1           |  |
| 1                    |      | J   | 1                          | 1                   | between SFFD and SFPUC staff in January 2016        | ì         |  |                            | I           |  |

| r  | 1  | I  | Т   | Г                                    |  | Т                 | T  | Bernandent to to 22   | Becommended:  |  |
|--|----|--|---|--------------------------------------|--|-------------------|--|---|---|--|
| Report Title<br>[Publication Date]   | F# | Finding (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGI<br>[Response Due Date]              | Finding Response<br>(Agree/Disagree) | Finding Response Text  | RH<br>[for F#]    | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by CGJ  [Response Due Date]  Chief, San Francisco Fire      | Recommendation<br>Response<br>(Implementation)<br>Will be | Recommendation Response Text  Ensuring that San Francisco has the  |
| Act Now Before It Is<br>Too Late:<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F1 | Files residing from an earthquake represents<br>significant file of the description of the significant<br>significant file of the significant<br>potential loss of life in San Francisco.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]   | Agree with the<br>finding            |  | R1<br>[for F1-F6] | By no lister than December 31, 2029, the Mayor, the SFDLP, the SFDLP, the SFDLP, and the Office of RedIllence and Capital Planning should jointly recent to the Result of Supervisions a detailed recent than the SMDLP of Supervisions a detailed from the SMDLP of SMD | Chief, San Francisco Fire<br>Department [September 15, 2019]                    | Will be implemented                                       | Instanting but San Francisco has the inflamentations and recovered to the will instantion and recovered to the will instantion to something that will be a forms of the next 30 Percs (1921st) Plan. Per Administrative Code 3.730, that Plan must be submitted to the Mayor and Bload on later than March 1.0f each odd-numbered very for supervise in laster than March 1.0f each odd-numbered very for supervise in laster than March 1.0f each odd-numbered very for supervise in laster than March 1.0f each odd-numbered very recent than March 1.0f each odd-numbered very prevent in laster than March 1.0f each odd-numbered very prevent in laster than March 1.0f each odd-numbered very prevent in laster than 1.0f each odd-numbered very laster and supervised very laster and timeline, until the ESER 2010 plan passes. For this research, left for this research left for this research each of the Visit Vis |
| Act Now Before It Is Too Later. Too Later. Too Later. Too Later. Too Later. Too Later. | F1 | Receiveuting from an earthquake represent a<br>ignificant fix of widespress d'amage and<br>potential lios of life in san Prandecs.   | Department<br>(September 15, 2015)                                | Agree with the finding               |  | RZ<br>[for F1-F6] | finanding sources, for the installation within 15 years of a high-pressure, multi-source, years of a high-pressure, multi-source, castendard years of earth pressure years for the store years of the store years of the store years of the store years of the store years of the store years of th | Chek, San Francisco Pire<br>Department<br>(September 15, 2019)                  | Requires further  | The commitment of sources for specific tures on specific tureling in Cash Frandscote spalls infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital Plan. The pland secures of in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be denon on the capital plant middle. The capital plant middle plants of analysis, and basiness planted buffers in the capital plant middle plants of the capital plant plants of the capital plants  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fixefighting Water<br>System<br>[July 17, 2019]   | F2 | The municipal waste supply system (MWSS) is<br>highly witherable obtaining from a milky<br>earthquake and is not a reliable source for<br>water supply for firefighting after a major<br>earthquake.   | Chief, San Francisco Fire<br>Department:<br>[September 15, 2019]  | Disagree, partially                  | The MWSS has been dignificantly upgraded in the last 15 years through the Water Supply Improvement Program (NSP) Initiated by the SPICLT. The goals of WSP Incidended to reduce valences and the program of the program  | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SPDLPL, the SPD | Chief, San Francisco Fire<br>Department<br>(September 15, 2019)                 | Will be<br>Implemented                                    | Ensuring that San Franchson has the ininfrastructure and recognose to be well prepared to flight fires in all parts of San Francisco is sometime that will be a focus of the next 20 foter Capital Flan. Per mount be substituted to the Mayer and Board not later than March 1 of each odd-numbered year for approval not bear than March 1 of each odd-numbered year for proportion to bear than March 1 of each odd-numbered year for this proportion to bear than March 1 of each odd-numbered year for this proportion to bear than March 1 of each odd-numbered year for this proportion to be delivered as part of that 1 of the second of the se |
| Act Now Belove It Is<br>Too Lake: Too Lake Agreed-wile Expand<br>and Etherheer Our<br>Exemption: The Exemption of Exemption<br>Exemption of Exemption (Find Exhibit Water<br>System [July 17, 2015]  | F2 | The municipal water supply system (MWSS) is highly valueable to damage from a mujor continuable and for a called to source for water supply for fire digitality after a mojor certification.   | Chief, San Francisco Fire<br>Department<br>[pages miber 15, 2019] | Osagree, pardsily                    | The MWSS has been significantly approach in the last 12 years through the Water specific has valved by the Water specific has been been supported by the Water specific has been supported by the Water specific has been supported by the Water specific has been supported by the Water Inflastration that the Water Specific has been supported by the water Inflastration that the Water Specific has been supported by the Water Inflastration that the Water Specific has been supported by the Water Inflastration that the Water Specific has been supported by the Water Inflastration that the Water Specific has been supported by the Water Inflastration that the Water Inflast | R2<br>[for F1-F6] | The glan Educated in Recommendation R1 through Include and emiline proposal including Programs in Including Rearning sources, for the installation within 15 years of a high-pressure, multi-sources, set and a size of a high-pressure, multi-sources, distinctionally used emergency water system for those parts of the UTU had don't currently have one, i.e., by no later than June 30, 2034.   | Chief, Sin Francisco Piec<br>Decartument<br>Decartument<br>(September 15, 2019) | Regules further analysis                                  | The commitment of sources for specific lives on social trivellages for San Fandacies's Sulfille Instatructures is the work of the ID-Yest Capital Entities Trivellage for the Capital Plan, and William Capital Plan, and will be acknowledged in the Capital Plan, and bushed on analysis, will be done on the application of the Capital Plan and bushed on analysis, and bushees planned funding for needs arross the public inferstructures protein and sources of the Plan and the Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and those the Capital Plan and the Capital Plan and the Capital Plan and those the Capital Plan and the Capital Plan and the capital Plan and those the Capital Plan and the capital Plan and those the Capital Plan and the capital Plan and the capital Plan and the capital Plan and the capital Plan and the capital Plan and the Capital Plan and the capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and the Capital Plan and th |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our . High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F3 | Approximately 30 observes have recently boen added with funds from ISSR bonds, but citation only have to to about a neur of water only have to to about a neur of water by and thus do not provide sufficient water for flighting fires following a major cartinquake. |   | Agree with the finding               | Cistems serve as one of many Important tools for use by the SFFD in response to a distance from the SFFD in response to a distance in Chern location are strategically location in College in Carlo and SFFD in SFFD i | R1<br>[for F1-F6] | By no later than December 33, 2010, the Mayor, the SFPU, the SPPU, which the Office of Resilience and Castal Parking photologically present to the Board of Supervisors a detailed present to the Board of Supervisors and the Stage to Stage of the well present of the Office of the Stage to Stage of the well present on the event of 11505-magnitude (7.8) rearriquable.  | Chlef, San Francisco Pire<br>Department<br>(September 15, 2019)                 | Will be<br>Implemented                                    | Greating that San Franctico has the infestructure and resources to be well infestructure and resources to be well infestructure and resources to be well inspected for fight resource in all parts of San presented for fight resource in the next Source Capital Plan. For execution of the next Source Capital Plan. For executing the substitution of the substitution of San Source and San San San San San San San San San San  |

| Act Now Before it i.<br>Too Late:<br>Aggressively Expand<br>and finithance Our<br>High-Pressure<br>Finishing Water<br>System<br>[July 17, 2019]   | s F3 | Approximately 30 cistorns have recently been<br>added with funds from ESR bonds, but cistory<br>only have use to about in hour of water<br>and thus 80 not provide utilities with the<br>fighting fire following a major earthqualse.  | Chiel, San Frandsco Fige<br>Department<br>(September 15, 2019) | Agree with the finding | Cistems serve as one of many important tools for use by the SFFD in response to a disaster. Observe based one see strategically located to City in the events of a estrategically located to City in the events of a major configuration to successful as "Description of the country of the countr | R2<br>[far F1-F6  | The plan discussed in Recommendation R1, should include a detailed proposal, including flamoding source, for the Installation Michael Stranding Source, for the Installation Michael Stranding Source, for the Installation Michael Stranding Source, and Source Source, multi-described, source described in Source Source, source Source, so |   | Soquires further smalypis | The commitment of sources for specific uses on specific threathers for San Francisco's public infrastructure is the work of the 1D/Frac Capital Plan. The plan discussed in Recommendation 1 Plan The plan discussed in Recommendation 1 When the school of the Capital Plan The plan discussed in Recommendation 1 Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Stand of the Capital Francisco's recilience challenges. The Capital Francisco's recilience challenges. The Capital Plan has longistanding funding principles to guide the prioritization of public Infrastructure investments. These investments are sliced; [1] address legal and/or regulatory mandates; [2] address legal and/or regulatory mandates; [3] address legal and/or regulatory mandates; [3] address legal and/or regulatory mandates; [3] address legal and/or regulatory mandates; [3] address planed and a mandates; [4] address legal and/or regulatory mandates; [4] address legal and/or regulatory mandates; [5] address planed and and programmatic needs and continued the Capital Plan and those that follow, the Capital Plan and those that follow, the Capital Plan and those that follow, the Capital Plan and those that follow, the Capital Plan and those that follow, the Capital Plan and these that follow the Capital Plan and the capital to entirely funding a single program out of context and without regard for the trade-off of other capital Plan and the capital plan and the capital plan and the capital plan and the capital plan and the capital plan and the capital plan and the capital plan and the capital planed and planed programs and dentify tources to capital planed and planed planed planed and planed p  |
|---|------|--|--|------------------------|--|-------------------|--|---|---------------------------|---|
| Act New Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Sur<br>High-Pressur<br>Emergency<br>Emergency<br>Excligating Water<br>System<br>(July 17, 2019)   |      | The Clfy Stagly pressure emergency value in<br>supply specifies, formers are haudinary Values<br>Supply Streem (AVSS), does not core large<br>parts of Superiorised Intertice 1, 2, a Test<br>roughly one-shirt of the Clfy developed area.<br>As a evalue, these districts are not adversely<br>protected from fires after a major earthquake.  | Obel, San Francisco Fire<br>Department<br>(September 15, 2019) | Agree with the finding | he 6FD/L, SFD, and Ser Francisco Public.  Works (SFW) was committed to increasing flor protection throughout, Ser Francisco, Store the season of the protection throughout, Ser Francisco, Store the season of the first Enthrousine Sulface and Emergency Keaponne Bond In 2010, the three segandics have been implementing imposition for large more than implementary impositions are impossible. Enthrancing the Assistance, Enthroning the Assistance of overlaps to all arrass of the City would require the allocation of funds to do so. The three apendics will comfine to develop and implement projection of funds to do so. The three apendics will comfine to develop and implement projection utilities are sufficiently and provent such than in the province of the city o | RL<br>[for F1-F6] | the SFEV. the SFFO, and the Office of<br>Recillinea and Capital Panning chould jointly<br>present to the Board of Supervivors a detailed<br>plan to ensure the City is well present and to light<br>first to all joints of San Francisco in the event of<br>a 3006-magnitude (7.8) certificials.   | Chief, San Francisco Fire<br>Repartment<br>(September 15, 2019) | Will be Implemented       | Counting that San Francisco has the informationary and responses to be well interested to fight fires in all parts of San Francisco is sententing that will be a fortius of the creat 16-Year Capital Plan. Per Administrative Code 3.70, that Plan must be submitted to the Mayor and Board no laser than Morsh 1 of each ded-numbered year for approval no later than Morsh 1 of each ded-numbered year for approval no later than high 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning errors San Francisco's resilience familience. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESRI 2010 plan passes. Per this reason, the City will spre this, and years the commence of the commenc  |
| Act Now Before 1: 12<br>Too Late:<br>Aggressively Espanse<br>Aggressively Espanse<br>Aggressively Espanse<br>High-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fligh-Pressure<br>Fli | F-4  | The Clip's high-pressure emergency vaster supply system, some size hauffall Water Souph's System, some size hauffall Water Souph's System (AWSS), does not cover large parts of Suppression Distracts 3, 4, 7 and 11, roughly one-third of the Clip's developed area. It is supply one-third of the Clip's developed area. Provided from five short or major certification protected from fives after a major certification.   | Chief, Sn Francisco Fire<br>Department<br>(September 15, 2015) | Agree with the finding | The SEPILC, SEPIL, and San Francisco Public Works (SEPIV) are committed to innersating file protection throughout San Francisco. Since the protection throughout San Francisco. Since the season of the Site Sarchivade Saleke and Emergency Mesopone Bond in 2010, the three season of the Site Sarchivade Saleke and Emergency Mesopone Bond in 2010, the other season of the season of th | R2<br>[for F1-F6] | The plan discussed in Recommendation F1 involved including inhoused including interposal, including inhoused including inhoused including inhoused including inhoused in the installation within 15 years of a high-pressure, multi-sourced, isolationally safe emergency water system of its chief including safe emergency water pytems of the other parts of the CV years don't Courament's have one, i.e., by no later than June 10, 4594.   | Chief, San Francisco Fre<br>Department<br>(Beptember 15, 2019)  | Requires further analysis | The commitment of sources for specific uses on specific intension for San Francisco's public infrastructure is the work of the 10-Vera Capital Infrastructure is the work of the 10-Vera Capital Final. The plan discussed in Recommendation 1 will be astronovietiged in the Capital Final, and value of the Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Plan Capital Final Plan Final Fin  |
| Act Now Before It is<br>Too Late:<br>Aggressively Extand<br>and Enhance Our<br>High-Pressure<br>Energency<br>Energency<br>Herieflything Water<br>System<br>(July 17, 2019)  | F4   | The CITY's high-pressure emergency waster scopilly system, known as the Auditory News Journal of the City of the C | Chef, San Francisco Fire<br>Department<br>Experiment 15, 2019] | Agree with the finding | The SFMC_SFTO, and an Franctice Public Works SFMO year committed to stores sing five North SFMO years are sentimed to store sing five North SFMO years and SFMO years and SFMO years and Emergency Response Bond in 2000, the three spendeds have been implementing projects to Improve the AWSS system's sealantic reliability and range of overages, chinhanding the AWSS range of overage to all areas of the City would require the allocation of funds to do so. The three agencies will contribute to develop and implements projected utilities on the original system design. There have been many implements system of the province of the original system design, there have been many checked to the system of the original system or the original system or the original system or the original system or the original system original s | R5<br>[for F4]    | The SPFO should strategically locate the majority of the PMSS have sometimes in areas that the stream configuration of the stream configuration and or distern.  | [September 15, 2019]  | Will be<br>Implemented    | The Department is currently finalizing specifications for these units, ofter which they specifications for these units, ofter which they specifications for these units in the specification of the second fair of 2000/perity 2021. These hose tenders are a heavy-duty apparatus designed to be able to be deplayed and moved throughout the Ling depending on need, glying the Department needed operational flexibility in its response.  |
| Act now Before it is foo late: Aggressively Expand and Enhance Our high-Precisive Friedling Water System [July 17, 2015]  |      | A high-pressure, multi-coursed, sedimically as the more memorative fileding water supply will see costly but is essential to protect the City.   | Chef, San Franktoo Fire<br>Department<br>(September 15, 2019)  | Agree with the fleding | As the City considers what is exemblal to protect Sun Francisco, it is limportant consenses that includes, it is limportant consenses that includes the commented to the headers of the commented in the headers of the commented in the headers of the commented in the headers of the commented in the headers of the commented in the headers of the commented of the co | R1<br>[forF1-F6]  | By no Start than December 31, 2020, the Mayor, the SPTUL, the SPTU, and the Office of Resillations and Capital Planning behalf planning as obtained as the SPTUL the SPTUL and SPTUL the S | (hlef, San Francisco Pire<br>Dobarrment<br>(September 13, 2019) | Will be<br>irrelemented   | Ensuring that San Francheo has the infrastructure and resources to be well prepared to fight lites in all parts of \$5 and francheo is commenting that will be a focus of francheo is commenting that will be a focus of francheo in the first of the first o |

.

| Act Now Before It is<br>Too Late. Py Espand<br>and Eshames (or Heave It is an expensive It is<br>the It is a market It is a market It is<br>Emergency Fire(Bything Water<br>System<br>(July 17, 2019) | PS | A high-pressure, multi-sourced, sebmically safe energency firefighting water associal will be coosily but it is essential to present the City.  | Department (Suppermber 15, 2015)                                | Approvide the finding     | As the CIV perceived what is executed to proceed that Facility, it is important to settle ended by the CIV perceived R2<br>[for P1-F6]  | The plan efficience of in Recommendation 81 should include a deadled reprocals, fellowing financing pourses, for the Installation within 15 years of a high-pressure, multi-sources, costmically rate emergency water system for those parts of the cry that don't nurmod hy have one, i.e., by no later than June 30, 2034.   | Chief, San Francisco Pier<br>Oppartment<br>(September 15, 2019) | Requires further analysis    | The commitment of sources for specific traves in contribution of the contribution of t  |
|---|----|---|---|---------------------------|--|--------------------|--|---|------------------------------|---|
| Act Now Before It is<br>Too Late:<br>Aggressively Example<br>and Enhance Our<br>High-Pressure<br>Energency<br>Prefighting Water<br>System<br>(July 17, 2019)  | F6 | Unleas the City Increases funding levels, I will be several decoded to., after the USBS predict one or more major enthquakes will occur? one or more major enthquakes will occur? All the control of the | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Olsagree, wholly          | levels of future SER bonds and other complementary sometists the could support the organization of the AWSS have yet to be made.   | R1<br>[for F1-F6]  | By no later than December 3.1, 2010, the Market Mar | Department<br>(September 15, 2019)                              | Implemented                  | Inflastructure and resources to be well<br>respected to fight first not laptor to \$5 an<br>franction to something that will be a focus of<br>franction to something that will be a focus of<br>the next 10-feet and that the something that<br>the next 10-feet and the something that<br>produce the something that the something that<br>the something that the something that<br>approval no later than May 1. The resourched<br>resonations would be delivered as part of that<br>Plan's submission to enable holistic planning<br>acreas San Francisco's resilience challenges.<br>Updates available on this timeline would be<br>included. The Circ Fourand classors he project<br>and simeline until the SBR 2000 plan passes.<br>For this research, the Cynell stype test<br>for this research, the Cynell stype test<br>for this research existing<br>proposed to the state of<br>publishments the some some<br>proposed to the state of<br>publishments and<br>publishments and<br>p |
| Act New Before It is Too Late: Too Late: Aggressively Expand and Enhance Out High-Pessure Emergency Pressure Emergency Riverlighting Water right 17, 2019]  | F6 | Unless the City horsease funding levels, I well to be several decades (Le., Alter the USGS predicts one or more major earthquakes will occur) before the scuther parts of the City Nava a high-pressure, multi-sourced, schmidally sale emergency fireflighting water supply.   | Chief, San Francisco Pire<br>Oppartment<br>(September 15, 2019) | Diagree, wholly           | Decisions about programming and funding levels of luture SES bonds and offer complementary sources that could support the organishm of the AWSS have yet to be made.   | R2<br>[[or F1-∓6]  | The plan discussed in Recommendation 13 bioding financing sources, for the installation wideling financing sources, for the installation within 15 years of a high-pressure, multi-sources, clientically and emergency water system for the three plans of the City that den't care water system for the plans of the City that den't care making have one, i.e., by no later than have 10, 4094.  | Chef, San Prancisco Pre<br>Department<br>(September 15, 2019)   | Requires further analysis    | The commisterent of sources for specific turnels not Soar Franchasor's public Inflammature is the work of the LO Year Capital Inflammature is the work of the LO Year Capital Inflammature is the work of the LO Year Capital Inflammature is the work of the LO Year Capital Inflammature is the source of the Inflammature is the In  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>FireRighting Water<br>System<br>[July 17, 2019]  | F6 | Unless the City horsexes funding levels, it will be several decades (i.e., after the USSS predicts on or more nargie entitysakes will occur) before the southern parts of the City laws all high preciation, making covered, infamiliarly and entiting making the control of the City laws and the control of the City laws and the control of the City laws are southern to the control of the City laws and the control of the City laws are so that the control of the City laws and the City laws are so that the City laws | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Disagree, wholly          | Decidence about programming and funding<br>level of finnes SES bunch and other<br>provided finnes SES bunch and other<br>complementary sources that could support the<br>orpanision of the AWSS have yet to be made.   | R4<br>[for F6-F7]  | As loadern measure, by no later than I une 30,<br>2021, the City should burshase the 30 men.<br>PWSS hose tenders being requested by the<br>PWSS hose tenders being requested by the<br>SPG1, to replace and expand its currently<br>nadequate Inventory.  | Chief, San Francisco Five<br>Department<br>(September 15, 2019) | Requires further<br>analysis | The fire Department has been allocated (funding to packed for units through funds from the PT3-20 City budget and an allocated from the PT3-20 City budget and an allocation from the State. The Department is currently working with the Office of Contrave the contravent for hose tenders a multi-year term contract for hose tenders as not all-year term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for pocurement of the appearant. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and pricipit,   |
| Act Now Before It is<br>Too Late:<br>Too Late:<br>Aggressively Expand<br>and Enhance Out<br>High-Pressure<br>Emergency<br>Fireflydring Water<br>System<br>[July 17, 2019]                             | FJ | The existing Porable Water Supply System (PWSS) Investors in Indequase, Investing in more PWSS have trenders would provide a relatively quick, coal-flet/we histeriam means to improve procession of the southern and western parts of the City until a high-pressure, multi-sourcest, sell-mixally safe emergency water supply can be developed in those areas.  | Chef, San Francisco Pro<br>Department<br>(September 15, 2019)   | Agree with the finding    | The Fire Department has been allocated funding to purches the units brough funds from the PTI-3-DLT ky budget and an ellocated from the State. White the Department currenty has the elder have tenders greed-out throughout the Chip, whose new units are much more modern and provide the Department with a number of operational benefits, including the author of the provide the Department with a sumber of operational benefits, including the contraction of the current benefits of the Department with the contraction of the current when the provide the Department with the provide the Department with the provide such countries are supported and purchasite benefits water pumps and a 3,000 GPM provide budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget water pumps and sa 3000 GPM provided budget sa | R4.<br>(for F6-F7) | As Interim measure, by no later than fune 30, 2022, the City should purchase the 20 new PMVS hose tenders being requested by the STPD, to replace and engrad its currently inadequate inventory.  The SPPUC, the SFFD and the STP Department of  | Chef. San Francisco Pier<br>Department<br>(September 15, 2019)  | Requires further<br>analysis | The Fire Department has been allocated funding to packase five units through funds from the F13-20 City budget and an allocated from the F13-20 City budget and an allocated more than the state. The Department for currently working with the Office of Contract Administration to devote an amidity are term as a state of the state of  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | FB | Redundancy is an important feature of an<br>emergency firelighting water system.  | Chief, San Francisco Fire<br>Oepartment<br>[September 15, 2019] | Agree with tho<br>finding |  | R6<br>(for F8-F9)  | The SPRUC, the SFFD and the SF Department of<br>the Environment brould study adding salr-<br>water pump stations to Improve the<br>redundancy of water sources, especially on the<br>west side. Findings and recommendations from<br>this study should be presented to the Board of<br>Supervisors by no later than June 30, 2021.   | Chief, San Francisco Fire<br>Gepartment<br>(September 15, 2019) | Will be<br>implemented       | SFPUC and SFFD will complete this study by June 30, 2021.   |

| Act Now Before It is  | F9  | Current plans to extend protections to the   | Chilef, San Francisco Fire                                      | Disagree, partially | While It is true that the SFPUC and SFFO are   |                  | The SEPUC, the SEFD and the SE Department of  |                                    | Will be                 | SFPUC and SFFD will complete this study by   |
|---|-----|--|---|---------------------|--|------------------|---|------------------------------------|-------------------------|--|
| Too Late<br>Aggressively Expand<br>and Snhance Our<br>High-Pressure<br>Emergency<br>Emergency<br>Foreighting Waser<br>Special Park (1997)<br>(July 17, 2019)  |     | western par of the CIty do not Include amy high-<br>pressure water sources north of Golden Gate<br>Park.   | Department (September 15, 2019)                                 |                     | studying four potential water sources proposed to supply a potate PEVS on the west side of the City, which are not located nonth of Golden to start Park, which you means would reduce part Park, which we not located nonth of Golden Start Park, which you means would reduce part Park, which you want to be proposed to the Park Park Park Park Park Park Park Park  |                  | the Environment should study adding salf-<br>water purps station to fingment the<br>resolution of water sources, seedably on the<br>redundancy of water sources, seedably on the<br>redundancy of water sources, seedably on the<br>study should be presented to the Board<br>Supervisors by no leter than June 30, 2021.         | Opparment (September 15, 2019)     | inglemented             | June 30, 2021.   |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fixed Highling Water<br>(July 17, 2019)  | F10 | The "rollshifty score" being used by the SPIVL<br>impart an overly optimistic lempression of the<br>protection provided.   | Department (September 15, 7029)                                 | Diagree, partially  | role negotions areas; privaly were studies or y.  SPOIL and SPTO the by planning passed to be a planning passed to those defined by the SPTO for Initial alarm representations and the SPTO for Initial alarm representations are seen as the SPTO for Initial alarm (FRAQ), Probable fire demands were developed on the SPTO for Initial alarm representations of the SPTO for Initial alarm representation of the SPTO for Initial alarm representation of the SPTO for Initial alarm representation of the SPTO for Initial alarm representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the SPTO for Initial Representation of the Initial Representation   |                  | complete a more detailed savelyes of emorgency free[dipt] water needs [Individual above the median needs) by religiborhood, and not just by FAA and [b) prevents completed analysis to the Board of Supervisors by no later than June 30, 2021.   | Gepatrment<br>[September 15, 2019] | implomented             | June 30, 2021.   |
| Act Now Before it is Too Late: Too Late: Aggressively Epand and Enhance Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our High-Penner Our | F11 | The City does not have a simplifier to fund and complete development of a high-pressure, multi-sourced, esteroically sale emergency water supply for all parts of the City. Mulding the superance of the City. Mulding the superance of the City. Mulding the superance of the City. Mulding the superance of the City. Mulding the superance of the city of the superance of the city of the superance of th | Chief San Franckoo Fie<br>Department<br>(September 13, 2019)    | Gisagree, pardally  | The ETWA was built after the 1900 centinguisty and to location, primarily in the northeast, and to location, primarily in the centerious and to location, primarily in the centerious control of the majority of the notion of the majority of the notion primarily and public West have made critical improvements on the casting ETWA systems. Expanding the ETWA prior to ensuring that the desiring ETWA is reflected and follow enough laws controlled book employees and the existing ETWA systems. Expanding the ETWA prior to ensuring that the desiring ETWA for the Westalde of San Frencisco. The possible West was the prior to ensuring the expectation of the existing ETWA for the Westalde of San Frencisco. The possible West was been prior to the existing ETWA for the Westalde of San Frencisco. The possible waster systems to the Westalde not bringing waster systems to the Westalde neighborhoods in but well and the existing the exi   |                  | ·   |                                    |                         |  |
| Jack New Before It Is for Later New Texts of Later Agares/NeV Expand and Enhance Court High-Pressure Emergency Fireflighting Water System [July 17, 2019]   | F13 | In the 2025 MOU between the 25°C and the<br>5°PUL, the two agendes agreed to continue<br>joint and the state of the state of the state<br>joint and 5°C trainings annually, but there is no<br>formal protected underline specific [solid residence]<br>exercises or drifts using hypothetical distanter<br>scenarios, such as a major earthquake.   | Chel, San Francisco Five<br>Department.<br>[Saptember 15, 2019] | Disagree, particily | There are no formal protocol outsthring spedific<br>blink AWS searcies or drills in the Mo (II). Newexp, there are multiple opportunities to<br>the control of the control of the control of the control of the<br>start together during operation, maintenance, and construction of improvement projects for<br>the AWSS facilities as previously sectorized in<br>the response to the Grand Jury questions sent<br>in May 2015.  The SFFS and SFFUC have had multiple field a<br>starting apportunities during the meintenance<br>and starts-up estings of AWSS facilities in the last<br>SFPS and SFFUC have had multiple for the<br>starting apportunities during the meintenance<br>and starts-up estings of AWSS facilities in the last<br>SFPS and SFFUC have had multiple for<br>extractional starts and starting and starting approximation.<br>Full SFFUC and SFFU operatured (and starting and<br>Full SFFUC and SFFU operatured (and starting and<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting and<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting and<br>starting and starting and starting and starting and starting<br>starting and starting and starting and starting and starting and<br>starting and starting and starting and starting and starting and<br>starting a | R10<br>[for F13] | boxween the SPPUC and the SPFO choulds be ammeded to include a detailled readming for annual emergency response precises, including simulated disaster and entratusive deligible including the AWSS and the PWSS.   | Department [September 15, 2019]    | Will be                 | The Fire Department conducts weekly hossiphose harder dist hast it criters strough comparied throughout the CRy. The Fire Department will work with the SPPU in have them in attendance and particulate in three distillations. SPTU will also commit to weeking with the PUL to serve them in attendance and particulate in three distillations. SPTU will also commit to weeking with the PUL to senhance the scape of frequency of conditional control of the CRY of the CR |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High Precaure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  |     |  |   |                     |  | R9<br>[for F12]  | Se no later than December 31, 2000 the SPUC, with the addice an subject to the approach of the SPFQ, should (a) Invalence. Test practices for the maintenance of AWSS assets, not be read-to-which AWSS volves in the system are "critical," and, therefore, require men attention and priority in the SPPUC's maintenance plant. | Department                         | Has been<br>Implemented | Li SFILL Insidements "best paractises" for the minimum care of ANS sees the collaboration with SFIR, and consistent with the terms of the minimum care of ANS sees the notiliberation with SFIR, and consistent with the terms of the Moreanadium of Independent and Minimum Related to River Supply seems Related to River Supply seems Related to River Supply seems Related to River Supply seems Related to River Supply seems Related to River State Supply seems to Relate State 
| Report Title<br>[Publication Date]   | F#F | Finding [text may be duplicated due to spanning and multiple respondent offects]   | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agroe/Disagree) | Finding Response Text  | R#<br>[for F#]           | Recommendation<br>(text may be duplicated due to spanning and<br>multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text   |
|--|-----|--|--|--------------------------------------|--|--------------------------|--|--|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Ethanes Our<br>High-Pressure<br>Emergency<br>Fixelighting Water<br>System<br>(July 17, 2019)         | F6  | Unites the City Increases funding levels; I will be several decades [Lev., after the USS5 predicts one or more major earthquakes will occup before the southern parts of the City have a high-pressure, multi-sourced, seleminally, safe energency fireflighting water supply.   | City Administrator [September 15, 2019]              | Olsagree, wholly                     | Decisions about programming and hunding<br>levels of future ESE bands and other<br>complementary sources that could support the<br>organishm of the AWSS have yet to be made.  | R1<br>(for F1-F6)        | Resilience and Capital Planning should Jointy<br>recent to the Board of Supervisors a debiled<br>plan to cursue the City is well peopared to flight<br>little in all parts of Son Francisco in the event of<br>a 3006-magnitude (7.8) earthquisk.  | City Administrator<br>(September 15, 2019)           | Will be<br>Implemented                         | Ensuring but San Francisco has the Initiativities and inscreases to be well prepared to fight fires in all parts of San Francisco is benefit for firest fire in all parts of San Francisco is something that will be a Focus of the next 10-Year Capital Plan, For Administrative Code 3.00, that Plan must be submitted to the Mayor and Board no later than March 10 elected and-unambered year for approval in later than March 11 elected and-unambered year for approval in later than March 12 elected and-unambered year for spectrostation would be develored as part of that Plant's submission to enable holisos planning successful and the proposition of the San San San San San San San San San San  |
| Act New Before it is<br>Too Late:<br>Aggresolvely Espands<br>and Enhance Our<br>Before Committee of the<br>Energency<br>FineIghting Water<br>System<br>July 17, 2019 | F6  | Unless the City Increases funding levels, I will be several decaded in After the USSS predicts on or mire major extribusibles will occup before the southern parts of the City Yahava a Rollyn man and the City Yahava a Rollyn man and the City Yahava a Rollyn man and the City Man and City and the City of     | [September 15, 2019]                                 | Disagree, whelly                     | Decisions about programming and funding levels of future SEA bonds and other clevels of future SEA bonds and other complementary sources that could support the organization of the AWSS have yet to be made.  |                          | The plan discussed in Recommendation fit in<br>thould limitude a detailed proposal, including<br>liseaching sources, for the installation within 15<br>years of a high-pressure, multi-sourced, for<br>years of a high-pressure, multi-sourced, for<br>the plant of the plant of the plant of the<br>plant of the plant of the plant don't currently have<br>one, i.e., by no later than June 30, 2034.  | Clip Administrator<br>(September 15, 2019)           |  | The commitment of issures for specific used in specific lumination (Fas Francisco 2 public infestructure is the work of the ID-Terc capital infestructure is the work of the ID-Terc capital infestructure is the work of the ID-Terc capital infestructure is the commendation. I should be a supported in the commendation of the control of the commendation of the control of the commendation of the control of the commendation of the control of the commendation of the control of the commendation of the control of the co |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]         | F6  | Unless the City increases funding levels, it will be severel decade (i.g., a her the USS predicts one or more major earthquakes will occur) before the suschen parts of the City have a high-pressure, multi-coursed, selsmically safe emergency fire-fighting water supply.   | City Administrator<br>(September 15, 2019)           | Disagree, wholly                     | Decisions about pregramming and funding<br>levels of future ERR bonds and other<br>to predict the control of the control of<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.  |                          | By no later than lune 30, 2022, the Mayor and<br>the Board of Superivices should analyze<br>whether to propose a separate band for the<br>development of a high-pressure, multi-sourced,<br>selsmitally safe amergency water system for<br>those parts of the City Nation 4 and or currently have<br>one, with a target date of compelling<br>construction by no later than June 30, 2034.   | City Administrator<br>[September 15, 2019]           | Will be<br>Implemented                         | The analysis will be performed as part of the<br>(Gry 10 Year Captal Pland development<br>process. The next full update to the Capital Plan<br>will be submitted to the Mayer and Board not<br>later than March 1, 2021, for approval no later<br>than May 1, 2021.  |
| Act Now Before It Is<br>Too Late:<br>Too Late:<br>Aggressively Kanad<br>and Enhance Our<br>High-Pressure<br>Extellighting Water<br>System<br>[July 17, 2019]         |     | The City does not have a timeline to find and momphete development of a high-pressure, multi-coursed, solarmically safe emergency multi-coursed, solarmically safe emergency water supply for all parts of the City. Piculaing poor neighborhoods that historikally have not business district and many richer multiplication of the city was not provided to the course of the city of th | City Administrator<br>(September 15, 2019)           |                                      | The EFWs was built after the 1906 certification and its location, primarily in the nentheast portion of San Francisco, corresponds to the contact of the majority of the city's possible to contact of the majority of the city's possible to at that them. Since 2010, the SFWL SFWL SFWL and SFW to the contact of the majority of the city's possible to the contact of the majority of the city's provided to the contact of the conta | RS<br>[forF5,F6,<br>F11] | By no later than June 30, 2022, the Mayer and the Board of Superfices, should analyze whether to propose a separate bond for the development of a high-measure, multi-auroral, excellentative and the state of the st | CITy Administrator<br>(Responses 15, 2019)           |  | The analysis will be performed as part of the<br>Orig's 50°Fect pagin be development<br>process. The next full update to the Capital Pain<br>process. The next full update to the Capital Pain<br>will be submitted for be Mayor and Robin<br>to submitted to the Mayor and Robin<br>later than May 1, 2011, for approval no later<br>than May 1, 2021.  |

|  |    |  |  |                                      |                       | -                 |   |  |  |   |
|--|----|--|--|--------------------------------------|-----------------------|-------------------|---|--|--|---|
| Report Title<br>[Publication Date]   | FH | Finding (text may be duplicated due to spanning and multiple respondent effects) | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text | RN<br>[for F#]    | Recommendation (text may be duplicated due to spanning and multiple respondent effects) | Respondent Assigned by<br>CGJ<br>[Response Due Date]     | Recommendation<br>Response<br>(Implementation) | Recommendation Response Yext                                      |
| Act Now Bofore It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>Systom<br>[July 17, 2019] |    |  |  |                                      |                       | R6<br>[far F8-F9] |   | Department of the<br>Environment<br>[September 15, 2019] |  | Not applicable to the San Francisco Department of the Environment |

### Civil Grand Jury 2018-19 Report:

Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System

> John Scarpulla SFPUC



### What is the EFWS?

- Emergency Firefighting Water System (EFWS): A highpressure fire-suppression water system built after 1906 earthquake
- Ownership transferred to SFPUC in 2010
- SFFD is the end user: System improvements and expansion approved by SFFD, SFPUC, and Public Works

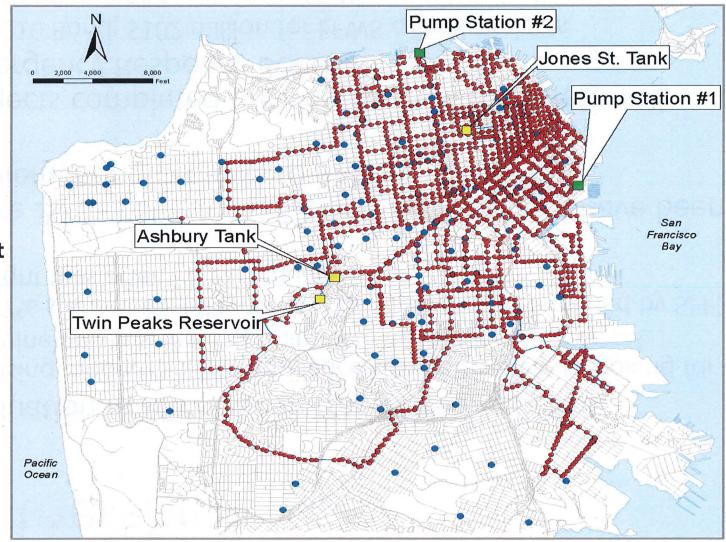
> Hydraulic Modeling utilized to guide decision making.





## Original EFWS Map

33
Seismically
Reliable
Valves
Throughout
System











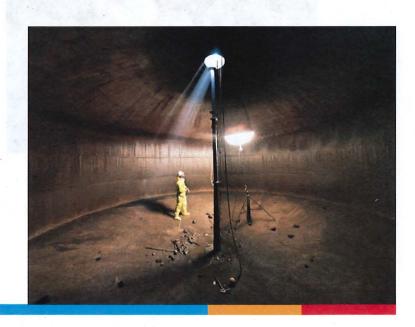
### Partnership

- > Evaluation of EFWS when transferred to SFPUC:
  - Using modern seismic resilience capability analysis looking for vulnerabilities, leading to immediate and future projects
  - 47% system reliability for median flow of water needed by SFFD to fight fires after 7.8 earthquake
- Since 2010 SFPUC, SFFD, and Public Works have been implementing projects to improve the EFWS.
- Projects completed utilizing Earthquake Safety and Emergency Response Bonds:
  - 2010 Bond: \$102 million for EFWS capital projects
  - 2014 Bond: \$54 million for EFWS capital projects



# Key ESER Projects Completed

- > EFWS Reliability upgrades at three primary source supplies:
  - > Twin Peaks Reservoir, Ashbury Heights Tank, and Jones Street Tank
- Replaced engines and installed remote control capabilities for Seawater pump station #1
- Installation of 30 new cisterns:
  - > 15 in the Sunset and Richmond districts
- Electronic Control Improvements
- 6 pipeline and tunnel projects



# Key ESER Projects Underway

- Seawater pump station #2
- > 19<sup>th</sup> Ave. Pipeline:
  - Bidding Feb 2020
- Ashbury Bypass Pipeline
- Clarendon Supply Pipeline
- > Irving St. Pipeline
- Terry Francois Blvd. Pipeline:
  - Phase 1: completed
  - Phase 2: Bidding 2019





### Development Projects

- Large Development Projects install EFWS pipes within their development boundaries.
- SFFD & SFPUC negotiate with Developers for projects outside of the development boundaries.
- > Mission Rock

Park Merced

Mission Bay

> Candlestick

Pier 70

- Hunters Point/Shipyard
- > Potrero Powerplant
- Executive Park
- Potrero Hope SF
- Visitation Valley
- > Sunnydale Hope SF
- > India Basin

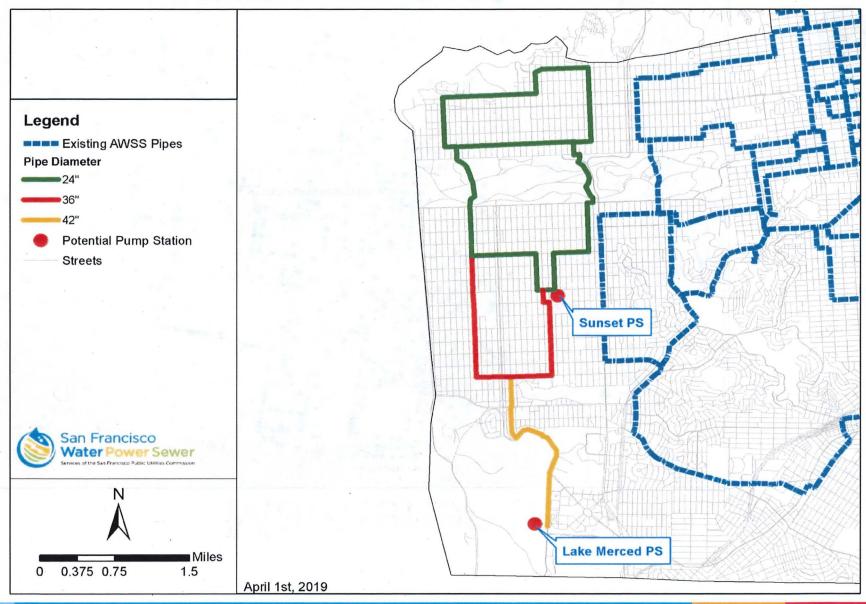


# Preliminary List of Potential Projects

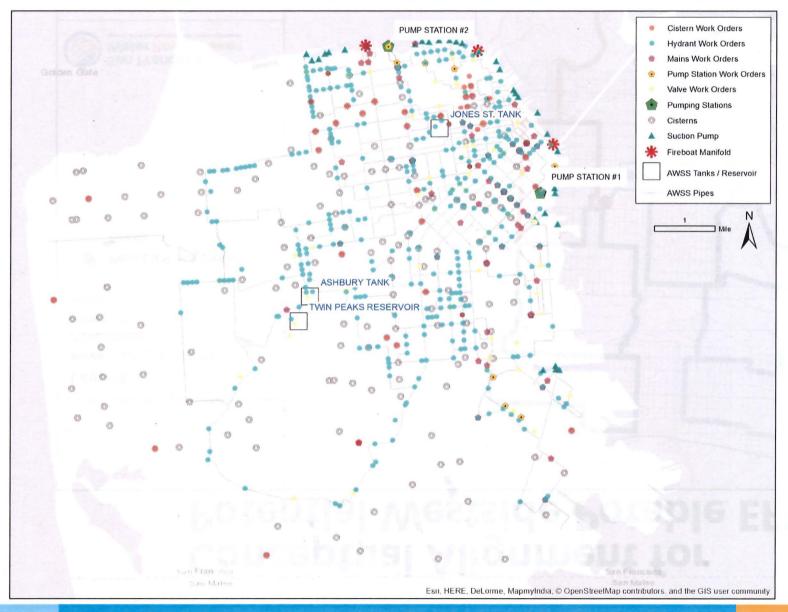
- Developed a preliminary list of potential projects that SFPUC and SFFD continue to develop and analyze
- > Preliminary projects range in scope:
  - Pipeline projects
  - New water sources
  - > Infirm area projects
- Citywide with a focus in areas that have limited access to the EFWS



#### **Conceptual Alignment for Potential Westside Potable EFWS**



### Maintenance Activities





### Moving Forward

- Continue to implement EFWS projects using remaining 2014 ESER Bonds: estimated completion end of 2021
- Continue to perform routine and high-quality maintenance on the EFWS to ensure it is in good working order: **ongoing**
- 5 Hose Tenders in FY19-20 Budget (4 in City Budget, 1 from State)
- Continue to conduct regular emergency response trainings with all applicable City agencies, while also working collaboratively to enhance the scope and frequency of trainings: ongoing
- Memorialize a detailed roadmap for annual emergency response exercises in SFFD-SFPUC Memorandum of Understanding: 6/30/2020



### Moving Forward Cont'd.

- SFPUC and SFFD complete seawater pump station study: 6/30/2021
- SFPUC to continue efforts to complete more detailed analysis of emergency firefighting water needs within neighborhoods: 6/30/2021
- Develop a robust and thorough plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 7.8 earthquake: 12/31/2021
- Quarterly presentations to SFPUC Citizen Advisory Committee and increased community meetings: ongoing



# EFWS in the Capital Plan

- > Recent Funding
  - > ESER 2010: \$102.4 million
  - > ESER 2014: \$54.1 million
- > FY2020-29 Capital Plan
  - > ESER 2020: \$153.5 million
  - > SFPUC Funds
  - Future ESER Funds







# Thank you







### **BOARD of SUPERVISORS**



City Hall 1 Dr. Carlton B. Goodlett Place, Room 244 San Francisco 94102-4689 Tel. No. 554-5184 Fax No. 554-5163 TDD/TTY No. 554-5227

DATE:

September 16, 2019

TO:

Members of the Board of Supervisors

FROM: Angela Calvillo, Clerk of the Board

SUBJECT:

2018-2019 Civil Grand Jury report, entitled

"Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-

Pressure Emergency Firefighting Water System"

We are in receipt of the following required responses to the San Francisco Civil Grand Jury report released July 17, 2019, entitled: "Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System." Pursuant to California Penal Code, Sections 933 and 933.05, named City Departments shall respond to the report within 60 days of receipt, or no later than September 15, 2019.

For each finding the Department response shall:

- 1) agree with the finding; or
- 2) disagree with it, wholly or partially, and explain why.

As to each recommendation the Department shall report that:

- 1) the recommendation has been implemented, with a summary explanation; or
- 2) the recommendation has not been implemented but will be within a set timeframe as provided; or
- 3) the recommendation requires further analysis. The officer or agency head must define what additional study is needed. The Grand Jury expects a progress report within six months; or
- 4) the recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

The Civil Grand Jury Report identified the following City Departments to submit responses (attached):

- Office of the Mayor:
  - Received September 16, 2019;
- General Manager of the San Francisco Public Utilities Commission: Received September 16, 2019;
- Public Utilities Commission:
  - Received September 11, 2019
- Fire Commission:
  - Received September 12, 2019;

Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Office of the Clerk of the Board 60-Day Receipt September 16, 2019 Page 2

- Fire Department: Received September 16, 2019; and
- City Administrator: Received September 16, 2019.
- Department of the Environment Received September 16, 2019.

These departmental responses are being provided for your information, as received, and may not conform to the parameters stated in California Penal Code, Section 933.05 et seq. The Government Audit and Oversight Committee will consider the subject report, along with the responses, at a hearing on September 19, 2019.

Honorable Garrett L. Wong, Presiding Judge Sophia Kittler, Mayor's Office Kanishka Karunaratne Cheng, Mayor's Office Andres Power, Mayor's Office Sally Ma, Mayor's Office Rebecca Peacock, Mayor's Office Jon Givner, Office of the City Attorney Ben Rosenfield, City Controller Todd Rydstrom, Office of the Controller Peg Stevenson, Office of the Controller Tonia Lediju, Office of the Controller Alisa Somera, Office of the Clerk of the Board Debra Newman, Office of the Budget and Legislative Analyst Severin Campbell, Office of the Budget and Legislative Analyst Reuben Holober, Office of the Budget and Legislative Analyst Jennifer Millman Tell, Office of the Budget and Legislative Analyst Rasha Harvey, 2018-2019 Foreperson, San Francisco Civil Grand Jury Lori Campbell, 2017-2018 Foreperson, San Francisco Civil Grand Jury

Naomi M. Kelly, City Administrator, Office of the City Administrator Lynn Khaw, Office of the City Administrator Brian Strong, Office of the City Administrator Debbie Raphael, Director, Department of the Environment Peter Gallotta, Department of the Environment Charles Sheehan, Department of the Environment Jeanine Nicholson, Chief, Fire Department Theresa Ludwig, Fire Department Stephen Nakajo, President, Fire Commission Maureen Conefrey, Fire Commission Harlan L. Kelly, Jr., General Manager, San Francisco Public Utilities Commission Juliet Ellis, San Francisco Public Utilities Commission John Scarpulla, San Francisco Public Utilities Commission Christopher Whitmore, San Francisco Public Utilities Commission Ann Moller Caen, President, San Francisco Public Utilities Commission Donna Hood, San Francisco Public Utilities Commission



LONDON N. BREED MAYOR

September 16, 2019

The Honorable Garrett L. Wong Presiding Judge, Superior Court of California, County of San Francisco 400 McAllister Street, Room 008 San Francisco, CA 94102-4512

Dear Judge Wong,

In accordance with Penal Code 933 and 933.05, the following is in response to the 2018-2019 Civil Grand Jury Report, Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System. We would like to thank the members of the 2018-2019 Civil Grand Jury for their interest in disaster preparedness and in improving the resiliency of our critical public safety infrastructure to provide robust emergency firefighting to all communities in San Francisco.

San Francisco continues to improve our City's resiliency each day through our ongoing investments in public infrastructure and equipment. Our Capital Planning Program coordinates much of these investments by conducting strategic long-term planning across major programs and projects, including the Emergency Firefighting Water System and Earthquake Safety and Emergency Response (ESER). The ESER bonds approved by voters in 2010 and 2014 have funded improvements to cisterns, pipelines, and critical public facilities that improve the City's ability to respond in emergencies and to fight fires. In addition, through the City's annual budgeting process, we will continue weighing resources to improve public safety and the operational readiness and emergency response capabilities of our departments. For example, our most recently adopted FY 2019-20 budget includes funding for five new hose tenders to replace and enhance the Fire Department's aging equipment.

In March 2020, the voters of San Francisco will once again vote on a new \$628.5 million ESER bond measure. Included in the proposal is an investment of an additional \$153.5 million for the Emergency Firefighting Water System.

We appreciate the opportunity to comment on the Civil Grand Jury report findings and recommendations. Moving forward, and as appropriate, the City plans to analyze many of the recommendations as part of our next 10-Year Capital Plan.

A detailed response from the Mayor's Office, City Administrator's Office, Fire Department, Public Utilities Commission, and the Department of the Environment is attached.

Each signatory prepared its own responses and is able to respond to questions related to its respective part of the report.

Indu Brown

London N. Breed Mayor

Harla & Wellyfr.

Harlan L. Kelly Jr. General Manager, Public Utilities Commission

Jeanine Nicholson Chief, Fire Department

Naomi Kelly City Administrator

Deborah Raphael Director, Department of the Environment

| Report Title<br>[Publication Date]  | F# | Finding (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#]    | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text   |
|---|----|--|--|--------------------------------------|--|-------------------|--|--|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, rown as the Auxillary Water Supply system (NWSS), does not over large barst of Supprivation Iboritists 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  | Mayor<br>(September 15, 2019)                        | Agree with the finding               | The SFPLC, SFPD, and San Francisco Public Works (SFPV) are committed to nicreasing fire protection throughout San Francisco. Since the protection throughout San Francisco. Since the passage of the first Earthquake Safeky and Emergency Response Bond in 2010, the three spanices have been implementing projects to improve the AWSS system's seemin crelability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies with continue to develop and the committee of the city would be a seeming the continue to develop and continue to develop | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SPDLY, the SPTL, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all grants of an Francisco in the event of a 1506-magnitude (7.8) earthquake.              | Mayor<br>[September 15, 2019]                        | Will be implemented                            | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10 Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 10 each odd-numbered year for approval no later than March 10 each odd-numbered year for approval no later than March 10 each odd-numbered year for approval no later than March 10 each odd-numbered year for approval no later than March 10 each odd-number of the March 10 each of the March 10 each of the March 10 each of the March 10 each of the March 10 each of the March 10 each of the March 10 each 1 |
| Act Now Before It Is Too Late: Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Freelighting Water System (July 17, 2019)                | F4 | The City's high-pressure emergency water supply system, novan as the Auxillany Water Supply system (NWSS), does not over large parts of Supprivation (Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, three districts are not allegative protected from these after a major earthquake. | Mayor (September 15, 2019)                           | Agree with the finding               | The SPEUC, SPED, and San Francisco Public Works (SPPV) are committed to increasing fire protection throughout San Francisco. Since the protection throughout San Francisco. Since the protection throughout San Francisco. Since the protection of the Section | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, estimically safe energency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.                  | Mayor [September 15, 2019]                           | Requires further analysis                      | The commitment of sources for specific uses on specific timelies for San Francisco's public infrastructure is the work of the 10-Year Capital infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planting process for the capital planting process the capital planting process the capital planting process the capital planting for medical capital plan has longstanding funding principles to guide the prioritizen challenges. The Capital Plan has longstanding funding principles to guide the prioritizen of public infrastructure investments. These investments are tiered: (1a) advance public safety and enhance resilience; (3) advance planted and programmatic needs, and of promote such planting the process of the capital Plan and these that follow, the capital Plan and these that follow, the capital Plan and these that follow, the capital Plan and these that follow, the capital Plan and these that follow, for the Capital Plan and these that follow, for the Capital Plan and these that follow, for the Capital Plan and these that follow, for the Capital Plan and these that follow, for the Capital Plan and these that follow, for the Capital Planting process and itself yourse to advance those priorities. Committing to entirely funding a single program and identify cornect and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely crast estignificant vulnerabilities elsewhere in the portfolio.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | FS | A high-pressure, multi-sourced, seismically see mergency freelings water supply to be costly but is essential to protect the City.   | Mayor<br>(September 15, 2019)                        | Agree with the finding               | As the CRY considers what is essential to protect San Francisco, it is important to acknowledge our multiple, compiler resilience shellenges. These challenges are documented in the Reallienges are documented in the Mellienges are documented in the Mellienges. The CRY continues are represented in the 10-Year Capital Plan (last updated 2019). Here challenges are updated 2019, Here challenges are the public of the CRY and the | R1<br>[for F1-F6] | Sy no laster than December 31, 2020, the Mayor, the SPEUP, the SPFIQ, the SPFIQ, and the Office of Resilience and Capital Planning should jointly present to the Beard of Supervisors a deligible plan to ensure the CIV is well prepared to flight fires in all parts of Son Francisco in the event of a 1506-magnitude (7.8) earthquake. | Mayor<br>[september 15, 2019]                        | Wil be   | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a Gous of the next 10 Year Capital Plan. Per Administrative Code 3.00, that Plan must be submitted to the Mayor and Board no later than March 10 each odd-numbered year for approval no later than March 20 each odd-numbered year for approval no later than March 20 each odd-numbered year for approval no later than March 20 each odd-numbered year for approval no later than March 20 each odd-number of work of the code of the co |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019]                         | FS | A high-pressure, multi-sourced, seimincally safe emergency freeling water supply to be costly but is essential to protect the City.  | Mayor<br>(September 15, 2015)                        | Agree with the finding               | As the CRY considers what is essential to protect San Francisco, it is important to acknowledge our multiple, compiler resilience valuelineges. These challenges are documented in the Realliences are documented in the Realliences are accounted to the transpire (Total) and underlient set strategy (CRIOS) and underlient set strategy (CRIOS) and underlient set strategy (CRIOS) and underlient set of the CRIOS and the CRIOS are also as a set of the CRIOS and the CRIOS are also as a set of the CRIOS and the CRIOS are also as a set of the CRIOS and the CRIOS are also as a set of the CRIOS a | R2<br>[for F1-F6] | The glan discussed in Recommendation £1 and a should include a detailed proposal, including financing sources, for the installation within 5 years of a high-pressure, multi-sourced, seismically safe energency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.             | Mayor<br>(september 15, 2019)                        | Requires further analysis                      | the commitment of sources for specific uses on<br>specific timelines for San Francisco's public<br>infrastructure is the work of the 10-Year Capital<br>Plan. The plan discussed in Recommendation 1<br>will be acknowledged in the Capital Plan, and<br>based on analysis, will be done on the capital<br>plan timeline. The capital planning process<br>gathesis, documents, and balances planned<br>funding for needs across the public<br>landing for needs across the public<br>plan has longstanding funding principles to<br>guide the prioritization of public infrastructure<br>investments. These investments are tiered: (1a)<br>address legal and/or regulatory mandates; (2)<br>ensure public safety and enhance resilience; (3)<br>address legal and promote sustainability; (4)<br>advance planned and programmatic needs, and<br>projects and programs and identify sources to<br>advance those priorities. Committing to entirely<br>projects and programs and identify sources to<br>advance those priorities. Committing to entirely<br>funding a single program out of context and<br>without regard for the trade-offs of that<br>commitment would be out of step with the<br>City's longstanding and highly regarded capital<br>planning process and likely create significant<br>vulnerabilities desewhere in the portfolio.  |

| Act Now Before It Is Too Late:  Aggressively Expand and Enhance Our High-Pressure High-Pressure Fixed Part of the | FS  | A high-pressure, multi-sourced, seismically safe emergency fireflighting water supply will be costly but is essential to protect the City.  | Mayor<br>[September 15, 2019] | Agree with the finding | As the City considers what is essential to protect San Francisco, it is important to acknowledge our mittple, complex resilience challenges. These challenges are documented challenges. These challenges are documented to the Realized States() 2003 and underline as represented in the 10-rear Capital Plan (but updated 2019). Here challenges are: Earthquakes, Sea Level Rise/Climate Change, danging infrastructure, unsfordedablity, and Social inequity. All of these challenges represent continues of the control of the | R8<br>[for F5, F6,<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-source for the development of a high-pressure, multi-source for the City with the propose of the City o | Mayor<br>[September 15, 2019] | Will be implemented          | The analysis will be performed as part of the Ciry's 10-Year Capital Plan development process. The next full update to the Capital Plan will be submitted to the Mayor and Board not later than March, 2021, for approval no later than March, 2021, f |
|---|-----|---|-------------------------------|------------------------|--|----------------------------|--|-------------------------------|------------------------------|--|
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6  | Unless the City Increases funding levels, it will be several decades its., after the 1955 set, its will be several decades its., after the 1955 set one or more major earthquakes will occur) before the southern parts of the City have a high pressure, multi-sourced, seismically safe emergency fireflighting water supply. | Mayor<br>(September 15, 2019) | Disagree, wholly       | Decisions, about programming and funding<br>levels of future SES bonds and other<br>complementary sources that could support the<br>separation of the AWSS have yet to be made.  | R1<br>[for F1-F6]          | Synol size than December 31, 2000, the Major, the SFPUC, the SFF1, and the Office of Resilience, and Capital Planning should jointly present to the Board of Supervisors a design size as some size of Supervisors a design size on some the City is well prepared to flight free; and jarst of Sun Francisco in the event of a 1906-magnitude (7.8) earthquake.   | Mayor<br>[September 15, 2019] | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to flight fires in all parts of San francisco is something that will be a focus of the next 10 Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 10 dech od-dnumbered year for approval no later than March 10 dech od-mumbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City andit Synt project and timeline until the ESER 2020 plan passes. For this reason, the City will synt for this reason, the City will synt fin, an prohibact the timeline to December 31, 2021.   |
| Act Now Before It is Too Late: Aggressively Expand and Enhance Out High-Pressure Emergency Fireflighting Water System [July 17, 2019]   | F6  | Unless the City increases funding levels, it will be several decades it, after the USSS predicts one or more major earthquakes will occup before the southern parts of the City have a high-pressure, multi-ourred, seismically safe emergency fireflighting water supply.  | Mäyor<br>[September 15, 2019] | Disagree, wholly       | Decisions about programming and funding<br>levels of future ESE bonds and other<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.  | R2<br>[for F1-F6]          | The glan discussed in Recommendation R1 about linclude a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, estimically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Mayor<br>(September 15, 2019) | Requires further<br>analysis | The commitment of sources for specific uses on<br>specific timelines for San Francisco's public<br>infrastructure is the work of the 10-Year Capital<br>Plan. The plan discussed in Recommendation 1<br>will be acknowledged in the Capital Plan, and<br>based on analysis, will be done on the capital<br>plant timeline. The capital planning process<br>gathers, documents, and balances planned<br>funding for needs across the public<br>infrastructure portion and across San<br>Francisco's resilience challenges. The Capital<br>Plan has longstanding funding principes to re-<br>investments. These investments are tiered: (1)<br>advance public safety and enhance resilience; (3)<br>ensure public safety and enhance resilience; (3)<br>ensure public safety and enhance resilience; (3)<br>preserve assets and promotes sustainability; (4)<br>advance planned and prongrammatic needs; and<br>(3) promote economic development. In the<br>next 10-Year Capital Plan and those that follow,<br>the City will continue to analyze princit to<br>advance those protries. Committing to entirely<br>funding a single program out of context and<br>without regard for the trade-offs of the<br>City's longstanding and highly regarded capital<br>planning process and likely creat esignificant<br>vulnerabilities elsewhere in the portfolio.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6  | Unless the City increases funding levels, it will be several decades (i.e., after the USGs predicts one or more major earthquakes will occur) selfore the southern parts of the City have a high-pressure, multi-borrect, desirably safe energiency freelighting water supply.  | Mayor<br>[September 15, 2019] | Disagree, wholly       | Decisions about programming and funding<br>levels of future EER bonds and other<br>complementary owners that could support the<br>expansion of the ANYSS have yet to be made.  | R4<br>[for F6-F7]          | As interim measure, by no later than June 30, 2012, the first should purchase the 20 new YMSS hose tenders being requested by the 97th, or explace and expand its currently inadequate inventory.  | Mayor<br>(September 15, 2019) | Requires further<br>analysis | The Fire Department has been allocated funding to purchase five units through funds from the FT3-0 (c) thought and an allocation from the FT3-0 (c) throught and an allocation from the size. The Department is currently sent to the size of the size |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6  | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, sebincially safe emergency firefighting water supply.  | Mayor<br>[September 15, 2019] | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  | R8<br>(for F5, F6,<br>F11) | By no later than lune 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, sesmically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  | Mayor<br>[September 15, 2019] | Will be<br>implemented       | the analysis will be performed as part of the<br>City's 10-Year Capital Plan development<br>process. The neat full update to the Capital Plan<br>will be submitted to the Mayor and Board not<br>later than March 1, 2021, for approval no later<br>than May 1, 2021.  |
| Act Now Before It Is Too Late: Too Late: Aggressively Expand and Enhance Out- High-Pressure Emergency Fireflighting Water System [July 17, 2019]  | F11 | The City does not have a bimilite to find and complete development of high-pressure, multi-sourced, setsmically safe emergency water supply for all pains of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.          | Mayor<br>(September 15, 2019) | Disagree, partially    | The FTVS was built after the 1900 earthquist and its location, primarily in the northeast portion of 3sh Francisco, corresponds to the contained of the majority of the city's population at that time. Since 2010, the sFTVC, SFTD, and Public Works have made critical improvements to the existing ETVS system. Expanding the 1905 prior to ensuring that the existing ETVS is resilient and reliable would have contradicted best engineering practices. The SFTVC critical SFTVD are developing plans that would implement a few for the strength of the  | R8<br>[for F5, F6,<br>F11] | Syno later than June 30, 2022, the Mayor and the Board of Sperious should analyse whether to propose a separate bond for the whether to propose a separate bond for the development of a high-pressure, multi-ourzed, ssimically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  | Mayor<br>[September 15, 2019] | Will be implemented          | The analysis will be performed as part of the CDY's 10-Year Capatile Paid evelopment process. The next full update to the Capital Pland well-open will be submitted to the Mayor and Board not later than March 1, 2021, for approval no later than May 1, 2021.   |

| Report Title<br>[Publication Date]  | FII | Finding (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date]                                     | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#]    | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date]                                     | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text   |
|---|-----|--|--|--------------------------------------|--|-------------------|--|--|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Frefighting Water<br>System<br>[July 17, 2019]   | F1  | Fires resulting from an earthquake represent a<br>significant risk of the despread damage and<br>potential loss of life in San Francisco.  | General Manager, San<br>Francisco Public Utilites<br>Commission<br>[September 15, 2019]  | Agree with the finding               |  | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SPDLP, the SPTLP, the SPTLP, and the Office of Resilience and Capital Planning should jointly present to the Beach of Supervisors a detailed join to ensure the CIV is well prepared to flight fires in all parts of Son Francisco in the event of a 1906-magnitude (7.8) earthquake.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Will be implemented                            | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than Mays 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience Amelineges. Updates available on this timeline would be found to make the state of the submission of the San San San San San San San San San San   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019] | F1  | Fises resulting from an earthquake represent a<br>significant risk of discoprend damage and<br>potential loss of life in San Francisco.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Agree with the finding               |  | R2<br>[for F1-F6] | The plan discussed in Recommendation 11 should include a detailed proposal, including financing sources, for the installation within 52 years of a high-pressure, multi-sourced, sestimically safe emergency water system for those parts of the Cyth and on't currently have one, i.e., by no later than June 30, 2034.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Requires further analysis                      | The commitment of sources for specific uses on specific timeles of Soa Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gasthers, documents, and balances planned funding for needs across the public infrastructure portion and across Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered; 13) address legal and/or regulatory mandates; (2) ensure public cafety and enhance resilience; (3) advance public safety and enhance resilience; (3) advance planned and programmatic needs; and (3) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze prioritis. Committing to entirely advance those profirms. Committing to entirely without regard for the trade-offs of that commitment would be out of size with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.   |
| Act Now Before It is<br>Too late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fredighting Water<br>System<br>[July 17, 2019]   | F2  | The municipal water supply system (MWSS) is<br>highly windreable obtained from a major<br>earthquake and is not a reliable source for<br>water supply for firefighting after a major<br>earthquake.  | General Managor, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Disagree, partially                  | The NMS has been significantly upgraded in the bast 15 years frough the Water Special to the bast 15 years frough the Water Special to the bast 15 years frough the Water Special to Part 10 years of the Special to the |                   | By no later Than Dicember 31, 2003, the Major, the STPUE, best Type the Defice of Reciliance and Capital Falaning should jointly present to the Beaut of Supervisors a deligible plan to ensure the City is well prepared to flight free; hall glant 5 of an Francisco in the event of a 1905-magnitude (7.8) earthquake.  | General Managor, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Will be implemented                            | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later han March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The city cannot discoss the project scan for the properties of the propert |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Preefighting Water System (July 17, 2019)                          | F2  | The municipal water supply system (NWSS) in highly valuerable to damage from a major aarthquake and is not a reliable source for water supply for firefighting after a major earthquake.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Disagree, partially                  | The MWSS has been significantly upgraded in the last 15 years frough the Water Supply Improvement Program (WSP) initiated by the SPUCL. The galot of WSP included to reduce valine ability of the water system to damage from earthquakes and increase overall water system reliability. There were 25 in city projects with the water system of the water system of the water system of the water system in the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's science reliability and resiliency. Additionally, it is unique because the WSP utilized a 7.8 magnitic earthquake as its sesmic Level of Service.  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-source, described the plan of the Custom (and the continued of the continued | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Requires further analysis                      | The commitment of sources for specific uses on specific users on specific users on specific users on specific specific spublic infrastructure is the work of the 1D-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timelite. The capital planning process of the plan discussed in the capital plan discussed in the capital plan discussed in the capital plan discussed in the capital plan discussed in the capital plan discussed in the capital plan has discussed in the capital plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (13) address legal and/or regulatory mandets; (2) ensure public safety and enhance resilience; (3) advance planned and programmatic needs; and (3) promote economic development. In the capital plan discussed in the capit |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Freelighting Water<br>System<br>[July 17, 2019]  | F4  | The City's high-pressure emergency water<br>supply system, nown as the Audilary Water<br>Supply System (AWSS), does not cover large<br>super of Supervisional Districts 1, 4, 7 and 11,<br>roughly one-third of the City's developed area<br>of a result, these districts are not adequately<br>protected from fires after a major earthquake. | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Agree with the finding               | The SFPLC_SFTD, and San Francisco Public Works (SFPV) are committed to accessing five protection throughout San Francisco. Since the passage of the first Earthquake Selfey and Emergency Response Bond in 2010, the three spancies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Financing the AWSS system's seismic reliability and range of coverage: Enhancing the AWSS system's Seismic reliability and range of coverage. Enhancing the AWSS system's Seismic reliability and range of coverage. Enhancing the AWSS system's Seismic reliability and range of coverage. Enhancing the AWSS supplementation of fineds to do so. The three agencies will continue to develop and variety of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the AWSS system's Seismic reliability and range of the SWS system's Seismic reliability and range of the SWS system's Seismic reliability and range of the SWS system's SwS system' | R1<br>[for F1-F6] | By no later than December 31, 2003, the Major, the SPUP, the SPTD, on the Office of Redillence and Capital Flaming should jointly present to the Board of Supervisors a deligible plan to ensure the City is well prepared to flight free; sail glast of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Will be<br>Implemented                         | Ensuring that San Francisco has the infrastructure and rosources to be well prepared to fight fires in all parts of San Francisco is Something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 10 desh odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning that the properties of the properties of the properties of the properties and timeline until the SER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Autillary Water Supply system (MSS), does not cover give parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed and As a result, these districts are not adequately protected from fires after a major earthquake. | General Manager, San<br>Francisco Public Utilities<br>commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPV) are committed to increasing five protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's sestimic religious and range of coverage. Enhancing the AWSS range of coverage of coverage at all areas of the City would require the allocation of funds to do so. The three agencies will remove upon the residence of the service of the control of the service of the control of the service of the control of the service of the control of the service of the control of the service of the control of the service of the control of the service of the control of the service of the control of the service of the serv | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including flanding source, for the installation within 15 years of a high-pressure, multi-sourced, sestimically safe engreency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Requires further analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital planning process gathers, documents, and balances planned unding for needs across the public infrastructure portfolio and across San Prancisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tered; (1) address legal and/or regulatory manaless. (2) ensure public sallerly and enhance resilience; (3) growned seator and promose sustainable; (4) ensure public sallerly and enhance resilience; (3) growned seator and promose sustainable; (4) ensure public sallerly and enhance resilience; (3) growned economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority concepts and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.  |
|--|----|---|--|------------------------|--|-------------------|---|--|---------------------------|--|
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | B  | A high-pressure, multi-sources, estimically as the emergency friending water supply will be costly but is essential to protect the City.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Agree with the finding | As the City considers what is essential to protect San Francios. It is important to acknowledge our multiple, complex resilients callenges. The callenges are documented in the Reallenges are documented in the Reallenges are documented in the Reallenges. The consideration of the Control of t |                   | By no later than December 31, 2020, the Major, the SPPUC, the SPTO, and the Office of Resilience and Capital Planning should jointly office and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fire; and plant of San Francisco in the event of a 1306-magnitude (7.8) earthquake. | General Manager, San<br>Trandsso Public Utilities<br>Commission<br>(September 15, 2015)  | Will be implemented       | crisuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 1.0 Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Major and Board no later than March 1 of each od-numbered year of approval no later than March 1 of each od-numbered year of approval no later than March 1 of each od-numbered year of approval no later than March 1 of each od-numbered year of approval no later than March 1 of each od-numbered year of approval no later than March 2 the year of approval no later than March 2 the year of approval and the same of the profession of the year of year of years of the year of years of the year of years o |
| Act Now Before It Is Too Late: Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Emergency Expending Water System [July 17, 2019]        | FS | A high-pressure, multi-sourced, estemically as the emergency friending water supply will be costly but it is essential to protect the City.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Agree with the finding | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, compiler resilient callenges, the callenges are documented in the Resilient 5's strategy (2015) and underlied the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last Esthewakes, See Level RiscyClimate Change, Aging Infrastructure, Unaffordability, and Social Insulput, All of these challenges represent meaningful threats to San Franciscans, their opporty, and their ability to make all file in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make prostructured to the control of the fact of the standard of the control of the standard of the control of the standard of t | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-phesix multi-sourced, estemically safe emergency water system for those parts of the Cybra don't currently have one, i.e., by no later than June 30, 2034.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Requires further analysis | The commitment of sources for specific uses on specific timelies for San Francisco, public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process studies of the capital plan timeline. The capital planning process should be capital plan timeline. The capital planning process should be capital plan timeline. The capital planning process should be capital plan has longstanding fundamental plan timeline. The capital planning process to guide the prioritizen challenges. The Capital Plan has longstanding funding principles to guide the prioritizen of public infrastructure investments. These investments are tiered: (1) advance public safety and enhance resilience; (3) reserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote connomic development. In the next 10-Year Capital Plan and those that follow, registed may forgorise and dentify sources to advance those priorities. Committent to context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades [e.g., after the USS of the cone or more major earthquakes will occup before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.   | Francisco Public Utilities<br>Commission<br>(September 15, 2019)                         | Disagree, wholly       | Decisions about programming and funding levels of future ESF bands and other levels of future ESF bands and other complementary sources that could support the expansion of the AWSS have yet to be made.  |                   | By no later than December 11, 2020, the Mayor, the SPUC, the SPIC, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a decipied plan to ensure the City is well prepared to flight fires in all pasts of San Francisco in the event of a 1006-magnitude (7.8) earthquake.  | Francisco Public Utilities<br>Commission<br>[September 15, 2019]                         | Will be<br>implemented    | Insuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than Mays. 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be fused to the submission of the San San Francisco's part of that plan for the submission of the San San Francisco's resilience challenges. Updates available on this timeline would be fused timeline until the SER 2020 plan passes. For this reason, the City will sync this commendation with the Capital Plan, and push back the timeline to December 31, 2021.  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>System<br>[July 17, 2019]                       | F6 | Unless the City increases funding levels, I will be several decades [i.e., after the USSS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, sesmically safe emergency fireflighting water supply.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Disagree, wholly       | Decisions about programming and funding levels of Inture ESE bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | R2<br>[for F1-F6] | The plan discussed in Recommendation R1<br>housed include a delayed proposal, including<br>financing sources, for the installation within 15<br>years of a high-phere, multi-sourced,<br>seismically safe emergency water system for<br>house parts of the Cybra don't currently have<br>one, i.e., by no later than sune 30, 2034.                                   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Requires further analysis | The commitment of sources for specific uses on specific timelies for San Francisco public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital season of the capital Plan, and based on analysis, will be done on the capital infrastructure, so the capital plan and season of the capital plan and season of the capital plan and season seaso |

|  | F8  | D-44 1 146   | Consultations Con  | A (tab. ab             |   | R6                | The CERTIC AND CERTIFICATION OF December 1   | C  | Will be                | SFPUC and SFFD will complete this study by   |
|--|-----|--|--|------------------------|---|-------------------|--|--|------------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]   | PS  | Redundancy is an important feature of an<br>emergency fireflighting water system.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Agree with the finding |   |                   | The SFPUC, the SFP and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.   | Francisco Public Utilities<br>Commission   | will be<br>implemented | SPUL and SH10 will complete this study by June 30, 2021.   |
| Act Now Before It Is Too List. Too L | F9  | Current plans to extend protections to the wastern part of the City do not include any high pressure water sources north of colden Gate Park.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2019) | Deagree, partially     | While it is true that the SFPUC and SFPD are studying flour potential water accuracy proposed studying flour potential water accuracy proposed studying flour potential water accuracy proposed for City, which are not obseled noth of Golden Gate Park, which by no means would reduce the proposed system's resiliency, reliability, performance, or ability to provide abundant high-pressure water for resuppression to the Richmool Buttird after a sessinic event. San Francisco is unique in that there are 11 in-city reservoirs, with a total water capacity of approximately 43 (20,000) gailon to the control of the proposed system's proposed system of the Westside of San Francisco that is included an adultional approximately 43 (20,000) gailon per minute pump some control of the proposed system of the Westside of San Francisco that is, and control of the San San San San San San San San San San  | R6<br>[for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt- terms of the SFPUC, the SFPUC and the SFP | Francisco Public Utilities<br>Commission<br>[September 15, 2019]                         | Will be implemented    | SPPUC and SPFD will complete this study by June 30, 2021.  |
| Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Emergency Fireflighting Water System [July 17, 2019]  | F10 | The "reliability scores" being used by the SFPUC<br>impart an overly optimistic impression of the<br>protection provided.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Diagree, partially     | Fine Reprome Areas (FRA) were utilized by SPEVL and SPEI to the planning study CS-199. This study divided the City into areas based on those defined by the SPEI for Initial standard response and were called Fire Response Areas and were called Fire Response Areas (SPEA). Probable fire demands were developed for each FRA using 1000 sets of fire demands sequented by Charles Sewhorth, PhD using a Monte Carlo analysis of fire ignitions and fire specific and analysis of fire ignitions and the specific sequented by Charles (SPEA). Probable fire Areas (SPEA) and SPEA (SPEA) a  | R7<br>[for F10]   | The SFPL/Should (a) continue its efforts to complete amore detailed analysis of emergency fireflighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>(September 15, 2015) | Will be implemented    | SFPUC and SFFD will complete this analysis by June 30, 2021.   |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Friedpling Water System [July 17, 2019]   | F11 | The City does not have a timeline to fund and complete development of a high-present of the complete development of the complete of th | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] | Diagree, partially     | The ETW was built after the 1906 earthquake and its location, promarily in the northeast portion of San Francisco, corresponds to the location of the majority of the city's population at that time. Since 2010, the STPUC, STPD, and Public Worsh have made critical improvements to the existing ETWS system. Expanding the PURS yipit or essenting ETWS systems, paparing the STPUC and STPU and S  |                   |  |  |                        |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Tressure Emergency Freelighting Water System [July 17, 2019]   | F12 | The SFPL Chas not developed a number of the countiem maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AVRS valves are "Critical" and therefore require increased attention.   | General Manager, San<br>Francisco Public Utilites<br>Commission<br>[September 15, 2019]  | Disagree, wholly       | Since taking over maintenance responsibilities,<br>SPIPUL has completed spillificant maintenance<br>activities. For example, on a monthly basis, staff<br>from the SPIPUL exist both Pump Station of 1 and<br>Pump Station 82. There are 6 maintenance<br>teachmentations provided in the CS-199 study<br>as shown below in Table 7-1 from CS-199. The<br>saintenance places recommended in the report<br>or has determined the recommended<br>maintenance practice in not necessary (i.e.<br>flushing of a non-postable water system).<br>Maintenance Recommendations, CS. 199 Task<br>11 The:<br>Maintenance Recommendation 1: Confirm that<br>all AMSS assets are entered into COTO saset<br>at AMSS and the saintenance and<br>SPIPUL Responser. All AMSS is are set boottons are<br>entered into COTO shade on<br>SPIPUL Responser. All AMSS is also in 2 Perform<br>Maintenance Recommendation 2: Perform<br>SPIPUL Responser. All AMSS is also in SPIPUL Maximo<br>misternance Percommendation 3: Check, flush<br>maintenance and testing<br>SPIPUL Responser. All continues are<br>settlementance places.<br>Maintenance and testing<br>SPIPUL Responser. According to SPIPUL Maximo<br>maintenance places in<br>maintenance and testing is performed in<br>accordance with maintenance plans.<br>Maintenance. Recommendation 3: Check, flush<br>Maintenance. Recommendation 3: Check, | R9<br>[for F12]   | By no later than December 31, 2020 the SPPU.  With the advice and subject to the approach the SPFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "Critical," and, therefore, require menury attention and priority in the SPPUC's maintenance plans.   | Francisco Public Utilities   | Has been implemented   | (a) SFPLC implements "best practices" for the maintenance of ANSS sasest in collaboration with SFD, and consistent with the terms of the Memorandum of Inderstanding Regarding Operation and Maintenance of San Francisco Water Supply systems Related to FSF Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFP Suppression (MOU), SFPLC will seek SFPLC suppression (MOU), SFPLC will seek SFPLC will seek SFPLC suppression (MOU), SFPLC will seek seek SFPLC will see |

| Act Now Before It Is | F13 | In the 2015 MOU between the SFFD and the        | General Manager, San       | Disagree, partially | There are no formal protocol outlining specific     | R10       |  | General Manager, San       | Will be     | SFFD and SFPUC will work together to amend |
|----------------------|-----|---|----------------------------|---------------------|---|-----------|--|----------------------------|-------------|--|
| Too Late:            |     | SFPUC, the two agencies agreed to conduct       | Francisco Public Utilities |                     | joint AWSS exercises or drills in the MOU;          | [for F13] | between the SFPUC and the SFFD should be       | Francisco Public Utilities | implemented | the MOU by June 30, 2020.                  |
| Aggressively Expand  |     | joint AWSS trainings annually, but there is no  | Commission                 |                     | however, there are multiple opportunities to        |           |  | Commission                 |             |  |
| and Enhance Our      |     | formal protocol outlining specific joint AWSS   | [September 15, 2019]       |                     | train together during operation, maintenance,       |           | annual emergency response exercises, including | [September 15, 2019]       |             |  |
| High-Pressure        |     | exercises or drills using hypothetical disaster |                            |                     | and construction of improvement projects for        |           | simulated disaster and earthquake drills       |                            |             |  |
| Emergency            |     | scenarios, such as a major earthquake.          |                            |                     | the AWSS facilities as previously described in      |           | involving the AWSS and the PWSS.               |                            |             |  |
| Firefighting Water   |     |   |                            |                     | the response to the Grand Jury questions sent       |           |  |                            |             |  |
| System               |     |   |                            |                     | in May 2019.  |           |  |                            |             |  |
| [July 17, 2019]      |     |   |                            |                     |   |           |  |                            |             |  |
|                      |     |   |                            |                     | The SFFD and SFPUC have had multiple field          |           |  |                            |             |  |
|                      |     |   |                            |                     | training opportunities during the maintenance       |           |  |                            |             |  |
|                      |     |   |                            |                     | and start-up testing of AWSS facilities in the last |           |  |                            |             |  |
|                      |     |   |                            |                     | 5 years. For example, on December 20, 2018,         |           |  |                            |             |  |
|                      |     |   |                            |                     | SFFD and SFPUC personnel conducted                  |           |  |                            |             |  |
|                      |     |   |                            |                     | emergency generator start-up procedures for         |           |  |                            |             |  |
|                      |     |   |                            |                     | Pump Station No. 2 (PS2). On April 5, 2018          |           |  |                            |             |  |
|                      |     |   |                            |                     | SFPUC and SFFD performed joint-department           |           |  |                            |             |  |
|                      |     |   |                            |                     | full-scale test of AWSS Pump Station No. 1 (PS1)    |           |  |                            |             |  |
|                      |     |   |                            |                     | including pumping seawater into an isolated         |           |  |                            |             |  |
|                      |     |   |                            |                     | section of the AWSS distribution through            |           |  |                            |             |  |
|                      |     |   |                            |                     | system hydrants. On August 29, 2018, SFPUC,         |           |  |                            |             |  |
|                      |     |   |                            |                     | SFFD and DPW personnel conducted a seawater         |           |  |                            |             |  |
|                      |     |   |                            |                     | drafting drill and confirmation test from the       |           |  |                            |             |  |
|                      |     |   |                            |                     | new suction connection at Pier 50. In addition,     |           |  |                            |             |  |
|                      |     |   |                            |                     | SFFD and SFPUC periodically test different          |           |  |                            |             |  |
|                      |     |   |                            |                     | facilities to assure systems are in good working    |           |  |                            |             |  |
|                      |     |   |                            |                     | order, and to train personnel on operations and     |           |  |                            |             |  |
|                      |     |   |                            |                     | joint-agency communications. For example, a         | 1         |  |                            |             |  |
|                      |     |   |                            |                     | full-scale emergency exercise was performed         |           |  |                            |             |  |
|                      |     |   |                            |                     | between SFFD and SFPUC staff in January 2016        | 1         |  |                            |             |  |
|                      |     |   |                            |                     |   |           |  |                            |             |  |

| Report Title<br>[Publication Date]  | F# | Finding (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date]            | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#]    | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date]            | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text   |
|---|----|--|---|--------------------------------------|--|-------------------|--|---|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Furelighting Water<br>System<br>(July 17, 2019)  | F1 | Free resulting from an earthquake represent a<br>significant risk of widespread dramage and<br>potential loss of life in San Francisco.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding               |  | R1<br>[for F1-F6] | Syn o laster than December 31, 2020, the Mayor, the SPUPL, the SFTP, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a delegal plan to ensure the City is well prepared to flight frees will give the service of the STP of th | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Will be<br>implemented                         | Ensuring that San Francisco has the<br>infrastructure and resources to be well<br>prepared to fight fires in all parts of San<br>Francisco is something that will be a focus of<br>the next 10-Year Capital Plan. Per<br>Administrative Code 3.20, that Plan must be<br>submitted to the Mayor and Board no later<br>than March 10 each od-numbered year for<br>approval no later than May 1. The requested<br>presentation would be delivered as part of that<br>Plan's submission to enable holistic planning<br>across San Francisco's resilience fuellnegs.<br>Included. The City cannot discuss the project<br>and timeline unlike ESER 2020 plan passes.<br>For this reason, the City will your this<br>recommendation with the Capital Plan, and<br>push back the timeline to December 31, 2021.  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Freelighting Water<br>System<br>[July 17, 2019]  | F1 | Fires resulting from an earthquake represent a<br>significant risk of designed damage and<br>potential loss of life in San Francisco.  | Chlef, San Francisco Fire<br>Department<br>(September 15, 2019) | Agree with the finding               |  |                   | The plan discussed in Recommendation £1 should include a detailed proposal, including financing sources, for the installation within 5 years of a high-pressure, multi-sourced, sesmically safe energency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis                      | The commitment of isources for specific uses on specific tunels on specific tunels on Stan Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and badances planned based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and badances planned unfastructure portfolio and across San Infrastructure portfolio and across San Judices legical and caross San Judices legical profit profit planning brockers, the Capital Plan has longstanding funding principles to guide the prioritization of public Infrastructure investments. These investments are tiered; (1) address legical and for regulatory mandates; (2) ensure public safety and enhance realisinor; (3) advance planned and programmatic needs; and (2) promote economic development. In the Capital Planning process and programs and identity sources to advance those priorities. Committing to entirely funding a single program and identity sources to advance those priorities. Committing to entirely funding a single program and identity sources to advance those priorities. Committing to entirely funding a single program and identity sources to advance those priorities. Committing to entirely funding a single program and identity sources to advance those priorities. Committing to entirely projects and programs and identity sources to advance those priorities. Committing to entirely projects and programs and identity sources to advance those priorities. Committing to entirely projects and programs and identity set significant vulnerabilities elsewhere in the portfolio.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Fireflighting Water<br>System<br>[July 17, 2019] | F2 | The municipal water supply system (MWSS) is<br>highly vulnerable to damage from a major<br>earthquake and is not a reliable source for<br>water supply for firefighting after a major<br>earthquake.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Disagree, partially                  | The MWS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the less 15 Years IN WSIP included for reduce valuerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the 54.8 billion dollar program. The WSIP was the largest capital program ever undertaken by San franction, and one of the largest water infrastructure programs in the annotance Adminishing it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a yadded of the control of the con | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SPEU, the SPFI, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a delegal plan to ensure the CIV is well prepared to flight fires in all parts of Son Francisco in the event of a 1906-magnitude (7.8) earthquake.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Will be implemented                            | Ensuring that San Francisco has the<br>infrastructure and resources to be well<br>prepared to fight fires in all parts of San<br>Francisco is something that will be a focus of<br>the next 10-Year Capital Plan. Per<br>Administrative Code 3.20, that Plan must be<br>submitted to the Mayor and Board no later<br>than March 10 each odd-numbered year for<br>approval no later than May 1. The requested<br>presentation would be delivered as part of that<br>Plan's submission to enable holistic planning<br>across San Francisco's resilience challenges.<br>Updates available on this timeline would be<br>included. The city cannot discoss the project<br>for this reason, the City will yone this<br>recommendation with the Capital Plan, and<br>push back the timeline to December 31, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Freelighting Water<br>System<br>[July 17, 2019]  | F2 | The municipal water supply system (NWSS) is to highly vulnerable domage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.   | Chlef, San Francisco Fire<br>Department<br>[September 15, 2019] | Disagree, partially                  | The MWS has been significantly upgraded in the last 15 years through the Water Supply improvement Program (WSP) initiated by the SPUCL. The goals of WSP included to reduce valuerability of the water system to damage from entripulsars and increase overall water system reliability. There were 15 in-city projects with the 54.5 billional dollar program. The undertaken by San Francisco, and one of the major that the state of the system reliability, and one of the notion of the system of the s | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, estimically safe energency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis                      | The commitment of sources for specific uses on specific users on specific users on specific users on specific specific spublic infrastructure is the work of the 1D-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and badances planned based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and badances planned unfarstructure portfolio and across San unfarstructure portfolio and across San unfarstructure portfolio and across San did across San planned and process the specific specific planning with the planning badders legal and/or regulatory mandets; (2) ensure public safety and enhance realistner; (3) advance public safety and enhance realistner; (3) advance planned and programmatic needs; and (3) promote economic development. In the next 1D-Year Capital Plan and those that follow, respects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F3 | Approximately 30 cistens have recently been deaded with funds from SER Bonds, for More SER bonds, but obtained only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake. |   | Agree with the finding               | Gaterns serve as one of many important tools for use by the STF0 in response to a disaster. Gatern locations are strategically located in the City in the event of a major conflagration to assist as a "Demarcation Line" on some of The City's major thoroughtees. This was reading dealer the 1906 earthquake. With work accomplished throughtees. This was reading content to the complete the complete the STF0 and program, colleren have been seismically improved colleren have been seismically improved colleren has increased to approximately and colleren has increased to approximately and providing the Fire Department access to millions of gallons of water in an emergency.  |                   | Syn o laster than December 31, 2020, the Major, the SPUPL, the SPTP, and the Office of Resilience and Capital Planning should jointly present to the Beach of Supervisors a delegal plan to ensure the City is well prepared to flight frees will glast of Servisors a desired from the event of a 1506-magnitude (7.8) earthquake.  | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Will be<br>implemented                         | ensuring that San Francisco has the<br>infrastructure and resources to be well<br>prepared to fight fires in all parts of San<br>Francisco is something that will be a focus of<br>the next 10-Year Capital Plan. Per<br>Administrative Code 3.20, that Plan must be<br>submitted to the Mayor and Board no later<br>than March 1 of each ode-numbered year for<br>approval no later than May 1. The requested<br>year for<br>approval no later than May 1. The requested<br>parts of the code of the parts of<br>parts of<br>the code of the code of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>parts of<br>pa |

| Act Now Before It Is<br>Too Late:<br>Aggressively Espand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Emergency<br>Water<br>System<br>[July 37, 2019]                                   | F3 | Approximately 30 cistems have recently been added with funds from ESR bonds, but cistems only have up to about a hour of water byen and thus do not provide sufficient water for fighting fires following a major earthquake.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding | Cisterns serve as one of many important tools for use by the SFTD in response to a disaster. Cistern location are strategically located in the Cly in the event of a major confligation to assist as a "Demandation Lise" on some of The Cly's major thoroughtines: This was realized accomplished through the SER bend program, cisterns have been seismically improved throughout the Cly and the overall number of cisterns has increased to approximately 320, providing the FIRE peartment access to millions of gallons of water in an emergency.  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, ostionizally sade energency water system for those parts of the City that don't currently have one, i.e., by no later than tune 30, 2094.                       | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the Drycar Capital Plan. The plan discussed in Recommendation 1 and the accommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital based on analysis, will be done on the capital safety. Adocuments, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are lettered, (1) address legal and/or regulatory mandates; (2) address legal and/or regulatory mandates; (2) and seven the priority and the priority projects and programs and those that follow, the City will confluence to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City will confluence and highly regulated capital.  |
|--|----|---|---|------------------------|--|-------------------|--|---|---------------------------|--|
| ACI, Now Before It Is Too late: Aggressively Expand aggressively expand and the pressure Emergency Firefighting Water System [July 17, 2019]   | F4 | The City's high-pressure emergency water<br>supply system, somen the feutiliary Water<br>Sopph's System (AWSS), does not cover large<br>start of Suppressional Instricts 1, a 7, and 11,<br>roughly one-third of the City's developed area,<br>are assult, these districts are not adequated,<br>protected from fires after a major earthquake. | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Agree with the finding | The STPLC_STPC, and San Francisco Public Works (STPV) are committed to increasing five orderion throughout San Francisco. Since the bassage of the first Earthquake Saffey and Enregency Response Bond in 2010, the three bassage of the first Earthquake Saffey and Enregency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's sessimic reliability and range of coverage. Enhancing the AWSS system's sessimic reliability and range of coverage. Enhancing the AWSS single of coverage to all areas of the City would range of coverage. Enhancing the AWS in the City with the City of the City would be an advantage of the City would be applied to the City would be applied to the City would be applied to the City would be applied to the City would be applied to the City would be applied to meet the performance standards of the STPL.   |                   | Syno later than December 31, 2020, the Mayor, the SFV/L, be SFT and the Office of Resilience, and Exportise of Resilience, and Capital Finning should jointly present to the Board of Supervisors a deligation to ensure the City is well prepared to fight fires; and japan 50 fan Francisco in the event of a 1906-magnitude (7.8) earthquake. | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Will be implemented       | insuring that San Francisco has the infrastructure and resources to be well prepared to light fires in all parts of San Francisco is commenting that will be a fous of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of sech odd-numbered year for approval no later than Mays 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESR 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| ACI, Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Friedlything Water System [July 17, 2019]  | F4 | The City's high-pressure mergenery water supply system, some at the Auxiliany Water Supply system (MVSS), does not cover large parts of Supervisional Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, three districts are not adequately protected from fires after a major earthquake.                  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding | The SPIUC, SPED, and San Francisco Public Works (SPPV) are committed to increasing free protection throughout San Francisco. Since the possage of the first Earthquake Safeky and Emergency Response Bond in 2010, the three processing agencies have been implementing projects to improve the AWSS system's selsmic reliability and range of coverage. Enhancing the Avistic Sangle of coverage to all reads of the City would require the allocation of fasts to do so. The three agencies will continue to develop and three processing of the city would be continued to the city and some continued to the city and some continued to the city and continue to develop and continued to the city and some continued to the city and city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and continued to the city and city  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1.  Anoul include adealed proposal, including financing sources, for the installation within 2 years of a high-pressure, multi-sourced, sesimically safe emergency water system for those parts of the CV that don't currently have one, i.e., by no later than June 30, 2034.                             | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis | the commitment of sources for specific uses on specific timelies of Soa Francisco's public infrastructure is the work of the 10-Year Capital Final. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portion and across San Francisco's resilience challenges. The public infrastructure protriols and across the public sind process of the public sind public process of the public sind public process of the public sind public sind public process of the public sind public sind public process of the public sind public sind public sind public sind public sidely and enhance resilience; (3) advance public safety and enhance resilience; (3) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze protriots. Committing to entirely without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likey create significant vulnerabilities elsewhere in the portfolio. |
| ACI, Now Before It Is Too Late: Aggressively Expand and Service Aggressively Expand and Service Aggressively Expand Aggressively Expand Aggressively Firefighting Water System [July 17, 2019] | F4 | The City's high-pressure emergency water<br>supply system, somes the Audiany Water<br>supply system (AWSS), does not cover large<br>super of Supervision (Intertes 1, a 7, and 11,<br>roughly one-third of the City's developed area,<br>are assult, these districts are not adequately<br>protected from fires after a major earthquake.       | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Agree with the finding | The STPLC_STPL and San Francisco Public Works (STPV) are committed to increasing fire protection throughout San Francisco. Since the passage of the first sarthquakes Saffley and Emergency Response Bond in 2010, the three passage of the first sarthquakes Saffley and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage, chanakoning the city and range of coverage, chanakoning the city and range of coverage. Enhankoning the Comparison of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original advancements in earthquake resistant pipeline design and materials, hydrants, and estimate valves since the early 1000s, and the City inclinates to use the test possible technology available to meet the performance standards of the 5TPL.  | RS<br>[for F4]    | The SFD should strategically locate the magnity of the PMSS locate tunders in areas that at present only have low-pressure hydrants and/or cistems.  | Chief, San Francisco Fire<br>Department<br>(September 15, 2019) | Will be implemented       | The Department is currently finalizing specifications for these units, after which they will go out to bid through the City's procurement processes before construction. It is anticipated the Department will take receipt of these units in the second half of 2000/early 2021. These hose tenders are a heavy-duty apparatus designed to be able to be deployed and moved throughout the City depending on need, giving the Department needed operational flexibility in its response.  |
| ACI Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflying Water System [July 37, 2039]   | FS | A high-pressure, multi-sources, estimatally sale emergency freelights water supply will be costly but is essential to protect the City.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding | As the City considers what is essential to protect Star Francisco, it is important to acknowledge our multiple, compiler resilience challenges. The challenges are documented in the Resilient SF strategy (2015) and underflent set strategy efforts of our capital inventions are represented in the 10-Year Capital Plan (last updated 2019). Here challenges are updated 2019, Here challenges are updated 2019, Here challenges are challenges are challenges are challenged and the challenges are strategy and the challenges are strategy and the challenges are challenges are strategy and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges and the challenges are challenges and the challenges and the challenges are challenges and the challenges are challenges and afforts simultaneously. The city has taken of the challenges are challenges and the challenges are challenges and the challenges and the challenges are challenges and the challenges are challenges and the challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges and the challenges are challenges are challenges and the challenges are challenges and the challenges are challenges are challenges are challenges and the challenges are challenges are challenges are challenges are challenges are challenges and the challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challenges are challeng | R1<br>[for F1-F6] | Sy no lister than December 31, 2020, the Mayor, the SPUPL, the SPTP, and the Office of Resilience and Capital Flamining should jointly present to the Board of Supervisors a deligate joint to ensure the CIV is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7,8) earthquake.                   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Will be implemented       | insuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than Mays 1. The requested year for approval no later than Mays 1. The requested year for approval no later than Mays 1. The requested year for approval no later than Mays 1. The requested year for approval no later than Mays 1. The requested year of approval on bits fine the would be included. The city cannot discuss the project and timeline until the SERS 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand   | F5 | A high-pressure, multi-sourced, seismically safe<br>emergency firefighting water supply will be<br>costly but is essential to protect the City.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding | As the City considers what is essential to<br>protect San Francisco, it is important to<br>acknowledge our multiple, complex resilience  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis    | The commitment of sources for specific uses on<br>specific timelines for San Francisco's public<br>infrastructure is the work of the 10-Year Capital   |
|--|----|--|---|------------------------|--|-------------------|--|---|------------------------------|--|
| and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019)   |    |  |   |                        | challenges. These challenges are documented in the Reallend's strategy (2016) and underlie the strategy efforts of our capital investments are represented in the DYear Capital Pain (last updated 2019). These challenges are: Earthquake, Sea Level Res/Climate Change, Aging Infrastructure, Unaffordsibility, and Social inquelly, All of these challenges represent meaningful threats to San Franciscan, their property, and their ability to make a file in the City. In making desistoria shoul priority or a similar of the control of the |                   | years of a high-pressure, multi-sourced, sessimally safe energency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   |   |                              | Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital planting process gathers, documents, and balances planting in process gathers, documents, and balances planted indirect process. The capital planting process gathers, documents, and balances planted infrastructure portfolio and across San practices of the process of the pr |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unlets the City increases funding levels, it will be several decades [Le., after the USSD predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.   | [September 15, 2019]  | Disagree, wholly       | Decisions about programming and funding levels of Inture ESF bands and other complementary sources that could support the expansion of the AWSS have yet to be made.   | [for F1-F6]       | By no later than December 31, 2020, the Mayor, the SPEUP, the SPFI, and the Office of Resilience and Capital Planning should jointly present to the Beach of Supervisors a detailed plan to ensure the CIV is well prepared to flight free; sail glants of son Francisco in the event of a 1506-magnitude (7.8) earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Will be implemented          | cinsuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 10 each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience fadelings. Submission to enable holistic planning across San Francisco's resilience fadelings. In clothed the Code of the Code o |
| Act Now Before It is Too Late:  Aggressively Expand and Enhance Our High-Pressure Emergency Teoelighting Water Systems (July 17, 2019)                       |    | Unless the City increases funding levels, I will be several decades [Le., after the USOS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.  | Department<br>(September 15, 2019)                              | Disagree, wholly       | Decisions about programming and funding levels of Inture ESE bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | [for F1-F6]       | The plan discussed in Recommendation fit about include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-source, lestimically safe emergency water system for the state of the plant of the plant of the plant of the plant of the plant of the City that don't currently have one, i.e., by no later than tune 30, 2094. | Chlef, San Francisco Fire<br>Department<br>(September 15, 2019) | Requires further analysis    | The commitment of sources for specific uses on specific tursels on specific tursels on Span Francisco's public infrastructure is the work of the 1D-Year Capital infrastructure is the work of the 1D-Year Capital Flan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital staken, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Jean Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments are tiered. (1a) address legal and regulation of public infrastructure investments. These investments are tiered: (1a) address legal and regulation of public infrastructure investments. These investments are tiered: (1a) address legal and regulation of public infrastructure investments. These investments are tiered: (1a) address legal and and promotes ustainability. (4) advance planned and programmatic needs; and event 10-year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identity sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely craste is egificant vulnerabilities elsewhere in the portfolio.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, I will be several decades [i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.   | Department<br>[September 15, 2019]                              | Disagree, wholly       | Decisions about programming and funding levels of Inture ESE bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   |                   | As interim measure, by no later than June 30,<br>2021, the City should purchase the 20 new<br>PMVSs hose tenders being requested by the<br>57FF, to replace and expand its currently<br>inadequate inventory.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further<br>analysis | The Fire Department has been allocated funding to purches five units through funds from the F193-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multi-year term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for procurement of the apparatus. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and printly.  |
| Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019]                        |    | The existing Portable Mater Souph System<br>(PWSS) inventory is inadequate. Inventing in<br>more PWSS host tenders would provide a<br>relatively quick, cost-effective interim means to<br>improve protection of the southern and<br>western part of the City until a high-pressure,<br>multi-sourcest, steinmically safe emergency<br>water supply can be developed in those areas. | Chlef, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding | The Fire Department has been allocated funding to purchase the units through funds from the PTI3-20 City budget and an allocation from the PTI3-20 City budget and an allocation mit has the white the Department currently has five older hote tenders spread-out which thoughout the City, these new units are revent a contract of the part of the properties o | [for F6-F7]       | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the 579Tb, to replace along most successful inadequate inventory.   | Chlef, San Francisco Fire<br>Department<br>[September 15, 2019] | Requires further analysis    | The Fire Department has been allocated funding to purchase five units through funds from the P193-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multi-year term Administration to develop a multi-year term administration to develop a multi-year term administration will be able to reduce the amount of time for procurement of the amount of time for procurement of the apparatus. Each hose tender cost St million each, and we need to weigh purchase of additional hose tenders to other budget request and priority.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F8 | Redundancy is an important feature of an<br>emergency fireflighting water system.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Agree with the finding |  |                   | The SFPUC, the SFPD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Will be<br>implemented       | SFPLC and SFFD will complete this study by June 30, 2021.  |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Emergency<br>Emergency<br>(July 17, 2019)       | F9  | Current plans to extend protections to the western part of the City do not include any high pressure water sources north of Golden Gate Park.  | Department<br>[September 15, 2019]                              | Disagree, partially | While it is true that the SFPUC and SFFD are studying four potential water sources proposed to supply a pollable FPVS on the west side of the City, which are not located north of Golden Cate Park, which by no means would read the proposed system's resiliency, reliability, performance, a pollably to provide abundant. If the proposed system's resiliency, reliability, performance, a pollably to provide abundant. Bit common the proposed system's resiliency, reliability, performance, a pollably to provide abundant. Bit common the proposed system's resiliency and the Richard District after a session event. San Richardsco is unique in that the expect by approximately 1,000,000,000 gallions. The potable FPVS yettern for the Westerds of San Francisco that is being developed and analyzed would provide that the new EFVS popilies in the Sannest and Richmond Districts could be supplied from four sources of water at two locations. The first water sources could be supplied to the EFVS propilies via a 3,000 gallion per minute pump station in the vicinity of Lake Merced. The two water sources being studied for this pump station are Lake Merced, which has a water supply of propromitted propromitted propromited propro | R6<br>[for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump station to improve the redundancy of water sources, especially on the redundancy of water sources, especially on the third study should be presented to the Board of Supervisors by no later than June 30, 2021.                        | Department [September 15, 2019]                                | Will be implemented     | SFPUC and SFFD will complete this study by June 30, 2021.  |
|--|-----|--|---|---------------------|--|-------------------|--|--|-------------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>(July 17, 2019)           | F10 | The "reliability cores" being used by the SFPUC impart an overly optimistic impression of the protection provided.   | Department<br>[September 15, 2019]                              | Disagree, partially | Fine Response Areas (FRAs) were utilized by SPICL and SFIO in the planning study C-199. This study divided the City into areas based on those defined by the FST Dio ristial sales are supported and the segment of the segment areas and were called fine Response Areas and were called fine Response Areas and the segment of the segment areas and series of the segment areas and series of the segment areas and series of the segment and series of the series of the segment and series of the segment and series of the segment and series of the series of t | R7<br>(for F10)   | The SPEVE should (a) continue its efforts to complete a more detailed analysis of emergency fireflighting water needs (including above the-medial medi) by neighborhood, and not just by FRA, and (b) present a completed analysis to the located of Supervisors by no lister than June 30, 2021.  | Chef, San Francisco Fre<br>Department<br>[September 15, 2019]  | Will be                 | SFPLC and SFPD will complete this analysis by June 30, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F11 | The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods. | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Disagree, partially | The EFMS was built after the 1906 earthquake, and its location, primarily in the northeast portion of San Francisco, corresponds to the location of the majority of the cryls's population at that time. Since 2010, the SFMC, SFMC, and Tabulte Works have made critical improvements to the existing EFMS system. Expanding the Ambient Service of the SFMC and SFMC are developing placel would have contradicted best engineering practices. The SFMC and SFMC are developing placel would have contradicted best engineering practices. The SFMC and SFMC are developing placel would have contradicted best engineering practices. The SFMC and SFMC are developing placel would have contradicted best engineering practices. The SFMC and SFMC are developing placel would be some store that the service of the Westerd of SeM Francisco. The potable EFWS that is being developed and analyzed would propose the best method for brigging a robust and resilient high-pressure firelighting water system to the Western engiblehoots in Sem Francisco that is capable of providing water to the SFMC infections at the high-pressure needed for firelightens to combat large fires a section event, and is lakely to include and SFMC special points and the section of th |                   |  |  |                         |  |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 27, 2019] | F13 | in the 2015 MOU between the SFTD and the SFTD Link to SFTD, and the SFTD, the two against agreed to conduct joint AWST trainings annually, but there is no Gmmal protocol outlings specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.                            | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Disagree, partially | Inter aer no formal protectol outsines specific nor MXSS exercises or drills in the MXDI; however, there are multiple opportunities to the most opportunities to the control together during operation, maintenance, and construction of improvement projects for MXSS facilities as previously described in the response to the Grand Jury questions sent in MXP 2019.  The STF0 and SFPUC have had multiple field with the standard of the maintenance and start-up testing of AWSS facilities in the last syears. For example, on December 20, 2018, SFPUC and SFPUC personnel conducted emergency generates start-up procedures for Pump Station No. 2 (FSJ). On April 5, 2018 SFPUC and SFPU common joint conducted emergency generates start-up procedures for Pump Station No. 2 (FSJ). On April 5, 2018 SFPUC and SFPUC personnel conducted as swaver during unique severate risk on a totaled under pumping severate risk on a totaled severate of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series Severate risk of the start of AWSS series series in good working order, and to train personnel on operations and other and to train personnel on operations and other and to train personnel on operations and other and to train personnel on operations and other and to train personnel on operations and other and the start of AWSS series are in good working order, and to train personnel on operations and other and the start of the AWSS and the start of AWSS series are in good working order, and to train personnel on operations and other and the start of AWSS and the start of AWSS series are in good working order, and to train personnel on operations and the start of AWSS a |                   | between the SFPUC and the SFPO should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  | Chlef, San Francisco Fire<br>Departmental (September 15, 2019) | Will be implemented     | The Fire Department conducts weekly hose/hose tender drills that it rolates through companies throughout the City. The Fire Department will work with the SPFUC have them in attendance and participate in these drills. SFFD will also commit to working with the FUC to enhance the scope and frequency of trainings in the future for improved collaboration. SFFD and SFPUC will work together to amend the MOU by June 30, 2020.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |     |  |   |                     |  | R9<br>[for F12]   | By no lister than Becember 31, 2020 the SPIVO.  with the advice and subject to the approval of the SFIP, should (a) implement? Thest practices' for the maintenance of AWSS sizes, and (b) redefine which AWSS valves in the system are "critical," and, therfoor, require more attention and priority in the SFPUC's maintenance plans. | Department   | Has been<br>implemented | IJ STPUC implements "Dest practices" for the maintenance of ANSS seets in collaboration with SFD, and consistent with the terms of the Memorandum of Indestranding Regarding Operation and Maintenance of San Francisco Water Supply systems Related to Trier Suppression (MOU), SFDIC will seek SFID's written approad for 'any modification that a could compromise" the Septem's function that a could compromise the religibing system (MOU), page 2). (b) The ANSS Critical valves have been identified and will be exercised every year through the ANSS Critical Valves Exercise Program. |

| Report Title<br>[Publication Date]   | FII | Finding<br>(text may be duplicated due to spanning and<br>multiple respondent effects)   | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#]             | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text   |
|--|-----|--|--|--------------------------------------|--|----------------------------|--|--|--|--|
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Outure High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6  | Unlest the City increases funding levels, it will be several decades [Le., after the USOS predicts on e or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.  | City Administrator<br>[September 15, 2019]           | Disagree, wholly                     | Decisions about programming and funding<br>levels of future SEF bonds and other<br>complementary sources that could support the<br>expansion of the AWSS have yet to be made.  | R1<br>[for F1-F6]          | By no later than December 31, 2020, the Mayor, the SPDLY, the SPTL, and the Office of Resilience and Capital Planning should jointly present to the Beach of Supervisors a detailed plan to ensure the City is well prepared to flight frees will apply a some summer of the SPDL of the S | City Administrator<br>[September 15, 2019]           | Will be implemented                            | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than Mays 1. The requested year for approval no later than Mays 1. The requested is part of that compared to the delivered is part of that the same of the same o |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6  | Unless the City increases funding levels, it will be several decades [i.e., after the USGs predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.  |  | Disagree, wholly                     | Decisions about programming and funding levels of Inture SEE Bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | R2<br>[for F1-F6]          | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, estimically said energency water system for those parts of the CV that don't currently have one, i.e., by no later than June 30, 2034.  | City Administrator<br>[September 15, 2019]           | Requires further<br>analysis                   | The commitment of sources for specific uses on specific tusels on specific tusels on Span Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and balances planned based on analysis, will be done on the capital plan timeline. The capital planning process gapthers, documents, and balances planned infrastructure portfolio and across San raracisco's resillation of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandets; (2) ensure public cafety and enhance resilience; (3) advance public safety and enhance resilience; (3) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyse protruct to projects and programs and identify sources and promote sustainability. (4) advance planned and programs and those that follow, the City will continue to analyse protruct to projects and programs and identify sources and without regard for the trade-offs of that commitment would be out of size with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6  | Unless the City increases funding levels, it will be several deads [i.e., after the USSS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.   | City Administrator<br>[September 15, 2019]           | Disagree, wholly                     | Decisions about programming and funding levels of future ESR bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | R8<br>(for F5, F6,<br>F11) | By no later than June 30, 2022, the Mayor and<br>the board of Supervisors should analyze<br>whether to propose a separate bond for the<br>development of a high-pressure, multi-sourced,<br>scismically safe emergency water system for<br>those parts of the City that don't currently have<br>one, with a target date of completing<br>construction by no later than June 30, 2034.  | City Administrator<br>[September 15, 2019]           | Will be<br>implemented                         | The analysis will be performed as part of the<br>City's 1.D'erac related lain development<br>process. The next full update to the Capital Plan<br>will be submitted to the Mayor and Board not<br>later than March 1, 2021, for approval no later<br>than May 1, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand and Enhance Our<br>High-Pressure<br>Emergency<br>Fitefighting Water<br>System<br>[July 17, 2019]    | F11 | The City does not have a timeline to fund and complete development of a high-present of a high-present complete, multi-sourced, selsmically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods. | City Administrator<br>[September 15, 2019]           | Diagree, partially                   | The ETMS was built after the 1906 earthquake and its location, primarily in the northeast portion of 3an Francisco, corresponds to the coation of the majority of the city's population at that time. Since 2010, the SFPUC, SFPD, and Polici. Works have made critical improvements to the existing ETMS systems. Expanding the SFPUC states of the seasing ETMS systems, provided the season of the seas | R8<br>[for F5, F6,<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Superious should analyze whether to propose a separate bond for the development of a high-pressure, multi-ourced, assimically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2094.  | City Administrator<br>[September 15, 2019]           | Will be implemented                            | The analysis will be performed as part of the CIPY's 10-Year Capital Pland development process. The next full update to the Capital Plan will be submitted to the Mayor and Board not later than March 1, 2021, for approval no later than March 2, 2021, for approval no later than May 1, 2021.  |

| Report Title<br>[Publication Date]   | FII | Finding<br>(text may be duplicated due to spanning and<br>multiple respondent effects) | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text | R#<br>[for F#] | Recommendation<br>(text may be duplicated due to spanning and<br>multiple respondent effects) | Respondent Assigned by<br>CGJ<br>[Response Due Date]     | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text                                      |
|--|-----|--|--|--------------------------------------|-----------------------|----------------|---|--|--|---|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |     |  |  |                                      |                       | [for F8-F9]    |   | Department of the<br>Environment<br>[September 15, 2019] |  | Not applicable to the San Francisco Department of the Environment |

From: Anatolia Lubos
To: Carroll, John (BOS)

Subject: San Francisco Public Utilities Commission Response (by the Commission President) to the 2018-2019 AWSS

Report

**Date:** Friday, September 13, 2019 10:14:02 AM

Attachments: President Caen Letter to CGJ.pdf

**From:** Civil Grand Jury < CGrandJury@sftc.org> **Sent:** Wednesday, September 11, 2019 11:11 AM

To: Anatolia Lubos <ALubos@sftc.org>

Subject: FW: Response of the San Francisco Public Utilities Commission to the 2018-2019 Civil Grand

Jury Report

From: Hood, Donna

Sent: Wednesday, September 11, 2019 11:10:54 AM (UTC-08:00) Pacific Time (US & Canada)

**To:** Civil Grand Jury

Cc: Kelly Jr, Harlan; Breed, London (MYR)

Subject: Response of the San Francisco Public Utilities Commission to the 2018-2019 Civil Grand Jury

Report

MARNING: This email was generated from an external source. You should only open files from a trustworthy source.

## Good Morning,

In accordance with Penal Code Sections 933 and 933.05, and pursuant to the request of Mr. Rasha Harvey, Foreperson of the City and County of San Francisco 2018-19 Civil Grand Jury, attached please find the response of the San Francisco Public Utilities Commission to the 2018-2019 Civil Grand Jury Report, *Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System*.

Thank you,

Donna Hood

Commission Secretary

San Francisco Water, Power and Sewer/Services of the San Francisco Public Utilities Commission

525 Golden Gate Ave., 13th Floor

San Francisco, CA 94102

415-554-0761 (direct)

http://sfwater.org/

Conserve a drop today for a drink tomorrow! Learn how at <a href="www.sfwater.org/conservation">www.sfwater.org/conservation</a>



525 Golden Gate Avenue, 13th Floor San Francisco, CA 94102 T 415.554.3155 F 415.554.3161 TTY 415.554.3488

September 11, 2019

Sent via U.S. Mail and email to CGrandJury@sftc.org

The Honorable Garrett L. Wong Presiding Judge Superior Court of California, County of San Francisco 400 McAllister Street, Room 008 San Francisco, CA 94102-4512

Dear Judge Wong:

In accordance with Penal Code Sections 933 and 933.05, and pursuant to the request of Mr. Rasha Harvey, Foreperson of the City and County of San Francisco 2018-19 Civil Grand Jury, attached please find the response of the San Francisco Public Utilities Commission to the 2018-2019 Civil Grand Jury Report, *Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System.* At its regularly scheduled public meeting of September 10, 2019, the Commission voted to approve the attached responses by Resolution No. 19-0178.

The response of the General Manager of the San Francisco Public Utilities Commission is being sent under separate cover.

The Commission would like to thank the members of the 2018-2019 Civil Grand Jury for their service and their interest in our vital water infrastructure that supports firefighting in all communities in San Francisco.

Sincerely,

Ann Moller Caen

President

San Francisco Public Utilities Commission

cc: Harlan Kelly, SFPUC General Manager

Marko

Mayor London Breed

London N. Breed Mayor

Ann Moller Caen President

Francesca Vietor

Vice President

Anson Moran

Commissioner

Sophie Maxwell Commissioner

> Tim Paulson Commissioner

Harlan L. Kelly, Jr. General Manager



# PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. 19-0178

|      | WH    | EREAS,   | On.   | July 17 | , 2019 | , the 20 | )18-201 | 9 Civil ( | Grand  | Jury rel | leased a | report entitled, |
|------|-------|----------|-------|---------|--------|----------|---------|-----------|--------|----------|----------|------------------|
| "Act | Now   | Before   | It I  | s Too   | Late:  | Aggre    | ssively | Expand    | and    | Enhand   | ce Our   | High-Pressure    |
| Emer | gency | Firefigl | nting | Water   | Syste  | em," a   | copy    | of which  | h is o | n file   | with th  | e Commission     |

Secretary and has been provided to this Commission for review; and

WHEREAS, The Civil Grand Jury requires written responses from this Commission to the Report's Findings Nos. 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, and 13, and Recommendations Nos. 1, 2, 6, 7, 9, and 10; and

WHEREAS, California Penal Code §933(c) requires such written responses be submitted to the Presiding Judge no later than September 15, 2019; and

WHEREAS, Attached hereto are the Commission's responses to the above stated Findings and Recommendations in the 2018-19 Civil Grand Jury Report; now, therefore be it

RESOLVED, That this Commission hereby approves the Commission's responses, attached hereto, to the relevant findings and recommendations of the July 17, 2019 Civil Grand Jury Report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" and authorizes and directs the Commission President to submit the response to the Presiding Judge of the Civil Grand Jury by September 15, 2019, as required by California Penal Code §933(c).

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of September 10, 2019.

Secretary, Public Utilities Commission

| Report Title<br>[Publication Date]   | F# | Finding (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date]                      | Finding Response<br>(Agree/Disagree) | Finding Response Text  | R#<br>[for F#] | Recommendation (text may be duplicated due to spanning and multiple respondent effects)   | Respondent Assigned by CGJ [Response Due Date]                            | Recommendation Response (Implementation) | Recommendation Response Text   |
|--|----|---|---|--------------------------------------|--|----------------|---|---|--|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F1 |   | President, San Francisco Public Utilities Commission [September 15, 2019] | Agree with the finding               |  | [for F1-F6]    |   | President, San Francisco Public Utilities Commission [September 15, 2019] |  | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F1 | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco. | President, San Francisco Public Utilities Commission [September 15, 2019] | Agree with the finding               |  | [for F1-F6]    | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034. | President, San Francisco Public Utilities Commission [September 15, 2019] |  | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F2 | · · · · · · · · · · · · · · · · · · ·   | President, San Francisco Public Utilities Commission [September 15, 2019] |                                      | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the \$4.8 billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's seismic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service. | [for F1-F6]    |   | President, San Francisco Public Utilities Commission [September 15, 2019] | Will be implemented                      | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  President, San Francisco Public Utilities Commissio [September 15, 2019]  | Disagree, partially    | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the \$4.8 billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's seismic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service.  | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  President, San Francisco Public Utilities Commission [September 15, 2019]  Requires further analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
|--|---|------------------------|---|-------------|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  Will be implemente Will be implemente Public Utilities Commission [September 15, 2019]            | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |

| Act Now Before It Is   | F5 | A high-pressure, multi-sourced, seismically safe  | President, San Francisco  | Agree with the | As the City considers what is essential to protect San Francisco, it is   | R1          | By no later than December 31, 2020, the Mayor, President, San Francisco  | Will be implemented       | Ensuring that San Francisco has the infrastructure and   |
|--|----|---|---|----------------|---|-------------|--|---------------------------|--|
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  |    |   | Public Utilities Commission<br>[September 15, 2019]                       |                | important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient SF strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFFD, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design.   |             | the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  |                           | resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | emergency firefighting water supply will be       | President, San Francisco Public Utilities Commission [September 15, 2019] | finding        | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient SF strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFFD, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design. | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.    | Requires further analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | be several decades (i.e., after the USGS predicts | President, San Francisco Public Utilities Commission [September 15, 2019] |                | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | ·                         | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  President, San Francisco Public Utilities Commission [September 15, 2019] | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034. | analysis            | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
|--|---|------------------------|---|-------------|---|---------------------|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | Redundancy is an important feature of an emergency firefighting water system.  President, San Francisco Public Utilities Commissio [September 15, 2019]   | Agree with the finding |   | [for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.           | Will be implemented | SFPUC and SFFD will complete this study by June 30, 2021.  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | Current plans to extend protections to the western part of the City do not include any high-pressure water sources north of Golden Gate Park.  President, San Francisco Public Utilities Commission [September 15, 2019]  | Disagree, partially    | While it is true that the SFPUC and SFFD are studying four potential water sources proposed to supply a potable EFWS on the west side of the City, which are not located north of Golden Gate Park, which by no means would reduce the proposed system's resiliency, reliability, performance, or ability to provide abundant high-pressure water for fire suppression to the Richmond District after a seismic event. San Francisco is unique in that there are 11 in-city reservoirs, with a total water capacity of approximately 413,000,000 gallons. Additionally, Lake Merced, also located within City Limits, has an additional approximately 1,000,000,000 gallons. The potable EFWS system for the Westside of San Francisco that is being developed and analyzed would provide that the new EFWS pipeline in the Sunset and Richmond Districts could be supplied from four sources of water at two locations. The first two water sources could be supplied to the EFWS pipeline via a 30,000 gallon per minute pump station in the vicinity of Lake Merced, which has a water supply of approximately one billion gallons, and a 60" seismically resilient SFPUC Hetch Hetchy Regional Water System pipeline. The proposed potable EFWS also is analyzing the inclusion of a second 30,000 gallons per minute pump station in the vicinity of the SFPUC's Sunset Reservoir that could be supplied water by two sources: (1) the 90 million gallon north basin of the Sunset Reservoir, which recently underwent a \$64 million seismic retrofit, and (2) a 54" seismically resilient SFPUC Hetch Hetchy Regional Water system pipeline. | [for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.           | Will be implemented | SFPUC and SFFD will complete this study by June 30, 2021.  |

| At the wild factor is a company of part of Co. (In the passed of the Co.)  At the wild factor is a company of part of the Co. (In the Co.)  At the wild factor is a company of part of the Co.)  At the wild factor is a company of part of the Co. (In the Co.)  At the wild factor is a company of part of the Co.)  At the wild factor is a company of part of the Co. (In the Co.)  At the wild factor is a company of part of the Co.)  At the wild factor is a company of part of the Co. (In the Co.)  At the wild factor is a company of part of the Co.)  At the wild factor is a company of part of the Co. (In the Co.)  At the wild factor is a company of part of the Co.)  At the wild factor is a company of the wild factor is a company of the wild factor is a company of the wild factor is a company of the wild factor is a company of |                                       |
|--|---------------------------------------|
| Agreement from the control of the co | complete this analysis by June 30, 20 |
| indications to it in the property of the control to |                                       |
| Intell Pressure Provinging Provin |                                       |
| Exergence (Testify the West System of the Commission of the Commis |                                       |
| Investigating Water Spream (July 17, 2015)  And The City cose not have a simulation to found and information Copyrights (Copyrights) and the City for multiple control of the City for multiple contro |                                       |
| Section (Liv 17, 2019)  (Liv 1 |                                       |
| Safety (CASA) and pl AC 2000). The first gentoms absolute, melting informs absolute and information in the company and in the company and interest and including an and included in the company and interest and including an analysis of the company and included in the company and included in the company and included in the company and included in the company and included in the company and included in the company and included in the comp |                                       |
| Octobelity water cenands that were aggregated into the Hilledy Time districts for earth FATA. The Control of anyther centre of the Control of |                                       |
| Act Now Refere It Is  Act Now Refere It Is  Faz Agerssoyl spand and Charles Court Internation of a inthi-resource, many agreement of a inthi-resource, many agreement of a inthi-resource, many spand and charles court of a inthi-resource, many spand and spand and spand and spand and spand and span |                                       |
| Section   Sect   |                                       |
| Act Now Before It Is   Time City does not have a smelline to fund and Caption and September 15, 2019   |                                       |
| analysis to drange pipes in the system for multiple scenarios. The water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for each FAA. Is should be noted that the filety water supplies for the filety water supplies for the filety water supplies for the filety water supplies for the filety water supplies for the filety water supplies for the filety water supplies for filety water supplies for filety water supplies for the filety water supplies for filety wat |                                       |
| Section 1 to 1 act.  Act Now Before 1 to 1 F12  The City does not have a trinsellar to fund and complete development of a high pressure, multi-public, with the section of the agrees where the process of doing so.  Act Now Before 1 to 1 F12  The City does not have a trinsellar to fund and complete the section of the sect |                                       |
| supples for each FRA. It should be noted that the likely water supplies for each FRA. The collation conservative and highly unlikely even after a seismic event. The reliability scores for each FRA is collatated using the sum of all water supplies for each FRA and dividing it by the FRA water demand. The reliability scores of each FRA is collatated using the sum of all water supplies for each FRA and dividing it by the FRA water demand. The reliability scores are not many the process of each FRA is could be written with the sum of all water supplies for each FRA and dividing it by the FRA water demand. The reliability scores are not ment to report and a strained of the FRA of the supplies for each FRA and dividing it by the FRA water will be available for freighting demands in a given FRA. The reliability scores are not ment to report and extrained the process of doing so.  Act Now Before it it  Too late:  Agrees/by Exam connected exceptions to the day of the process of doing so.  President, San Francisco  complete development of a high pressure, multi-lyability tullities commission  sourced, sestincially safe energency water  supply for all pairs of the CLI, including poor  the provision of San Francisco, corresponds to the location of the majority of the city's population at that time. Since 2010, the SFPUC, SFFO, and full work of the control in spike pressure in the country of the city's population at that time. Since 2010, the SFPUC, SFFO, and full work of the control in spike pressure in the country of the city's population at that time is since 2010, the SFPUC of the country of the city's population at that time is since 2010, the SFPUC of the country of the city's population at that time is since 2010, the SFPUC of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the country of the countr |                                       |
| Act Now Bidors It b  F11  The City does not have a timeline to fund and complete development of a high pressure make the process of the pressure state of  |                                       |
| Lowest, seek and processes are a settlemed to the generative and highly unlikely even after a setsimal event. The reliability score for each FFA and dividing it by the FFA water demand. The reliability score so cach; that - estimate how much FFAV savet eventual. The reliability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that - estimate how much FFAV savet eventual to availability score so cach; that is settinated to supply and demand. The reliability score so cach; that is settinated to available the process of during so.    President, San Francisco complete development of a high-pressure, multi-sourced, seismically alse emergency water supply and thinking to sourced, seismically alse emergency water supply and the much sourced, seismically alse emergency water supply and thinking and thinking sourced, seismically alse emergency water supply and thinking and thinking sourced seismically alse emergency water supply and the supplements to the setting FFAV supplements to the setting FFAV supplements and the supplements and the supplements and supplements and the supplements and the supplements and the suppl   |                                       |
| Act Now Before it is The City does not have a timeline to fund and complient development of a high-pressure, must shipling-fresper (adjust) Part of the City, southern business (adjust) Part of the City |                                       |
| Act Now Before It Is The City does not have a timeline to fund and complete development of a ligh-pressure, must be supplied be development of a ligh-pressure and and famous complete development of a ligh-pressure supplied by development of a ligh-pressure supplied by development of a ligh-pressure supplied by development and that time. Since 2010, the SPIPU. It is a light of the light of |                                       |
| Act Now Before It Is  Act Now Before It Is  F11 The City does not have a timeline to fund and complete development of a high-pressure, must be source, seemically as emergency are supplied of the City, including poor neighborhoods is a historically have not been as well protected as the downtrown business firreflighting Water System  [July 17, 2019]  Act Now Before It Is  F11 The City does not have a timeline to fund and complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, must be added to the complete development of a high-pressure, and and channed our high-pressure supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtrown business district and many richer neighborhoods.  September 15, 2019]  Act Now Before It Is  The City does not have a timeline to fund and complete development of a high-pressure, and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the time and the advanced of the pressure and the time and the advanced of the pressure and the time and the advanced of the pressure and the time and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the pressure and the advanced of the press |                                       |
| Act Now Before It Is   The City does not have a timeline to fund and complete development of a high-pressure, multi-plants of the City o   |                                       |
| Act Now Before It is  F11 The City does not have a timeline to fund and complete development of a high-pressure, multi space development of a high-pressure supply for all parts of the City, Including poor neighborhoods that historically have not been as well protected as the downtown business Fireflighting, Water System  [July 17, 2019]    Disagree, partially   The EFWS capability scores are not member to repressed an estimate of the fire pressure and the space of the EFWS capability and many richer neighborhoods that historically have not been as well protected as the downtown business (strict and many richer neighborhoods.)    Disagree, partially   The EFWS was built after the 1906 earthquake, and its location, primarily in the northeast portion of San Francisco, corresponds to the location of the najority of the city's population at that time. Since 2010, the SPTD, SFTD, and Public Works have made critical improvements to the existing EFWS system. Expanding the EFWs fine to ensuring that the existing EFWS is the semilar resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San F |                                       |
| Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi- Aggressively Expand and Enhance Dus- High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure Emergency High-Pessure High-High-Pessure High-Pessure High-Pessure High-High-Pessure High-High-Pessure High-Pessure High-Pessure High-Pessure  |                                       |
| Act Now Before It Is Too Late:  Act Now Before It Is Too Late:  Complete development of a high-pressure, multi Sourced, sesmically safe emergency water supply for all parts of the Cty, Including porn neighborhoods that historically have not been saw largorised as well protected as the downtown business firefighting Water System [July 17, 2019]  The City does not have a timeline to fund and complete development of a high-pressure, multi Sourced, sesmically safe emergency water supply for all parts of the Cty, Including porn neighborhoods that historically have not been saw legrorised as the downtown business district and many richer neighborhoods.  System [July 17, 2019]  The City does not have a timeline to fund and complete development of a high-pressure, multi Sourced, sesmically safe emergency supply for all parts of the Cty, Including porn neighborhoods that historically have not been saw legrorised as the downtown business district and many richer neighborhoods.  System [July 17, 2019]  The City does not have a timeline to fund and complete development of a high-pressure, multi Utilities Commission September 15, 2019]  Biograe, partially the northeast portion of San Francisco, corresponds to the location, primarily in the northeast portion of San Francisco, corresponds to the location of the majority of the city's population at that time. Since 2010, the SPPUC, SFPD, and Apblic Works have not been setting the SPPS of the Service of Service system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. Expanding the EPKS prior to ensuring that the existing EPKS is system. E |                                       |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi- bublic Utilities Commission September 15, 2019)  September 15, 2019)  Disagree, partially the northeast portion of San Francisco, corresponds to the location of the majority of the city's population at that time. Since 2010, the SPPUC, SPPO, and Public Works have made citrical improvements to the existing EPVS system. Expanding the EFVS for to ensuring that the existing EPVS is system. Expanding the EFVS for the existing that the existing EPVS is system. Expanding the EFVS for the existing that the value of providers district and many richer neighborhoods.  The SPPUC and SPFD are developing plans that would implement a resilient, robust, and redundant potable EPVMS that is being developed and analyzed would propose the Dest method for bringing a robust and resilient high-pressure innected on the high-pressure innected on the high-pressure innected on the high-pressure innected on the pressure innected on the pressure innected on the high-pressure innected on the high-pressure innected on the pressure innected on the high-pressure innected on the pressure in the pressure in the pressure in the pressure in the pressure in the pressure in the pressure in the pressure in the pressure in the pressure in the  |                                       |
| Act Now Before it is Too Late: Agressively Expand and Enhance Our High-Pressure Emergency Strict and many richer neighborhoods.  Iluly 17, 2019]  Act Now Before it is The City does not have a timeline to fund and complete development of a high-pressure, multi Sourced, seismically safe emergency water and Enhance Our High-Pressure Emergency Site of the City, including poor neighborhoods that historically have not been as well protected as the downtown business of district and many richer neighborhoods.  System [July 17, 2019]  Act Now Before it is The City does not have a timeline to fund and complete development of a high-pressure frequency neighborhoods that historically have not been as well protected as the downtown business of district and many richer neighborhoods.  Act Now Before it is The City does not have a timeline to fund and complete development of a high-pressure frequency from the city is population at that time. Since 2010, the SFPU, and Public Works have made critical improvements to the existing EFWS is resilient and reliable would have contradicted best engineering practices. The SFPU and SFFD are developing plans that would implement a resilient, robust, and recludant protable EFWS for the Western neighborhoods in San Francisco that is capable of providing water to the SFPU Grighters at the high-pressure freighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFPU Grighters at the high-pressure freighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFPU Grighters at the high-pressure freighting water sources. The SFPUC and SFPOs potable EFWS is being designed in a manner that allows for agility and the explicit of the city is possible of San Francisco. The potable explosion of the city of the City is possible of San Francisco. The potable voltage of the city of the City is possible state of the City of the City of the City of the City of the City of the City of the City of the City |                                       |
| Act Now Before It Is Too Late: Agressively Expand and Enhance Our High-Pressure supply for all parts of the City, including poor High-Pressure supply for all parts of the City, including poor Emergency Emergency Emergency Liyu 17, 2019]  The City does not have a timeline to fund and complete development of a high-pressure, water supply for all parts of the City, including poor say well protected as the downtown business district and many richer neighborhoods.  The SPUC and SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Weststed of San Francisco. The potable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure ferrifeighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD Irequipers at the high-pressure needed for firefighers to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS planles and potentially two new pump stations likely to be supplied by four water sources, and in  The City does not have a timeline to fund and complete development of a high-pressure fine free parts. Since 203, the SFPUC, SFPD, and Public Works have made critical improvements to the existing EFWS system. Expanding the EFWS prior to ensuring that the existing EFWS is resilient and reliable would have contradicted best engineering practices. The SFPUC and SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Weststern neighborhoods in San Francisco. The portable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient, high-pressure freefighting water system to the Western neighborhoods in San Francisco. The SFPUC and SFFD are developing plans and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the |                                       |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Out High-Pressure Emergency and High-Pressure Emergency Carbon of San Francisco, Corresponds to the location of the System. Expanding the EFWS prior to ensuring that the existing EFWS is resilient and reliable would have contradicted best engineering practices. The System [July 17, 2019]  July 17, 2019]  The SPPU Cand SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco that is capable of providing water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS plealines and optentially two new pump stations likely to be supplied by four water sources, and in additional provided in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| Complete development of a high-pressure, multi- Aggressively Expand and Enhance Our High-Pressure Emergency Emergency as well protected as the downtown business of sirrifighting Water System [July 17, 2019]  System [July 2016]  System [July 2 |                                       |
| Complete development of a high-pressure, multi- Aggressively Expand sourced, seismically safe emergency water and Enhance Our High-Pressure Emergency as well protected as the downtown business of irrifeghting Water System  [July 17, 2019]  The strict and many richer neighborhoods.  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  The strict and many richer neighborhoods.  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 17, 2019)  System (July 2014)  System (System (July 2014)  System (System (July 2014)  System (System (July 2014)  System (System (J |                                       |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Out High-Pressure Emergency and High-Pressure Emergency Carbon of San Francisco, Corresponds to the location of the System. Expanding the EFWS prior to ensuring that the existing EFWS is resilient and reliable would have contradicted best engineering practices. The System [July 17, 2019]  July 17, 2019]  The SPPU Cand SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco that is capable of providing water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS plealines and optentially two new pump stations likely to be supplied by four water sources, and in additional provided in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| Too Late: Aggressively Expand sourced, seismically safe emergency water and Enhance Our High-Pressure Emergency and parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business (firefighting Water System [July 17, 2019]  System [July 17, 2019]  The SPPUC and SPFD are developing plans that would implement a resilient, robust, and resilient and regilient and resilient, robust, and resilient and regilient and resilient, robust, and resilient and regilient and resilient, robust, and resilient and regilient and resilient and regilient and resilient and re |                                       |
| Aggressively Expand and Enhance Our High-Pressure neighborhoods that historically have not been as well protected as the downtown business (Breighting Water System (July 17, 2019)  Firefighting Wat |                                       |
| and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.  The SFPUC and SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The potable EFWS for the Westside of San Francisco. The potable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure needed for firefighters at the high-pressure needed for firefighters at the high-pressure needed for firefighters to combat large fires after a selsmic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWs being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| High-Pressure Emergency as well protected as the downtown business Firefighting Water System [July 17, 2019] |                                       |
| Emergency Firefighting Water System [July 17, 2019]  Emergency Firefighting Water System [July 17, 2019]  Firefighting Water System [July 17, 2019]  Firefighting Water System [July 17, 2019]  Firefighting Water System [July 17, 2019]  Firefighting Water System [July 17, 2019]  Firefighting Water System to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for a gillity and the flexibility to add new technologies and water sources, and in  |                                       |
| Firefighting Water System [July 17, 2019]  Individual content of the SPPUC and SFFD are developing plans that would implement a resilient, robust, and redundant potable EFWS for the Westside of San Francisco. The potable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| robust, and redundant potable EFWS for the Westside of San Francisco. The [July 17, 2019]  potable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| [July 17, 2019]  potable EFWS that is being developed and analyzed would propose the best method for bringing a robust and resilient high-pressure firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| best method for bringing a robust and resilient high-pressure firefighting water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| water system to the Western neighborhoods in San Francisco that is capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| capable of providing water to the SFFD firefighters at the high-pressure needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| needed for firefighters to combat large fires after a seismic event, and is likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| likely to include over 14 miles of new EFWS pipelines and potentially two new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| new pump stations likely to be supplied by four water sources. The SFPUC and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in   |                                       |
| and SFFD's potable EFWS is being designed in a manner that allows for agility and the flexibility to add new technologies and water sources, and in  |                                       |
| agility and the flexibility to add new technologies and water sources, and in  |                                       |
|  |                                       |
| 12 Manner that allowe the highest to be extended in the future to  |                                       |
|  |                                       |
| serve additional areas.  |                                       |
|  |                                       |
|  |                                       |
|  |                                       |
|  |                                       |
|  |                                       |

| Act Now Before It Is oo Late: | F12 | The SFPUC has not developed a number of the routine maintenance plans recommended in a | President, San Francisco Public Utilities Commission | Disagree, wholly | Since taking over maintenance responsibilities, SFPUC has completed significant maintenance activities. For example, on a monthly basis, staff | R9 By no later than December 31, 2020 the SFPUC, President, San Francisco Has been [for F12] with the advice and subject to the approval of Public Utilities Commission implemented | (a) SFPUC implements "best practices" for the maintenant of AWSS assets in collaboration with SFFD, and consistent |
|-------------------------------|-----|--|--|------------------|--|---|--|
| aggressively Expand           |     | 2014 report (CS-199), and has not adequately   | [September 15, 2019]                                 |                  | from the SFPUC test both Pump Station #1 and Pump Station #2. There are  | the SFFD, should (a) implement "best practices" [September 15, 2019]  | with the terms of the Memorandum of Understanding  |
| nd Enhance Our                |     | defined which AWSS valves are "critical" and   | [September 15, 2019]                                 |                  | 6 maintenance recommendations provided in the CS-199 study as shown  | for the maintenance of AWSS assets, and (b)   | Regarding Operation and Maintenance of San Francisco   |
| ligh-Pressure                 |     | therefore require increased attention.   |  |                  | below in Table 7-1 from CS-199. The SFPUC has developed several of the   | redefine which AWSS valves in the system are  | Water Supply Systems Related to Fire Suppression (MOU)   |
| · ·                           |     | l  |  |                  | routine maintenance plans recommended in the report or has determined  | "critical," and, therefore, require more  | SFPUC will seek SFFD's written approval for "any   |
| mergency                      |     |  |  |                  |  |   |  |
| Firefighting Water            |     |  |  |                  | the recommended maintenance practice is not necessary (i.e. flushing of a  |   | modifications that could compromise" the system's  |
| System<br>July 17, 2019]      |     |  |  |                  | non-potable water system).   | maintenance plans.  | function as a high pressure firefighting system (MOU, pag  |
| July 17, 2019]                |     |  |  |                  | Maintenance Recommendations, CS. 199 Task 11 TM:   |   | (b) The AWSS critical valves have been identified and will   |
|                               |     |  |  |                  | Maintenance Recommendation 1: Confirm that all AWSS assets are entered   |   | , ,  |
|                               |     |  |  |                  |  |   | exercised every year through the AWSS Critical Valve Exercise Program.   |
|                               |     |  |  |                  | into CDD's asset management system and PM's are established SFPUC Response: All AWSS asset locations are entered into CDD's Maximo             |   | Exercise Program.  |
|                               |     |  |  |                  | and GIS databases. PM's are established for regular maintenance.   |   |  |
|                               |     |  |  |                  | and the databases in the data conditioned for its gainst maintenance.  |   |  |
|                               |     |  |  |                  | Maintenance Recommendation 2: Perform Regular maintenance and  |   |  |
|                               |     |  |  |                  | testing  |   |  |
|                               |     |  |  |                  | SFPUC Response: According to SFPUC Maximo maintenance/testing  |   |  |
|                               |     |  |  |                  | records, regular maintenance and testing is performed in accordance with   |   |  |
|                               |     |  |  |                  | maintenance plans.   |   |  |
|                               |     |  |  |                  | Maintenance Recommendation 3: Check, flush and repair all suction  |   |  |
|                               |     |  |  |                  | connections regularly  |   |  |
|                               |     |  |  |                  | SFPUC Response: All suction connections were assessed 4-5 years ago.   |   |  |
|                               |     |  |  |                  | Some were cleaned as needed at that time. A high-pressure jetting machine  |   |  |
|                               |     |  |  |                  | was recently purchased, and personnel is being trained on its use.   |   |  |
|                               |     |  |  |                  | was recently parenased, and personner is being trained on its use.   |   |  |
|                               |     |  |  |                  | Maintenance Recommendation 4: Establish pipeline flushing program for  |   |  |
|                               |     |  |  |                  | AWSS   |   |  |
|                               |     |  |  |                  | SFPUC Response: Non-potable fire-fighting water systems are not typically  |   |  |
|                               |     |  |  |                  | flushed as part of regular flushing maintenance program. However, flushing   |   |  |
|                               |     |  |  |                  | naturally occurs when the AWSS is utilized approximately 20 times per  |   |  |
|                               |     |  |  |                  | year.  |   |  |
|                               |     |  |  |                  | Maintenance Recommendation 5: Establish leak detection program and a   |   |  |
|                               |     |  |  |                  | pipeline leak database to monitor potential hot spots  |   |  |
|                               |     |  |  |                  | SFPUC Response: SFPUC maintenance activities have helped reduced EFWS  |   |  |
|                               |     |  |  |                  | leakage by over 500,000 gallons per day, improving system performance  |   |  |
|                               |     |  |  |                  | while reducing water waste. A condition assessment project was   |   |  |
|                               |     |  |  |                  | implemented using Smart Ball technology. In addition, the system water   |   |  |
|                               |     |  |  |                  | supply sources are regularly monitored for water levels/filling requirements   | 5   |  |
|                               |     |  |  |                  | which will indicate potential leaks in the pipeline system.  |   |  |
|                               |     |  |  |                  | Maintenance Recommendation 6: Establish a cistern inspection, filling and  |   |  |
|                               |     |  |  |                  | testing program  |   |  |
|                               |     |  |  |                  | SFPUC Response: A cistern inspection and testing program has been  |   |  |
|                               |     |  |  |                  | developed for implementation in 2019. In addition, a filling procedure has   |   |  |
|                               |     |  |  |                  | been established with SFFD.  |   |  |
|                               |     |  |  |                  |  |   |  |
|                               |     |  |  |                  | As part of the AWSS Critical Valve Exercise Program, CDD has identified 66   |   |  |
|                               |     |  |  |                  | AWSS valves as "critical" (66 of 1,685 valves, or approximately 4 percent  |   |  |
|                               |     |  |  |                  | (source: CDD GIS). Critical valves for AWSS were defined based on the  |   |  |
|                               |     |  |  |                  | following criteria for operational importance:   |   |  |
|                               |     |  |  |                  | • Tank bypass valves   |   |  |
|                               |     |  |  |                  | Tank supply valve from higher pressure to lower pressure tank supply   |   |  |
|                               |     |  |  |                  | source   |   |  |
|                               |     |  |  |                  | <ul> <li>Closed control valves to isolate piping within an infirm area</li> </ul>  |   |  |
|                               |     |  |  |                  | • Distribution system divide gate valve, manual operation (allows higher   |   |  |
| I                             |     | I  | ı l  |                  | proceure zone to food into lower proceure zone within the distribution   | 1 1   |  |

|  |     |  |   |                     | system)  Distribution system divide gate valve, motorized operation (allows higher pressure zone to feed into lower pressure zone within the distribution system)  Open control valves to allow a single supply source to feed an infirm area Balancing valve, TP reservoir only (allows the two TP reservoir basins to equalize in level) Critical Valves: These EFWS critical valves are broken down by type below. All 66 of the AWSS critical valves were exercised in 2018-2019 and will be exercised every year.  Valve Type (# of Critical Valves per type): Ashbury Tank By-Pass Valves (10) Ashbury Tank Supply Valve #1 [Ashbury to Jones] (1) Close Control Gate Valve (15) Division Gate Valve (14) Jones Street Tank By-Pass Valves (10) Motorized Division Gate Valve or Motorized Line Gate Valve (6) Open Control Gate Valve [Infirm Area] (6) Twin Peaks East Reservoir Lead Valve [Supply, TP to Ashbury] (1) Twin Peaks West Reservoir Lead Valve [Supply, TP to Ashbury] (1) Total AWSS Critical Valves (66)  |   |   |  |
|--|-----|--|---|---------------------|---|---|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | F13 | In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake. | President, San Francisco Public Utilities Commission [September 15, 2019] | Disagree, partially | There are no formal protocol outlining specific joint AWSS exercises or drills in the MOU; however, there are multiple opportunities to train together during operation, maintenance, and construction of improvement projects for the AWSS facilities as previously described in the response to the Grand Jury questions sent in May 2019.  The SFFD and SFPUC have had multiple field training opportunities during the maintenance and start-up testing of AWSS facilities in the last 5 years. For example, on December 20, 2018, SFFD and SFPUC personnel conducted emergency generator start-up procedures for Pump Station No. 2 (PS2). On April 5, 2018 SFPUC and SFFD performed joint-department full-scale test of AWSS Pump Station No. 1 (PS1) including pumping seawater into an isolated section of the AWSS distribution through system hydrants. On August 29, 2018, SFPUC, SFFD and DPW personnel conducted a seawater drafting drill and confirmation test from the new suction connection at Pier 50. In addition, SFFD and SFPUC periodically test different facilities to assure systems are in good working order, and to train personnel on operations and joint-agency communications. For example, a full-scale emergency exercise was performed between SFFD and SFPUC staff in January 2016 at Islais Creek, which involved the Phoenix Fireboat pumping sea water directly into an isolated section of the Jones pressure system via AWSS manifold connection. Sea water discharged from select hydrants within the isolated section of the system where pressure and flow were monitored at each discharge point.  The SFFD uses their Disaster Response Manual and Water Supply Manual to provide guidelines for training. Training occurs throughout the year and is ongoing. In March 2018, the SFPUC sponsored a tabletop drill focused on CDD emergency response in coordination with SFFD response. Participants were asked to utilize Incident Command Structure (ICS) principles to | [for F13] between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS. | President, San Francisco Public Utilities Commission [September 15, 2019] | SFFD and SFPUC will work together to amend the MOU by June 30, 2020. |

|  | respond to a hypothetical earthquake event (determine ICS, formulate specific objectives, and document findings). It is anticipated that this tabletop exercise will be repeated at least every other year, and that a larger scale simulation of post-earthquake response will be conducted within the next two years for SFFD and SFPUC joint-exercise.   |  |  |
|--|---|--|--|
|  | In February 2018 the SFPUC and SFFD staff convened to review the SFPUC's Division Emergency Operations Plan (DEOP), the CDD's Emergency Action Plan (EAP), and the CDD's Emergency Response Plan (ERP). The ERP overview focused on the Incident Command structure specific to CDD staff responsibilities, communication methods, critical facilities and assets, first responders for each facility (PWS and AWSS) and updated "critical facilities map" for all major pressure zones. |  |  |
|  |   |  |  |

From: <u>Anatolia Lubos</u>
To: <u>Carroll, John (BOS)</u>

**Subject:** Fire Commission Response to 2018-2019 AWSS Report

**Date:** Friday, September 13, 2019 10:03:24 AM

Attachments: Copy of Fire Commission Nakajo AWSS Matrix of Findings and Recommendations Response 190904.xlsx

**From:** Civil Grand Jury < CGrandJury@sftc.org > **Sent:** Thursday, September 12, 2019 1:24 PM

**To:** Anatolia Lubos <ALubos@sftc.org> **Subject:** FW: Civil Grand Jury Report

From: Conefrey, Maureen (FIR)

Sent: Thursday, September 12, 2019 1:24:22 PM (UTC-08:00) Pacific Time (US & Canada)

**To:** Civil Grand Jury

Cc: Rasha Harvey; Steve Nakajo (sknakajo@yahoo.com); Nicholson, Jeanine (FIR)

Subject: RE: Civil Grand Jury Report

MARNING: This email was generated from an external source. You should only open files from a trustworthy source.

Here's the correct document.

Maureen Conefrey Fire Commission Secretary (415) 558-3451

From: Conefrey, Maureen (FIR)

Sent: Thursday, September 12, 2019 11:45 AM

To: CGrandJury@sftc.org

**Cc:** Rasha Harvey <<u>r.harvey@sfcgj.org</u>>; Steve Nakajo (<u>sknakajo@yahoo.com</u>) <<u>sknakajo@yahoo.com</u>>; Nicholson, Jeanine (FIR) <<u>jeanine.nicholson@sfgov.org</u>>

**Subject:** Civil Grand Jury Report

Dear Honorable Garrett L. Wong,

Please see attachments. I will also send by U.S. Mail.

Sincerely,

Maureen Conefrey Fire Commission Secretary (415) 558-3451

| Report Title [Publication Date]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | F# F1 | Finding (text may be duplicated due to spanning and multiple respondent effects)  Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco. | Respondent Assigned by CGJ [Response Due Date] President, San Francisco Fire Commission [September 15, 2019] | Finding Response<br>(Agree/Disagree)<br>Agree with the<br>finding | Finding Response Text  | [for F1-F6] | Recommendation (text may be duplicated due to spanning and multiple respondent effects)  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | Respondent Assigned by CGJ [Response Due Date] President, San Francisco Fire Commission [September 15, 2019] | Recommendation Response Text  Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
|---|-------|---|--|---|--|-------------|---|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]          |       | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  | Agree with the finding  |  |             | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital Plan, and based on lanalysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]          |       | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.                            | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  | Disagree, partially   | The MWSS has been significantly upgraded in the last 15 years through the Water Supply Improvement Program (WSIP) initiated by the SFPUC. The goals of WSIP included to reduce vulnerability of the water system to damage from earthquakes and increase overall water system reliability. There were 35 in-city projects within the \$4.8 billion-dollar program. The WSIP was the largest capital program ever undertaken by San Francisco, and one of the largest water infrastructure programs in the nation. Additionally, it is one of the only comprehensive and strategic infrastructure programs targeted specifically at improving a water system's seismic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic Level of Service. | [for F1-F6] |   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

WSS Page 1 of 7

| Act Now Before It Is | F2 | The municipal water supply system (MWSS) is       | President, San Francisco | Disagree, partially | The MWSS has been significantly upgraded in the last 15 years through the   | R2           | The plan discussed in Recommendation R1            | President, San Francisco | Requires further    | The commitment of sources for specific uses on specific   |
|----------------------|----|---|--------------------------|---------------------|---|--------------|--|--------------------------|---------------------|---|
| Too Late:            | гZ | highly vulnerable to damage from a major          | Fire Commission          | Disagree, partially |   |              | should include a detailed proposal, including      | Fire Commission          | analysis            | timelines for San Francisco's public infrastructure is the work of  |
| Aggressively Expand  |    | earthquake and is not a reliable source for water |                          |                     | of WSIP included to reduce vulnerability of the water system to damage from   | [101 1 1-10] | financing sources, for the installation within 15  | [September 15, 2019]     | unuiyaia            | the 10-Year Capital Plan. The plan discussed in Recommendation  |
| and Enhance Our      |    | supply for firefighting after a major earthquake. | [550,6111061 13, 2013]   |                     | earthquakes and increase overall water system reliability. There were 35 in-city  | 1            | years of a high-pressure, multi-sourced,           | [500)(01100113, 2013]    |                     | 1 will be acknowledged in the Capital Plan, and based on  |
| High-Pressure        |    | supply for mengitting after a major cartifiquake. |                          |                     | projects within the \$4.8 billion-dollar program. The WSIP was the largest  |              | seismically safe emergency water system for        |                          |                     | analysis, will be done on the capital plan timeline. The capital  |
| Emergency            |    |   |                          |                     | capital program ever undertaken by San Francisco, and one of the largest  |              | those parts of the City that don't currently have  |                          |                     | planning process gathers, documents, and balances planned   |
| Firefighting Water   |    |   |                          |                     | water infrastructure programs in the nation. Additionally, it is one of the only  |              | one, i.e., by no later than June 30, 2034.         |                          |                     | funding for needs across the public infrastructure portfolio and  |
| System               |    |   |                          |                     | comprehensive and strategic infrastructure programs targeted specifically at  |              | one, i.e., by no later than June 30, 2034.         |                          |                     | across San Francisco's resilience challenges. The Capital Plan has  |
| [July 17, 2019]      |    |   |                          |                     |   |              |  |                          |                     | - ·   |
| [July 17, 2019]      |    |   |                          |                     | improving a water system's seismic reliability and resiliency. Additionally, it is unique because the WSIP utilized a 7.8 magnitude earthquake as its seismic |              |  |                          |                     | longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: |
|                      |    |   |                          |                     | Level of Service.   |              |  |                          |                     | (1) address legal and/or regulatory mandates; (2) ensure public   |
|                      |    |   |                          |                     | Level of Service.   |              |  |                          |                     | safety and enhance resilience; (3) preserve assets and promote  |
|                      |    |   |                          |                     |   |              |  |                          |                     | sustainability; (4) advance planned and programmatic needs;   |
|                      |    |   |                          |                     |   |              |  |                          |                     | and (5) promote economic development. In the next 10-Year   |
|                      |    |   |                          |                     |   |              |  |                          |                     | Capital Plan and those that follow, the City will continue to   |
|                      |    |   |                          |                     |   |              |  |                          |                     | analyze priority projects and programs and identify sources to  |
|                      |    |   |                          |                     |   |              |  |                          |                     | advance those priorities. Committing to entirely funding a single   |
|                      |    |   |                          |                     |   |              |  |                          |                     | _ · · · · · · · · · · · · · · · · · · ·   |
|                      |    |   |                          |                     |   |              |  |                          |                     | program out of context and without regard for the trade-offs of   |
|                      |    |   |                          |                     |   |              |  |                          |                     | that commitment would be out of step with the City's  |
|                      |    |   |                          |                     |   |              |  |                          |                     | longstanding and highly regarded capital planning process and   |
|                      |    |   |                          |                     |   |              |  |                          |                     | likely create significant vulnerabilities elsewhere in the portfolio.   |
|                      |    |   |                          |                     |   |              |  |                          |                     |   |
|                      |    |   |                          |                     |   |              |  |                          |                     |   |
| Act Now Before It Is | F3 | Approximately 30 cisterns have recently been      | President, San Francisco | Agree with the      | Cisterns serve as one of many important tools for use by the SFFD in response   | R1           | By no later than December 31, 2020, the Mayor,     | President, San Francisco | Will be implemented | Ensuring that San Francisco has the infrastructure and resources  |
| Too Late:            |    | added with funds from ESER bonds, but cisterns    | Fire Commission          | finding             | to a disaster. Cistern locations are strategically located in the City in the event   |              |  |                          |                     | to be well prepared to fight fires in all parts of San Francisco is   |
| Aggressively Expand  |    | only have up to about an hour of water supply     | [September 15, 2019]     |                     | of a major conflagration to assist as a "Demarcation Line" on some of The   | (            | and Capital Planning should jointly present to     | [September 15, 2019]     |                     | something that will be a focus of the next 10-Year Capital Plan.  |
| and Enhance Our      |    | and thus do not provide sufficient water for      | [September 15, 2015]     |                     | City's major thoroughfares. This was realized after the 1906 earthquake. With   |              | the Board of Supervisors a detailed plan to        | [500,000,000,000]        |                     | Per Administrative Code 3.20, that Plan must be submitted to  |
| High-Pressure        |    | fighting fires following a major earthquake.      |                          |                     | work accomplished through the ESER bond program, cisterns have been   |              | ensure the City is well prepared to fight fires in |                          |                     | the Mayor and Board no later than March 1 of each odd-  |
| Emergency            |    | ingitting in as rollowing a major car anquate.    |                          |                     | seismically improved throughout the City and the overall number of cisterns   |              | all parts of San Francisco in the event of a 1906- |                          |                     | numbered year for approval no later than May 1. The requested   |
| Firefighting Water   |    |   |                          |                     | has increased to approximately 230, providing the Fire Department access to   |              | magnitude (7.8) earthquake.                        |                          |                     | presentation would be delivered as part of that Plan's  |
| System               |    |   |                          |                     | millions of gallons of water in an emergency.   |              | magnitude (7.6) earthquake.                        |                          |                     | submission to enable holistic planning across San Francisco's   |
| [July 17, 2019]      |    |   |                          |                     | inimions of gallons of water in an emergency.   |              |  |                          |                     | resilience challenges. Updates available on this timeline would   |
| [July 17, 2015]      |    |   |                          |                     |   |              |  |                          |                     | be included. The City cannot discuss the project and timeline   |
|                      |    |   |                          |                     |   |              |  |                          |                     | until the ESER 2020 plan passes. For this reason, the City will   |
|                      |    |   |                          |                     |   |              |  |                          |                     | sync this recommendation with the Capital Plan, and push back   |
|                      |    |   |                          |                     |   |              |  |                          |                     | the timeline to December 31, 2021.  |
|                      |    |   |                          |                     |   |              |  |                          |                     | the timeline to becember 31, 2021.  |
| Act Now Before It Is | F3 | Approximately 30 cisterns have recently been      | President, San Francisco | Agree with the      | Cisterns serve as one of many important tools for use by the SFFD in response   | R2           | The plan discussed in Recommendation R1            | President, San Francisco | Requires further    | The commitment of sources for specific uses on specific   |
|                      | гэ | added with funds from ESER bonds, but cisterns    | Fire Commission          | _                   |   |              | 1 .  | Fire Commission          |                     | <b>1</b>  |
| Too Late:            |    | 1   |                          | finding             | to a disaster. Cistern locations are strategically located in the City in the event   | [101 F1-F6]  | 1  |                          | analysis            | timelines for San Francisco's public infrastructure is the work of  |
| Aggressively Expand  |    | only have up to about an hour of water supply     | [September 15, 2019]     |                     | of a major conflagration to assist as a "Demarcation Line" on some of The   |              | financing sources, for the installation within 15  | [September 15, 2019]     |                     | the 10-Year Capital Plan. The plan discussed in Recommendation  |
| and Enhance Our      |    | and thus do not provide sufficient water for      |                          |                     | City's major thoroughfares. This was realized after the 1906 earthquake. With   |              | years of a high-pressure, multi-sourced,           |                          |                     | 1 will be acknowledged in the Capital Plan, and based on  |
| High-Pressure        |    | fighting fires following a major earthquake.      |                          |                     | work accomplished through the ESER bond program, cisterns have been   |              | seismically safe emergency water system for        |                          |                     | analysis, will be done on the capital plan timeline. The capital  |
| Emergency            |    |   |                          |                     | seismically improved throughout the City and the overall number of cisterns   |              | those parts of the City that don't currently have  |                          |                     | planning process gathers, documents, and balances planned   |
| Firefighting Water   |    |   |                          |                     | has increased to approximately 230, providing the Fire Department access to   |              | one, i.e., by no later than June 30, 2034.         |                          |                     | funding for needs across the public infrastructure portfolio and  |
| System               |    |   |                          |                     | millions of gallons of water in an emergency.   |              |  |                          |                     | across San Francisco's resilience challenges. The Capital Plan has  |
| [July 17, 2019]      |    |   |                          |                     |   |              |  |                          |                     | longstanding funding principles to guide the prioritization of  |
|                      |    |   |                          |                     |   |              |  |                          |                     | public infrastructure investments. These investments are tiered:  |
|                      |    |   |                          |                     |   | 1            |  |                          |                     | (1) address legal and/or regulatory mandates; (2) ensure public   |
|                      |    |   |                          |                     |   |              |  |                          |                     | safety and enhance resilience; (3) preserve assets and promote  |
|                      |    |   |                          |                     |   |              |  |                          |                     | sustainability; (4) advance planned and programmatic needs;   |
|                      |    |   |                          |                     |   | 1            |  |                          |                     | and (5) promote economic development. In the next 10-Year   |
|                      |    |   |                          |                     |   | 1            |  |                          |                     | Capital Plan and those that follow, the City will continue to   |
|                      |    |   |                          |                     |   |              |  |                          |                     | analyze priority projects and programs and identify sources to  |
|                      |    |   |                          |                     |   |              |  |                          |                     | advance those priorities. Committing to entirely funding a single   |
|                      |    |   |                          |                     |   |              |  |                          |                     | program out of context and without regard for the trade-offs of   |
|                      |    |   |                          |                     |   | 1            |  | 1                        |                     | that commitment would be out of step with the City's  |
|                      |    |   |                          |                     |   | 1            |  |                          |                     | longstanding and highly regarded capital planning process and   |
|                      |    |   |                          |                     |   |              |  |                          |                     | likely create significant vulnerabilities elsewhere in the portfolio.   |
|                      |    |   |                          |                     |   |              |  |                          |                     | inkery create significant vulnerabilities eisewhere in the portiono.  |
|                      |    |   |                          |                     |   | 1            |  | 1                        |                     |   |
| 1                    |    | 1   |                          |                     |   | I            |  | 1                        |                     |   |

WSS Page 2 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>Higher<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]        | F4 | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. |                | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Will be implemented          | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
|--|----|---|---|------------------------|---|----------------|--|---|------------------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. |                | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.    | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further<br>analysis | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The SFPUC, SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the AWSS system's seismic reliability and range of coverage. Enhancing the AWSS range of coverage to all areas of the City would require the allocation of funds to do so. The three agencies will continue to develop and implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the City intends to use the best possible technology available to meet the performance standards of the SFFD. | R5<br>[for F4] | The SFFD should strategically locate the majority of the PWSS hose tenders in areas that at present only have low-pressure hydrants and/or cisterns.   | Fire Commission   | Will be implemented          | The Department is currently finalizing specifications for these units, after which they will go out to bid through the City's procurement processes before construction. It is anticipated the Department will take receipt of these units in the second half of 2020/early 2021. These hose tenders are a heavy-duty apparatus designed to be able to be deployed and moved throughout the City depending on need, giving the Department needed operational flexibility in its response.  |

AWSS Page 3 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient SF strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure  | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will  |
|--|----|--|---|---|-------------|--|---|--|
|  |    |  |   | that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFFD, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design.  |             |  |   | sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | As the City considers what is essential to protect San Francisco, it is important to acknowledge our multiple, complex resilience challenges. These challenges are documented in the Resilient SF strategy (2016) and underlie the strategic efforts of our capital investments as represented in the 10-Year Capital Plan (last updated 2019). These challenges are: Earthquakes, Sea Level Rise/Climate Change, Aging Infrastructure, Unaffordability, and Social Inequity. All of these challenges represent meaningful threats to San Franciscans, their property, and their ability to make a life in the city. In making decisions about priority investments, San Francisco must keep an eye on all of these challenges, identify the areas of greatest need across them, and make progress on all fronts simultaneously. The City has taken significant steps since 2010 to ensure that the City has a high-pressure multi-sourced, seismically safe EFWS. Since the passage of the first Earthquake Safety and Emergency Response Bond in 2010, SFPUC, SFFD, SF Public Works have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design. | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.    | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high pressure, multi-sourced, seismically safe emergency firefighting water supply. | Fire Commission<br>[September 15, 2019]                             | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.   |             | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. |   | Ensuring that San Francisco has the infrastructure and resources to be well prepared to fight fires in all parts of San Francisco is something that will be a focus of the next 10-Year Capital Plan. Per Administrative Code 3.20, that Plan must be submitted to the Mayor and Board no later than March 1 of each odd-numbered year for approval no later than May 1. The requested presentation would be delivered as part of that Plan's submission to enable holistic planning across San Francisco's resilience challenges. Updates available on this timeline would be included. The City cannot discuss the project and timeline until the ESER 2020 plan passes. For this reason, the City will sync this recommendation with the Capital Plan, and push back the timeline to December 31, 2021.   |

WSS Page 4 of 7

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |    | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high pressure, multi-sourced, seismically safe emergency firefighting water supply.   | Fire Commission<br>[September 15, 2019]                             | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  | R2 [for F1-F6] from F1-F6] fro | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further analysis    | The commitment of sources for specific uses on specific timelines for San Francisco's public infrastructure is the work of the 10-Year Capital Plan. The plan discussed in Recommendation 1 will be acknowledged in the Capital Plan, and based on analysis, will be done on the capital Plan, and based on analysis, will be done on the capital plan timeline. The capital planning process gathers, documents, and balances planned funding for needs across the public infrastructure portfolio and across San Francisco's resilience challenges. The Capital Plan has longstanding funding principles to guide the prioritization of public infrastructure investments. These investments are tiered: (1) address legal and/or regulatory mandates; (2) ensure public safety and enhance resilience; (3) preserve assets and promote sustainability; (4) advance planned and programmatic needs; and (5) promote economic development. In the next 10-Year Capital Plan and those that follow, the City will continue to analyze priority projects and programs and identify sources to advance those priorities. Committing to entirely funding a single program out of context and without regard for the trade-offs of that commitment would be out of step with the City's longstanding and highly regarded capital planning process and likely create significant vulnerabilities elsewhere in the portfolio. |
|--|----|--|---|------------------------|--|--|---|------------------------------|---|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |    | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high pressure, multi-sourced, seismically safe emergency firefighting water supply.   | Fire Commission<br>[September 15, 2019]                             | Disagree, wholly       | Decisions about programming and funding levels of future ESER bonds and other complementary sources that could support the expansion of the AWSS have yet to be made.  | R4 As interim measure, by no later than June 30, [for F6-F7] 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further analysis    | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multi-year term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for procurement of the apparatus. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and priority.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |    | The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSS hose tenders would provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multisourced, seismically safe emergency water supply can be developed in those areas. | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. While the Department currently has five older hose tenders spread-out throughout the City, these new units are much more modern and provide the Department with a number of operational benefits, including the following: the capability of pumping and drafting water from any water source; extending the current AWSS system infrastructure; carrying 6,000 feet of hose for deployment; a 5,500 gallon per minute (GPM) on-board water pump and a 3,000 GPM portable submersible water pump; on-board monitor with a 525 foot reach; and four wheel drive. In addition, the Department has been successful in advocating and receiving Federal grant funds to assist with purchasing various PWSS equipment (valves, hose, ramps, etc.), and will continue to advocate for alternative sources of funding to increase the inventory of PWSS equipment. | [for F6-F7] 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Requires further<br>analysis | The Fire Department has been allocated funding to purchase five units through funds from the FY19-20 City budget and an allocation from the State. The Department is currently working with the Office of Contract Administration to develop a multi-year term contract for hose tenders so in the case that additional funding is secured in future years, the Department will be able to reduce the amount of time for procurement of the apparatus. Each hose tender cost \$1 million each, and we need to weigh purchase of additional hose tenders to other budget request and priority.   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F8 | Redundancy is an important feature of an emergency firefighting water system.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Agree with the finding |  | R6 [for F8-F9] The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019] | Will be implemented          | SFPUC and SFFD will complete this study by June 30, 2021.   |

VSS Page 5 of 7

|                      |     | In  | To                       | la:                 | Turking the state of the state | 1 50        | Tri croup il crea il crea                       | la :1 : 0 = :            | haent to the state  | legging terms ill. I all the second in the s |
|----------------------|-----|---|--------------------------|---------------------|---|-------------|---|--------------------------|---------------------|--|
| Act Now Before It Is | F9  | Current plans to extend protections to the        | President, San Francisco | Disagree, partially | While it is true that the SFPUC and SFFD are studying four potential water  | R6          | The SFPUC, the SFFD and the SF Department of    | President, San Francisco | Will be implemented | SFPUC and SFFD will complete this study by June 30, 2021.  |
| Too Late:            |     | western part of the City do not include any high- | Fire Commission          |                     | sources proposed to supply a potable EFWS on the west side of the City, which   | [for F8-F9] | · -   | Fire Commission          |                     |  |
| Aggressively Expand  |     | pressure water sources north of Golden Gate       | [September 15, 2019]     |                     | are not located north of Golden Gate Park, which by no means would reduce   |             | pump stations to improve the redundancy of      | [September 15, 2019]     |                     |  |
| and Enhance Our      |     | Park.   |                          |                     | the proposed system's resiliency, reliability, performance, or ability to provide   |             | water sources, especially on the west side.     |                          |                     |  |
| High-Pressure        |     |   |                          |                     | abundant high-pressure water for fire suppression to the Richmond District  |             | Findings and recommendations from this study    |                          |                     |  |
| Emergency            |     |   |                          |                     | after a seismic event. San Francisco is unique in that there are 11 in-city   |             | should be presented to the Board of Supervisors |                          |                     |  |
| Firefighting Water   |     |   |                          |                     | reservoirs, with a total water capacity of approximately 413,000,000 gallons.   |             | by no later than June 30, 2021.                 |                          |                     |  |
| System               |     |   |                          |                     | Additionally, Lake Merced, also located within City Limits, has an additional   |             |   |                          |                     |  |
| [July 17, 2019]      |     |   |                          |                     | approximately 1,000,000,000 gallons. The potable EFWS system for the  |             |   |                          |                     |  |
|                      |     |   |                          |                     | Westside of San Francisco that is being developed and analyzed would provide  |             |   |                          |                     |  |
|                      |     |   |                          |                     | that the new EFWS pipeline in the Sunset and Richmond Districts could be  |             |   |                          |                     |  |
|                      |     |   |                          |                     | supplied from four sources of water at two locations. The first two water   |             |   |                          |                     |  |
|                      |     |   |                          |                     | sources could be supplied to the EFWS pipeline via a 30,000 gallon per minute   |             |   |                          |                     |  |
|                      |     |   |                          |                     | pump station in the vicinity of Lake Merced. The two sources being studied for  |             |   |                          |                     |  |
|                      |     |   |                          |                     | this pump station are Lake Merced, which has a water supply of approximately  |             |   |                          |                     |  |
|                      |     |   |                          |                     | one billion gallons, and a 60" seismically resilient SFPUC Hetch Hetchy Regional  |             |   |                          |                     |  |
|                      |     |   |                          |                     | Water System pipeline. The proposed potable EFWS also is analyzing the  |             |   |                          |                     |  |
|                      |     |   |                          |                     | inclusion of a second 30,000 gallons per minute pump station in the vicinity of   |             |   |                          |                     |  |
|                      |     |   |                          |                     | the SFPUC's Sunset Reservoir that could be supplied water by two sources: (1)   |             |   |                          |                     |  |
|                      |     |   |                          |                     | the 90 million gallon north basin of the Sunset Reservoir, which recently   |             |   |                          |                     |  |
|                      |     |   |                          |                     | underwent a \$64 million seismic retrofit, and (2) a 54" seismically resilient  |             |   |                          |                     |  |
|                      |     |   |                          |                     | SFPUC Hetch Hetchy Regional Water system pipeline.  |             |   |                          |                     |  |
|                      |     |   |                          |                     |   |             |   |                          |                     |  |
| Act Now Before It Is | F10 | The "reliability scores" being used by the SFPUC  | President, San Francisco | Disagree, partially | Fire Response Areas (FRAs) were utilized by SFPUC and SFFD in the planning  |             |   |                          |                     |  |
| Too Late:            |     | impart an overly optimistic impression of the     | Fire Commission          |                     | study CS-199. This study divided the City into areas based on those defined by  |             |   |                          |                     |  |
| Aggressively Expand  |     | protection provided.                              | [September 15, 2019]     |                     | the SFFD for initial alarm response and were called Fire Response Areas (FRAs).   |             |   |                          |                     |  |
| and Enhance Our      |     | · ·   |                          |                     | Probable fire demands were developed for each FRA using 1000 sets of fire   |             |   |                          |                     |  |
| High-Pressure        |     |   |                          |                     | demands generated by Charles Scawthorn, PhD using a Monte Carlo analysis of   |             |   |                          |                     |  |
| Emergency            |     |   |                          |                     | fire ignitions and fire growth using the ground motions from the design   |             |   |                          |                     |  |
| Firefighting Water   |     |   |                          |                     | earthquake (7.8 magnitude). The fire ignitions were generated using methods   |             |   |                          |                     |  |
| System               |     |   |                          |                     | similar to those used for the Community Action Plan for Seismic Safety (CAPSS)  |             |   |                          |                     |  |
| [July 17, 2019]      |     |   |                          |                     | study (ATC 2010). The fire ignitions subsequently were used to develop water  |             |   |                          |                     |  |
|                      |     |   |                          |                     | demands that were aggregated into the likely fire demands for each FRA. The   |             |   |                          |                     |  |
|                      |     |   |                          |                     | water supplies for each FRA were developed using the reliability modeling tool  |             |   |                          |                     |  |
|                      |     |   |                          |                     | GIRAFFE, developed at Cornell University by Professor Thomas D. O'Rourke.   |             |   |                          |                     |  |
|                      |     |   |                          |                     | GIRAFFE performs internal Monte Carlo analysis to damage pipes in the system  |             |   |                          |                     |  |
|                      |     |   |                          |                     | for multiple scenarios. The water supplies developed by GIRAFFE were  |             |   |                          |                     |  |
|                      |     |   |                          |                     | aggregated into the likely water supplies for each FRA. It should be noted that   |             |   |                          |                     |  |
|                      |     |   |                          |                     | the likely water supplies for each FRA assumed no water from the City's   |             |   |                          |                     |  |
|                      |     |   |                          |                     | municipal water system (MWSS), which is quite conservative and highly   |             |   |                          |                     |  |
|                      |     |   |                          |                     | unlikely even after a seismic event. The reliability score for each FRA is  |             |   |                          |                     |  |
|                      |     |   |                          |                     | calculated using the sum of all water supplies for each FRA and dividing it by  |             |   |                          |                     |  |
|                      |     |   |                          |                     | the FRA water demand. The reliability scores do exactly that - estimate how   |             |   |                          |                     |  |
|                      |     |   |                          |                     | much EFWS water will be available for firefighting demands in a given FRA. The  |             |   |                          |                     |  |
|                      |     |   |                          |                     | reliability scores are not meant to represent an estimate of the fire protection  |             |   |                          |                     |  |
|                      |     |   |                          |                     | for a given house, block, or blocks. Rather it is a measure of the EFWS capacity  |             |   |                          |                     |  |
|                      |     |   |                          |                     | and demand. The SFPUC recognizes the need to analyze potential EFWS   |             |   |                          |                     |  |
|                      |     |   |                          |                     | demands on a more detailed level, and the agency began the process of doing   |             |   |                          |                     |  |
|                      |     |   |                          |                     | so.   |             |   |                          |                     |  |
|                      |     |   |                          |                     |   |             |   |                          |                     |  |
|                      |     |   |                          |                     |   |             |   |                          |                     |  |
|                      |     |   |                          |                     |   |             |   |                          |                     |  |
| 1                    |     | 1   | 1                        |                     |   |             | 1   | 1                        |                     |  |

VSS Page 6 of 7

#### 2018-2019 CIVIL GRAND JURY FINDINGS, RECOMMENDATIONS, AND RESPONSES TO FINDINGS AND RECOMMENDATIONS

| Act Now Before It Is | F11 | The City does not have a timeline to fund and   | President, San Francisco | Disagree, partially | The EFWS was built after the 1906 earthquake, and its location, primarily in the  | ı         |  | l                        |                     |   |
|----------------------|-----|---|--------------------------|---------------------|---|-----------|--|--------------------------|---------------------|---|
| Too Late:            | LII | complete development of a high-pressure, multi  |                          | 0 / 1               | northeast portion of San Francisco, corresponds to the location of the majority   |           |  |                          |                     |   |
| Aggressively Expand  |     | sourced, seismically safe emergency water   | [September 15, 2019]     |                     | of the city's population at that time. Since 2010, the SFPUC, SFFD, and Public  |           |  |                          |                     |   |
| and Enhance Our      |     | supply for all parts of the City, including poor  | [September 15, 2015]     |                     | Works have made critical improvements to the existing EFWS system.  |           |  |                          |                     |   |
| High-Pressure        |     |   |                          |                     |   |           |  |                          |                     |   |
| 1 -                  |     | neighborhoods that historically have not been as<br>well protected as the downtown business | `[                       |                     | Expanding the EFWS prior to ensuring that the existing EFWS is resilient and reliable would have contradicted best engineering practices. The SFPUC and |           |  |                          |                     |   |
| Emergency            |     | ·   |                          |                     | = =:  |           |  |                          |                     |   |
| Firefighting Water   |     | district and many richer neighborhoods.   |                          |                     | SFFD are developing plans that would implement a resilient, robust, and   |           |  |                          |                     |   |
| System               |     |   |                          |                     | redundant potable EFWS for the Westside of San Francisco. The potable EFWS  |           |  |                          |                     |   |
| [July 17, 2019]      |     |   |                          |                     | that is being developed and analyzed would propose the best method for  |           |  |                          |                     |   |
|                      |     |   |                          |                     | bringing a robust and resilient high-pressure firefighting water system to the  |           |  |                          |                     |   |
|                      |     |   |                          |                     | Western neighborhoods in San Francisco that is capable of providing water to  |           |  |                          |                     |   |
|                      |     |   |                          |                     | the SFFD firefighters at the high-pressure needed for firefighters to combat  |           |  |                          |                     |   |
|                      |     |   |                          |                     | large fires after a seismic event, and is likely to include over 14 miles of new  |           |  |                          |                     |   |
|                      |     |   |                          |                     | EFWS pipelines and potentially two new pump stations likely to be supplied by   |           |  |                          |                     |   |
|                      |     |   |                          |                     | four water sources. The SFPUC and SFFD's potable EFWS is being designed in a  |           |  |                          |                     |   |
|                      |     |   |                          |                     | manner that allows for agility and the flexibility to add new technologies and  |           |  |                          |                     |   |
|                      |     |   |                          |                     | water sources, and in a manner that allows the piping network to be extended  |           |  |                          |                     |   |
|                      |     |   |                          |                     | in the future to serve additional areas.  |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
| Act Now Before It Is |     |   |                          |                     |   | R9        | By no later than December 31, 2020 the SFPUC,      | President, San Francisco | Has been            | (a) SFPUC implements "best practices" for the maintenance of      |
| Too Late:            |     |   |                          |                     |   |           | with the advice and subject to the approval of     | Fire Commission          |                     | AWSS assets in collaboration with SFFD, and consistent with the   |
| Aggressively Expand  |     |   |                          |                     |   | ` '       | the SFFD, should (a) implement "best practices"    | [September 15, 2019]     | •                   | terms of the Memorandum of Understanding Regarding                |
| and Enhance Our      |     |   |                          |                     |   |           | for the maintenance of AWSS assets, and (b)        |                          |                     | Operation and Maintenance of San Francisco Water Supply           |
| High-Pressure        |     |   |                          |                     |   |           | redefine which AWSS valves in the system are       |                          |                     | Systems Related to Fire Suppression (MOU), SFPUC will seek        |
| Emergency            |     |   |                          |                     |   |           | "critical," and, therefore, require more attention |                          |                     | SFFD's written approval for "any modifications that could         |
| Firefighting Water   |     |   |                          |                     |   |           | and priority in the SFPUC's maintenance plans.     |                          |                     | compromise" the system's function as a high pressure              |
| System               |     |   |                          |                     |   |           | and priority in the 511 oc 3 maintenance plans.    |                          |                     | firefighting system (MOU, page 2).                                |
| [July 17, 2019]      |     |   |                          |                     |   |           |  |                          |                     | (b) The AWSS critical valves have been identified and will be     |
| [July 17, 2019]      |     |   |                          |                     |   |           |  |                          |                     | · ·   |
|                      |     |   |                          |                     |   |           |  |                          |                     | exercised every year through the AWSS Critical Valve Exercise     |
|                      |     |   |                          |                     |   |           |  |                          |                     | Program.  |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  |                          |                     |   |
| Act Now Before It Is |     |   | <u> </u>                 |                     |   | R10       | By no later than June 30, 2020, the 2015 MOU       | President, San Francisco | Will be implemented | The Fire Department conducts weekly hose/hose tender drills       |
| Too Late:            |     |   |                          |                     |   |           | between the SFPUC and the SFFD should be           | Fire Commission          |                     | · · · · · · · · · · · · · · · · · · ·                             |
|                      |     |   |                          |                     |   | [101 F13] |  | [September 15, 2019]     |                     | that it rotates through companies throughout the City. The Fire   |
| Aggressively Expand  |     |   |                          |                     |   |           | amended to include a detailed roadmap for          | [September 15, 2019]     |                     | Department will work with the SFPUC to have them in               |
| and Enhance Our      |     |   |                          |                     |   |           | annual emergency response exercises, including     |                          |                     | attendance and participate in these drills. SFFD will also commit |
| High-Pressure        |     |   |                          |                     |   |           | simulated disaster and earthquake drills           |                          |                     | to working with the PUC to enhance the scope and frequency of     |
| Emergency            |     |   |                          |                     |   |           | involving the AWSS and the PWSS.                   |                          |                     | trainings in the future for improved collaboration. SFFD and      |
| Firefighting Water   |     |   |                          |                     |   |           |  |                          |                     | SFPUC will work together to amend the MOU by June 30, 2020.       |
| System               |     |   |                          |                     |   |           |  |                          |                     |   |
| [July 17, 2019]      |     |   |                          |                     |   |           |  |                          |                     |   |
|                      |     |   |                          |                     |   |           |  | 1                        |                     |   |

Page 7 of 7



#### **MEMORANDUM**

TO:

Mayor and Members of the Board of Supervisors

CC:

Angela Calvillo, Clerk of the Board of Supervisors

FROM:

Anatolia Lubos, Grand Jury Administrative Analyst

DATE:

July 18, 2019

SUBJECT:

Civil Grand Jury Report, "Act Now Before It Is Too Late: Aggressively

Expand and Enhance Our High-Pressure Emergency Firefighting Water

System"

The previous version of the aforementioned Civil Grand Jury report as received and distributed on Monday, July 15, 2019 was incomplete and omitted Appendices F to R (inclusive).

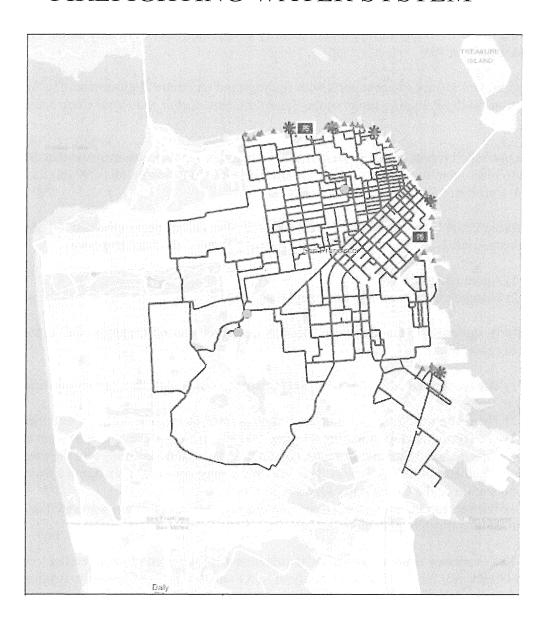
Enclosed is the complete report.

BOARD OF SUPER VISORS
SAN FRANCISCO

7019 JUL 18 PM 4: 09



# ACT NOW BEFORE IT IS TOO LATE: AGGRESSIVELY EXPAND AND ENHANCE OUR HIGH-PRESSURE EMERGENCY FIREFIGHTING WATER SYSTEM





### THE CIVIL GRAND JURY AND ITS OPERATIONS

California state law requires that all 58 counties impanel a Grand Jury to serve during each fiscal year. California Penal Code Section 905; California Constitution, Article I, Section 23

The Civil Grand Jury investigates and reports on one or more aspects of the County's departments, operations, or functions. *California Penal Code Sections 925, 933(a)* 

Reports of the Civil Grand Jury do not identify individuals interviewed by name. *California Penal Code Section 929* 

The Civil Grand Jury issues reports with findings and recommendations resulting from its investigations to the Presiding Judge of the Superior Court. *California Penal Code Section* 933(a)

Each published report includes a list of those elected officials or departments that are required to respond to the Presiding Judge of the Superior Court within 60 or 90 days as specified. *California Penal Code Section 933* 

California Penal Code Section 933.05 is very specific with respect to the content of the required responses. Under Section 933.05(a), for each finding, the response must:

- 1) Agree with the finding, or
- 2) Disagree with it, wholly or partially, and explain why.

Similarly, under Penal Code Section 933.05(b), for each recommendation, the responding party must report that:

- 1) The recommendation has been implemented, with a summary of the implemented action; or
  - 2) The recommendation has not been implemented but will be within a set timeframe; or
- 3) The recommendation requires further analysis, with an explanation of what additional study is needed, and the timeframe for conducting that additional study and the preparation of suitable material for discussion. This timeframe may not exceed six months from the date of publication of the Civil Grand Jury's report; or
- 4) The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Any San Francisco resident who is a US citizen and is interested in volunteering to serve on the Civil Grand Jury for the City and County of San Francisco is urged to apply. Additional information about the San Francisco Civil Grand Jury, including past reports, can be found online at <a href="http://civilgrandjury.sfgov.org/index.html">http://civilgrandjury.sfgov.org/index.html</a>.



### **MEMBERSHIP ROSTER**

RASHA HARVEY (Foreperson)

JANET ANDREWS HOWES (Parliamentarian)

LINDA BADGER

ANDREW BENJAMIN

GORDON CRESPO

KRISTINE EQUIHUA (Technology Secretary)

STEPHEN GARBER

JONATHAN HILL

LEONARD KULLY (Correspondence Secretary)

WILLIAM LEE (Foreperson Pro Tem)

FRANK NETTLETON

NONA RUSSELL

RANDALL SMITH (Recording Secretary)

KAAREN STRAUCH BROWN

RUSH STURGES

MARTHA SUTHERLIN

JASON TAM

MICHAEL WIXTED

#### **EXECUTIVE SUMMARY**

San Francisco is one of the most vulnerable cities in the world, and certainly in the United States, to the risk of fire following an earthquake. In 1906, the City suffered tremendous destruction and devastation from the fires that followed a major earthquake. Over 3,000 people died and approximately 28,000 buildings were destroyed. In 1995, the 6.9-magnitude Kobe, Japan earthquake ignited over 100 fires, with several large conflagrations and major fire damage. We know the question is when, not if, another major earthquake will strike San Francisco and ignite numerous fires.

The Civil Grand Jury believes it is essential that we take prompt and aggressive action to expand and enhance our defenses against the inevitable fires following an earthquake before it is too late. All parts of the City – north and south, east and west, rich and poor, downtown and residential neighborhoods – deserve to be well protected against this catastrophic risk.

Today, the City has a seismically safe high-pressure Auxiliary Water Supply System (AWSS) -- separate and distinct from the low-pressure municipal water supply system (MWSS) -- that provides excellent firefighting protection to parts of the City. However, large parts of the City, such as the outer Richmond, outer Sunset, and Bayview/Hunters Point, among others, do not have a high-pressure AWSS and are not nearly as well protected.

Plans to develop a seismically safe high-pressure AWSS for the western portions of our City are now moving forward. But even though City leaders have known about this issue for decades, the City still does not have concrete plans or a timeline to provide a more robust emergency firefighting water supply for all parts of the City that need one.

In 2014, the U.S. Geological Survey (USGS) estimated there is a 72 percent chance of one or more magnitude 6.7 or greater earthquakes striking the Bay Area between 2014 and 2043. Earlier this year Mayor London Breed announced that planning for such a disaster is a priority. But at our current pace and funding levels, expansion of a high-pressure AWSS to currently unserved parts of the City will not be completed for another thirty-five (35) years or more—well after the USGS predicts we will be struck by one or more major earthquakes.

The Civil Grand Jury makes the following recommendations, among others which are more fully discussed herein:

- The City should be prepared to fight fires in all parts of the City in the event of a repeat of a 1906 size earthquake;
- The City should aggressively develop a high-pressure, multi-sourced, seismically safe emergency water supply for those parts of the City that don't currently have one, with a target completion date of no later than 2034;
- As an interim measure, the City should immediately replace and expand its inventory of Portable Water Supply System (PWSS) hose tenders, which are comparatively cheap, can be acquired much more quickly than the high-pressure AWSS, and were essential in fighting the 1989 Loma Prieta fire, but are now past their useful life;
- The new PWSS hose tenders should be strategically placed in those areas of the City that do not have a high-pressure, multi-sourced, seismically safe emergency water supply.

## **TABLE OF CONTENTS**

| Section  | Page No. |
|--|----------|
| Executive Summary  | 1        |
| Table of Contents  | 2        |
| Background and Problem Statement                           | 4        |
| A. Fire Following Earthquake Is a Major Risk to The City   | 4        |
| B. AWSS Background and Current Status                      | 5        |
| C. Problem Statement                                       | 7        |
| Methodology  | 8        |
| Discussion   | 9        |
| A. San Francisco is Highly Vulnerable to Fires Following a |          |
| Major Earthquake   | 9        |
| B. The USGS Warns the San Francisco Bay Area Has a High    |          |
| Likelihood of a Major Earthquake                           | 13       |
| C. The Existing High-pressure AWSS System Only Covers      |          |
| Part of the City   | 15       |
| D. The Municipal (Domestic) Water Supply System Is "Highly |          |
| Vulnerable to Catastrophic Failure"                        | 18       |
| E. Cisterns Provide Limited Protection                     | 20       |
| F. The PWSS Inventory Needs to Be Modernized and Expanded  | 23       |
| G. Efforts to Expand the High-pressure AWSS Need           |          |
| to Be Accelerated  | 26       |
| H. The Bottom Line: Act Fast, but Ensure Redundancy        | 34       |
| I. Current FRA Reliability Scores Promote Overconfidence   | 36       |
| J. Maintenance and Training Issues                         | 37       |
| Conclusion   | 40       |
| Findings   | 41       |
| Recommendations  | 43       |
| Required Responses   | 45       |
| Glossary and Table of Acronyms and Abbreviations           | 46       |
| Appendices   | 49       |

| List of Figures   | Page No. |
|---|----------|
|   |          |
| Figure 1: Population Density By County                                  | 10       |
| Figure 2: Population Density By City                                    | 11       |
| Figure 3: Map of Existing High-Pressure AWSS                            | 16       |
| Figure 4: Map of Existing Cisterns                                      | 21       |
| Figure 5: Map of EFWS Reliability Scores by FRA as of 2010              | 27       |
| Figure 6: Map of EFWS Reliability Scores by FRA After 2010              |          |
| and 2014 ESER Bond Work Completed                                       | 28       |
| Figure 7: Conceptual Proposed Alignment for Potable West Side AWSS      | 30       |
|   |          |
|   |          |
| List of Tables  | Page No. |
|   |          |
| Table 1: Bounds for Losses to Buildings Due to Fire Following Earthquak | ke 12    |
| Table 2: San Francisco Region Section of Table from March 2015 from     | 14       |
| USGS Fact Sheet 2015-3009   |          |
| Table 3: HP AWSS Hydrants and Miles of Main by District                 | 17       |
| Table 4: Cisterns by Supervisorial District                             | 22       |

### **BACKGROUND AND PROBLEM STATEMENT**

No one knows when the next large earthquake is coming. But it is coming.

## A. Fire Following Earthquake Is a Major Risk to The City

"San Francisco will sustain major damage from fires following future earthquakes, in addition to the damage caused by shaking." As explained in a 2010 report prepared for the City,

In San Francisco, over 90 percent of buildings are constructed from wood, many of them directly touching their neighbor buildings. Earthquakes in places with this type of construction have caused the two largest peacetime urban fires in history: in 1906 in San Francisco and in 1923 in Tokyo.<sup>2</sup>

A main reason the 1906 fire was so devastating is that the earthquake destroyed much of the water system.<sup>3</sup>

Fires following earthquakes remain a major threat today. In 1994, approximately 110 fires were ignited after the Northridge earthquake in Los Angeles County, even though it was "only" a 6.7-magnitude earthquake. In 1995, the 6.9-magnitude Kobe, Japan earthquake ignited over 100 fires, with several large conflagrations and major fire damage. In Kobe "broken water"

<sup>&</sup>lt;sup>1</sup> Applied Technology Council (ATC) ATC 52-1, Here Today—Here Tomorrow: The Road to Earthquake Resilience in San Francisco, Potential Earthquake Impacts, prepared for the Department of Building Inspection, CCSF, under the Community Action Plan for Seismic Safety (CAPSS) Project (2010) ("ATC 52-1, Potential Earthquake Impacts"), <a href="https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf">https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf</a> at p. 25.

<sup>&</sup>lt;sup>2</sup> *Id*.; footnote omitted.

<sup>&</sup>lt;sup>3</sup> See Scawthorn, C., O'Rourke, T. D. & Blackburn, F., *The 1906 San Francisco Earthquake and Fire---Enduring Lessons for Fire Protection and Water Supply*, Earthquake Spectra, Volume 22, S135-S158 (2006) ("Scawthorn, O'Rourke & Blackburn, 1906 Lessons"), <a href="http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf">http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf</a>; see also Scawthorn, C., Water Supply In Regard to Fire Following Earthquake, Pacific Earthquake Engineering Research Center, College of Engineering, University of California, sponsored by the California Seismic Safety Commission, Berkeley (2011) ("PEER 2011, Water Supply Following Earthquake"), <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a> at p. 5.

<sup>&</sup>lt;sup>4</sup> See discussion in Scawthorn, C., SPA Risk LLC, *Analysis of Fire Following Earthquake Potential for San Francisco, California*, prepared for the Applied Technology Council on behalf of the Department of Building Inspection City and County of San Francisco (October 2010 Rev. 1) ("Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco"), <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 7; PEER 2011. Weter Supply Following Forthquake, https://poor.berkelay.edu/sites/documt/files/wyshpager.2011. 08

<sup>2011,</sup> Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a> at pp. 12-17.

<sup>&</sup>lt;sup>5</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a> at pp. 17-19; ATC, 52-1, Potential Earthquake Impacts, <a href="https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf">https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf</a> at p. 25.

mains left the fire department helpless, and fires destroyed more than 7,000 buildings."<sup>6</sup> A magnitude 7.9 earthquake would be an estimated 10 times larger than a magnitude 6.9 earthquake, and would release approximately 31 times more energy.<sup>7</sup>

San Francisco is by far the most densely populated large city in California and is the second most densely populated large city in the country.<sup>8</sup> With mostly wood construction in many areas, this dense City remains at significant risk.<sup>9</sup>

### B. AWSS Background and Current Status

After the 1906 earthquake and its devastating fires, the City built an independent emergency water supply for firefighting, known as the AWSS.<sup>10</sup>

The AWSS is a separate, non-potable emergency firefighting water supply system that at present consists of approximately 135 miles of high-pressure (HP) pipelines, 230 cisterns, two above-ground storage tanks, a reservoir, and two salt-water pumping stations. <sup>11</sup> Applying a "belt

People sometimes confuse Emergency Firefighting Water System (EFWS) and AWSS, or use them interchangeably. EFWS is the broader concept, including all emergency sources of water and the means for delivering them. AWSS is sometimes described as including cisterns, and other times not. Compare CS-199, at p. 7, ("AWSS is a water supply system consisting of pipelines, cisterns, reservoir, storage tanks, and salt-water pump stations.") <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a> with AECOM, Westside Emergency Firefighting Water Systems Options Analysis Report, January 5, 2018 ("2018 Westside Options Analysis"), at pp. 10-13, 20 (differentiating between EFWS and AWSS, and discussing cisterns as a supplement to but not part of AWSS), <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a>.

<sup>&</sup>lt;sup>6</sup> ATC 52-1, Potential Earthquake Impacts, https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf at p. 25.

<sup>&</sup>lt;sup>7</sup> See the United States Geological Survey's "How Much Bigger ....?" Calculator, located at <a href="https://earthquake.usgs.gov/learn/topics/calculator.php">https://earthquake.usgs.gov/learn/topics/calculator.php</a>, where one can compare the relative size and strength of different magnitude earthquakes.

<sup>&</sup>lt;sup>8</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 6.

<sup>&</sup>lt;sup>9</sup> Ibid.

<sup>&</sup>lt;sup>10</sup> See generally SFPUC, Frequently Asked Questions—Fire Suppression Water Systems, dated November 2017 "SFPUC 2017 FAQ", <a href="https://sfwater.org/modules/showdocument.aspx?documentid=11507">https://sfwater.org/modules/showdocument.aspx?documentid=11507</a> attached as Appendix N; see also Scawthorn, O'Rourke & Blackburn, 1906 Lessons, <a href="http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf">http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf</a>

<sup>11</sup> AECOM / AGS, a Joint Venture, CS-199 Planning Support Services for Auxiliary Water Supply System (AWSS) Project Report (Final Report), February2014 ("CS-199"), at p. 7, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>; SFPUC Fact Sheet, dated Summer 2012, located at <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=2501">https://www.sfwater.org/modules/showdocument.aspx?documentid=2501</a> and printed March 6, 2019. The online Fact Sheet is outdated, as the City has added approximately 30 more cisterns through the 2010 and 2014 ESER bonds. The SFFD also has three large capacity fireboats berthed at Pier 22 ½ and an additional, smaller fireboat berthed at the San Francisco Marina Yacht Harbor.

and suspenders" approach, if the City's MWSS mains break leaving low-pressure hydrants useless, firefighters will have access to other sources of water, including the Twin Peaks Reservoir and the Bay. Unlike the MWSS, AWSS pipelines were designed to withstand movement from an earthquake. 12

The AWSS is "remarkably well designed to furnish large amounts of water for firefighting purposes under normal conditions and contains many special features to increase reliability in the event of an earthquake." The AWSS is "designed to provide water at higher pressures than the potable water system, allowing firefighters to use water from the AWSS hydrants without requiring a fire engine." <sup>14</sup>

Another of the key features of the AWSS is its redundancy. The HP AWSS was designed with both a redundant water supply and a gridded main system. <sup>15</sup> This feature provides a more reliable emergency water supply system, allowing potential pipe breaks to be bypassed. <sup>16</sup> As succinctly stated by an outside expert, "the AWSS achieves high reliability by having multiple sources, a highly redundant network and special piping and valves." <sup>17</sup>

The AWSS was originally built over 100 years ago, at a time when the northeast portion of the City contained both the central business district and the majority of the City's population. <sup>18</sup> As a result, the multi-sourced, HP AWSS pipeline network primarily covers just the northeastern part of the City. <sup>19</sup>

The City has been considering expanding the HP AWSS for decades. For example the Analysis by the Ballot Simplification Committee of 1986's Proposition A, Fire Protection Bonds, specifically noted that parts of the City were not served by the HP AWSS:

This report will use EFWS as the broader concept, and will generally use AWSS to refer to the HP AWSS (the 135 miles of pipelines and associated facilities but not including cisterns), although we will not change quotes. This distinction is important, as there are cisterns in the southern and western portions of the City, but not the HP AWSS.

<sup>&</sup>lt;sup>12</sup> CS-199, at p. 8, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055.

<sup>&</sup>lt;sup>13</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at p. 80; see also Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="https://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">https://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at pp.12-15.

 $<sup>^{14}~2018</sup>$  Westside Options Analysis, <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a> at p. 10.

<sup>&</sup>lt;sup>15</sup> *Id.*, at p. 37.

<sup>16</sup> Ibid.

<sup>&</sup>lt;sup>17</sup> C. Scawthorn, January 5, 2018 memorandum to D.Myerson & S.Huang of SFPUC re Review of "Westside Emergency Firefighting Water System Options Analysis" "Scawthorn 2018 memo"), https://www.sfwater.org/modules/showdocument.aspx?documentid=11740.

 $<sup>^{18}</sup>$  See SFPUC 2017 FAQ, Question 2, at  $\underline{\text{https://sfwater.org/modules/showdocument.aspx?documentid=}11507}$  , a copy of which is attached as Appendix N.

<sup>&</sup>lt;sup>19</sup> *Id*.

THE WAY IT IS NOW: Since the 1906 earthquake and fire, the San Francisco Fire Department has had programs to improve its fire protection system. A bond issue in 1977 paid for the most recent improvements, including an extension of the high pressure firefighting water system which operates independently from the City's domestic water supply. However, there are still parts of the City which are not served by that high pressure system.<sup>20</sup>

In June 2003, the 2002-2003 Civil Grand Jury recommended that the HP AWSS be extended "to serve all parts of the City." Yet three decades after the 1986 bond and 16 years after the prior Civil Grand Jury report, many neighborhoods still do not have HP AWSS pipelines. Plans are moving forward to fund a new HP AWSS using potable water on the west side through an upcoming Earthquake Safety and Emergency Response Bond (ESER) issuance, but at the City's current pace it will take approximately 35 years or more to build out a HP AWSS pipeline system that serves all neighborhoods, including the southern portions of the City. The City does not have a plan with a firm timeline for completion of this work or firm plans to fund all the work that needs to be done.

### C. Problem Statement

Certain parts of the City, such as the northeast quadrant, are well protected against the risk of fires following an earthquake. These well-protected areas have a multi-sourced, redundant, Emergency Firefighting Water System (EFWS), including the HP AWSS. Unfortunately, other parts of the City are protected only by the low-pressure MWSS and by cisterns, which are not

The 1986 Ballot Simplification Committee Analysis explained the proposal for Proposition A as paying for improvements including extending the high-pressure system and installing a high-pressure pump station at Lake Merced. Proposition A passed, but large areas of the City still do not have the protection of the independent high-pressure water system, and Lake Merced still does not have a high-pressure pump station. A copy of the Analysis by the Ballot Simplification Committee of the 1986 Proposition A is attached as Appendix L.

<sup>&</sup>lt;sup>21</sup> 2002-2003 Civil Grand Jury for the City and County of San Francisco, Keeping the Faucets Flowing: Water Emergency Preparedness In San Francisco (June 2003), http://civilgrandjury.sfgov.org/2002 2003/Keeping the Faucets Flowing Water Emergency.pdf, at p. 2.

Neighborhoods currently without HP AWSS hydrants include Bayview Heights, Crocker Amazon, Excelsior, Ingleside, Merced Manor/Parkside, Mission Terrace, Oceanview, Outer Mission, Outer Richmond, Outer Sunset, Portola, Sea Cliff, Stonestown, and Sunnyside. A map showing the current layout of HP AWSS pipelines is on the cover and is attached as Appendix I.

<sup>&</sup>lt;sup>23</sup> March 4, 2019 and March 11, 2019 SFPUC presentations and accompanying materials provided to the Emergency Firefighting Water System Management Oversight Committee. The amount of funding potentially available through the 2020 ESER bond and through water rates has been increased since the March 2019 Emergency Firefighting Water System Management Oversight Committee meetings. Thus, it *may* now be somewhat less than the 35 years presented in March. It has been difficult to tie down the City's "pace of funding" given there are no firm long term plans and the amount of funding available through an ESER bond can and does change. Although 35 years may be off somewhat, it remains the best (indeed only) current articulation of pace of funding and a timeline provided to the Civil Grand Jury.

nearly as reliable for fighting fires following a major earthquake and, unlike the HP AWSS, need fire engine support to effectively deliver water to a fire.<sup>24</sup>

The problem addressed in this report is how to ensure that all parts of the City – north and south, east and west, rich and poor, downtown and residential neighborhoods – are well protected from fires following earthquakes before it is too late.

### **METHODOLOGY**

Members of the Civil Grand Jury conducted interviews with representatives of:

- The San Francisco Public Utilities Commission
- The San Francisco Fire Department
- The San Francisco Department of Public Works
- The San Francisco Office of Resilience and Capital Planning
- The San Francisco Department of the Environment
- The San Francisco Fire Commission
- The Board of Supervisors

Members of the Civil Grand Jury also conducted interviews with:

- Retired members of the San Francisco Fire Department
- A retired fire chief from a local jurisdiction
- Technical experts in the fields of engineering, wildfires, and water supply for fighting fires after earthquakes
- Concerned community members

Members of the Civil Grand Jury reviewed numerous planning and engineering reports specifically focusing on the AWSS or the PWSS, listed in Appendix D.

Members of the Civil Grand Jury also reviewed the relevant parts of articles, publications and reports regarding fires following earthquakes and related issues. These more general sources, some of which discuss the AWSS or PWSS but are not solely focused on them, are listed in Appendix E. <sup>25</sup>

<sup>&</sup>lt;sup>24</sup> See discussion of expected problems of relying on a municipal water supply system in Section D of the Discussion, at pp. 18-20.

<sup>&</sup>lt;sup>25</sup> Several of these publications are technical papers, and the Civil Grand Jury is comprised of lay citizens. When we cite or refer to technical papers it is generally for the conclusions or other non-technical information; we do not purport to be knowledgeable regarding the intricacies of fire spread models or the like.

### DISCUSSION

Succinctly stated, "water supply is critical to firefighting." Without a reliable water supply, the San Francisco Fire Department (SFFD) cannot be realistically expected to fight fires following a major disaster such as an earthquake.

# A. San Francisco is Highly Vulnerable to Fires Following a Major Earthquake

San Francisco is highly vulnerable to fire after an earthquake, more than any other city in the country.

As explained in a 2008 article for the International Association for Fire Safety Science,

Densely built environments are highly vulnerable to disasters. Common problems include: (a) narrow streets enabling fire to spread easily from one building to another; (b) streets cluttered with collapsed buildings in an earthquake restricting fire engine access; (c) shortage of open spaces which function as fire breaks or evacuation sites; (d) older and less robust wooden houses that easily collapse and burn in an earthquake ....<sup>27</sup>

San Francisco has significantly higher population density than any other county in California, as shown in Figure 1 on the next page: <sup>28</sup>

<sup>&</sup>lt;sup>26</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 12.

<sup>&</sup>lt;sup>27</sup> Himoto, K., Akimoto, Y., Hokugo, A., and Tanaka, T., Risk and Behavior of Fire Spread in a Densely-built Urban Area, International Association for Fire Safety Science (2008), <a href="http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1000.9412&rep=rep1&type=pdf.">http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1000.9412&rep=rep1&type=pdf.</a> at pp. 267-268 (parenthetical reference omitted). San Francisco does have streets that operate as fire breaks: Market St., Van Ness Ave., Geary St. (west of Gough), Dolores St., Mission St, 19<sup>th</sup> Avenue, Park Presidio Blvd., Alemany Blvd., and Third Street.

 $<sup>^{28} \ \</sup> See \ \underline{https://www.indexmundi.com/facts/united-states/quick-facts/california/population-density\#chart} \ .$ 

Figure 1
Population Density By County



Similarly, based on 2016 data, San Francisco is the eighth densest city in the country with a population above 50,000, and other than New York City is the densest city with a population above 100,000:<sup>29</sup> See Figure 2, below.

Figure 2
Population Density by City

| Search:                     |  |                           |     |                       |      |          |
|-----------------------------|--|---------------------------|-----|-----------------------|------|----------|
| City                        | Population Density (Persons/S<br>Mile) | equare 2016<br>Population |     | d Area (Squ<br>Miles) | ıare |          |
| Union City, New Jersey      | 54,138                                 | 69,296                    | 1   |                       |      | -<br>.A. |
| West New York, New Jersey   | 52,815                                 | 53,343                    | 1   |                       |      |          |
| Hoboken, New Jersey         | 42,484                                 | 54,379                    | 1   |                       |      |          |
| New York, New York          | 28,211                                 | 8,537,673                 | 303 |                       |      |          |
| Passaic, New Jersey         | 22,424                                 | 70,635                    | 3   |                       |      |          |
| Somerville, Massachusetts   | 19,738                                 | 81,322                    | 4   |                       |      |          |
| Huntington Park, California | 19,561                                 | 58,879                    | 3   |                       |      |          |
| San Francisco, California   | 18,581                                 | 870,887                   | 47  |                       |      |          |
| Jersey City, New Jersey     | 17,860                                 | 264,152                   | 15  |                       |      |          |
| Paterson, New Jersey        | 17,438                                 | 147,000                   | 8   |                       |      |          |
| Cambridge, Massachusetts    | 17,316                                 | 110,651                   | 6   |                       |      |          |
| East Orange, New Jersey     | 16,528                                 | 64,789                    | 4   |                       |      |          |

San Francisco also has many narrow streets, and buildings that will almost certainly collapse in an earthquake and obstruct many streets, blocking traffic including fire engines. We also have a heavy concentration of older, wooden homes that are densely concentrated and highly flammable.<sup>30</sup>

<sup>&</sup>lt;sup>29</sup> https://www.governing.com/gov-data/population-density-land-area-cities-map.html.

<sup>&</sup>lt;sup>30</sup> ATC 52-1, Potential Earthquake Impacts, https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf at p. 25.

This is not just the Civil Grand Jury's perspective. Many experts, and numerous witnesses interviewed by the Civil Grand Jury, have opined that San Francisco faces "the most serious conflagration risk" and "will sustain major damage from fires following future earthquakes..."<sup>31</sup>

In July 2010, SPA Risk LLC (Dr. Charles Scawthorn, principal) prepared a report entitled, *Analysis of Fire Following Earthquake Potential for San Francisco, California*, for the Applied Technology Council (ATC) on behalf of the City's Department of Building Inspection.<sup>32</sup> The report concluded that San Francisco is at "significant risk" due to fire following earthquake, and that the SFFD's fire engines<sup>33</sup> "will almost certainly not be able to respond to all post-earthquake fires, which are estimated to be about 100 on average (with a 10% chance of as many as 140) for a magnitude 7.9 San Andreas event."<sup>34</sup>

A key table in that 2010 report is copied below:

Table 1

Bounds for Losses to Buildings Due to Fire Following Earthquake<sup>35</sup>

|                    | 25% - 75% Confidence Range |                     |                                    |  |
|--------------------|----------------------------|---------------------|------------------------------------|--|
|                    | Ignitions                  | Loss<br>\$ billions | Total Burnt Building<br>Floor Area |  |
|                    |                            |                     | Mill. Sq. ft.                      |  |
| San Andreas Mw 7.9 | 68 ~ 120                   | \$ 4.1 ~ \$ 10.3    | 11.2 ~28.2                         |  |
| San Andreas Mw 7.2 | 52 ~ 89                    | \$ 2.8 ~ \$ 6.8     | 7.7 ~ 18.6                         |  |
| San Andreas Mw 6.5 | 48 ~ 70                    | \$ 1.7 ~ \$ 5.1     | 4.7 ~ 14.0                         |  |
| Hayward Mw 6.9     | 27 ~ 46                    | \$ 1.3 ~ \$ 4.0     | 3.6 ~ 11.0                         |  |

<sup>&</sup>lt;sup>31</sup> See, e.g., Scawthorn, C., Fire following earthquake: Estimates of the conflagration risk to insured property in greater Los Angeles and San Francisco, All-Industry Research Advisory Council, Oak Brook, Ill. (1987), <a href="http://www.sparisk.com/documents/AIRACFFEs.pdf">http://www.sparisk.com/documents/AIRACFFEs.pdf</a>, at p. iii ("Scawthorn 1987"); ATC 52-1, Potential Earthquake Impacts, <a href="https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf">https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf</a> at pp. vi, 25-29.

<sup>&</sup>lt;sup>32</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf.

<sup>&</sup>lt;sup>33</sup> SFFD now has 44 frontline fire engines, and 19 relief engines, according to information provided by the SFFD. At the time of the 2010 report, the City apparently had 42 frontline engines.

<sup>&</sup>lt;sup>34</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 2. A copy of the Abstract (or summary) of that report is attached as Appendix K.

<sup>&</sup>lt;sup>35</sup> Ibid. These estimates already take into account the AWSS system as it existed in 2010 (i.e., prior to the addition of more cisterns and other work performed under the 2010 and 2014 ESER bonds). The damage estimates do not include business interruption losses, loss of tourism or loss of property tax revenues.

As explained in that report, there is significant uncertainty regarding how many fires might be ignited following an earthquake, and the extent of damage they are likely to cause. One of the key variables is completely outside the City's control: wind. In 1989, the City was extremely lucky that there was no wind.<sup>36</sup> Indeed, "stronger wind conditions would have resulted in much greater fire spread in the Marina..."<sup>37</sup>

According to the 2010 report, there is a 25% chance that fires and damages could fall below the ranges in Table 1 on the preceding page, and an equal likelihood that they could exceed the ranges in that table.<sup>38</sup> Earlier this year (2019) the San Francisco Public Utilities Commission (SFPUC) engaged Dr. Scawthorn to update his analysis, but that update will not be completed until after this report has been issued. However, the key is not the precise numbers but "their overall magnitude."<sup>39</sup> Indeed, given the escalation in Bay Area home values over the last decade, one can only assume that the dollar loss estimates will increase substantially.

# B. The USGS Warns the San Francisco Bay Area Has a High Likelihood of a Major Earthquake

In 2014, the USGS estimated there is a 72 percent chance of a 6.7 or greater magnitude earthquake striking the Bay Area by 2043. This was based on a new model, commonly referred to as the third Uniform California Earthquake Rupture Forecast, or UCERF3. 14

Small earthquakes occur more frequently than large earthquakes.<sup>42</sup> According to the updated model, the probability that an earthquake magnitude 6.0 or larger will occur in the San Francisco region before 2043 is 98 percent. By comparison, the probability of at least one earthquake of magnitude 6.7 or larger is 72 percent for the same area, and the probability of at least one earthquake of magnitude 7.0 or larger is 51 percent. <sup>43</sup>

<sup>&</sup>lt;sup>36</sup> Scawthorn and Blackburn, Performance of the San Francisco Auxiliary and Portable Water Supply Systems in the 17 October 1989 Loma Prieta Earthquake, presented at Fourth U.S. National Conference on Earthquake Engineering May 20-24, 1990.

<sup>&</sup>lt;sup>37</sup> *Id.*, at p. 6.

<sup>&</sup>lt;sup>38</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 2, attached as Appendix K.

<sup>&</sup>lt;sup>39</sup> *Ibid*.

<sup>&</sup>lt;sup>40</sup> See USGS, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020 (2016) (version 1.1), https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf, attached as Appendix G.

 $<sup>^{41}</sup>$  UCERF3: A New Earthquake Forecast for California's Complex Fault System, Fact Sheet 2015-3009 (2015)  $\underline{\text{https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf}}, \text{ attached as Appendix F.}$ 

<sup>&</sup>lt;sup>42</sup> USGS, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020 (2016) (version 1.1), https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf, attached as Appendix G.

<sup>&</sup>lt;sup>43</sup> UCERF3: A New Earthquake Forecast for California's Complex Fault System, Fact Sheet 2015-3009 (2015) https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf , attached as Appendix F.

Table 2 below is a simplified version of a table from a USGS fact sheet showing the likelihood of one or more events of varying size for the San Francisco region within the next 30 years based on this new model:<sup>44</sup>

Table 2
San Francisco Region Section of Table from March 2015 USGS Fact Sheet 2015-3009

| San Francisco Region                    |                             |  |  |  |  |
|---|-----------------------------|--|--|--|--|
| Magnitude<br>(greater than or equal to) | Average repeat time (years) | 30-year likelihood of one or more events |  |  |  |
| 5                                       | 1.3                         | 100%                                     |  |  |  |
| 6                                       | 8.9                         | 98%                                      |  |  |  |
| 6.7                                     | 29                          | 72%                                      |  |  |  |
| 7                                       | 48                          | 51%                                      |  |  |  |
| 7.5                                     | 124                         | 20%                                      |  |  |  |
| 8                                       | 825                         | 4%                                       |  |  |  |

Although these figures are for the region, and not just the City and County of San Francisco, the predictions are sobering. To put these predictions in perspective, the 1989 Loma Prieta earthquake had a magnitude of 6.9, and, even though the epicenter was approximately 60 miles from San Francisco, it was the largest earthquake to strike the City since 1906. <sup>45</sup> Using the USGS online calculator, <sup>46</sup> a 7.5 magnitude earthquake, which has a 20% chance of happening by 2043, would be almost four times bigger than Loma Prieta, and would release almost eight times the energy. An 8.0 magnitude earthquake would be over 12.5 times bigger than Loma Prieta, and would release almost 45 times the energy. And this is without addressing the risk that the next major earthquake's epicenter could be much closer than 60 miles away.

<sup>&</sup>lt;sup>44</sup> *Id.*, at p.4; Table 2 above is a simplified version of Table 1 of Fact Sheet 2015-3009, attached as Appendix F.

<sup>&</sup>lt;sup>45</sup> See USGS, M 6.9 October 17, 1989 Loma Prieta Earthquake, <a href="https://earthquake.usgs.gov/earthquakes/events/1989lomaprieta/">https://earthquake.usgs.gov/earthquakes/events/1989lomaprieta/</a>; USGS, M 6.9 - Loma Prieta, California Earthquake, <a href="https://earthquake.usgs.gov/earthquakes/eventpage/nc216859/executive">https://earthquake.usgs.gov/earthquakes/eventpage/nc216859/executive</a>.

The USGS has also warned that the pace of large earthquakes is likely to increase:

In the 50 years prior to 1906, there were 13 earthquakes with a magnitude between 6 and 7, but only 6 earthquakes of similar magnitude in the 110 years since 1906. The rate of large earthquakes is expected to increase from this low level as tectonic plate movements continue to increase the stress on the faults in the region.<sup>47</sup>

The warnings and predictions from the USGS should be a wake-up call to all of us.

# C. The Existing High-pressure AWSS System Only Covers Part of the City

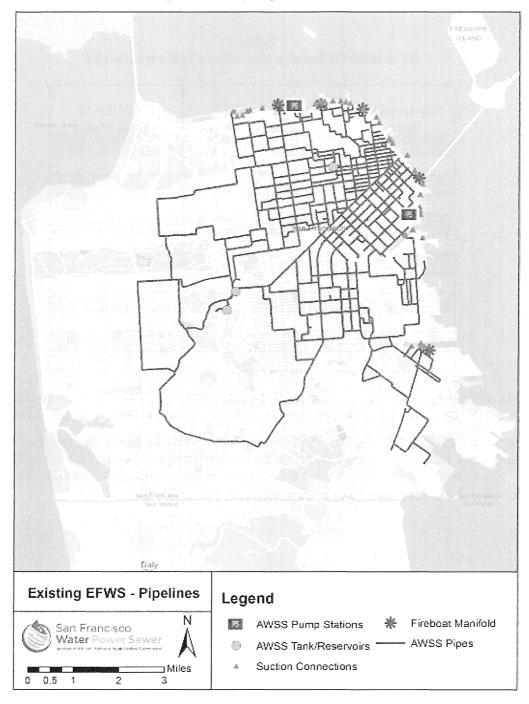
The history and condition of the existing HP AWSS have been described in detail in multiple other reports. 48 Figure 2, on the following page, shows the location of the HP AWSS: 49

<sup>47</sup> USGS, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020 (2016) (version 1.1), <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf</a>. See also Aster, R., <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">California's Outlook as a see also Aster, R., <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">California's Outlook as a see also Aster, R., <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">California's Outlook as a see also Aster, R., <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">California's Outlook as a see also Aster, R., <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">California's Other drought: A major earthquake is overdue, The Conversation (January 30, 2018), <a href="https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf">https://pubs.usgs.gov/fs/2016/3020/fs2016/3020/fs20163020.pdf</a>. See also Aster, R., <a href="https://california's other drought: A major earthquake is overdue, The Conversation">California's Current Earthquake Hiatus is an Unlikely Pause, Seismological Society of America, published April 3, 2019, <a href="https://www.seismosoc.org/news/californias-current-earthquake-hiatus-is-an-unlikely-pause/">https://www.seismosoc.org/news/californias-current-earthquake-hiatus-is-an-unlikely-pause/">https://www.seismosoc.org/news/californias-current-earthquake-hiatus-is-an-unlikely-pause/</a>, printed on April 5, 2019.

<sup>&</sup>lt;sup>48</sup> See, e.g., CS-199, at pp. 7-11, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>; Scawthorn, O'Rourke & Blackburn, 1906 Lessons, <a href="http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf">https://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf</a>; Madsen, M., Reports on an Auxiliary Water Supply System for Fire Protection for San Francisco, California (1908), <a href="https://sfpuc.sharefile.com/share/view/4743f327acfd4ba7">https://sfpuc.sharefile.com/share/view/4743f327acfd4ba7</a>.

<sup>&</sup>lt;sup>49</sup> Map supplied by the SFPUC on May 7, 2019.

Figure 3
Map of Existing High-Pressure AWSS



On a district by district basis, Supervisorial Districts 1, 4, 7 and 11 are not nearly as well protected by the HP AWSS as, for example, Districts 3 or 6:<sup>50</sup> See Table 3 below.

Table 3
HP AWSS Hydrants and Miles of Main by District

| Supervisorial<br>District | # of AWSS<br>Fire Hydrants | Miles of<br>AWSS Mains |
|---------------------------|----------------------------|------------------------|
| 1                         | 42                         | 5                      |
| 2                         | 170                        | 14                     |
| 3                         | 327                        | 23                     |
| 4                         | 3                          | 0                      |
| 5                         | 188                        | 16                     |
| 6                         | 366                        | 27                     |
| 7                         | 79                         | 7_                     |
| 8                         | 110                        | 9                      |
| 9                         | 110                        | 9                      |
| 10                        | 222                        | 18                     |
| 11                        | 24                         | 1                      |
| TOTAL                     | 1641                       | 130                    |

In fact, six of the eleven Supervisorial Districts, Districts 1, 4, 7, 8, 9 and 11, each have less than ten miles of AWSS mains. Districts 1, 4, and 11 each have less than 50 AWSS fire hydrants.

The areas not protected by the HP AWSS would need to rely primarily on getting emergency firefighting water supplies from the City's MWSS through its low-pressure hydrants or from cisterns. For a number of reasons detailed below, these resources are unlikely to provide adequate water to protect residents from fires after a major earthquake.

<sup>&</sup>lt;sup>50</sup> Data provided by SFPUC on March 13, 2019.

# D. The Municipal (Domestic) Water Supply System Is "Highly Vulnerable to Catastrophic Failure" 51

No one knows with certainty what will happen in a major earthquake. But common sense says we should look at past experience and listen to experts when they warn us not to rely on the MWSS for firefighting following an earthquake.

As explained in a 2009 report prepared for the SFPUC,

By their nature, domestic water mains are more vulnerable to earthquake damage. Numerous service connections and the jointed construction that is the industry norm contribute to their vulnerability.<sup>52</sup>

San Francisco has made a tremendous effort to improve and seismically reinforce its regional and local water system by means of the \$4.8 billion Water System Improvement Project (WSIP).<sup>53</sup> The WSIP is one of the largest water infrastructure programs in the nation and the largest infrastructure program ever undertaken by the City. Among its objectives has been reducing the water system's vulnerability to earthquakes, with a particular emphasis on seismically reinforcing the regional delivery system, transmission mains, and reservoirs.<sup>54</sup>

Although the WSIP greatly enhances the reliability of the MWSS, and in particular the transmission mains and reservoirs, the 2009 report emphasizes that, unlike the HP AWSS, the local MWSS system is vulnerable to a major earthquake due to the numerous branches and service connections that can break and drain the system.<sup>55</sup>

This has been borne out by experience in San Francisco and elsewhere. In the 1906 earthquake, an estimated 23,000 breaks in the MWSS resulted in the loss of water and pressure. <sup>56</sup> In the much smaller 1989 Loma Prieta earthquake, there were 69 main breaks and 54 service

<sup>51</sup> See SF Fire Commission Resolution 2010-01, <a href="https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf">https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01</a> attached as Appendix M.

<sup>&</sup>lt;sup>52</sup> Metcalf & Eddy, at p. 18, <a href="http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00">http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00</a>. The SFPUC has initiated a planning study to better understand the current level of reliability of the entire potable distribution system, focusing on backbone pipes, but that study will take several years to complete.

<sup>53</sup> See SFPUC's WSIP webpage, https://sfwater.org/index.aspx?page=114.

<sup>&</sup>lt;sup>54</sup> See, e.g., list of WSIP projects at <a href="https://sfwater.org/index.aspx?page=968">https://sfwater.org/index.aspx?page=968</a> .

<sup>&</sup>lt;sup>55</sup> Metcalf & Eddy, at pp. 18-19, <a href="http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-dee6-b24c-2cf837f3bc00">http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-dee6-b24c-2cf837f3bc00</a>. The Civil Grand Jury is not questioning the importance or the efficacy of the WSIP, which is essential to rapidly restoring potable water service to residents following an earthquake. But fire suppression needs an immediately available supply of water, which the MWSS is unlikely to be able to provide following a major earthquake.

<sup>&</sup>lt;sup>56</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, p. 6. Other reports have provided somewhat different, but still extremely high estimates. Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at p. 13 [over 28,000 breaks, including service breaks]. But whatever the precise number of water main breaks in 1906, the earthquake devastated the water supply system which contributed to the horrific fires that nearly destroyed the City.

connection breaks in the Marina district alone.<sup>57</sup> Because of these breaks, low-pressure hydrants located in the Marina could not provide adequate water or pressure for firefighting.<sup>58</sup>

Other recent major earthquakes have also caused substantial damage to municipal water supply systems. In the 6.7-magnitude 1994 Northridge earthquake, there were over 1,000 water main breaks and over 100 fires.<sup>59</sup> In the 6.9-magnitude 1995 Kobe, Japan earthquake, "water loss seriously impaired firefighting."<sup>60</sup> There were over 2,000 breaks in the underground piping, and large fires burned freely due to lack of water.<sup>61</sup> Similarly, in the 2011 Eastern Japan earthquake there was extensive damage to water supply lines.<sup>62</sup> Even the relatively small 6.0-magnitude 2014 South Napa earthquake "highlighted the vulnerability of water and wastewater systems to earthquake-related ground failure, the additional fire hazards that earthquake-related water system failures can pose, and the fiscal challenges that public agencies face in improving the seismic resiliency of these systems, both pre- and post-earthquake."<sup>63</sup>

Experts have predicted that in a future major San Francisco earthquake, the MWSS could sustain over 1,000 breaks.<sup>64</sup> Various reports have said it in different ways, but the clear takeaway is that the MWSS should not be relied upon to save the City from fires following a major earthquake:

- "MWSS pipes will sustain damage in certain areas of the City, which will impair the ability to deliver water for firefighting." <sup>65</sup>
- "In such an emergency it is likely that the potable water distribution system would be compromised by pipe breaks and leaks." 66

<sup>&</sup>lt;sup>57</sup> CS-199, at p. 11, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>; see also O'Rourke, T.D., Lessons Learned For Lifeline Engineering From Major Urban Earthquakes, presented at Eleventh World Conference on Earthquake Engineering (1996) ("O'Rourke, Lessons Learned").

<sup>&</sup>lt;sup>58</sup> Scawthorn, C., Porter, K., and Blackburn, F., Performance of Emergency-Response Services After the Earthquake, chapter in The Loma Prieta, California, Earthquake of October 17, 1989, Marina District, T.D. O'Rourke editor, USGS Professional Paper 1551-F (1992)

<sup>&</sup>lt;sup>59</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at p. 16; O'Rourke, Lessons Learned, at p. 3.

<sup>&</sup>lt;sup>60</sup> O'Rourke, Lessons Learned, at p. 3.

<sup>&</sup>lt;sup>61</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles</a> scawthorn.pdf, at pp. 18-19.

<sup>&</sup>lt;sup>62</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles</a> scawthorn.pdf, at p. 24.

<sup>&</sup>lt;sup>63</sup> Johnson, L. and Mahin, S., The 6.0 M<sub>w</sub> South Napa Earthquake of August 24, 2014: A Wake-up Call for Renewed Investment in Seismic Resilience across California, Pacific Earthquake Engineering Research Center prepared for the California Seismic Safety Commission, CSSC Publication 16-03, PEER Report No. 2016/04 (2016), <a href="https://ssc.ca.gov/forms-pubs/cssc-603peer201604">https://ssc.ca.gov/forms-pubs/cssc-603peer201604</a> final 7 20 16.pdf, Finding 2.3, at p. iii.

<sup>64</sup> Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf at p. 2.

<sup>65</sup> CS-199, p. 11, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055.

- "...the usual firefighting water supplies will almost certainly fail..."<sup>67</sup>
- "World renowned scientists, whose area of expertise is the modeling of the destructive effects of earthquakes on underground infrastructure, have identified the domestic water system of San Francisco as highly vulnerable to catastrophic failure in the event of a major Bay Area earthquake." 68

Moreover, unlike AWSS hydrants, low-pressure hydrants connected to the MWSS require a fire engine to extract and pump the water to sufficient pressure for firefighting.<sup>69</sup> Given that fire engines are likely to be in high demand and potentially overwhelmed in a major earthquake, this is yet another reason why an alternative source of water is necessary.<sup>70</sup>

### E. Cisterns Provide Limited Protection

Cisterns are underground tanks, unconnected to any water source. <sup>71</sup> Typically, cisterns in San Francisco hold approximately 75,000 gallons of water. <sup>72</sup>

The City has 229 cisterns located throughout the City, as shown by Figure 4 on the next page<sup>73</sup>:

<sup>&</sup>lt;sup>66</sup> 2018 Westside Options Analysis, <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a> at p. 10.

<sup>&</sup>lt;sup>67</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles</a> scawthorn.pdf, at p. 39.

 $<sup>^{68}</sup>$  SFFC Resolution 2010-01, p. 1, <a href="https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf">https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf</a> and attached as Appendix M.

<sup>&</sup>lt;sup>69</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055, at pp. 55-56.

 $<sup>^{70}</sup>$  Scawthorn, O'Rourke & Blackburn, 1906 Lessons, at pp. S153-1S54,  $\underline{\text{http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf}}\,.$ 

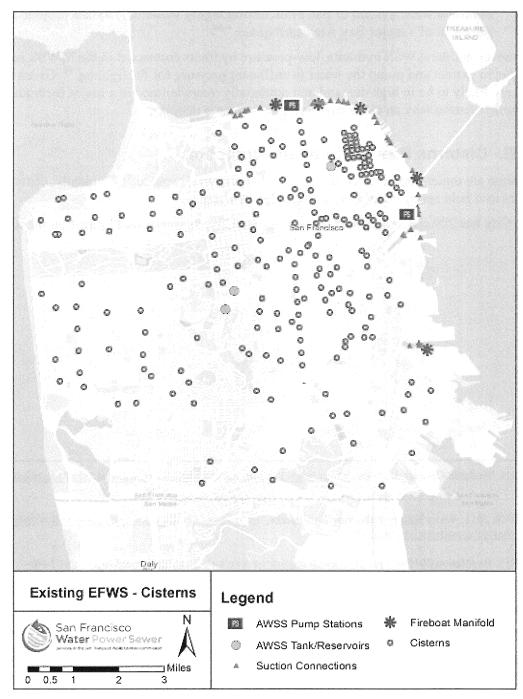
<sup>&</sup>lt;sup>71</sup> CS-199, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>, at p. 13.

<sup>&</sup>lt;sup>72</sup> See SFFD Water Supplies Manual, <a href="http://ufsw.org/pdfs/water\_supplies\_manual.pdf">http://ufsw.org/pdfs/water\_supplies\_manual.pdf</a>, at pp. 4.1, 6.13-6.17; PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at p. 77.

<sup>&</sup>lt;sup>73</sup> Map provided by SFPUC on May 7, 2019.

Figure 4

Map of Existing Cisterns



By Supervisorial District, the breakdown of cistern locations is listed in Table 4 below.

Table 4
Cisterns by Supervisorial District

| Supervisorial<br>District | Cisterns |
|---------------------------|----------|
| 1                         | 17       |
| 2                         | 23       |
| 3                         | 46       |
| 4                         | 12       |
| 5                         | 20       |
| 6                         | 26       |
| 7                         | 12       |
| 8                         | 27       |
| 9                         | 21       |
| 10                        | 20       |
| 11                        | 5        |
| TOTAL                     | 229      |

Notably, Districts 1, 4, 7 and 11, which currently have the fewest miles of HP AWSS pipelines, also have the fewest cisterns. This is especially true of District 11, with only one mile of AWSS main pipeline and only five cisterns. <sup>74</sup>

Cisterns provide a valuable backup or "last resort" in the event of damage to the MWSS and AWSS. In the 1994 6.7-magnitude Northridge earthquake, the MWSS suffered over 1,000 water main breaks. Firefighters used backyard swimming pools as water supply sources. In the 1906 earthquake, San Francisco's 23 cisterns were credited with saving a major building in the Financial District when the water mains broke. The same of the MWSS and AWSS are sufficiently saving a major building in the Financial District when the water mains broke.

Cisterns, however, have limited capacity<sup>77</sup> and are therefore unlikely to be effective against serious fires following a major earthquake. In the 1995 6.9-magnitude Kobe earthquake,

<sup>&</sup>lt;sup>74</sup> In recent years, the SFPUC has built 30 additional cisterns, funded by the 2010 and 2014 ESER bonds. These 30 new cisterns are included in the totals in the above table. Half of these new cisterns were strategically located in the Richmond and Sunset districts, which now have 17 and 12 cisterns, respectively, to begin to address concerns that those areas of the City were inadequately protected. SFPUC 2017 FAQ, Question 4, <a href="https://sfwater.org/modules/showdocument.aspx?documentid=11507">https://sfwater.org/modules/showdocument.aspx?documentid=11507</a>.

PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at pp. 12-17.

<sup>&</sup>lt;sup>76</sup> Scawthorn 1987, http://www.sparisk.com/documents/AIRACFFEs.pdf, at p. S140.

<sup>&</sup>lt;sup>77</sup> SFFD Water Supplies Manual, <a href="http://ufsw.org/pdfs/water-supplies-manual.pdf">http://ufsw.org/pdfs/water-supplies-manual.pdf</a>, at pp. 4.1, 5.6-5.7.

however, the city's 968 cisterns provided little help to firefighters because they drained in 10 minutes. 78

San Francisco's typical cistern would drain within an hour of continuous firefighting.<sup>79</sup> Given that on average it takes several hours to put out a four-alarm fire,<sup>80</sup> cisterns cannot be expected to successfully fight post-earthquake conflagrations in parts of the City not protected by AWSS. In addition to providing limited firefighting water, cistern water must be extracted and pressurized by an engine, requiring more staff and time to deploy than, for example, AWSS hydrants.<sup>81</sup>

## F. The PWSS Inventory Needs to Be Modernized and Expanded

In addition to the MWSS and cisterns, the SFFD intends to rely on the City's Portable Water Supply System, or PWSS, to fight fires in non-AWSS areas.

In the 1980s, the SFFD developed and implemented the PWSS, an above-ground, large-diameter hose system used to move water great distances from a water source to a fire. PWSS units consist of a hose tender, or truck, equipped with approximately one mile of large-diameter five-inch hose (larger than the normal three-inch hose), along with a portable pump, portable hydrants that allow water to be distributed from a large-diameter hose, and other essential firefighting equipment. With its portable pump, a hose tender can be used to draft and pressurize water from alternative water sources, such as lakes, lagoons, a fireboat (as in the 1989 Loma Prieta earthquake), cisterns, or even broken water mains. It can also be used to extend the reach of the HP AWSS system to blocks or neighborhoods without a HP hydrant. 83

<sup>&</sup>lt;sup>78</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at pp. 17-19. San Francisco's cisterns are larger than Kobe's, but the point remains they are only good for a limited duration. *Id.*, at p. 77.

<sup>&</sup>lt;sup>79</sup> PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>, at p. 77.

<sup>&</sup>lt;sup>80</sup> Information provided by SFFD.

<sup>81</sup> CS-199, at pp. 13, 56, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055.

<sup>82</sup> Scawthorn, O'Rourke, Blackburn, S150-151. A detailed description of the PWSS can be found in Scawthorn, C. and Blackburn, F. (1990), Performance of the San Francisco Auxiliary and Portable Water Supply Systems in the 17 October 1989 Loma Prieta Earthquake, presented at Fourth U.S. National Conference on Earthquake Engineering May 20-24, 1990, and provided by SFPUC. The PWSS and its five-inch hoses are different from a prior, abandoned concept of a Flexible Water Supply System, using massive, 12-inch hoses in lieu of expanding the HP AWSS. That concept was proposed in AECOM / WRE, a Joint Venture, CS-229 Task 16 and 19, Emergency Firefighting Water System (EFWS) Spending Plan for the Earthquake Safety Emergency Response (ESER) 2014 Bond (November 2015), <a href="https://sfwater.org/Modules/ShowDocument.aspx?documentid=8246">https://sfwater.org/Modules/ShowDocument.aspx?documentid=8246</a>. It was abandoned as impractical after concerns over, among other things, how 12-inch diameter hoses would block traffic.

Figure 6-1 on page 83 of CS-199, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>, is a map of the City showing how the PWSS can be used to expand the areas protected by the AWSS. Figure 6-1 assumes certain extensions of the AWSS

Currently, there are only five PWSS hose tenders, three of which are located in the "unprotected areas"<sup>84</sup> of the Sunset district and Hunter's Point. In the SFFD's opinion, the PWSS hose tenders are "past their useful life."<sup>85</sup> The newest hose tender, housed in the Sunset, is 27 years old. The second newest, in Hunter's Point, is over 30 years old. The remaining three are over 45 years old. <sup>86</sup>

Firefighters and emergency response experts have been calling for a large-scale expansion of the PWSS for years. <sup>87</sup> In January 2010, the San Francisco Fire Commission (SFFC) issued Resolution 2010-01, encouraging the SFFD to pursue approximately \$10 million in grant funding to expand the PWSS. The SFFC recognized that the City's MWSS is highly vulnerable to a catastrophic failure in the event of a major earthquake, and that the AWSS does not cover the entire City. The SFFC declared that the PWSS has been proven effective in the aboveground transmission of water for firefighting, that the PWSS can work in conjunction with and supplement the AWSS, and that the City did not have a sufficient number of units to supply all areas of the City where the AWSS does not extend. <sup>88</sup> Unfortunately, that grant was not funded, and the City has not yet purchased any additional PWSS hose tenders. <sup>89</sup>

Also in 2010, the Applied Technology Council issued several reports as part of the City's Community Action Plan for Seismic Safety, or the "CAPSS Project." Among its recommendations was one similar to ours: Improve emergency water supply systems to cover those neighborhoods not served by the HP AWSS. As explained in that report,

The Auxiliary Water Supply System provides a redundant water system for fighting fires after earthquakes and at other times, and incorporates many earthquake resistant features in its design. However, this system covers only northern and eastern City neighborhoods, those that were developed in the early

that do not presently exist, and does not take into consideration the limited size of the existing PWSS inventory. As a result, Figure 6-1 in CS-199 overstates the current level of protection, but does show what could be accomplished with a larger inventory of PWSS hose tenders.

These areas are of course not completely unprotected, but as discussed above they do not have a HP AWSS. The City's outside expert AECOM/AGS, A Joint Venture, has referred to the portion of the City protected by the HP AWSS as the "Protected Area." See CS-199, at p. 8, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055

<sup>85</sup> Information provided by SFFD.

<sup>&</sup>lt;sup>86</sup> Information provided by SFFD.

<sup>&</sup>lt;sup>87</sup> See Fire Dept.'s Ace in the Hole, San Francisco Independent, January 31, 1990, attached as Appendix O.

 $<sup>^{88}</sup>$  SFFC Resolution 2010-01,  $\underline{https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf}$ 

<sup>&</sup>lt;sup>89</sup> Information provided by SFFD.

According to the CAPSS website, CAPSS was started in the Department of Building Inspection beginning in 1998, and was a nine-year, \$1 million study to understand, describe, and mitigate the risk San Francisco faces from earthquakes. CAPSS produced an extensive analysis of potential earthquake impacts as well as community-supported recommendations to mitigate those impacts. See <a href="https://sfgov.org/esip/capss">https://sfgov.org/esip/capss</a>.

part of the last century when the system was constructed. The City needs adequate, reliable water sources to fight post-earthquake fires in all neighborhoods. There are a number of options to improve the water supply in neighborhoods not served by the Auxiliary System, including expanding the City's Portable Water Supply System, which can be deployed wherever needed. This important issue needs to be addressed as soon as possible. (Emphasis added)<sup>91</sup>

In 2014, outside consultant AECOM/AGS, a Joint Venture, advised the City that "[a]dditional PWSS units would be a prudent investment for SFFD/SFPUC."92

The SFFD submitted a request for funding to purchase 20 newly designed PWSS hose tenders in the fiscal year 2019/2020 budget, but the Civil Grand Jury understands that only four new PWSS hose tenders are included in the Mayor's May 31, 2019 two-year budget proposal. The proposed new SFFD hose tenders are designed to be more efficient and maneuverable than older models, with four-wheel drive to overcome obstacles on roads, the ability to carry up to 6,000 feet of five-inch fire hose, and only one firefighter required to operate each vehicle. Each vehicle will have a high-volume onboard water pump, and a portable submersible water pump. Both pumps will be able to draft water from the Bay, reservoirs, or other water sources. These new hose tenders could be connected together to carry water over many miles of the City. The SFFD estimates these new PWSS vehicles, fully equipped with hoses and appliances would cost approximately \$1 million per vehicle. <sup>94</sup>

Given the time required to build or extend a HP pipeline system, acquiring additional PWSS hose tenders is a practical intermediate step to enhance fire protection throughout the City. The SFFD advised the Civil Grand Jury that additional PWSS hose tenders could be acquired and in service within a year or so, or at the outside two years. The failure to obtain grant monies should not stop the City from making this important investment in public safety.

Although the Civil Grand Jury recommends immediately replacing and expanding PWSS units, this is not a long-term solution. A successful PWSS deployment requires a nearby water source, and personnel to unwind a mile of heavy, five-inch-diameter hose through potentially

<sup>&</sup>lt;sup>91</sup> Applied Technology Council (ATC) ATC-52-2, Here Today—Here Tomorrow: The Road to Earthquake Resilience in San Francisco, A Community Action Plan for Seismic Safety (2010), prepared for the Department of Building Inspection, CCSF, under the (CAPSS) Project, at pp. 53-54, <a href="https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9757-atc522.pdf">https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9757-atc522.pdf</a>

<sup>&</sup>lt;sup>92</sup> CS-199, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a> at p. 85. Although this report referred to the PWSS as an investment in the colloquial sense, the PWSS is not a fixed asset and thus does not involve a capital expenditure. As such, purchasing new hose tenders will need to come from city funds, not bonds. The Civil Grand Jury nevertheless believes that acquiring more PWSS hose tenders is long overdue.

<sup>&</sup>lt;sup>93</sup> Information provided by SFFD. The City's budget process is of course ongoing. It is therefore uncertain whether the Board of Supervisors will approve sufficient funding for the four new units or conversely whether the Board of Supervisors will increase the funding for purchasing new PWSS units. We also understand that a request for funding for PWSS hose tenders has been made to state officials, but at this time the SFFD does not know if that request has been approved.

<sup>&</sup>lt;sup>94</sup> Information provided by SFFD.

congested and damaged city streets. <sup>95</sup> Moreover, although hose tenders can draft water from the Bay, they are not designed for use in the ocean – the only unlimited water source on the west side of the City. <sup>96</sup> Given these challenges, PWSS is essentially an important but temporary "Plan B."

# G. Efforts to Expand the High-Pressure AWSS Need to Be Accelerated

As discussed in Section B above, the USGS estimates there is a 72 percent chance of a 6.7 or greater magnitude earthquake striking the Bay Area before 2043. <sup>97</sup> In early April of 2019, USGS researchers issued a new study warning that "the next 100 years of California earthquakes along [the San Andreas, San Jacinto and Hayward] faults could be a busy one." Each year we delay construction of an expanded HP AWSS we are gambling, pushing our luck that a major earthquake won't hit before we're ready.

City departments, including the SFPUC, which assumed jurisdiction over the operation and maintenance of the AWSS from the SFFD in 2010, have been analyzing the reliability of the EFWS and the possible expansion of the HP AWSS for over a decade. An analysis in 2009 indicated that the EFWS was "47% reliable, and thus only able to provide about half of the water needed for city-wide firefighting following a 7.8 earthquake." In actuality, and as discussed in Section I below, the SFPUC's consultant's metric is overly optimistic: a 50% score really means that we will have about half of the water needed to meet *median* firefighting demands following a 7.8-magnitude earthquake. Put differently, if the firefighting demands are above the median estimate, this analysis indicates that even with a score of 99% there will be insufficient water to meet the demand.

<sup>&</sup>lt;sup>95</sup> Metcalf & Eddy (2009), <a href="http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00">http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00</a>, at pp. 4-5; information provided by SFFD.

According to the SFFD, there is no known SFFD access to the ocean on the western side of the City, but SFFD is continuing to investigate potential access areas where it might be able to use a PWSS unit.

<sup>&</sup>lt;sup>97</sup> See USGS, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020, https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf.

<sup>&</sup>lt;sup>98</sup> See *California's Current Earthquake Hiatus is an Unlikely Pause*, Seismological Society of America, published April 3, 2019, <a href="https://www.seismosoc.org/news/californias-current-earthquake-hiatus-is-an-unlikely-pause/">https://www.seismosoc.org/news/californias-current-earthquake-hiatus-is-an-unlikely-pause/</a>, printed on April 5, 2019.

<sup>&</sup>lt;sup>99</sup> See e.g., Metcalf & Eddy (2009), <a href="https://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00">https://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00</a>, CS-199 (2014), <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>, CS-229 (2015), <a href="https://sfwater.org/modules/ShowDocument.aspx?documentid=8246">https://sfwater.org/Modules/ShowDocument.aspx?documentid=8246</a>, 2018 Westside Options Analysis (2018), <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a>, among other reports.

 $<sup>^{100}</sup>$  SFPUC FAQ, Question No. 3, <a href="https://sfwater.org/modules/showdocument.aspx?documentid=11507">https://sfwater.org/modules/showdocument.aspx?documentid=11507</a> and attached as Appendix N.

<sup>&</sup>lt;sup>101</sup> See pages 35-36 below.

Figure 5, below, shows EFWS reliability by so-called Fire Response Areas (FRAs)<sup>102</sup> as of 2010, i.e., prior to recent improvements.

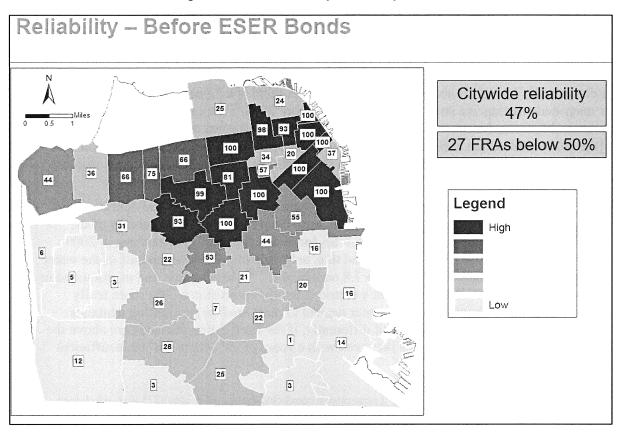


Figure 5
Map of EFWS Reliability Scores by FRA as of 2010<sup>103</sup>

Figure 5 shows that as of 2010 the majority of the City scored below 50%, and in some cases far below. In 2010 and again in 2014, voters approved Earthquake Safety and Emergency Response (ESER) Bonds. The 2010 ESER bonds provided approximately \$102 million for the EFWS, and the 2014 ESER bonds provided \$54 million. The money was spent on assessing the existing HP AWSS, rehabilitating and upgrading core facilities (existing water storage tanks, pipelines, salt-water pumping stations) that needed seismic strengthening or other repairs or improvements, adding 30 cisterns, and other tasks. <sup>104</sup>

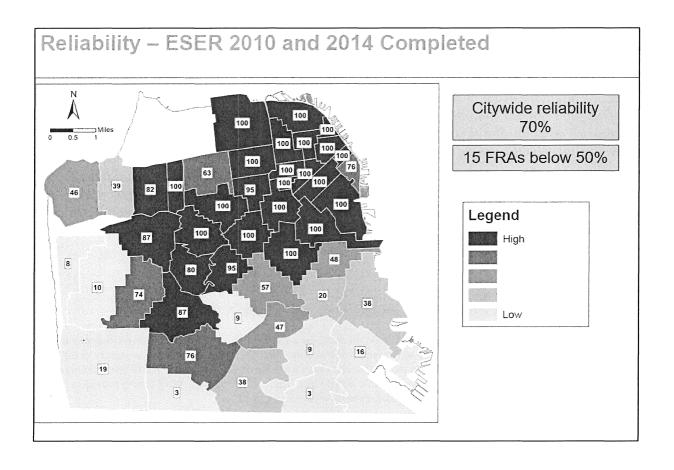
<sup>&</sup>lt;sup>102</sup> The SFFD divides the City into 46 areas for initial alarm response, also referred to as Fire Response Areas or FRAs. A map showing the different FRAs is attached as Appendix J.

Map supplied by SFPUC. Identical map, except for legend, in AECOM / AGS, JV, Auxiliary Water Supply System Planning Study Summary, <a href="https://sfwater.org/Modules/ShowDocument.aspx?documentid=4907">https://sfwater.org/Modules/ShowDocument.aspx?documentid=4907</a> at p.3.

A February 26, 2019 status list provided by the SFPUC for the various projects undertaken pursuant to the 2014 and 2014 ESER bonds, showing which are in planning, in design, in construction, complete, canceled or

The result has been significantly improved EFWS reliability scores, as shown by Figure 6:

Figure 6
Map of EFWS Reliability Scores by FRA After 2010 and 2014 ESER Bond Work
Completed 105



The SFPUC has performed important work in analyzing what needs to be done and by repairing existing facilities. But today, nine years after the 2010 CAPSS report called for action as soon as possible, 16 years after the 2002-2003 Civil Grand Jury called for expanding the HP AWSS to the entire City, almost 33 years after the 1986 Fire Protection Bonds Analysis stating

postponed is attached as Appendix O. See also Earthquake Safety and Emergency Response (ESER) Bond, Citizens' General Obligation Bond Oversight Committee Reports & Quarterly Reports, found at <a href="http://www.sfearthquakesafety.org/eser-reports.html">http://www.sfearthquakesafety.org/eser-reports.html</a>

<sup>&</sup>lt;sup>105</sup> This map assumes completion of work in progress, which is expected by late 2020 according to the SFPUC. The SFPUC has retained outside experts to update the anticipated water demands by FRA but that work has not been completed.

the improvements would include extending the HP AWSS and installation of a HP pump station at Lake Merced, and over a hundred years after the AWSS system was first built, we are still decades away from reliably protecting all neighborhoods.

Over the past year, the SFPUC has made substantial progress in developing plans to improve EFWS on the west side. Specifically, the SFPUC and the SFFD propose to develop a new, separate AWSS system using potable water ("Potable AWSS") for the western part of the City. The Potable AWSS approach contemplates a dual-purpose pipeline, independent from the existing HP AWSS network. The Potable AWSS would function as a potable water transmission main during normal operations and would provide HP emergency firefighting water supply for major fires. The new pipeline would provide "daily reliability and water quality benefits as well as a post-earthquake potable water supply to the Richmond and Sunset districts", the new pipeline would automatically be isolated from the remainder of the potable distribution system and converted to a dedicated HP system, similar to the existing or conventional AWSS. To increase reliability, the new pipeline would be made of modern, seismically reliable material. To

The SFPUC currently anticipates having approximately \$195 million, <sup>110</sup> from water rates and from an expected 2020 ESER bond (assuming voter approval), to spend on extending the HP AWSS and improving EFWS reliability over the next five to seven years. <sup>111</sup> The current Potable AWSS proposal is divided into two phases, as the projected \$195 million is insufficient to

<sup>&</sup>lt;sup>106</sup> 2018 Westside Options Analysis, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740 at pp. 7, 10, 13.

<sup>&</sup>lt;sup>107</sup> *Id.*, at p. 8. The Potable AWSS would eliminate the need for a project that the SFPUC had been planning to supply potable water to the Richmond District, saving up to \$30 million. *Id.* Today the potable water supply to the Richmond District depends on two transmission mains that run north from the Sunset District. One of those mains was built in 1915. The other was recently replaced with a ductile iron main. The Potable AWSS would provide a third transmission main, built with modern earthquake resistant pipe. *Id.*, at p. 13.

<sup>108</sup> A detailed description of the Potable AWSS concept can be found in CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055, CS-229, https://sfwater.org/Modules/ShowDocument.aspx?documentid=8246, and 2018 Westside Options Analysis, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740. The actual proposal has evolved over time, so the alignment discussed in those 2014, 2015 and 2018 reports has changed, as have the water sources. This plan is still under review and the alignment may well change again before the plan is finalized and ready for any required public hearings or environmental or other review. But the underlying concept of a Potable AWSS and how it would operate remains the same.

New pipe would be so-called Earthquake Resistant Ductile Iron Pipe (ERDIP), the most seismically reliable pipe available. ERDIP pipe performed admirably in several recent Japanese earthquakes See Scawthorn 2018 memo, <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a> at p. 6, re ERDIP pipe.

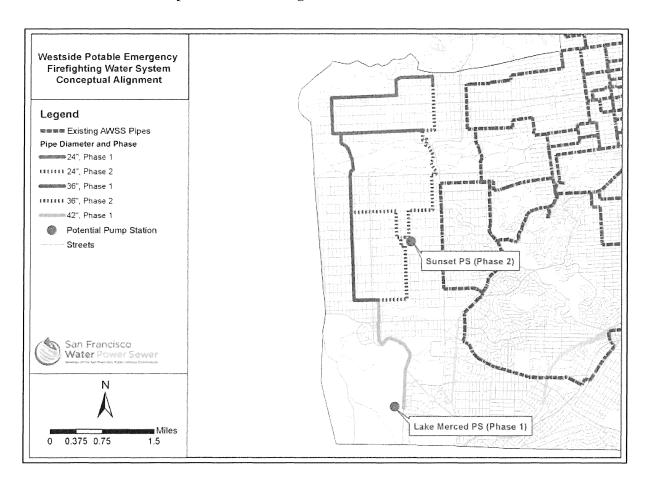
<sup>&</sup>lt;sup>110</sup> Information supplied by the SFPUC. The \$195 million is adjusted for inflation as the build out will occur over several years. This is roughly equivalent to \$160 million in 2018 dollars according to the SFPUC.

Meetings with SFPUC representatives. The Board of Supervisors approved the 2020-2029 ten-year Capital Plan at its April 30, 2019 meeting. See <a href="https://sfbos.org/sites/default/files/bag043019\_minutes.pdf">https://sfbos.org/sites/default/files/bag043019\_minutes.pdf</a>. The new ten-year Capital Plan can be found at <a href="http://onesanfrancisco.org/the-new-plan/overview">https://onesanfrancisco.org/the-new-plan/overview</a>.

complete the entire project. Phase 1 involves adding approximately 8.6 miles of new pipe. 112 A conceptual potential pipe alignment would extend north from Lake Merced along the west side, through the western portion of the Sunset and Richmond districts, and then have two pipelines head east, one immediately south of the Presidio and one in the southern Richmond district. 113

A conceptual potential alignment of both Phase 1 and Phase 2 is shown in Figure 7 below: 114

Figure 7
Conceptual Potential Alignment for Potable West Side AWSS



<sup>&</sup>lt;sup>112</sup> Information provided by SFPUC. The phasing and the potential, proposed or conceptual alignment discussed above and on the following pages are still in the planning stages and are subject to change. Detailed designs have not yet been completed, much technical analysis remains to be done, and the project has not yet undergone environmental reviews.

<sup>&</sup>lt;sup>113</sup> The current furthest west AWSS pipeline is located east of Park Presidio Boulevard.

Provided by the SFPUC on April 10, 2019. See footnote 121 on page 32.

The Potable AWSS pipeline network would tie into an existing, recently seismically reinforced, potable 60-inch transmission main, providing a source for normal, potable-water operations. The proposed Phase 1 also includes adding a new HP pumping station at Lake Merced. Although the water in Lake Merced is deemed non-potable, Lake Merced contains approximately a billion gallons or more, making it an excellent source of water for emergency firefighting purposes. 117

The SFPUC and SFFD's future west side plans (Phase 2) include an additional 5.6 miles of pipeline for better coverage and potentially an additional pumping station at Sunset Reservoir, for another source in case of a broken pipe or other emergency. However, the SFPUC and the SFFD do not anticipate having the additional approximately \$120 million 119 needed to complete that portion of their plan until the next round of ESER bonds, which may not be for another five to seven years or even longer. 120

Unfortunately, the Potable AWSS on the west side only addresses the EFWS deficits on the west side of the City. Many other City neighborhoods along its southern part, from Park Merced in the west to Visitacion Valley in the east, will be no closer to having a multi-sourced, seismically reliable HP AWSS or substantially enhancing their neighborhood's EFWS even if this westside Potable AWSS plan moves forward.

According to the SFPUC, this transmission main connects to both (a) the Crystal Springs Reservoir in San Mateo County and to the 9'6" Crystal Springs Bypass tunnel, which is supplied by Calaveras Reservoir, San Antonio Reservoir, and the SFPUC's upcountry water sources (Hetch Hetchy, Don Pedro, etc.). These potable water sources were seismically reinforced by the SFPUC's Water System Improvement Program (WSIP), a \$4.8 billion program to improve water system reliability, including seismic reliability. See SFPUC webpage on WSIP, https://www.sfwater.org/index.aspx?page=114.

<sup>&</sup>lt;sup>116</sup> Like the conceptual potential pipeline alignment, the size, location and design of any new pumping station is at present unknown and uncertain. The Civil Grand Jury understands that the Potable AWSS project is currently moving forward with design, technical studies, environmental and management reviews, but is of course also dependent upon approval of necessary funding.

<sup>&</sup>lt;sup>117</sup> Information provided by SFPUC; see also V. Matuk and N. Salcedo, Lake Merced Hydrology and Water Quality, http://online.sfsu.edu/bholzman/LakeMerced/water.htm ("Estimates of the capacity of the lake also vary greatly from a low of 768 million gallons to high of 1.93 billion gallons."). The Sunset pumping station shown in the figure on the preceding page is being considered as a potential part of Phase 2.

Per the SPFUC, the Sunset Reservoir Pumping Station will also be connected to a seismically reinforced, potable 54-inch transmission main. Unlike the northeast quadrant, where the AWSS pipeline system is a grid and thus provides an excellent measure of redundant support in case of a broken pipe, the proposed Potable AWSS would not be a grid. The lack of redundant pipelines creates a somewhat higher level of risk. However the use of modern ERDIP significantly reduces the risk of pipeline failure, and having redundant water sources provides additional comfort as it would enable back-feeding and reduces the risk of a potential single point of failure. 2018 Westside Options Analysis, <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a> at p. 37.

<sup>&</sup>lt;sup>119</sup> This cost estimate is in 2018 dollars. Unless otherwise stated, all cost estimates provided by the SFPUC, SFFD and SFDPW to the Civil Grand Jury for work on the EFWS system and discussed in this report are in 2018 dollars.

Even if new bonds are issued in five to seven years, design and construction of the new pipelines and new pumping station would take several more years.

The limited scope of the SFPUC's current plans is the result of budgetary constraints. The Mayor and the Board of Supervisors determine what bond proposals are placed before the voters, how frequently, and what is included. The SFPUC and the SFFD must operate within the financial constraints they are given.

The SFPUC has rough estimates showing that extending the high-pressure AWSS throughout the City-or building separate but functionally equivalent Potable AWSS systems in areas without a HP AWSS-will cost approximately \$500 million in addition to the funds already targeted for Phase 1 of the Potable West Side system, as discussed above. <sup>121</sup> The SFPUC is not presently planning a programmatic City-wide expansion; it merely has developed a rough list of possible projects for various parts of the City that are not presently served by the HP AWSS (as well as other projects to reinforce or otherwise improve the HP AWSS system in those areas that are currently served by the HP AWSS). <sup>122</sup>

This roughly \$500 million estimate is a huge amount of money, but as discussed in Section A above, the risk of incurring the costs from a major, inadequately-fought fire is far greater.

First and foremost is the risk to human life. In 1906, an estimated 3,000 people lost their lives, and 225,000 were left homeless. The City is obviously much better prepared today, with

This Candidate EFWS Projects list is an internal SFPUC document: it is a list of potential project alternatives provided by the SFPUC staff to the EFWS Management Oversight Committee. The list contains potential projects that could be implemented in the future if approved by the EFWS Management Oversight Committee, if funding is made available, and if and when they go through the required environmental review. Due to the preliminary nature of the list, some of the estimated costs on this candidate project list are merely planning level estimates and would likely change if the SFPUC decided to move forward with a detailed design for a given project. Some of these projects, such as the Potable AWSS on the west side, are moving forward towards completion of design and technical studies and required environmental review based on management direction and the anticipated availability of funds. However, others are still simply candidate project alternatives that management may never proceed with.

This May 8 Candidate EFWS list also includes various proposals and potential projects to improve the seismic safety of the approximately 20 miles of HP AWSS pipes in the so-called infirm zones, as well other supply or proposed projects under consideration unrelated to any potential HP AWSS expansion. May 8, 2019 Candidate EFWS Project list attached as Appendix P; see CS-199, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a> at p. 31 for a map of infirm zones.

Although the original AWSS system was designed to be seismically strong, and to survive an earthquake, it was designed shortly after the 1906 earthquake and installed by 1913. Most of the AWSS pipelines fared well during the Loma Prieta earthquake, although that was 60 miles away and not as big an earthquake as we will someday face. See, e.g., PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a> at pp. 9-12. Accordingly, no one knows for certain how the existing AWSS will fare in a major earthquake, especially in liquefaction areas or so-called infirm zones. The infirm zone projects, which are estimated to cost \$135 million, involve installing new, backbone ERDIP pipe in each infirm zone, so that even if the existing AWSS pipe fails there will be at least one reliable major high-pressure pipeline in each area. Information provided by SFPUC; see also Appendix P.

<sup>121</sup> See "Candidate EFWS Projects" list dated May 8, 2019, attached as Appendix P. The actual total of projects related to system expansion is approximately \$485 million, plus the \$160 million for Phase 1 of the Westside project, for a total of \$645 million. We have rounded the \$485 million up to \$500 million for the sake of simplicity and in recognition of the fact that these are all very preliminary high level estimates.

The recently approved 2020-2029 ten-year Capital Plan does not designate nearly enough money for EFWS to complete a City-wide expansion of the HP AWSS system. See <a href="http://onesanfrancisco.org/the-new-plan/overview">http://onesanfrancisco.org/the-new-plan/overview</a>

fire suppression systems, the existing HP AWSS, and modern building standards. Yet the 2017 North Bay fires and the 2018 Camp fire that destroyed the town of Paradise demonstrate how destructive and fast-moving fires can be under windy conditions. <sup>123</sup> In 1906, residents fled to the south and the west, to relatively uninhabited portions of the City that did not burn. Today, the entire City is densely populated and there would literally be no place for residents, especially our many senior citizens, to run to escape a fast-moving conflagration.

Second, in terms of property value, San Francisco has billions of dollars at risk. As discussed in Section A of this report, and in particular Table 1, a 2010 report prepared for the City estimated the range of losses due to fire following an earthquake could exceed \$10 billion for a 7.9-magnitude event – in 2010 dollars. The damage estimates in Table 1 do not include business interruption losses, loss of tourism or loss of property tax revenues, all of which would undoubtedly be substantial. 124

The substantial increase in San Francisco property values over the last decade undoubtedly increases the potential losses. In light of the dire consequences we face, the approximately \$650 million price tag to expand the HP AWSS throughout the City (which includes Phase 1 of the proposed Potable AWSS on the west side), seems well worth the expenditure.

The Civil Grand Jury is not in a position to know whether each of the SFPUC's potential projects is essential, how the costs will change after detailed design work, further studies and environmental reviews, or whether more cost-efficient approaches exist. We are also not in a position to weigh the relative merits of the approximately \$320 million in non-expansion-related projects on the SFPUC's Candidate EFWS Projects list. But we do know that the current approach is taking too long. The SFPUC itself estimates that build-out of the AWSS "would take ~ 35 years using current funding rate assuming 5 year bond cycle." 126

The most recent public timeline provided by the SFPUC is in CS-199, and is most as the various projects have evolved over time. However, that timeline relies upon the issuance of

<sup>123</sup> As discussed above, wind is a major factor in fire spread. See, e.g., Kearns, F. and Moritz, M., *The Conversation* (November 16, 2018), <a href="https://theconversation.com/how-fierce-fall-and-winter-winds-help-fuel-california-fires-106985">https://theconversation.com/how-fierce-fall-and-winter-winds-help-fuel-california-fires-106985</a>; Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco, <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a> at pp. 8-9, 15, 18-19. The 1923 Tokyo earthquake and subsequent fires are probably the most devastating in peacetime, with substantially greater loss of life (an estimated 140,000 killed) than the 1906 earthquake. See Eidinger, J. Editor, Fire Following Earthquake, Revision 11 (2004), <a href="http://home.earthlink.net/~eidinger">http://home.earthlink.net/~eidinger</a>, downloaded from the internet on March 6, 2019 at pp. 1-2, 19-23; see also Great Tokyo Earthquake of 1923, at <a href="http://factsanddetails.com/japan/cat26/sub160/item2226.html">http://factsanddetails.com/japan/cat26/sub160/item2226.html</a>. Among the reasons for the devastation in Tokyo were winds of approximately 28 miles per hour at the time of the earthquake, with increasing wind throughout the day.

<sup>&</sup>lt;sup>124</sup> See CS-199, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a> at pp. 95-97.

<sup>&</sup>lt;sup>125</sup> See May 8, 2019 Candidate EFWS Projects list, attached as Appendix P.

<sup>&</sup>lt;sup>126</sup> SFPUC Emergency Firefighting Water System, Management Oversight Committee presentation dated March 4, 2019, at p. 32. The City is not committed to a five year bond cycle, so it could be even longer, although the increased level of funding in the proposed 2020 ESER bond indicates that things may be moving more rapidly.

ESER bonds every five to seven years, through and including a 2045 bond issuance, such that work would not be completed until 2049. 127

Either way, this means that areas of our City, such as District 11, would not be as well protected as other areas, and would not have a HP AWSS in place if, as predicted by the USGS, a major earthquake hits the Bay Area before 2043.

Accordingly, the Civil Grand Jury recommends a major acceleration of these efforts, such that all areas of the City are protected by a seismically sound, multi-sourced, HP emergency water firefighting system within 15 years, i.e., by no later than 2034.

#### H. The Bottom Line: Act Fast, but Ensure Redundancy

Among the most important factors in designing an EFWS is redundancy. This is true whether the City chooses to extend the existing AWSS or to adopt a different approach. Regardless of the specific plan, there must be multiple, redundant sources of water such that if one source fails or a pipe breaks, firefighters have other means to obtain necessary water supplies.

In the Loma Prieta earthquake the Marina district was saved by the combination of the PWSS and a fireboat, or "the backup to the backup." Unpredictable stuff happens, especially in a major earthquake, and redundancy is necessary. 129 This means not just looped pipe systems but also multiple sources of water. One of the great ironies of the 1906 earthquake is that San Francisco is surrounded by water yet it burned due to a lack of water.

The original HP AWSS was designed with both a redundant water supply and a gridded main system. <sup>130</sup> The system in the northeast quadrant of the City "seeks high post-earthquake

<sup>&</sup>lt;sup>127</sup> Figure 5-1, *Preferred Alternative Planning Level Schedule*, from CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055 at p. 71, and attached as Appendix R.

<sup>128</sup> See Scawthorn, C., Porter, K., and Blackburn, F., Performance of Emergency-Response Services After the Earthquake, chapter in The Loma Prieta, California, Earthquake of October 17, 1989, Marina District, T.D. O'Rourke editor, USGS Professional Paper 1551-F (1992); Scawthorn, C. and Blackburn, F., Performance of the San Francisco Auxiliary and Portable Water Supply Systems in the 17 October 1989 Loma Prieta Earthquake, presented at Fourth U.S. National Conference on Earthquake Engineering May 20-24, 1990, and provided by SFPUC; Blackburn, F., Report on Firefighting Requirements Following Earthquake and Current Proposals by the SFPUC (2018).

<sup>&</sup>lt;sup>129</sup> See, e.g., Metcalf & Eddy, <a href="http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-dee6-b24c-2cf837f3bc00">http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-dee6-b24c-2cf837f3bc00</a> at p. 20; CS-199, at p. 11 ("Multiple redundancies in fire water supply systems are necessary."), <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>

<sup>&</sup>lt;sup>130</sup> 2018 Westside Options Analysis, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740 at p. 37.

reliability via multiple sources of supply."<sup>131</sup> Those sources include two above-ground storage tanks, a reservoir, two salt-water pumping stations, plus several fire boat manifolds if needed. <sup>132</sup>

Many citizens have called for installing a salt-water pump station or stations on the west side, arguing that the ocean provides an unlimited source of water. <sup>133</sup> A salt-water pump station north of Golden Gate Park would also provide geographic diversity of water sources, as the other proposed pumping stations and HP water sources are all south of Golden Gate Park. Dr. Scawthorn, the City's consultant, has asserted that a salt-water pump station on the west side "would be very beneficial." <sup>134</sup>

The Civil Grand Jury recognizes that this may raise environmental and other issues, and may or may not be necessary in light of the potential use of Lake Merced. Nevertheless, the Civil Grand Jury strongly believes in having redundant and geographically diversified water sources, and developing a robust water source in the northwest quadrant of the City seems to us to be beneficial. Other areas of the City have added protection from the SFFD's four fireboats, which can be connected to the PWSS to provide an alternate water supply, as in Loma Prieta. Unfortunately, fireboats are not designed to work in the open water of the Pacific Ocean, and PWSS hose tenders cannot practically drive onto beaches to draft water from the ocean. For these reasons, a salt-water pumping station on the west side seems particularly appropriate.

The need for further EFWS projects is underscored by two additional considerations, discussed more fully below. First, the reliability scores cited in the SFPUC's consultant's reports over-state how effective our current plans are likely to be upon completion. Second, these scores – and our safety – are predicated on being able to properly maintain and operate the existing AWSS assets, especially critical assets, so they are ready when needed.

<sup>131</sup> Scawthorn 2018 memo, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740 at p. 2.

<sup>132</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055, at pp. 7-8.

<sup>133</sup> Pendergast, T, *Plan to Protect Neighborhood Abandoned*, Richmond Review (November 2017), <a href="https://sfrichmondreview.com/2017/11/02/plan-to-protect-neighborhoods-abandoned/">https://sfrichmondreview.com/2017/11/02/plan-to-protect-neighborhoods-abandoned/</a>; Fracassa, D, *SF Moves to Build Water System to Fight Fires for When the Worst Hits*, San Francisco Chronicle (February 11, 2018), <a href="https://www.sfchronicle.com/politics/article/SF-moves-to-build-water-system-to-fight-fires-12605847.php">https://www.sfchronicle.com/politics/article/SF-moves-to-build-water-system-to-fight-fires-12605847.php</a>; Doudiet, T., *Commentary—Sound the Fire Alarm!*, Richmond Review / Sunset Beacon (November 3, 2017), <a href="https://sfrichmondreview.com/2017/11/03/commentary-thomas-w-doudiet/">https://sfrichmondreview.com/2017/11/03/commentary-thomas-w-doudiet/</a>; Wuerfel, N., *Commentary—SFPUC Misleads Public*, Richmond Review / Sunset Beacon (November 13, 2018), <a href="https://sfrichmondreview.com/2018/11/13/commentary-nancy-wuerfel-2/">https://sfrichmondreview.com/2018/11/13/commentary-nancy-wuerfel-2/</a>.

<sup>134</sup> Scawthorn 2018 memo, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740, at p. 7.

Any plan to add a salt-water pump station would need to be responsive to concerns about reducing or even eliminating if possible any impacts on marine life.

<sup>&</sup>lt;sup>136</sup> Information provided by the SFFD.

#### I. Current FRA Reliability Scores Promote Overconfidence

The SFPUC's and the SFFD's goal is to provide a certain Level of Service (LOS) for emergency firefighting water supply throughout the City. In particular, the SFPUC has articulated the following LOS objective:

AWSS will reliably provide water to supply the "probable fire demands" after a magnitude 7.8 San Andreas earthquake. Each FRA will have a minimum of 50% reliable water supply to meet probable fire demands. The Citywide average will be a minimum of 90% reliable water supply to meet probable fire demands. <sup>137</sup>

The Civil Grand Jury agrees with the goal that the City should be prepared to fight fires following a magnitude 7.8 San Andreas earthquake. However, we are concerned with the current measures of "reliability." As discussed below, the "reliability scores" being used by the City create a misleadingly optimistic impression and imply a false precision.

As explained in CS-199, "[i]n the context of this study, reliability is defined as the percentage of the water demand met by AWSS high-pressure system and other sources." Put differently, the reliability score methodology "does not actually represent an estimate of reliability but is a ratio of the EFWS capacity and demand." <sup>139</sup>

The ratio of capacity and demand is a useful measure, but the scores being used are overly optimistic in that the estimated "demand" used is the *median* estimated demand. <sup>140</sup> By definition, half the time one would expect worse conditions and therefore greater demand for water to fight fires. Using a demand estimate that is by definition insufficient half the time is not truly preparing for a repeat of the 1906 earthquake.

The problem of using the median demand is exacerbated by the wide variation in the potential number of fires, fire size, and water demands. <sup>141</sup> As just one example, San Francisco was lucky that there was little to no wind during the Loma Prieta earthquake. Yet as any resident of our City knows, the City often experiences significant wind conditions.

Another problem with the reliability scores is that they ignore where in the FRA a fire is, as well as the size of each FRA. For example, the southeastern portion of the City has several geographically large FRAs. <sup>142</sup> Although water may be able get to the northern part of a particular FRA, the southern part of that FRA may not be as well protected. In addition, the

<sup>137 2018</sup> Westside Options Analysis, at p. 7, <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=117400">https://www.sfwater.org/modules/showdocument.aspx?documentid=117400</a>; CS-199, at p. 102, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>.

<sup>&</sup>lt;sup>138</sup> CS-199, at p. ix, <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>.

<sup>139</sup> Scawthorn 2018 memo, at p. 6, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740.

<sup>&</sup>lt;sup>140</sup> *Id.*, at p. 5.

<sup>&</sup>lt;sup>141</sup> *Id.*, at p. 5.

<sup>&</sup>lt;sup>142</sup> See map of FRAs, attached as Appendix J.

demand represents the water supply need for an entire FRA, and the scores assume that the SFFD "would utilize the Portable Water Supply System (PWSS) or engine relays to distribute the water supply within the FRA to the actual ignition locations." This is an unrealistic assumption, given the City's current inventory of only five old PWSS hose tenders, and the likely demand on fire engines in a major earthquake with a multitude of fires.

The SFPUC is in the process of analyzing potential EFWS demands on a more detailed level, and has shared some of the preliminary results with the Civil Grand Jury. The Civil Grand Jury supports this approach and recommends that the SFPUC continue its efforts to make a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA.

#### J. Maintenance and Training Issues

#### 1. Maintenance Issues

AWSS assets must be well maintained in order to be operational during an emergency. A 2014 study prepared for the SFPUC by its outside consultants AECOM/AGS, a Joint Venture found "maintenance deficiencies" because routine maintenance plans had not been established for all AWSS assets. Instead, maintenance was being performed on an "as needed" basis. 144

During our investigation, the Civil Grand Jury learned that the SFPUC has not developed a number of the routine maintenance plans recommended in the 2014 report. <sup>145</sup> The SFPUC assured us that it has done a good job at maintaining AWSS, and disagrees with some of the recommendations in that 2014 report. Nevertheless, the SFPUC has yet to develop routine maintenance plans for some important AWSS assets.

As an example, the report recommended the SFPUC adopt plans to regularly exercise all AWSS system valves. <sup>146</sup> In response, the SFPUC expressed a "goal" to exercise critical valves every two years. <sup>147</sup> It has defined "critical valves" to include only 66 out of the approximately 1,685 valves in the HP AWSS system. <sup>148</sup> SFPUC personnel acknowledge that its current approach is not a "best practice," and that valves should likely be exercised on a regular basis. SFPUC personnel also acknowledge that its definition of what constitutes a "critical" valve requiring more frequent testing is probably too narrow. <sup>149</sup>

<sup>143 2018</sup> Westside Options Analysis, at p. 37, https://www.sfwater.org/modules/showdocument.aspx?documentid=11740.

<sup>&</sup>lt;sup>144</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055 at pp. 15-16, 24-26.

<sup>&</sup>lt;sup>145</sup> Information provided by SFPUC.

<sup>146</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055 at p. 25.

<sup>&</sup>lt;sup>147</sup> Information provided by SFPUC.

<sup>148</sup> Ibid.

<sup>149</sup> Interviews with SFPUC personnel.

In another instance, the 2014 report recommended that all suction connections be cleaned on a regular basis. <sup>150</sup> The SFPUC noted that suction connections were cleaned in 2014, but that the agency had not adopted a routine maintenance plan. <sup>151</sup>

Now that the SFPUC has had time to focus on the condition of the AWSS, the Civil Grand Jury recommends that it utilize "best practices" for the maintenance of AWSS assets, including valves and suction connections, and that the SFPUC, with the help of the SFFD, redefine which valves in the system are "critical," and, therefore, require more attention and priority in its maintenance plans.

#### 2. Coordinated Training and Drills

Another recommendation in CS-199, the 2014 report prepared for the SFPUC by its outside consultant AECOM/AGS, a Joint Venture, was that the SFPUC "prepare an emergency response program and conduct training exercise [sic]." The report also recommended that SFPUC staff be trained on the AWSS system, including "communications, operational strategies," and "emergency response requirements." Both of these recommendations were given "high" priority, and assessed to entail "low" ongoing cost. <sup>154</sup>

In 2015, the SFFD and the SFPUC entered into a Memorandum of Understanding ("MOU") regarding the operation and maintenance of water-supply systems related to fire suppression. <sup>155</sup> In Section C, entitled "Coordinated Emergency Operations Between the SFWD and SFFD", the MOU requires that "All members of the SFWD … must be trained in the AWSS and the AWSS SCADA system along with the SFFD Water Supply manual." <sup>156</sup> The MOU also specifies that "[t]he SFFD and the SFWD will collaborate for annual training on system operations and appropriate shut-down procedures during and after firefighting operations." <sup>157</sup> The MOU, therefore, requires the SFPUC and the SFFD to coordinate to train all SFWD personnel on the

<sup>150</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055, at pp. 15-16, 24-26, 88, 135. There are approximately35 suction connections along the bay that allow engine pumpers to draw by suction from the bay, and a suction line with low-pressure hydrants along Fulton St. that draws from lakes in Golden Gate Park. Some of these suction connections are located on the bottom of the Bay and can be filled with silt or marine organisms that would interfere with water pumping.

<sup>&</sup>lt;sup>151</sup> Interviews with SFPUC personnel.

<sup>152</sup> CS-199, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055, at pp. x, 88.

<sup>153</sup> Ibid.

<sup>154</sup> Ibid.

Memorandum of Understanding Regarding Operation and Maintenance of San Francisco Water Supply Systems Related to Fire Suppression, dated June 1, 2015 and signed in September 2015.

<sup>156</sup> Id., at Section C.1.

<sup>157</sup> Id., at Section C.3.

AWSS system and on other available water supply sources to fight fires in emergencies. It also requires coordinated, *annual* training on emergency operation of the system.

In 2017, the SFPUC updated its Emergency Response Plan. A review of the Plan, however, offers little detail on the type of exercise conducted or how often exercises might be conducted in the future. Similarly, although CS-199 identified the need for emergency training and a training exercise, CS-199 did not provide details as to the scope or frequency of any training exercises.

In the past several years the SFFD and SFPUC have taken advantage of many opportunities for joint training concomitant with their joint operation and maintenance of AWSS assets. For example, the two agencies test Pump Stations 1 and 2, on a monthly basis. The agencies also meet after greater-alarm fires to discuss coordination, and how to improve operations in the field. In addition, the SFFD and SFPUC have, on occasion, conducted joint emergency trainings involving earthquake disaster scenarios. In 2018, for example, they engaged in a "tabletop exercise" where high-level staff members were asked to respond to a hypothetical earthquake scenario to test their understanding of the emergency command structure.

The SFPUC anticipates that it will repeat this joint tabletop exercise at least every other year, and that it will conduct larger-scale simulations of post-earthquake emergency response procedures with the SFFD within the next two years. There is no formal document, however, outlining specific joint exercises or drills to be conducted by the two agencies.

In the 1989 Loma Prieta earthquake, human error was cited by some as a reason why AWSS was not available to fight fires in the Marina. A 2011 survey of California fire and water agencies concluded, generally speaking, that "[f]ire and water department liaison is not very good" and that "[e]mergency firefighting water supply is not a focus." Moreover, the report found that fire departments are not "regularly drilled for the very difficult task of moving water from the alternative water sources to the fire scene." 162

The Civil Grand Jury believes that the City would be well served if the SFPUC and SFFD worked together to design and implement annual "hands-on" drills to make certain that their staff is prepared to use all available resources to fight fires after an earthquake. Accordingly, the Civil Grand Jury recommends that the MOU between the SFPUC and the SFFD be amended to include a more detailed roadmap for emergency response exercises to be held, City-wide,

<sup>158</sup> Information provided by SFPUC.

<sup>&</sup>lt;sup>159</sup> City Distribution Department (CDD) Earthquake Response Plan (updated December 2017), https://sfpuc.sharefile.com/share/view/s77bd1c3318e4355b

<sup>&</sup>lt;sup>160</sup> See, e.g., Scawthorn, C., Porter, K., and Blackburn, F., Performance of Emergency-Response Services After the Earthquake, chapter in The Loma Prieta, California, Earthquake of October 17, 1989, Marina District, T.D. O'Rourke editor, USGS Professional Paper 1551-F (1992).

PEER 2011, Water Supply Following Earthquake, <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a> at p. 75. By contrast, both the SFPUC and the SFFD have indicated that they currently enjoy excellent communication.

<sup>&</sup>lt;sup>162</sup> *Id*.

annually. In addition to tabletop scenarios, these exercises should include hands-on field testing in the operation of AWSS assets and PWSS units.

#### CONCLUSION

Over one hundred years ago, our City was destroyed by fire following an earthquake. Luckily, our predecessors learned from this catastrophe. They aggressively undertook to design, fund, and quickly build a supplemental emergency water supply system that provided firefighters with multiple options if one or more water sources were compromised – "belt and suspenders." They gave us an excellent emergency water system to protect our wonderful, seismically vulnerable City.

We have, however, long outgrown the protective reach of the system we inherited. Now it is our turn to aggressively implement measures to extend protections to reach all San Francisco neighborhoods. The time to act is now, before it is too late.

#### **FINDINGS**

- F1. Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.
- F2. The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.
- F3. Approximately 30 cisterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake.
- F4. The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.
- F5. A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.
- F6. Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.
- F7. The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSS hose tenders would provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multi-sourced, seismically safe emergency water supply can be developed in those areas.
- F8. Redundancy is an important feature of an emergency firefighting water system.
- F9. Current plans to extend protections to the western part of the City do not include any high-pressure water sources north of Golden Gate Park.
- F10. The "reliability scores" being used by the SFPUC impart an overly optimistic impression of the protection provided.
- F11. The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.
- F12. The SFPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention.

F13. In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.

#### RECOMMENDATIONS

- R1. By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.
- R2. The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.
- R3. The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020.
- R4. As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.
- R5. The SFFD should strategically locate the majority of the PWSS hose tenders in areas that at present only have low-pressure hydrants and/or cisterns.
- R6. The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.
- R7. The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.
- R8. By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.
- R9. By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans.

R10. By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.

#### REQUIRED RESPONSES

Pursuant to Penal Code sections 933 and 933.05, the Civil Grand Jury requests responses as follows:

From the following City and County agencies and departments within 60 days:

- Office of the Mayor
  - o Findings 4, 5, 6, and 11
  - o Recommendations 1, 2, 4, and 8
- General Manager, San Francisco Public Utilities Commission
  - o Findings 2, 4, 5, 6, 8, 9, 10, 11, 12, and 13
  - o Recommendations 1, 2, 6, 7, 9, and 10
- Chief, San Francisco Fire Department
  - o Findings 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 13
  - o Recommendations 1, 2, 4, 5, 6, 7, and 10
- Office of the City Administrator
  - o Findings 6 and 11
  - o Recommendations 1, 2 and 8
- Chief Resilience Officer, Office of the City Administrator
  - o Findings 6 and 11
  - o Recommendations 1, 2 and 8
- Director, San Francisco Department of the Environment
  - o Recommendation 6
- Budget and Legislative Analyst Office, Board of Supervisors
  - o Findings 6 and 11
  - o Recommendation 3

From the Board of Supervisors and other governing bodies within 90 days:

- Board of Supervisors
  - o Findings 4, 5, 6 and 11
  - o Recommendations 1, 2, 3, 4, 6, 7, and 8
- San Francisco Public Utilities Commission
  - o Findings 2, 4, 5, 6, 8, 9, 10, 11, and 12
  - o Recommendations 1, 2, 6, 7, 9, and 10
- San Francisco Fire Commission
  - o Findings 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11
  - o Recommendations 1, 2, 4, 5, 6, 9 and 10

#### **GLOSSARY AND TABLE OF ACRONYMS AND ABBREVIATIONS**

- ATC Applied Technology Council. A non-profit corporation whose mission is to develop and promote state-of-the-art, user-friendly engineering resources and applications for use in mitigating the effects of natural and other hazards on the built environment, and which prepared reports in 2010 for the City under the CAPSS Project.
- AWSS Auxiliary Water Supply System. An independent emergency firefighting system built after the 1906 earthquake. The AWSS at present consists of approximately 135 miles of high-pressure (HP) pipelines, 230 cisterns, two above-ground storage tanks, a reservoir, and two salt-water pumping stations. The AWSS HP pipelines can supply water at pressures up to 300 psi via hydrants with black, red or blue tops, depending upon location.
- CAPSS Community Action Plan for Seismic Safety. According to the CAPSS website, CAPSS was started in the Department of Building Inspection beginning in 1998, and was a nine-year, \$1 million study to understand, describe, and mitigate the risk San Francisco faces from earthquakes. CAPSS produced an extensive analysis of potential earthquake impacts as well as community-supported recommendations to mitigate those impacts.
- CCSF City and County of San Francisco
- CDD City Distribution Division. The division of the SFPUC responsible for maintenance of both the MWSS and the AWSS.
- DWSS Domestic Water Supply System, also referred to as the Municipal Water Supply System, MWSS, or the potable water system. The SFPUC supplies potable (drinking) water throughout the City. The MWSS (DWSS) is a low-pressure system, typically ranging between 50 and 70 psi. The MWSS is also the primary supply for firefighting via fire hydrants with white tops.
- ERDIP Earthquake Resistant Ductile Iron Pipe. A modern type of pipe that is believed to be earthquake resistant and that has been subjected to several major earthquakes in Japan without any observed failures.
- EFWS Emergency Firefighting Water System. All emergency sources of water and the means for delivering them. Includes HP AWSS pipelines, cisterns, PWSS and fireboats.
- ESER Earthquake Safety and Emergency Response. ESER bonds are generally issued every five to seven years to address to fund repairs and improvements to infrastructure that allow the City to respond more quickly and effectively to a major earthquake or other disaster.

FRA Fire Response Area. The SFFD divides the City into 46 areas for initial alarm response, referred to as Fire Response Areas or FRAs.

HP High-pressure

LOS Level of Service

MOU A Memorandum of Understanding between the SFPUC and the SFFD Regarding Operation and Maintenance of San Francisco Water Supply Systems Related to Fire Suppression, dated June 1, 2015 and signed in September 2015.

MWSS Municipal Water Supply System, also referred to as the Domestic Water Supply System, DWSS, or the potable water system. The SFPUC supplies potable (drinking) water throughout the City. The MWSS is a low-pressure system, typically ranging between 50 and 70 psi. The MWSS is also the primary supply for firefighting via fire hydrants with white tops.

PEER Pacific Earthquake Engineering Research Center

PSI Pounds per square inch

PWSS Portable Water Supply System. A mobile above-ground large (five-inch) diameter hose system transported on trucks (hose tenders). A hose tender truck can carry approximately 5000 feet of five-inch hose. A more thorough description is provided at pages 23-26. The PWSS is not to be confused with the flexible water supply system, an idea for 12-inch diameter hoses that was abandoned as impractical.

SCADA Supervisory Control and Data Acquisition. A computer system for gathering and analyzing real time data. SCADA systems are used to monitor and control a plant or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining and transportation.

SFDPW San Francisco Department of Public Works

SFFC San Francisco Fire Commission

SFFD San Francisco Fire Department

SFPUC San Francisco Public Utilities Commission

SFWD San Francisco Water Department

USGS United States Geological Survey

WSIP Water System Improvement Program. The WSIP is a \$4.8 billion dollar, multiyear program to upgrade the SFPUC's regional and local water systems. The WSIP, which is over 96% complete, is one of the largest water infrastructure programs in the nation and the largest infrastructure program ever undertaken by the City.

#### **APPENDICES**

- A. Table of Findings and Recommendations
- B. Table of Findings with Required Responses
- C. Table of Recommendations with Required Responses
- D. List of Reports Specifically Focusing on the City's AWSS or PWSS
- E. List of Additional Reports Reviewed
- F. USGS, UCERF3: A New Earthquake Forecast for California's Complex Fault System, Fact Sheet 2015-3009 (2015) <a href="https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf">https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf</a>
- G. USGS, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020 (2016) (version 1.1), https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf
- H. Map of Existing EFWS, with HP AWSS, Cisterns and other Assets
- I. Map of Existing HP AWSS system
- J. Map of SFFD Fire Response Areas
- K. Abstract (page 2) from Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco,
  - $\underline{http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeO}\ \underline{ct2010.pdf}$
- L. Analysis by the Ballot Simplification Committee of 1986 Proposition A.
- M. San Francisco Fire Commission Resolution 2010-01, dated January 14, 2010, <a href="https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf">https://sf-fire.org/sites/default/files/FileCenter/Documents/2446-Resolution%202010-01%20PWSS%20Grant%20Funding.pdf</a>
- N. SFPUC 2017 FAQ, <a href="https://sfwater.org/modules/showdocument.aspx?documentid=11507">https://sfwater.org/modules/showdocument.aspx?documentid=11507</a> printed March 6, 2019
- O. SFPUC EFWS 2010 and 2014 ESER bond project status as of February 26, 2019
- P. SFPUC Candidate EFWS Project list dated May 8, 2019
- Q. Fire Dept.'s Ace in the Hole, San Francisco Independent, January 31, 1990
- R. Figure 5-1, *Preferred Alternative Planning Schedule*, from CS-199, at p. 71, https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055.

## APPENDIX A TABLE OF FINDINGS AND RECOMMENDATIONS

#### **Findings**

- F1. Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.
- F2. The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.
- F3. Approximately 30 cisterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake.
- F4. The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.
- F5. A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.
- F6. Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multisourced, seismically safe emergency firefighting water supply.

#### Recommendations

- R1. By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.
- R2. The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.
- R3. The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020.

| Findings   | Recommendations  |
|--|--|
| F6. Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multisourced, seismically safe emergency firefighting water supply.  | R4. As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.   |
| F7. The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSS hose tenders would provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multi-sourced seismically safe emergency water supply can be developed in those areas. |  |
| F4. The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.                                | R5. The SFFD should strategically locate the majority of the PWSS hose tenders in areas that at present only have low-pressure hydrants and/or cisterns.   |
| F8. Redundancy is an important feature of an emergency firefighting water system.  F9. Current plans to extend protections to the western part of the City do not include any high-pressure water sources north of Golden Gate Park.   | R6. The SFPUC, the SFFD, and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021. |
| F10. The "reliability scores" being used by the SFPUC impart an overly optimistic impression of the protection provided.   | R7. The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.                   |

| Findings  | Recommendations  |
|---|--|
| F5. A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | R8. By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multisourced, seismically safe emergency water  |
| F6. Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multisourced, seismically safe emergency firefighting water supply.   | system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  |
| F11. The City does not have a timeline to fund and complete the development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods. |  |
| F12. The SFPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention.  | R9. By no later than December 31, 2020, the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. |
| F13. In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.   | R10. By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  |

## APPENDIX B TABLE OF FINDINGS WITH REQUIRED RESPONSES

| Findings  | Required Responses   |
|---|--|
| F1. Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.   | <ul> <li>Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> </ul>   |
| F2. The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  | <ul> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> <li>Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> </ul>   |
| F3. Approximately 30 cisterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake.   | <ul> <li>Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> </ul>  |
| F4. The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul> |
| F5. A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul> |

| Findings  | Required Responses   |
|---|--|
| F6. Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  F7. The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSS hose tenders would | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> <li>Fire Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> <li>Office of the City Administrator</li> <li>Chief Resilience Officer, Office of the City Administrator</li> <li>Budget and Legislative Analyst Office, Board of Supervisors</li> <li>Fire Chief, San Francisco Fire Department</li> </ul> |
| provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multi-sourced, seismically safe emergency water supply can be developed in those areas.   | San Francisco Fire Commission  |
| F8. Redundancy is an important feature of an emergency firefighting water system.   | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul>  |
| F9. Current plans to extend protections to the western part of the City do not include any high-pressure water sources north of Golden Gate Park.   | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul>  |

| Findings  | Required Responses  |
|---|---|
| F10. The "reliability scores" being used by the SFPUC impart an overly optimistic impression of the protection provided.  F11. The City does not have a timeline to   | <ul> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> <li>Fire Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> <li>Office of the Mayor</li> </ul>  |
| fund and complete the development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods. | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> <li>Fire Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> <li>Office of the City Administrator</li> <li>Chief Resilience Officer, Office of the City Administrator</li> <li>Budget and Legislative Analyst Office, Board of Supervisors</li> </ul> |
| F12. The SFPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention.  | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> </ul>   |
| F13. In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.             | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> </ul>   |

## APPENDIX C TABLE OF RECOMMENDATIONS WITH REQUIRED RESPONSES

| Recommendations   | Required Responses   |
|---|--|
| R1. By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.   | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> <li>Office of the City Administrator</li> <li>Chief Resilience Officer, Office of the<br/>City Administrator</li> </ul> |
| R2. The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public Utilities Commission</li> <li>San Francisco Public Utilities Commission</li> <li>Fire Chief, San Francisco Fire Department</li> <li>San Francisco Fire Commission</li> <li>Office of the City Administrator</li> <li>Chief Resilience Officer, Office of the City Administrator</li> </ul>                 |
| R3. The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short-term and the long-term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020. | <ul> <li>Board of Supervisors</li> <li>Budget and Legislative Analyst Office,<br/>Board of Supervisors</li> </ul>  |

| Recommendations  | Required Responses   |
|--|--|
| R4. As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.   | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul>  |
| R5. The SFFD should strategically locate the majority of the PWSS hose tenders in areas that at present only have low-pressure hydrants and/or cisterns.   | <ul> <li>Fire Chief, San Francisco Fire         Department</li> <li>San Francisco Fire Commission</li> </ul>   |
| R6. The SFPUC, the SFFD, and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.   | <ul> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> <li>Director, San Francisco Department of<br/>the Environment</li> </ul> |
| R7. The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above the median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.   | <ul> <li>Board of Supervisors</li> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> </ul>   |
| R8. By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multisourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034 | <ul> <li>Office of the Mayor</li> <li>Board of Supervisors</li> <li>Office of the City Administrator</li> <li>Chief Resilience Officer, Office of the City Administrator</li> </ul>  |

| Recommendations  | Required Responses  |
|--|---|
| R9. By no later than December 31, 2020, the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul> |
| R10. By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  | <ul> <li>General Manager, San Francisco Public<br/>Utilities Commission</li> <li>San Francisco Public Utilities<br/>Commission</li> <li>Fire Chief, San Francisco Fire<br/>Department</li> <li>San Francisco Fire Commission</li> </ul> |

## APPENDIX D List of Reports Specifically Focusing On the City's AWSS or PWSS

2002-2003 Civil Grand Jury for the City and County of San Francisco, Keeping the Faucets Flowing: Water Emergency Preparedness In San Francisco (June 2003), <a href="http://civilgrandjury.sfgov.org/2002">http://civilgrandjury.sfgov.org/2002</a> 2003/Keeping the Faucets Flowing Water Emergenc y.pdf

AECOM / AGS, a Joint Venture, CS-199 Planning Support Services for Auxiliary Water Supply System (AWSS) Project Report (Final Report) (February 2014) ("CS-199"), <a href="https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055">https://www.sfwater.org/Modules/ShowDocument.aspx?documentid=5055</a>

AECOM / AGS, JV, Auxiliary Water Supply System Planning Study Summary, prepared for SFPUC (February 2014),

https://sfwater.org/Modules/ShowDocument.aspx?documentid=4907

AECOM / WRE, a Joint Venture, CS-229 Task 16 and 19, Emergency Firefighting Water System (EFWS) Spending Plan for the Earthquake Safety Emergency Response (ESER) 2014 Bond (November 2015) ("CS-229"),

https://sfwater.org/Modules/ShowDocument.aspx?documentid=8246

AECOM, Westside Emergency Firefighting Water Systems Options Analysis Report (January 5, 2018) ("2018 Westside Options Analysis"), https://www.sfwater.org/modules/showdocument.aspx?documentid=11740

Earthquake Safety and Emergency Response (ESER) Bond, Citizens' General Obligation Bond Oversight Committee Reports & Quarterly Reports, found online at <a href="http://www.sfearthquakesafety.org/eser-reports.html">http://www.sfearthquakesafety.org/eser-reports.html</a>

Madsen, M., Reports on an Auxiliary Water Supply System for Fire Protection for San Francisco, California (1908), <a href="https://sfpuc.sharefile.com/share/view/4743f327acfd4ba7">https://sfpuc.sharefile.com/share/view/4743f327acfd4ba7</a>

Metcalf & Eddy / AECOM, Auxiliary Water Supply System (AWSS) Study, prepared for Capital Planning Committee, City and County of San Francisco (2009) ("Metcalf & Eddy"), <a href="http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00">http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/b2754026-dded-4ee6-b24c-2cf837f3bc00</a>

San Francisco Department of Public Works, Auxiliary Water Supply System (AWSS) Pipeline Assessment, Earthquake Safety and Emergency Response Bond 2010, prepared for SFPUC (May 11, 2017), <a href="https://sfpuc.sharefile.com/share/view/684778cd4b46406e">https://sfpuc.sharefile.com/share/view/684778cd4b46406e</a>

Scawthorn, C., January 5, 2018 memorandum to D.Myerson & S.Huang of SFPUC re Review of "Westside Emergency Firefighting Water System Options Analysis", (Scawthorn 2018 memo"), <a href="https://www.sfwater.org/modules/showdocument.aspx?documentid=11740">https://www.sfwater.org/modules/showdocument.aspx?documentid=11740</a>

Scawthorn, C. and Blackburn, F., Performance of the San Francisco Auxiliary and Portable Water Supply Systems in the 17 October 1989 Loma Prieta Earthquake, presented at Fourth U.S. National Conference on Earthquake Engineering May 20-24, 1990, and provided by SFPUC

### APPENDIX E List of Additional Reports Reviewed

Applied Technology Council (ATC) ATC 52-1, Here Today—Here Tomorrow: The Road to Earthquake Resilience in San Francisco, Potential Earthquake Impacts, prepared for the Department of Building Inspection, CCSF, under the Community Action Plan for Seismic Safety (CAPSS) Project (2010)("ATC 52-1, Potential Earthquake Impacts"), <a href="https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf">https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9753-atc521.pdf</a>

Applied Technology Council (ATC) ATC-52-2, Here Today—Here Tomorrow: The Road to Earthquake Resilience in San Francisco, A Community Action Plan for Seismic Safety, prepared for the Department of Building Inspection, CCSF, under the (CAPSS) Project (2010), https://sfgov.org/esip/sites/default/files/FileCenter/Documents/9757-atc522.pdf

Aster, R., <u>California's other drought: A major earthquake is overdue</u>, *The Conversation* (January 30, 2018), <u>https://theconversation.com/californias-other-drought-a-major-earthquake-is-overdue-90517</u>

Blackburn, F., Report on Firefighting Requirements Following Earthquake and Current Proposals by the SFPUC (2018)

City Distribution Department (CDD) Earthquake Response Plan (updated December 2017), <a href="https://sfpuc.sharefile.com/share/view/s77bd1c3318e4355b">https://sfpuc.sharefile.com/share/view/s77bd1c3318e4355b</a>

Eidinger, J. Editor, Fire Following Earthquake, Revision 11 (2004), <a href="http://home.earthlink.net/~eidinger">http://home.earthlink.net/~eidinger</a>, downloaded from the internet on March 6, 2019

Himoto, K., Akimoto, Y., Hokugo, A., and Tanaka, T., Risk and Behavior of Fire Spread in a Densely-built Urban Area, International Association for Fire Safety Science (2008), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1000.9412&rep=rep1&type=pdf

Johnson, L. and Mahin, S., The 6.0 M<sub>w</sub> South Napa Earthquake of August 24, 2014: A Wake-up Call for Renewed Investment in Seismic Resilience across California, Pacific Earthquake Engineering Research Center prepared for the California Seismic Safety Commission, CSSC Publication 16-03, PEER Report No. 2016/04 (2016), <a href="https://ssc.ca.gov/forms\_pubs/cssc\_603peer201604\_final\_7\_20\_16.pdf">https://ssc.ca.gov/forms\_pubs/cssc\_603peer201604\_final\_7\_20\_16.pdf</a>

Kearns, F. and Moritz, M., <u>How fierce fall and winter winds help fuel California fires</u>, *The Conversation* (16 November, 2018), <u>https://theconversation.com/how-fierce-fall-and-winter-winds-help-fuel-california-fires-106985</u>

Li, W., Wang, D., and Zhao, K., Research on Urban Post-earthquake Fire, presented at Sixth China-Japan-U.S. Trilateral Symposium on Lifeline Earthquake Engineering (2013) <a href="https://ascelibrary.org/doi/10.1061/9780784413234.008">https://ascelibrary.org/doi/10.1061/9780784413234.008</a>

Moritz, M., California Needs To Rethink Urban Fire Risk, Starting with Where It Builds Houses, in The Conversation (December 13, 2017), <a href="https://theconversation.com/california-needs-to-rethink-urban-fire-risk-starting-with-where-it-builds-houses-88825">https://theconversation.com/california-needs-to-rethink-urban-fire-risk-starting-with-where-it-builds-houses-88825</a>

O'Rourke, T.D., Lessons Learned For Lifeline Engineering From Major Urban Earthquakes, presented at Eleventh World Conference on Earthquake Engineering (1996)

San Francisco Fire Department Emergency Operations Plan

San Francisco Fire Department Water Supplies Manual (2008), <a href="http://ufsw.org/pdfs/water-supplies-manual.pdf">http://ufsw.org/pdfs/water-supplies-manual.pdf</a>

Scawthorn, C., Coordinated Planning and Preparedness for Fire Following Major Earthquakes, Pacific Earthquake Engineering Research Center, College of Engineering, University of California, sponsored by the California Seismic Safety Commission, Berkeley (2013), <a href="https://ssc.ca.gov/forms-pubs/webpeer-2013-23-scawthorn.pdf">https://ssc.ca.gov/forms-pubs/webpeer-2013-23-scawthorn.pdf</a>

Scawthorn, C., Water Supply In Regards to Fire Following Earthquakes, Pacific Earthquake Engineering Research Center, College of Engineering, University of California, sponsored by the California Seismic Safety Commission, Berkeley (2011) ("PEER 2011, Water Supply Following Earthquake"), <a href="https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf">https://peer.berkeley.edu/sites/default/files/webpeer-2011-08-charles\_scawthorn.pdf</a>

Scawthorn, C., SPA Risk LLC, *Analysis of Fire Following Earthquake Potential for San Francisco, California*, prepared for the Applied Technology Council on behalf of the Department of Building Inspection City and County of San Francisco (October 2010 Rev. 1) ("Scawthorn 2010, Analysis of Fire Following Earthquake for San Francisco"), <a href="http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf">http://www.sparisk.com/documents/SPASanFranciscoCAPSSFireFollowingEarthquakeOct2010.pdf</a>

Scawthorn, C., Fire following earthquake: Estimates of the conflagration risk to insured property in greater Los Angeles and San Francisco, All-Industry Research Advisory Council, Oak Brook, Ill. (1987), <a href="http://www.sparisk.com/documents/AIRACFFEs.pdf">http://www.sparisk.com/documents/AIRACFFEs.pdf</a> or for a copy, <a href="https://www.sparisk.com/documents/AIRACFFEs.pdf">click here</a>.

Scawthorn, C., Fire Following Earthquake Aspects of the Southern San Andreas Fault Mw 7.8 Earthquake Scenario. *Earthquake Spectra* 27 (2), 419-441 (2011), <a href="http://www.sparisk.com/pubs/Scawthorn-2011-ShakeOut-FFE.pdf">http://www.sparisk.com/pubs/Scawthorn-2011-ShakeOut-FFE.pdf</a>

Scawthorn, C., *Fire Following Earthquake, Supplemental Study for the ShakeOut Scenario.* The ShakeOut Scenario: U.S. Geological Survey Open File Report 2008-1150, California Geological Survey Preliminary Report 2, version 1.0, U.S. Geological Survey Circular 1324, California Geological Survey Special Report 207 version 1.0. U. S. Geological Survey and California Geological Survey, Pasadena (2008), Scawthorn-2008-ShakeOut-FFE

Scawthorn, C., Fire Following the M<sub>w</sub> 7.0 HayWired Earthquake Scenario, in Detweiler, S.T., and Wein, A.M., eds., *The HayWired Earthquake Scenario—Engineering Implications*. Scientific Investigations Report 2017–5013–I–Q. Reston, VA: United States Geological Survey, ch. P, pp. 367-400 (2018), at <a href="https://doi.org/10.3133/sir20175013">https://doi.org/10.3133/sir20175013</a> and <a href="https://doi.org/10.3133/sir20175013">www.sparisk.com/pubs/HayWired-2018-vol2.pdf</a>

Scawthorn, C., O'Rourke, T. D. & Blackburn, F. T., *The 1906 San Francisco Earthquake and Fire---Enduring Lessons for Fire Protection and Water Supply*. Earthquake Spectra, Volume 22, S135-S158 (2006) ("Scawthorn, O'Rourke & Blackburn, 1906 Lessons"), <a href="http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf">http://www.sparisk.com/documents/06Spectra1906SFEQandFire-EnduringLessonsCRSTDOFTB.pdf</a>.

Scawthorn, C., Porter, K., and Blackburn, F., Performance of Emergency-Response Services After the Earthquake, chapter in The Loma Prieta, California, Earthquake of October 17, 1989, Marina District, T.D. O'Rourke editor, USGS Professional Paper 1551-F (1992)

U.S. Geological Survey, UCERF3: A New Earthquake Forecast for California's Complex Fault System, Fact Sheet 2015-3009 (2015) <a href="https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf">https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf</a>

U.S. Geological Survey, Earthquake Outlook for the San Francisco Bay Region 2014–2043, Fact Sheet 2016-3020 (2016) (version 1.1), https://pubs.usgs.gov/fs/2016/3020/fs20163020.pdf

# Appendix F









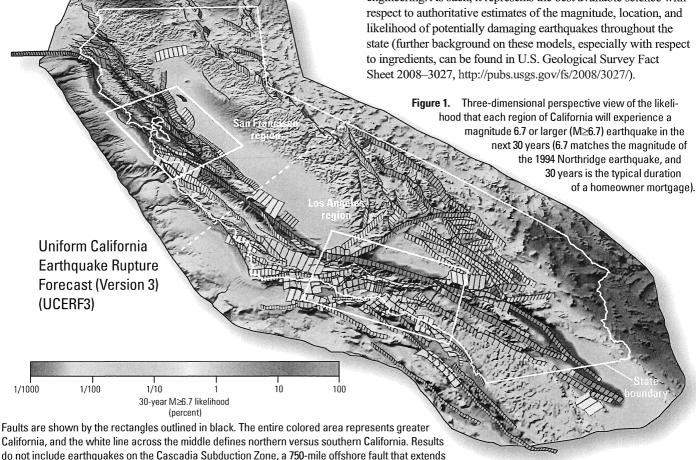
#### **UCERF3: A New Earthquake Forecast for California's Complex Fault System**

 $oldsymbol{W}$ ith innovations, fresh data, and lessons learned from recent earthquakes, scientists have developed a new earthquake forecast model for California, a region under constant threat from potentially damaging events. The new model, referred to as the third Uniform California Earthquake Rupture Forecast, or "UCERF3" (http://www.WGCEP.org/ UCERF3), provides authoritative estimates of the magnitude, location, and likelihood of earthquake fault rupture throughout the state. Overall the results confirm previous findings, but with some significant changes because of model improvements. For example, compared to the previous forecast (UCERF2), the likelihood of moderate-sized earthquakes (magnitude 6.5 to 7.5) is lower, whereas that of larger events is higher. This is because of the inclusion of multifault ruptures, where earthquakes are no longer confined to separate, individual faults, but can occasionally rupture multiple faults simultaneously. The public-safety implications of this and other model improvements depend on several factors, including site location and type of structure (for example, family dwelling compared to a long-span bridge). Building codes, earthquake insurance products, emergency plans, and other risk-mitigation efforts will be updated accordingly. This model also serves as a reminder that damaging earthquakes are inevitable for California. Fortunately, there are many simple steps residents can take to protect lives and property.

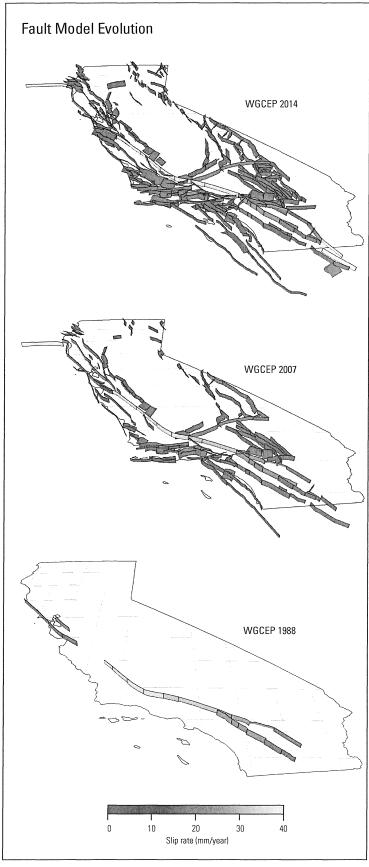
#### What is UCERF3?

California is sandwiched between the Pacific and North American tectonic plates, with the former migrating northwest about two inches per year compared to the latter. The plate boundary is far from smooth, reflecting more of a fragmented zone locked in a tectonic battle over which areas will give way, producing some of the steepest mountain ranges in the world. The sliding between plates is also not steady, but rather plays out in fits and starts with periods of rest interrupted by sudden slip along cracks in the Earth. These "fault ruptures" in turn cause the ground to shake, much like the ripples that radiate from a pebble tossed in a pond, and it is this shaking that causes the most damage in earthquakes.

Two kinds of scientific models are used to help safeguard against earthquake losses: an Earthquake Rupture Forecast, which tells us where and when the Earth might slip along the state's many faults, and a Ground Motion Prediction model, which estimates the subsequent shaking given one of the fault ruptures. UCERF3 is the first type of model, representing the latest earthquake-rupture forecast for California. It was developed and reviewed by dozens of leading scientific experts from the fields of seismology, geology, geodesy, paleoseismology, earthquake physics, and earthquake engineering. As such, it represents the best available science with respect to authoritative estimates of the magnitude, location, and likelihood of potentially damaging earthquakes throughout the state (further background on these models, especially with respect to ingredients, can be found in U.S. Geological Survey Fact



about 150 miles into California from Oregon and Washington to the north.



**Figure 2.** Changes with time of the inventory of faults used in California earthquake forecast models (WGCEP, Working Group on California Earthquake Probabilities).

#### Why a New Earthquake Forecast Model?

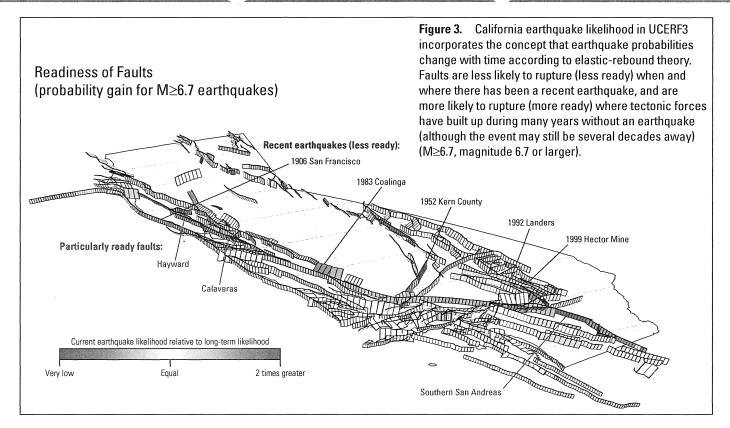
All scientific models, including earthquake rupture forecasts, are an approximation of the physical system they represent, in the same way that "the map is not the actual territory" (Korzbski, 1931). UCERF3 represents the latest model from the Working Group on California Earthquake Probabilities (WGCEP) (WGCEP, 2014), which also released forecasts in 1988, 1990, 1995, 2003, and 2007. This historical progression of models reflects increasingly accurate, detailed, and sophisticated representations of a particularly complex natural system.

A puzzling feature of previous models has been a forecasted rate of moderate-sized earthquakes (between magnitude 6.5 and 7.0) that is up to a factor of two higher than that observed historically. The first discovery of this discrepancy, by the 1995 WGCEP, was particularly disturbing in that one such event, the magnitude 6.7 1994 Northridge earthquake, had just surprised many as the costliest earthquake in U.S. history. In fact, the prospect of such events becoming more frequent contributed to an ensuing homeowner-insurance-availability crisis, as most insurance providers opted to pull out of the market altogether, rather than comply with a state law requiring they offer an earthquake option with each policy. This insurance availability crisis was ultimately solved in 1996 with the legislative creation of the California Earthquake Authority (http://www.earthquakeauthority.com), which has since become the largest earthquake insurance provider in the state. However, the discrepancy between the forecast rate and the observed rate at moderate magnitudes has remained through the most recent previous study (WGCEP, 2007), and scientists have hotly debated whether this is real or a result of some model limitation.

Recent earthquakes have fortunately provided clues. For example, the Northridge earthquake occurred on a previously unrecognized fault, which motivated scientists to search for other faults and quantify those that might be capable of producing damaging earthquakes. The effort has paid off. Whereas the 1988 WGCEP considered only 16 different faults, albeit the main ones, by the time of the WGCEP 2007 effort there were about 200. With UCERF3, there are now more than 350 fault sections in the model, thanks in part to using space-based geodesy where geologic data are limited. This historical progression is shown in the fault model evolution figure at left.

Another clue with respect to the moderate-magnitude rate discrepancy is that many recent earthquakes have plowed past previously inferred fault-rupture boundaries. That is, past models have generally assumed that earthquakes are either confined to separate faults, or that long faults like the San Andreas can be divided into different segments that only rupture separately. However, all three of the most-recent, largest earthquakes in California ruptured right past such boundaries, jumping from one fault to another as multifault ruptures. These were the 1992 magnitude 7.3 Landers, the 1999 magnitude 7.2 Hector Mine, and the 2010 magnitude 7.2 El Mayor–Cucapah earthquakes. The 2011 magnitude 9.0 Tohoku, Japan earthquake also violated previously defined fault-segment boundaries, resulting in a much larger fault-rupture area and magnitude than expected, and contributing to the deadly tsunami and Fukushima nuclear disaster.

Given these observations, the possibility of multifault ruptures clearly needed to be considered in our new model. In fact, as the inventory of California faults has grown over the years, it



has become increasingly apparent that we are not dealing with a few well-separate faults, but with a vast interconnected fault system. In fact, it has become difficult to identify where some faults end and others begin, implying many more opportunities for multifault ruptures. As a consequence, UCERF3 now considers more than 250,000 different fault-based earthquakes, including multifault ruptures, whereas UCERF2 had about 10,000, and previous models had far fewer. Because we still lack a complete inventory of faults, UCERF3 (and UCERF2 before it) also includes the possibility of earthquakes on unrecognized faults elsewhere in the region.

Solving for the rate of all possible ruptures in the interconnected fault system represented a significant challenge. The UCERF3 methodological breakthrough, referred to as the "grand inversion," allowed us to not only solve for the rate of each earthquake rupture, but to also draw upon a broader range of observations in doing so. For example, the previous rate discrepancy at moderate-magnitudes was turned into part of the solution. That is, because the total plate-tectonic deformation is generally well known, any increase in the rate of larger, multifault ruptures must come with a consequent reduction in rates at lower magnitudes. The grand inversion

manages the overall plate-tectonic, fault-system budget mathematically, adding whatever multifault ruptures are needed to eliminate the rate discrepancy at moderate magnitudes. So, not only does UCERF3 include the types of multifault ruptures seen in nature, but doing so has also eliminated the overprediction of moderate-sized events, implying the latter was simply a manifestation of the isolation and segmentation of faults in the previous models.

UCERF3 also includes the notion of fault "readiness," where earthquake likelihoods go down on faults that have recently ruptured, and build back up with time as tectonic stresses reaccumulate. Although this concept, known formally as Reid's elastic rebound theory (Reid, 1911), has been around for more than a century, applying it in a model that includes multifault ruptures also proved challenging. A new methodology was therefore developed, which also relaxes the requirement that the date-of-last event be known where applied. That is, we may not know when the most recent event occurred on many California faults, but we do know that it had to have been prior to 1875 (the year when reliable recordkeeping began). Being able to account for this "historic open interval" for events that precede 1875 allowed us to quantify fault readiness throughout

the entire fault system (fig. 3), rather than being limited to only a subset of faults as in previous studies.

There are many uncertainties in both the data and scientific theories that go into UCERF3, and alternative values for each element can lead to a different forecast. Consequently, UCERF3 is not a single model, but rather a collection of 5,760 different viable models. The results presented in the next section represent an average of these forecasts. Calculating grand-inversion results for all the models required the use of super computers, as they would have taken more than 8 years on a single desktop computer.

# What Are the Results, and How Do They Differ from Previous Estimates?

UCERF3 results for various regions and faults of interest are shown in the figures and tables here. How have expected earthquake rates changed from the previous model? Overall, the results confirm earlier findings (California is earthquake country), but with some important refinements in certain areas. Considering the entire region, the average time between magnitude 6.7 and larger earthquakes has gone from 1 every 4.8 years in UCERF2, to 1 about every 6.3 years in UCERF3, representing a 30 percent decrease in the new forecasted

Table 1. Average time between earthguakes in the various regions together with the likelihood of having one or more such earthquakes in the next 30 years (starting from 2014). Values listed in parentheses indicate the factor by which the rates and likelihoods have increased, or decreased, since the previous model (UCERF2). "Readiness" indicates the factor by which likelihoods are currently elevated, or lower, because of the length of time since the most recent large earthquakes (see text). These values include aftershocks. It is important to note that actual repeat times will exhibit a high degree of variability, and will almost never exactly equal the average listed here.

| Greater California region                  |       |                         |   |       |           |  |
|--|-------|-------------------------|---|-------|-----------|--|
| Magnitude<br>(greater than<br>or equal to) | repea | rage<br>at time<br>ars) | 30-year<br>likelihood of<br>one or more<br>events |       | Readiness |  |
| 5  | 0.12  | (0.7)                   | 100%  | (1.0) | 1.0       |  |
| 6  | 1.2   | (0.9)                   | : 100%  | (1.0) | 1.0       |  |
| 6.7  | 6.3   | (1.3)                   | >99%  | (1.0) | 1.0       |  |
| 7  | 13    | (1.3)                   | 93%   | (1.0) | 1.0       |  |
| 7.5  | 52    | (1.0)                   | 48%   | (1.0) | 1.1       |  |
| 8  | 494   | (0.8)                   | 7%  | (1.5) | 1.2       |  |

|  | Southe | rn Cali  | fornia r | egion     |     |
|--|--------|--|----------|-----------|-----|
| Magnitude<br>(greater than<br>or equal to) | repea  | Average 30-year likelihood of one or more (years) events |          | Readiness |     |
| 5  | 0.24   | (0.7)  | 100%     | (1.0)     | 1.0 |
| 6  | 2.3    | (0.9)  | 100%     | (1.0)     | 1.0 |
| 6.7  | 12     | (1.5)  | 93%      | (1.0)     | 1.0 |
| 7  | 25     | (1.4)  | 75%      | (0.9)     | 1.1 |
| 7.5  | 87     | (1.2)  | 36%      | (0.9)     | 1.2 |
| 8  | 522    | (0.4)  | 7%       | (2.5)     | 1.3 |

|  | Northe | rn Cali                 | fornia r  | egion |           |
|--|--------|-------------------------|---|-------|-----------|
| Magnitude<br>(greater than<br>or equal to) | repea  | rage<br>at time<br>ars) | 30-year<br>likelihood of<br>one or more<br>events |       | Readiness |
| 5 :  | 0.24   | (0.7)                   | : 100%  | (1.0) | 1.0       |
| 6  | 2.4    | (0.9)                   | 100%  | (1.0) | 1.0       |
| 6.7  | 12     | (1.2)                   | 95%   | (1.0) | 1.0       |
| 7  | 25     | (1.2)                   | 76%   | (1.0) | 1.1       |
| 7.5  | 92     | (0.9)                   | 28%   | (1.1) | 1.0       |
| 8  | 645    | (0.8)                   | 5%  | (1.4) | 1.1       |

|  | San   | Francis                 | sco regi  | on    |           |
|--|-------|-------------------------|---|-------|-----------|
| Magnitude<br>(greater than<br>or equal to) | repea | rage<br>at time<br>ars) | 30-year<br>likelihood of<br>one or more<br>events |       | Readiness |
| 5  | 1.3   | (0.7)                   | : 100%  | (1.0) | 1.0       |
| 6  | 8.9   | (1.0)                   | 98%   | (1.0) | 1.0       |
| 6.7  | 29    | (1.1)                   | 72%   | (1.1) | 1.1       |
| 7  | 48    | (0.9)                   | 51%   | (1.3) | 1.1       |
| 7.5  | 124   | (0.7)                   | 20%   | (1.6) | 0.9       |
| 8  | 825   | (0.7)                   | 4%  | (1.9) | 1.0       |

|  | Los   | Angel                    | es regio  | n     |           |
|--|-------|--------------------------|---|-------|-----------|
| Magnitude<br>(greater than<br>or equal to) | repea | rage<br>at time<br>ears) | 30-year<br>likelihood of<br>one or more<br>events |       | Readiness |
| 5 :  | 1.4   | (0.6)                    | : 100%  | (1.0) | 1.0       |
| 6  | 10    | (1.1)                    | 96%   | (1.0) | 1.0       |
| 6.7  | 40    | (2.1)                    | 60%   | (8.0) | 1.1       |
| 7  | 61    | (2.0)                    | 46%   | (0.7) | 1.2       |
| 7.5  | 109   | (1.3)                    | 31%   | (0.9) | 1.3       |
| 8  | 532   | (0.4)                    | 7%  | (2.5) | 1.3       |

rate (and note that most of these events occur in remote areas of the state). For magnitude 8 and larger, on the other hand, the rate has increased by 20 percent in UCERF3, with an expected repeat time of 494 years for UCERF3, down from 1 every 617 years in UCERF2. These changes are a direct and expected manifestation of including multifault ruptures in UCERF3. A more careful analysis of historical seismicity has also produced an increased rate for magnitude 5 and greater earthquakes, going from about 5.8 per year in UCERF2 to 8.3 per year in UCERF3. All of these trends are similar to those seen in various subregions of the state, with differences being slightly more dramatic for the Los Angeles area because that region has a large number of faults that can now host multifault ruptures.

Results are also expressed in terms of the likelihood of experiencing one or more earthquakes in the next 30 years, the duration of a typical home mortgage, and these values also take fault readiness into consideration (how long it has been since the most recent event). As in UCERF2, the likelihood for magnitude 6.7 and larger earthquakes somewhere in the entire region remains near certainty (greater than 99 percent). The likelihood is 7 percent for magnitude 8 and greater, a 50 percent increase over UCERF2, resulting from both the inclusion of multifault ruptures and the particular readiness of some large faults.

One particularly ready fault is the Southern San Andreas, which contributes to its continued status of being the most likely to host a large earthquake. Specifically, it has a 19 percent chance of having one or more events larger than magnitude 6.7 in the next 30 years near Mojave, Calif. The comparably low values for the Northern San Andreas, such as 6.4 percent near San Francisco, are partly because of the relatively recent 1906 earthquake on that fault. In fact, probabilities on two other Bay Area faults, the Hayward-Rodgers Creek and the Calaveras, currently rival or exceed those on the Northern San Andreas, in part because they are both relatively ready.

Compared to the previous model, UCERF2, the San Jacinto fault has a three-fold decrease in the likelihood of magnitude 6.7 or larger earthquakes. Much of this decrease is because of the inclusion of more multifault ruptures, as indicated by the factor of 57 increase in the likelihood of magnitude 8 and larger earthquakes. In other words, the fault has traded some moderate-sized events for rare larger ones.

The Calveras fault, on the other hand, has a three-fold increase in the likelihood of magnitude 6.7 or larger earthquakes. In UCERF2 most Calaveras events were well below magnitude 6.7, so the inclusion of multifault ruptures in UCERF3 has increased the frequency of earthquakes above magnitude 6.7.

We have only touched on a few of the more important changes between UCERF2 and UCERF3, and have highlighted only some of the influential factors. Many more are currently understood, and scientists will be further analyzing results and testing assumptions for years to come.

So what do these changes imply with respect to seismic hazard, the likelihood of ground shaking, as well as for seismic risk, the threat to the built environment with respect to fatalities and economic losses? The answer turns out to be entirely dependent on what you are concerned about. For example, increasing the likelihood of large multifault earthquakes, which consequently reduces the likelihood of moderate-sized events, may increase the risk to tall buildings or large bridges, but actually lower the risk to residential homes.

As a consequence, it is difficult to make generalizations about the hazard or risk implications of UCERF3 without first specifying both asset types and their locations. Conclusions will vary depending on whether you are designing a single family dwelling in Sacramento, retrofitting the San Francisco—Oakland Bay Bridge, considering the location of a nuclear power plant, laying pipeline across the San Andreas Fault, or considering aggregate losses over a large insurance portfolio. The practical implications will need to be considered on a case-by-case basis.

#### What Next?

UCERF3 can now be used to evaluate seismic hazard and risk in California. In fact, it has already been used for the 2014 update of the U.S. Geological Survey National Seismic Hazard Maps (http://earthquake.usgs.gov/hazards/), which in turn are used in building codes. The California Earthquake Authority, which is required by law to use the best available science, will use UCERF3 to evaluate insurance premiums charged to customers, as well as their own level of reinsurance. UCERF3 will be used in many other risk mitigation

Tabulated values represent the likelihood of having one or more earthquakes in the next 30 years (starting from 2014).

[At the points on the fault indicated by white circles. M≥6.7 means magnitude greater than or equal to 6.7, and likewise for the other two magnitude thresholds. %, percent. Values listed in parentheses indicate the factor by which the likelihoods have increased, or decreased, relative to the previous model (UCERF2), where "--" means the previous value was zero. "Readiness" indicates the factor by which probabilities are currently elevated, or lower, because of the length of time since the previous large earthquake]

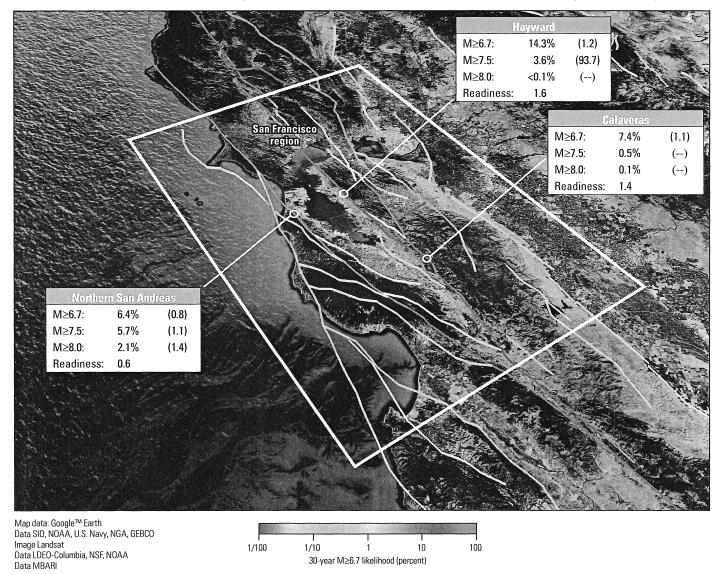


Figure 4. Likelihood of magnitude 6.7 or greater earthquakes in the next 30 years, from 2014, on the faults near San Francisco, Calif.

efforts in the years to come, including engineering design of buildings and lifelines, loss estimation for catastrophic bonds and other risk-linked securities, and emergency preparedness, all of which have the ultimate goal of increasing public safety and community resilience.

UCERF3 should also serve as a reminder that California is earthquake country, and residents should always be prepared. Simple safeguards include practicing "drop, cover, and hold on," securing items in your home and workplace that could fall

during an earthquake, and storing sevendays worth of food and water. Homeowners can also consider structural retrofits, such as bolting the house to its foundation, as well as earthquake insurance options. For further guidance on how to prepare for, survive, and recover after big earthquakes, follow the Seven Steps to Earthquake Safety (http://www.earthquakecountry.org/ sevensteps).

Although UCERF3 is a clear improvement over the previous model (UCERF2), it is still an approximation

of the natural system. For example, it does not model the earthquake-triggering process that produces aftershocks, even though we know such events can be large and damaging. Through the National Earthquake Hazard Reduction Program (http://www.nehrp.gov), the U.S. Geological Survey and its partners will continue to conduct research aimed at improving our understanding of fault behavior and estimates of earthquake hazard in the future.

Tabulated values represent the likelihood of having one or more earthquakes in the next 30 years (starting from 2014).

[At the points on the fault indicated by white circles.  $M \ge 6.7$  means magnitude greater than or equal to 6.7, and likewise for the other two magnitude thresholds. %, percent. Values listed in parentheses indicate the factor by which the likelihoods have increased, or decreased, relative to the previous model (UCERF2), where "--" means the previous value was zero. "Readiness" indicates the factor by which probabilities are currently elevated, or lower, because of the length of time since the previous large earthquake]

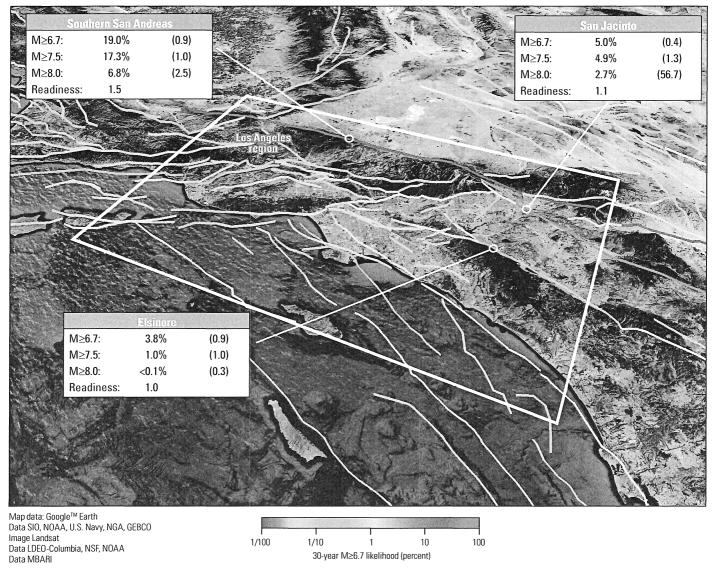


Figure 5. Likelihood of magnitude 6.7 or greater earthquakes in the next 30 years, from 2014, on the faults near Los Angeles, Calif.

#### References

Korzybski, A. 1931, A non-Aristotelian System and its necessity for rigour in mathematics and physics: presention at the American Mathematical Society, December 28, 1931, New Orleans, Louisiana, meeting of the American Association for the Advancement of Science. Reprinted in Science and Sanity, 1933, p. 747–61.

Reid, H.F., 1911, The elastic-rebound theory of earthquakes: University of California Publications, Bulletin of the Department of Geological Sciences v. 6, p. 413–444.

Working Group on California Earthquake Probabilities, 2007, Published as: Field, E.H., Dawson, T.E., Felzer, K.R., Frankel, A.D., Gupta, V., Jordan, T.H., Parsons, T., Petersen, M.D., Stein, R.S. Weldon, II, R.J., and Wills, C.J., 2009, Uniform California earthquake rupture forecast, Version 2 (UCERF 2): Bulletin of the Seismological Society of America, v. 99, p. 2053–2107, doi:10.1785/0120080049.

Working Group on California Earthquake Probabilities, in press, Published as: Field, E.H., Biasi, G.P., Bird, P., Dawson, T.E., Felzer, K.R. Jackson, D.D., Johnson, K.M., Jordan, T.H., Madden, C. Michael, A.J., Milner, K.R., Page, M.T., Parsons, T., Powers, P.M., Shaw, B.E., Thatcher, W.R., Weldon, R.J. II, and Zeng, Y., 2015, Long-term, time-dependent probabilities for the third uniform California earthquake rupture forecast (UCERF3), Bulletin of the Seismological Society of America.

-Authors: Edward H. Field and members of the 2014 WGCEP

Cooperating organizations: Southern California Earthquake Center (SCEC) California Geological Survey (CGS) California Earthquake Authority U.S. Geological Survey

#### **Additional Resources:**

For general earthquake information contact: 1-888-ASK-USGS (1-888-275-8747) http://earthquake.usgs.gov/http://ask.usgs.gov

SCEC Education and Outreach: 213-740-3262

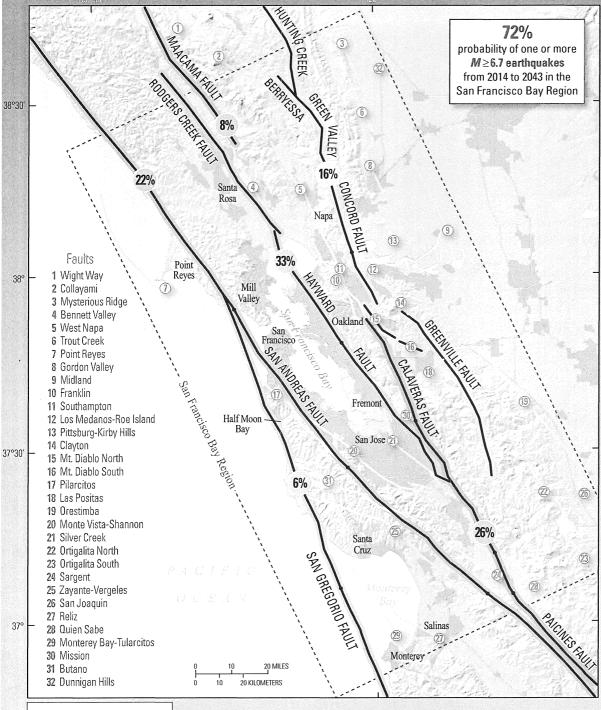
For UCERF3 information see: http://www.WGCEP.org/UCERF3

For technical questions contact: Edward (Ned) Field: field@usgs.gov

## Appendix G



### Earthquake Outlook for the San Francisco Bay Region 2014–2043



sing information from recent earthquakes, improved mapping of active faults, and a new model for estimating earthquake probabilities, the 2014 Working Group on California Earthquake **Probabilities updated** the 30-year earthquake forecast for California. They concluded that there is a 72 percent probability (or likelihood) of at least one earthquake of magnitude 6.7 or greater striking somewhere in the San Francisco Bay region before 2043. Earthquakes this large are capable of causing widespread damage; therefore, communities in the region should take simple steps to help reduce injuries, damage, and disruption, as well as accelerate recovery from these earthquakes.

Building damaged in 2014 South Napa earthquake. Photograph by Erol Kalkan, U.S. Geological Survey.



Fact Sheet 2016–3020 Revised August 2016 (ver. 1.1)

#### **EXPLANATION**

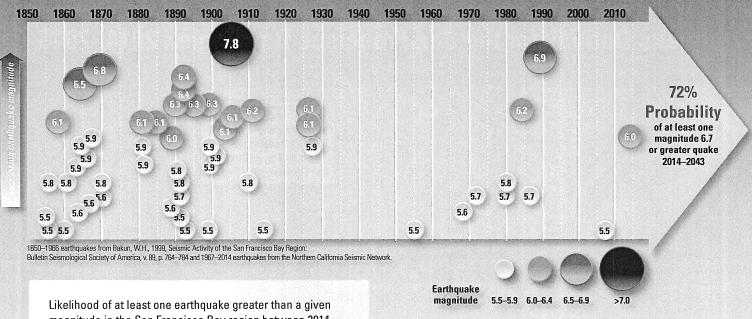
Major plate boundary faults

3 Lesser-known smaller faults

Urban areas

Map of known active faults in the San Francisco Bay region. The 72 percent probability of a magnitude 6.7 or greater earthquake includes the well-known major plate-boundary faults, lesser-known faults, and unknown faults. The percentage shown within each colored circle is the probability that a magnitude 6.7 or greater earthquake will occur somewhere on that fault system by the year 2043. The probability that a magnitude 6.7 or greater earthquake will involve one of the lesser-known faults is 13 percent.

#### San Francisco Bay Region Earthquake Timeline



Likelihood of at least one earthquake greater than a given magnitude in the San Francisco Bay region between 2014 and 2043.

| Magnitude<br>( <i>M</i> ) | 30-year likelihood of at least one earthquake in the San Francisco Bay region |
|---------------------------|---|
| <i>M</i> ≥ 6.0            | 98 percent  |
| $M \ge 6.7$               | 72 percent  |
| $M \ge 7.0$               | 51 percent  |
| $M \ge 7.5$               | 20 percent  |

Timeline of magnitude 5.5 and greater earthquakes in the San Francisco Bay region 1850–2014. In the 50 years prior to 1906, there were 13 earthquakes with a magnitude between 6 and 7, but only 6 earthquakes of similar magnitude in the 110 years since 1906. The rate of large earthquakes is expected to increase from this low level as tectonic plate movements continue to increase the stress on the faults in the region.

#### **Earthquake Preparedness Helps**

Early Sunday morning on August 24, 2014, the residents of Napa, California, were jolted awake by a strong, magnitude 6.0 earthquake. Within 30 minutes, the staff of Becoming Independent, a nonprofit organization that helps adults with intellectual disabilities lead independent lives, called the people they serve in the affected area. The staff quickly visited all of the clients that needed help with cleanup and making their homes safe, a task made easier because both groups were trained in disaster preparedness and the clients had emergency kits with needed supplies on hand. The South Napa earthquake shifted houses off their foundations, damaged chimneys, started fires, and broke water mains throughout the city, causing hundreds of millions of dollars in economic losses. Many historic masonry buildings in downtown Napa were damaged. The earthquake was the largest in the San Francisco Bay region since the 1989 magnitude 6.9 Loma Prieta

earthquake and a clear reminder of the seismic vulnerability of the region. The staff and clients of Becoming Independent showed that understanding and preparing for these events can improve how we live with future earthquakes.

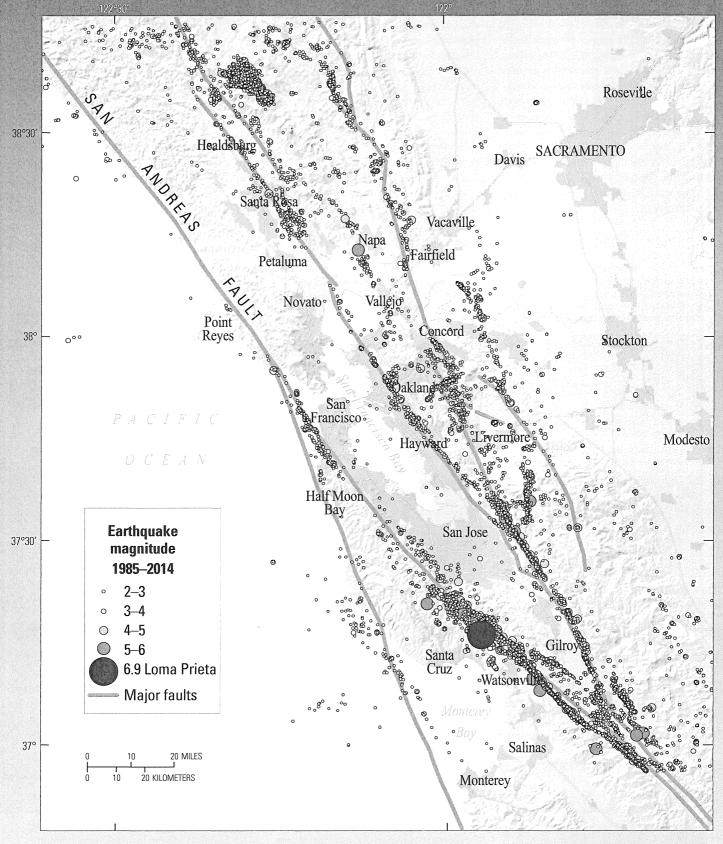
## Why Does the San Francisco Bay Region Have Earthquakes?

The same geologic process that is responsible for the San Francisco Bay region's beautiful coastlines, bays, hills, and valleys is also the primary driving force for earthquakes along faults in the region. The Bay region is located within the active boundary between the Pacific and the North American tectonic plates, where the Pacific plate slowly and continually slides northwest past the North American plate. The San Andreas Fault, on which two magnitude 7.8-7.9 earthquakes have occurred in historical time, including the 1906 San Francisco earthquake, is the fastest slipping fault along the plate boundary.

Other major plate boundary faults in the San Francisco Bay region include the Hayward, Rodgers Creek, Calaveras, Maacama, San Gregorio, Concord, Green Valley, and Greenville Faults.

## How Do Scientists Calculate Earthquake Probability?

Scientists rely upon a variety of techniques to help understand the rate and magnitude of past earthquakes in order to estimate the likelihood of future earthquakes. The Global Positioning System (GPS) and other land surveying and geologic techniques have allowed scientists to make more accurate measurements of how the current plate motionstotaling 1.6 inches per year across the San Francisco Bay region—distribute stress onto these individual faults. Balancing plate motions with the slip during large earthquakes and slow creep on faults allows scientists to calculate average rates of earthquake occurrence over periods of hundreds to thousands of years. (Continued on page 4)



Map of earthquakes greater than magnitude 2.0 in the San Francisco Bay region from 1985–2014. Small earthquakes occur on both major faults (shown by the gray lines) and minor faults (not shown). Because of the variability of fault geometry, earthquakes at depth do not always coincide with the mapped faults at the Earth's surface. There are sections of major faults, particularly the San Andreas Fault, with few or no small earthquakes but they will produce large earthquakes in the future. Compiled from the Northern California Seismic Network.

(Continued from page 2). A trench excavated across the Hayward Fault in Fremont revealed evidence of 12 large earthquakes over the past 1,900 years. The time interval between these earthquakes ranged from about 100 to 210 years. Historical records indicate that the most recent large earthquake on this fault occurred in 1868. However, detailed information about other past earthquakes in the San Francisco Bay region is difficult to obtain because seismograph records only go back to about 1900, historical accounts are sparse before 1850, and there are limited locations where faults can be trenched to identify and date prehistoric earthquakes.

Calculating accurate earthquake probabilities for short periods, such as 30 years, is also challenging. Although the 30-year time interval is convenient for humans, it is much less than the average time between large earthquakes on these faults, which can range from hundreds to thousands of years. The rate of large earthquakes in the San Francisco Bay region was high in the late 1800s but dropped abruptly after the 1906 San Francisco earthquake on the San Andreas Fault. Scientists believe that the post-1906 earthquake rate decreased because the large amount of slip along the San Andreas Fault in 1906 temporarily reduced the stress on

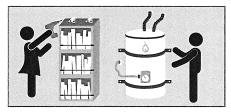
many of the faults in the region. However, the ongoing motion of the tectonic plates began rebuilding stresses after the 1906 event, and earthquakes larger than magnitude 5.5 resumed during the second half of the 20th century. Future large, damaging earthquakes in the San Francisco Bay region, similar in size to the 1989 Loma Prieta and 1906 San Francisco earthquakes, may or may not be accompanied by the level of earthquake activity observed in the late 1800s.

The 2014 Uniform California Earthquake Rupture Forecast version 3 (http:// pubs.usgs.gov/fs/2015/3009/) provides an updated estimate of the likelihood of large earthquakes in California over a 30-year time window from 2014 to 2043. The forecast accounts for how fast stress is accumulating on each fault due to plate motions and the time since its most recent large earthquake(s). In updating the probability calculations, scientists used a more complete set of faults for the San Francisco Bay region than those used in the previous (2008) calculations, adding 32 smaller faults to the 5 major fault systems. The new study has also incorporated more options for how multiple faults might rupture together in large earthquakes.

#### Seven Steps to Earthquake Safety

#### **PREPARE**

Before the next big earthquake we recommend these four steps that will make you, your family, or your workplace better prepared to survive and recover quickly:



**Step 1: Secure your space** by identifying hazards and securing moveable items.



Step 2: Plan to be safe by creating a disaster plan and deciding how you will communicate in an emergency.



**Step 3: Organize disaster supplies** in convenient locations.



Step 4: Minimize financial hardship by organizing important documents, strengthening your property, and considering insurance.

#### **SURVIVE**

During the next big earthquake, and immediately after, is when your level of preparedness will make a difference in how you and others survive and can respond to emergencies:



**Step 5: Drop, Cover, and Hold On** when the earth shakes.



**Step 6: Improve safety after earthquakes** by evacuating if necessary, helping the injured, and preventing further injuries or damage.

#### **RECOVER**

After the immediate threat of the earthquake has passed, your level of preparedness will determine your quality of life in the weeks and months that follow:



Step 7: Reconnect and Restore. Restore daily life by reconnecting with others, repairing damage, and rebuilding community.

Adapted from Seven Steps To Earthquake Safety http://earthquakecountry.org/sevensteps/

### Probabilities of Earthquakes in the San Francisco Bay Region

Smaller earthquakes occur more frequently than larger earthquakes. The probability that an earthquake of magnitude 6.0 or larger will occur before 2043 is 98 percent. The probability of at least one earthquake of magnitude 6.7 or larger in the San Francisco Bay region is 72 percent, and for at least one earthquake of magnitude 7.0 or larger it is 51 percent. These probabilities include earthquakes on the major faults, lesser-known faults, and unknown faults.

The probability of a large earthquake occurring on an individual fault in the San Francisco region is lower than the probability of an earthquake occurring anywhere in the region. The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward, Rodgers Creek, Calaveras, and San Andreas Faults. In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward or Rodgers Creek Faults. Individual sections of these faults have lower probabilities for large earthquakes to occur (continued on page 6);

Maps showing intensity of ground shaking for the South Napa and 1989 Magnitude 6.9 Loma Prieta earthquakes. The black lines show the location of fault Loma Prieta Earthquake Roseville slip at depth. The maps illustrate how the area subjected to strong shaking increases with increasing Healdsburg **SACRAMENTO** earthquake magnitude. Saint Helena Santa Rosa Vacaville Napa Petaluma Vallejo Point Concord Reyes Stockton Oakland San Francisco Modesto Hayward Half Moon Bay San Jose Shaking effects Damage to engineered structures and buildings Damage to older houses, chimneys, and masonry Gilroy Santa Objects thrown from shelves, water sloshed Watsonville Sleepers wakened, felt by almost everybody Felt by some people Salinas 2014 Magnitude 6.0 in tall buildings Monterey South Napa Earthquake Fault rupture 38°30 Healdsburg **SACRAMENTO** Santa Rosa Vacaville Napa Fairfield PACIFIC OCEANVallejo Novato Point Reyes 38° Oakland San Francisco Fremont 20 KILOMETERS Half Moon Damaged building in downtown Bay Napa. Photograph by Erol Kalkan, San Jose U.S. Geological Survey.

#### **Additional Earthquake Resources**

American Red Cross - Bay Area (http://www.redcross.org/local/northern-california-coastal)

Association of Bay Area Governments (http://resilience.abag.ca.gov/earthquakes/)

Bay Area Earthquake Alliance (http://bayquakealliance.org/)

California Earthquake Authority (http://www.californiarocks.com/)

California Geological Survey

(http://www.consrv.ca.gov/cgs/geologic hazards/earthquakes)

Did You Feel It? (http://earthquake.usgs.gov/earthquakes/dyfi/)

Earthquake Country Alliance (http://earthquakecountry.org/)

Putting Down Roots in Earthquake Country (http://pubs.usgs.gov/gip/2005/15/)

ShakeAlert – An Earthquake Early Warning System for the United States West Coast (http://pubs.usgs.gov/fs/2014/3083/)

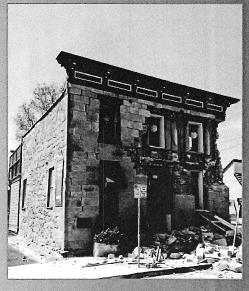
ShakeMap (http://www.cisn.org/shakemap/nc/shake/index.html)

ShakeOut.org (http://www.shakeout.org/california/bayarea/)

Uniform California Earthquake Rupture Fault version 3 Fact Sheet (http://pubs.usgs.gov/fs/2015/3009/)

United Policyholders (http://www.uphelp.org/)

USGS Real-Time Earthquakes (http://earthquake.usgs.gov/earthquakes/map/)



Damaged building in downtown Napa. Photograph by Erol Kalkan, U.S. Geological Survey.

(continued from page 5) however, an earthquake of magnitude 6.7 or larger will cause strong shaking over a broad area. Therefore, it is important to estimate the probability of a large earthquake occurring anywhere in the San Francisco Bay region.

### What is the Likelihood That an Earthquake Will Affect You?

Earthquake probabilities are only one component in the evaluation of earthquake hazards. Higher magnitude earthquakes have broader areas of intense shaking and cause more damage than lower magnitude earthquakes. In a magnitude 6.0 earthquake, strong shaking and damage are confined to a localized area, as illustrated by the 2014 South Napa earthquake. In comparison, the 1989 magnitude 6.9 Loma

Prieta earthquake caused damage over a region nearly 100 miles long. Local soil and geologic conditions, bedrock type, quality of building construction, and susceptibility to flooding (caused by dam or levee failure) can also affect the amount of damage at a particular site. This was dramatically demonstrated by the 1989 Loma Prieta earthquake, which devastated vulnerable parts of Oakland and San Francisco, more than 50 miles from the fault rupture.

## How Can You Protect Yourself and Your Family?

Taking simple steps before and during earthquakes can help protect you and your family, as well as speed your recovery from an earthquake. Before the next earthquake:

• Assess your home and we

- Assess your home and work space, identify hazards, and secure moveable items.
- Create an emergency plan and organize disaster supplies to sustain you and your family for 72 hours or longer.
- Practice "Drop, Cover, and Hold On" to protect yourself when the ground begins to shake. Learn and practice what to do at home, work, or in school.
- Stay prepared by repeating these steps on a regular basis. For example, reassess your preparedness every year and participate in the annual Great California ShakeOut drill on the third Thursday in October.

Lack of adequate shear walls on the garage level exacerbated damage to this building at the corner of Beach and Divisadero in the Marina District, San Francisco, during the October 1989 Loma Prieta earthquake.

Brad T. Aagaard, James Luke Blair, John Boatwright, Susan H. Garcia Ruth A. Harris, Andrew J. Michael, David P. Schwartz, and Jeanne S. DiLeo

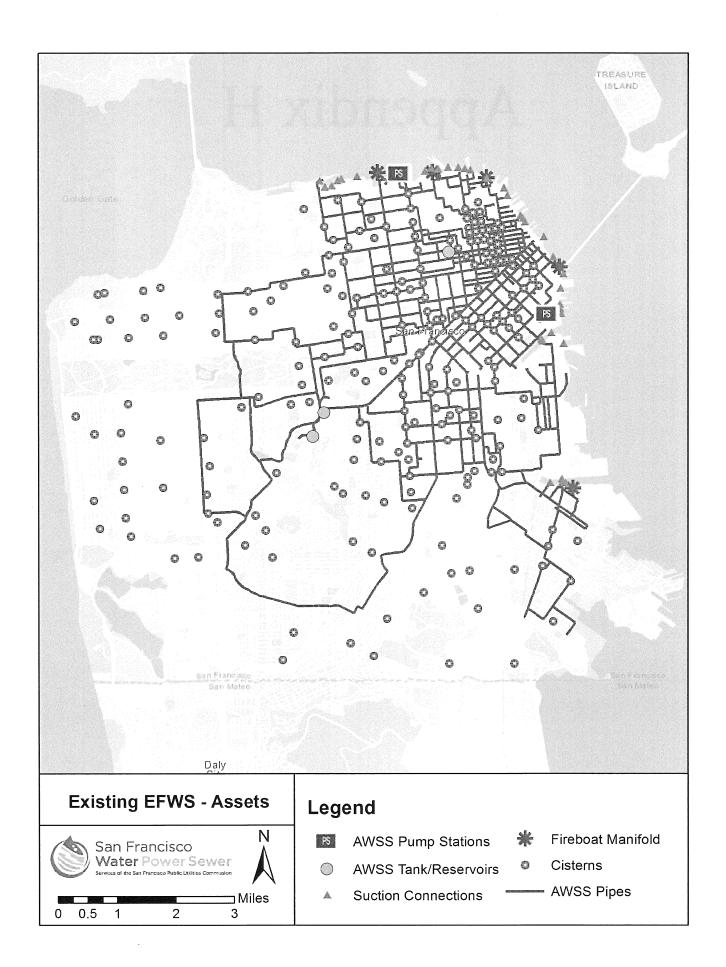
Edited by *Kate Jacques* and *Carolyn Donlin* 

For more information contact: 1-888-ASK-USGS (1-888-275-8747)

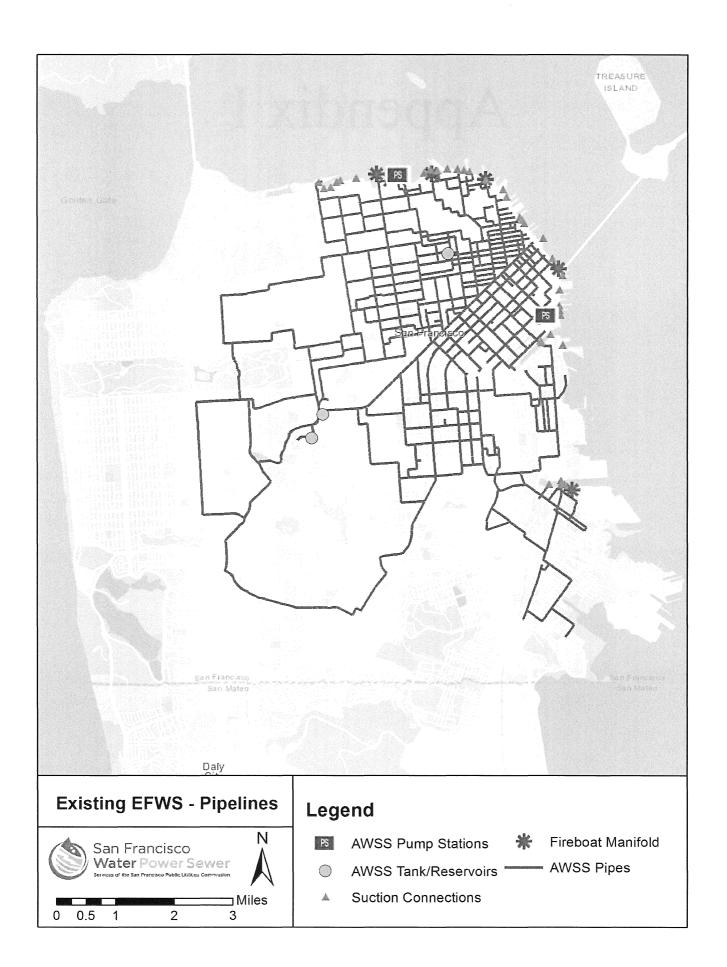
http://earthquake.usgs.gov/ http://ask.usgs.gov

https://www.facebook.com/ USGeologicalSurvey https://twitter.com/USGS

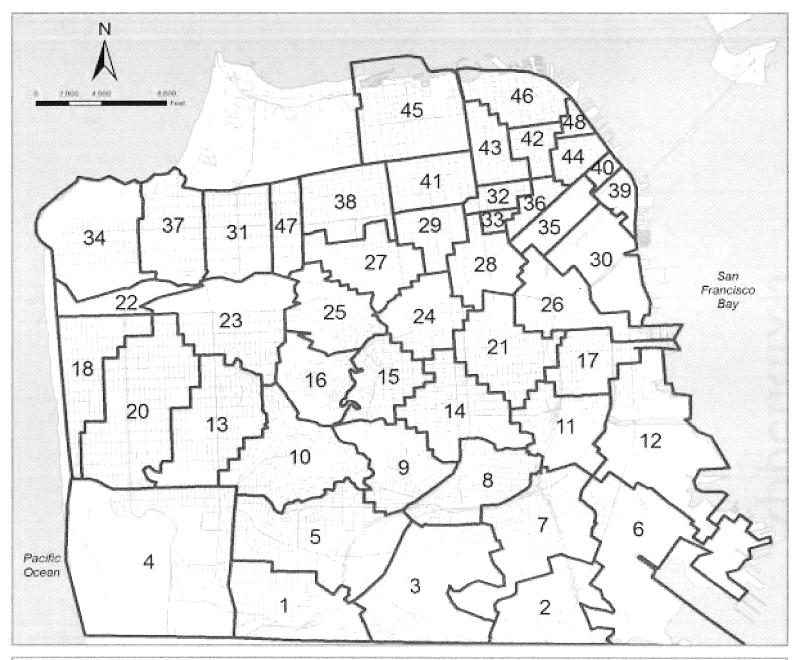
## Appendix H



# Appendix I



## Appendix J





## Appendix K

#### Abstract

San Francisco is at significant risk due to fire following earthquake. This report analyses fire following earthquake for San Francisco as part of a larger project undertaken by the San Francisco Department of Building Inspection entitled Community Action Plan for Seismic Safety (CAPSS). This specific report, on fire following earthquake, has been conducted with the support and assistance of the San Francisco Fire Department (SFFD).

A stochastic model for analyzing fire following earthquake for San Francisco has been developed, utilizing data received from CAPSS, SFFD and others, to assess fire following earthquake impacts due to four earthquake scenarios; magnitude 7.9, 7.2 and 6.5 events on the San Andreas fault near San Francisco, and a magnitude 6.9 event on the Hayward fault. These events cause high ground motions in San Francisco that result in ground failure in many parts of the City - ground motions are particularly high in the western part of San Francisco, which was not yet built up in 1906 and therefore is not protected by the special high pressure SFFD Auxiliary Water Supply System (AWSS). Depending on the specific earthquake scenario, these ground motions and ground failures are estimated to cause over 1,000 breaks in the potable water system, so that SFFD's AWSS and cisterns will be the only source of firefighting water in many parts of the City. The AWSS itself will sustain some damage, forcing SFFD to fall back to cisterns only in some places. At the same time, SFFD's 42 fire engines will almost certainly not be able to respond to all the post-earthquake fires, which are estimated to be about 100 on average (with a 10% chance of as many as 140) for the magnitude 7.9 San Andreas event. As a result, the methodology employed here estimates ignitions, building burnt areas and dollar losses for the four scenario events. These results are presented in Table A-1 as ranges within which losses will fall half (i.e., 50%) of the time (correspondingly, half the time the losses will be outside - that is, either more or less) than the indicated ranges:

Table A-1
Bounds for Losses to Buildings due to Fire Following Earthquake

|                    | 25% ~ 75% Confidence Range |                     |   |  |  |
|--------------------|----------------------------|---------------------|---|--|--|
|                    | Ignitions                  | Loss<br>\$ billions | Total Burnt Building<br>Floor Area<br>mill, Sq. ft. |  |  |
| San Andreas Mw 7.9 | 68 ~ 120                   | \$ 4.1 ~ \$ 10.3    | 11.2 ~ 28.2   |  |  |
| San Andreas Mw 7.2 | 52 ~ 89                    | \$ 2.8 ~ \$ 6.8     | 7.7 ~ 18.6  |  |  |
| San Andreas Mw 6.5 | 48 ~ 70                    | \$ 1.7 ~ \$ 5.1     | 4.7 ~ 14.0  |  |  |
| Hayward Mw 6.9     | 27 ~ 46                    | \$ 1.3 ~ \$ 4.0     | 3.6 ~ 11.0  |  |  |

For example, for the Mw 7.9 event, essentially a repeat of the 1906 earthquake, losses will on average be about \$7.6 billion, and half the time will be more than \$4.1 billion and less than \$10.3 billion. More detailed results are presented in the report, but the significance of these results is not in their precision, but rather in their overall magnitude. The model producing these results was validated by application to the 1989 Loma Prieta event, and examined for methodological and parametric sensitivity, with satisfactory results.

A number of opportunities exist for reducing the fire following earthquake in San Francisco, including further improvements in reliability of post-earthquake water supply, further support for NERT, and greater training for this problem for SFFD officers and firefighters.

## Appendix L



#### **PROPOSITION A**

FIRE PROTECTION SYSTEM IMPROVEMENT BONDS, 1986. To incur a bonded indebtedness of \$46,200,000 for the improvement of the fire protection system within the City and County of San Francisco.

YES 273



## **Analysis**

by Ballot Simplification Committee

THE WAY IT IS NOW: Since the 1906 earthquake and fire, the San Francisco Fire Department has had programs to improve its fire protection system. A bond issue in 1977 paid for the most recent improvements, including an extension of the high pressure firefighting water system which operates independently from the City's domestic water supply. However, there are still parts of the City which are not served by that high pressure system.

THE PROPOSAL: Proposition A would authorize the City to borrow \$46,200,000 by issuing general obligation bonds. This money would pay for improvements in San Francisco's fire protection system. These improvements would include extending the high pressure system, construction of new cisterns in residen-

tial areas, installation of a high pressure pump station at Lake Merced, construction of an emergency operations center, and other projects. The interest and principal on general obligation bonds are paid out of tax revenues. Proposition A would require an increase in the property tax.

A YES VOTE MEANS: If you vote yes, you want San Francisco to issue general obligation bonds totalling \$46,200,000 to make certain improvements in the City's fire protection system.

A NO VOTE MEANS: If you vote no, you do not want San Francisco to issue bonds for these improvements in the City's fire protection system.

#### Controller's Statement on "A"

City Controller John C. Farrell has issued the following statement on the fiscal impact of Proposition A:

"Should the proposed Resolution be authorized and when all bonds shall have been issued on a twenty (20) year basis and after consideration of the interest rates related to current municipal bond sales, in my opinion, it is estimated that approximate costs would be:

 Bond Redemption
 \$46,200,000

 Bond Interest
 38,808,000

 Debt Service Requirement
 \$85,008,000

"Based on a single bond sale and level redemption schedules, the average annual debt requirement for twenty-two (22) years would be \$3,864,000 which amount is equivalent to approximately one and twenty hundreths cents (\$0.0120) in the current tax rate."

#### How "A" Got on the Ballot

On July 28 and August 4 the Board of Supervisors voted 8-0 in favor of the ordinance placing Proposition A on the ballot.

The ordinance was signed by Mayor Dianne Feinstein on August

THE FULL LEGAL TEXT OF PROPOSITION A APPEARS ON PAGE 96

NOTE: YOUR POLLING PLACE MAY HAVE CHANGED. PLEASE REFER TO MAILING LABEL ON BACK COVER. 

#### **ARGUMENT IN FAVOR OF PROPOSITION A**

In 1906, as dawn was about to break on April 18, a giant earthquake hit the City, touching off 52 separate fires. Those downtown swiftly joined in a huge conflagration that swept westward from the waterfront, leaving much of the City in ruins.

If another major quake strikes—(and seismic experts say it will, but they can't pinpoint when), the City must be prepared.

Our firefighters must have sufficient water to fight spreading fires and quickly to control them. That's the only way our City will survive.

In 1906, water mains broke and left the City defenseless.

Proposition A will assure adequate water in every neighborhood throughout the City.

Proposition A will provide \$46 million in general obligation bonds to expand and improve emergency water supplies throughout

the City. Residential areas will be provided with underground cisterns, and the high-pressure water supply system will be extended. Suction hose connections to City lakes, San Francisco Bay and the Pacific Ocean will provide additional millions of gallons of water.

These emergency fire-fighting water supplies are necessary to protect our homes, schools, hospitals, churches and other structures from the threat of fire that inevitably comes with a monstrous quake.

This increased fire protection will benefit the entire City and all who live, work and vist here.

Vote Yes on Proposition A.

Dianne Feinstein, Mayor

#### **ARGUMENT IN FAVOR OF PROPOSITION A**

As a result of the earthquake and fire in 1906, San Francisco suffered great destruction and devastation from the conflagration which followed, including the destruction of 28,000 buildings.

Due to broken water mains caused by the earthquake, the San Francisco Fire Department was unable to stop the fire from getting out of control.

Proposition A will provide for the expansion of a high pressure fire-fighting water system to the residential districts of the City, which will be critical in emergency situations.

Underground cisterns also will be constructed in the outer residential districts to provide emergency water supply in areas not served by the high pressure system.

High pressure system gate valves will be motorized with emergency battery powerpacks so they can be opened and closed in an emergency when normal power is disrupted.

Suction connections will be provided to San Francisco Bay, the Pacific Ocean, and City lakes so that fire department pumpers can quickly connect and pump water from these large bodies of water to any fires.

A pumping station for the high pressure system will be con-

structed at Lake Merced to provide an important source of water from the western part of the City.

An Emergency Operations Center will be built to provide a command center for operations in earthquakes and other major disasters.

The recent fire and explosion in the Hunter's Point district demonstrated the critical need for water supplies in a major fire. The broken water main caused by the explosion severely hampered the Fire Department in controlling this major fire. This is an example of what can happen when normal water supplies are disrupted.

Increased earthquake activity in California demonstrates the importance of this Proposition.

The fire department can function only if an adequate water supply exists. Proposition A will provide an emergency fire-fighting water supply for the City, and ensure that fires will not get out of control due to lack of water, following an earthquake.

We urge all citizens to vote yes on Proposition A. This is protection for your home and your City.

-Submitted by the Board of Supervisors

#### ARGUMENT IN FAVOR OF PROPOSITION A

The Fire Commission and Chief of Department urge a YES vote on Propositon A—a \$46.2 million Earthquake Preparedness Program.

This construction Program is designed to provide an updated and expanded emergency water supply system so that all areas of the City and County of San Francisco will be protected in case of a conflagration following an earthquake or other disaster.

The major components of the Program are: high-pressure water supply extensions, underground cisterns, pumping station, emergency operations center, suction hose connections to the Bay and lakes, and a study to determine fire station reconstruction needs and their earthquake safety.

Help the San Francisco Fire Department provide increased fire protection. VOTE YES ON PROPOSITION A.

Henry E. Berman, President, Fire Commission Curtis McClain, Vice President, Fire Commission Juanita Del Carlo, Commissioner, Fire Commission Richard J. Guggenhime, Commissioner, Fire Commission Anne S. Howden, Commissioner, Fire Commission Emmet D. Condon, Chief of Department



#### ARGUMENT IN FAVOR OF PROPOSITION A

San Franciscans will not forget, nor should they, the tragic Bayview/Hunter's Point fire on April 4, 1986. Coincidentally, two earthquakes rocked the Bay Area in the weeks following the Bayview fire.

Following the Bayview fire, I requested Board of Supervisors hearings to investigate the adequacy of San Francisco's emergency water supply in the Bayview, Ingleside, Balboa Terrace, Oceanview, Lakeside, Forest Hill, Crocker-Amazon, St. Francis Wood, West Portal, Diamond Heights, Visitacion Valley, Merced Manor, Excelsior, Portola, Silver Terrace, Miraloma Park, Forest Knolls, Inner Sunset, Lakeshore Acres, Monterey Heights, and Outer Mission neighborhoods, and to implement a program to correct deficiencies in our emergency firefighting capabilities. From these hearings and deliberations of the Fire Commission, Proposition A emerged.

#### VOTE YES ON A.

Proposition A is a \$46,200,000 general obligation bond issue to construct a comprehensive emergency water supply system and an emergency operations center for firefighting in the event of a disaster.

That may seem like a lot of money, but it represents, in this case, a prudent, far-sighted investment in San Francisco's future. Unfortunately, we can't guarantee another Bayview-type fire won't happen. But we can be better prepared if one does happen, and significantly reduce the risk to life and property in the Bayview, Hunter's Point, the Outer Mission, and all of the West of Twin Peaks area.

Please vote "Yes" on A.

Quentin L. Kopp, Supervisor

#### ARGUMENT IN FAVOR OF PROPOSITION A

Earthquakes are a major concern to all of us who live in California, and a potential cause of disaster for San Francisco. Following a major earthquake it is highly likely that multiple fires will occur. San Francisco with its highly congested blocks of wooden buildings would face a conflagration (fire storm), if a major earthquake caused water supplies to be disrupted.

Proposition A, as an Earthquake Preparedness measure, is very important for San Francisco. It will provide for Emergency Water Supply necessary for fire fighting.

. We urge all citizens to VOTE YES ON PROPOSITION A.

Bruce Bolt, Professor of Seismology
Karl V. Steinbrugge, Past Chairman
California Seismic Safety Commission
Charles Scawthorn, Structural Engineer
Joe J. Litehiser, Seismologist
Donald H. Cheu, M.D., Vice Chairman
Governor's Earthquake Task Force

#### ARGUMENT IN FAVOR OF PROPOSITION A

We support this important Earthquake Preparedness Program. VOTE YES ON PROPOSITION A.

Willie L. Brown, Jr., Speaker of Assembly
Michael Hennessey, Sheriff
Morris Bernstein, President, Airports Commission
Douglas Engmann, Commissioner, Board of Permit Appeals
E. L. Friend, President
Anne Halstead, Commissioner, Port Commission

Thomas E. Horn, President, War Memorial Board of Trustees Melvin D. Lee, Commissioner, Redevelopment Commission Robert J. McCarthy, Vice President, Board of Permit Appeals Al Nelder, Commissioner, Police Commission Michael Salarno, Member, S.F. Parking Commission William K. Coblentz, Attorney Gordon J. Lau, Attorney Steven L. Swig, Attorney

#### ARGUMENT IN FAVOR OF PROPOSITION A

Fire Protection for San Francisco's neighborhoods is a vital factor. Emergency Water Supplies for fire fighting are necessary so that the Fire Department can provide ample protection to our homes in the event an earthquake damages water mains as occurred in 1906.

Proposition A will expand and improve the Fire Department's Emergency Water Supplies.

- Suction hose connections for pumpers will be provided to City lakes, S.F. Bay and Pacific Ocean.
  - Underground cisterns will be provided in residential areas.
  - The High-Pressure System will be extended to outer residen-

tial districts.

The cost of Proposition A is .0120 cent per \$100 valuation on the property tax; this means a home valued at \$150,000 would pay \$17.16 per year for this protection. This is highly cost effective insurance for our homes.

We urge all citizens to VOTE YES ON PROPOSITION A.

Marguerite A. Warren James J. Walsh, Jr. Dorothy Agnes McDougall Andrew Jones George L. Newkirk Jess T. Esteva Dolph Andrews Norman V. Wechsler



#### **ARGUMENT IN FAVOR OF PROPOSITION A**

Fire Protection and Earthquake Preparedness concern all school officials in San Francisco.

Proposition A is an important program that will provide Emergency Water Supplies For Fire Fighting throughout the City.

When a major earthquake strikes, the Fire Department must have a dependable water supply to protect our families, homes and schools.

Earthquakes cannot be stopped, but we must have water to stop the fires that will occur. We ask all citizens to join us and VOTE YES ON PROPO-SITION A.

Myra A. Kopf, President, Board of Education
A. Richard Cerbatos, Vice President, Board of Education
Libby Denebeim, Member, Board of Education
Joanne Miller, Member, Board of Education
Benjamin Tom, Member, Board of Education
Sodonia M. Wilson, Member, Board of Education
Rosario Anaya, Member, Board of Education
Ernest C. Ayala, President, S.F. Community College Board
Al Vidal, Principal, Washington High School

#### ARGUMENT IN FAVOR OF PROPOSITION A

Improved and expanded Emergency Water Supplies for fire fighting in San Francisco are a necessary factor to prevent another conflagration (fire storm) from sweeping the City as occurred in 1906.

Our central business and financial districts are the economic heart of the City, the residential districts contain the homes of our citizens.

Proposition A provides increased fire protection to our high-rise

buildings and our homes.

Earthquake preparedness and protection from the ravages of fire concern us all. As civic leaders of San Francisco we urge all citizens to VOTE YES ON PROPOSITON A.

Lee Dolson, General Manager, Downtown Association James R. Bronkema, President, Embarcadero Center

#### ARGUMENT IN FAVOR OF PROPOSITION A

We can bet that most of you have seen the circles of bricks encompassing certain intersections in some neighborhoods in San Francisco. These circles mark underground water cisterns that were constructed "after" the devastating earthquake and fire in 1906. Many neighborhoods in San Francisco built after 1912 are NOT serviced by this alternate water system.

Proposition A would provide a City-wide emergency water supply system to protect our homes and neighborhoods.

We cannot prevent earthquakes but we can take precaution against fire. . . the biggest threat to San Francisco.

We urge a YES vote on Proposition A... fire protection for our families no matter where they may be in our City.

Nancy Honig Roxanne Mankin Jane McKaskle Murphy Bernice E. Avala Cheryl Arenson Gina Moscone Jonnie B. Johnson

#### ARGUMENT IN FAVOR OF PROPOSITION A

Earthquake Preparedness and increased fire protection are of vital concern to all citizens of San Francisco.

#### VOTE YES ON PROPOSITION A.

Robert Bacci Michael Bernick Susan Bierman Frank T. Blackburn Rev. Dr. Amos C. Brown Sally Brunn Stafford Buckley Michael Chan Charles D. Cresci Rosemary DeGregorio Todd Dickinson H. Welton Flynn Ron Huberman Ralph Hurtado David Jenkins Agar Jaicks Carole Migden
Polly V. Marshall
Alicia Wang
Thomas F. McDonough
Thony Kilroy
Leroy King
David Looman
Christopher Martin
Peter Mezey
Marilyn Miller
Jeff Mori
Sandy Mori
Yoshio Nakashima

Mitchell Omerberg Edward J. Phipps Linda Post Thelma Shelley Robert J. Tully Yori Wada Evelyn Wilson Pansy Panzio Waller Bruce W. Lilienthal Jim Wachob

#### ARGUMENT IN FAVOR OF PROPOSITION A

Pure self interest dictates that we provide an abundant and surplus supply of "fire protection" water for EVERY part of San Francisco, not just half of it! VOTE YES!

W. F. O'Keeffe, Sr., San Francisco Taxpayers Association



#### ARGUMENT IN FAVOR OF PROPOSITION A

Emergency water supplies for fire fighting are vital for San Francisco. On April 4, 1986, an explosion and fire occurred in the Bayview District, causing nine deaths. The disrupted water supply caused by the explosion, severely hampered the Fire Department in controlling this fire.

In the event of a major earthquake it is highly likely that water mains will be damaged throughout San Francisco. Proposition A will provide for 94 underground cisterns to be built in residential areas where few emergency water supplies now exist. The Bayview fire demonstrated the need for emergency water supplies for fire fighting.

Protect your neighborhood and home.

#### VOTE YES ON PROPOSITION A.

Concerned Citizens for Improved Fire Protection

Michael Frew, Chairman John Holt

Robert L. Kreuzberger Ed F. Patterson Michael S. Newman Mel S. Newman Jack R. Brower August J. Nevolo

#### ARGUMENT IN FAVOR OF PROPOSITION A

San Franciscans remember what happened in 1906. The fires that occurred after the earthquake swept the City and left many thousands of people homeless.

Proposition A is a common sense program to provide Emergency Water Supplies for Fire Fighting throughout the City. This would ensure that fires would not get out of control due to lack of water supply.

This \$46.2 million bond issue needs a two-thirds vote. As a former member of the Board of Supervisors and neighborhood businessman, I urge all citizens to vote for this important program. It is protection for your family, home and city at a very low cost; it makes sense in both human and economic terms.

VOTE YES ON PROPOSITION A.

John Barbagelata, Realtor

#### ARGUMENT IN FAVOR OF PROPOSITION A

Proposition A assures San Francisco residents of on-going preparation which is the best defense against a major disaster—earthquake, conflagration, or an explosion.

San Francisco Fire Fighters regard this measure as the first-step in the earthquake preparedness program.

Control disaster with expanded fire protection!
San Francisco Fire Fighters urges a YES vote on Proposition A.

James T. Ferguson, President, San Francisco Fire Fighters Local 798

#### **ARGUMENT IN FAVOR OF PROPOSITION A**

Fire Protection is a serious concern for all citizens of San Francisco. We, the working Fire Chiefs of San Francisco are well aware of what happened in 1906, when fires occurring after the great earthquake burned thousands of buildings and left over 200,000 homeless.

The quake caused hundreds of breaks in water mains and the lack of water supplies prevented the Fire Department from controlling the fire.

We do not want this to happen again.

Proposition A will provide Emergency Water Supplies for Fire Fighting. The following installations will be placed in our neighborhoods to protect our homes.

- 94 underground cisterns will be built.
- 56 suction hose connections for pumpers will be provided to City lakes, S.F. Bay and Pacific Ocean.
- The High-Pressure System will be extended to residential areas.

• Improvements to tanks, reservoirs, pump stations, including a new pump station at Lake Merced and an Emergency Operations Center.

The recent fire in the Bayview District that took nine lives demonstrated how important water supplies can be. The damaged water supply caused by the fire and explosion seriously hampered Fire Department efforts to control this major fire.

We as the working Fire Chiefs who actually run the day-to-day field operations in San Francisco urge all citizens to support this important measure.

**VOTE YES ON PROPOSITION A.** 

John W. Flaherty
President, The San Francisco Fire Chiefs Association
Gary J. Torres
Secretary, The San Francisco Fire Chiefs Association

#### **ARGUMENT IN FAVOR OF PROPOSITION A**

Fire safety can be improved by voting FOR Proposition A and AGAINST BART director Eugene Garfinkle. BART's a fire trap.

Tom Spinosa, BART Board candidate



#### **ARGUMENT IN FAVOR OF PROPOSITION A**

Earthquake Preparedness and Fire Protection are vital factors for all citizens.

#### **VOTE YES ON PROPOSITION A.**

A. Cecil Williams, Glide United Methodist Church Bob Barry, President, S.F. Police Officers Association William Corvin, President, California Steam Company J. M. Eaneman, President, AMC Cancer Research Board of Directors George Foos, Chairman, Great Western Value Centers Rev. John L. Green, Chaplain, S.E. Fire Department Albert S. Samuels, Jr., Past President, Market Street Project Harvey Matthews, Bayview-Hunter's Point Democratic Club Arthur Goedewaagen, President, Sunset-Parkside Education & Action Committee

#### ARGUMENT IN FAVOR OF PROPOSITION A

Prior to the Great Earthquake and Fire of 1906, San Francisco Fire Chiefs had always insisted the City was not prepared for a major disaster. History proved them correct. Today, 80 years later, San Francisco's preparation is still not adequate.

When each of us was Chief of Department, we emphasized the need for the additional preparedness necessary to prevent a sweeping fire storm or catastrophic disaster. That state of preparedness has yet to be attained. However, Proposition A offers a once-in-alife opportunity to protect life and property, through preparation, at an extremely minimal cost. This opportunity should not be missed.

Proposition A will provide the necessary water supplies vital to preventing another conflagration of the 1906 magnitude!

Proposition A will expand the high-pressure firefighting water

supply system beyond the commercial areas into the residential neighborhoods!

Proposition A will greatly improve fire defenses not only in the western part of San Francisco but City-wide as well!

Proposition A will ensure that San Francisco is no longer one of the few remaining major cities with a sub-standard Emergency Operations Center for command and control during disasters and earthquakes!

As former San Francisco Fire Chiefs, we urge you to VOTE "YES" ON PROPOSITION A.

William F. Murray, Chief, San Francisco Fire Department, Retired Keith P. Calden, Chief, San Francisco Fire Department, Retired Andrew C. Casper, Chief, San Francisco Fire Department, Retired

#### **ARGUMENT IN FAVOR OF PROPOSITION A**

- Yes on Proposition A.
- Local fire chiefs have warned about grave BART fire catas-

trophe dangers. End disregard of public safety.

—San Franciscans for BART Safety

#### ARGUMENT IN FAVOR OF PROPOSITION A

This is a vital issue for San Francisco. Emergency Water Supplies for Fire Fighting must be provided throughout the City.

Many fires will occur if a major earthquake strikes San Francisco.

The Fire Department needs a water suply to prevent a conflagration (fire storm) from occurring again, as it did in 1906.

Earthquakes are a geologic fact of life and cannot be prevented, but we can prepare for the fires that will occur, this makes sense for all citizens. **VOTE YES ON PROPOSITION A.** 

Philip S. Day, Jr.

Director, San Francisco Office of Emergency Services Richard Eisner, Earthquake Preparedness Consultant Jelena Pantelic, Chairperson, Disaster Preparedness Committee Joe Posillico, Emergency Services, Salvation Army Peter Ashen, Disaster Director, American Red Cross

#### ARGUMENT IN FAVOR OF PROPOSITION A

San Francisco Council of Civic Organizations endorsements:

Proposition A—YES
Proposition M—YES

Terence Faulkner

President, San Francisco Council of Civic Organizations

#### ARGUMENT IN FAVOR OF PROPOSITION A

Earthquake Preparedness and providing Emergency Water Supplies for Fire Fighting are of vital importance to San Francisco.

VOTE YES ON PROPOSITION A.

Donald J. Birrer, Director of Public Works Frank M. Jordan, Chief of Police Dean Macris, Director of Planning
Rudy Nothenberg, General Manager, Public Utilities
William Stead, General Manager, Municipal Railway
David Werdegar, M.D.M.P.H., Director of Public Health
James D. Cooney, General Manager, S.F. Water Department

Arguments printed on this page are the opinion of the authors and have not been checked for accuracy by any official agency.

## Appendix M

### FIRE COMMISSION

#### City and County of San Francisco Gavin Newsom, Mayor

Victor Makras, President Stephen A. Nakajo, Vice President George Lau, Commissioner Andrea Evans, Commissioner



698 Second Street San Francisco, CA 94107 Telephone 415.558.3451 Fax 415.558.3413 Monica Quattrin, Commission Secretary

## SAN FRANCISCO FIRE COMMISSION RESOLUTION 2010-01

ENCOURAGING THE FIRE DEPARTMENT TO PURSUE GRANT FUNDING IN THE AMOUNT OF \$9.785 MILLION FROM THE FEDERAL GOVERNMENT, TO EXPAND THE DEPARTMENT'S PORTABLE WATER SUPPLY SYSTEM.

WHEREAS, The uniformed employees of the San Francisco Fire Department (SFFD) respond to approximately 100,000 incidents a year; and,

WHEREAS, It is the responsibility of the SFFD and its members to protect the lives and property of the citizens of San Francisco from the effects of natural disasters; and,

WHEREAS, The United States Geological Survey has issued increasingly frequent warnings of the high probability of a potentially catastrophic earthquake in the San Francisco Bay Area during the next thirty years; and,

WHEREAS, World renowned scientists, whose area of expertise is the modeling of the destructive effects of earthquakes on underground infrastructure, have identified the domestic water system of San Francisco as highly vulnerable to catastrophic failure in the event of a major Bay Area earthquake; and,

WHEREAS, World renowned scientists, whose area of expertise is the modeling of the spread of fire following earthquakes in modern urban settings, have predicted that there is a high likelihood that San Francisco will be subject to multiple simultaneous conflagrations following a major Bay Area earthquake; and,

WHEREAS, The assessed value of the real estate in San Francisco subject to property taxation exceeds \$100 billion; and,

WHEREAS, The spread of fire following earthquakes in a modern urban setting typically is responsible for as much as 75% of the total dollar loss that results; and,

WHEREAS, Loss of life following an earthquake in a modern urban setting is greatly exacerbated by the effects of resultant fires in buildings where occupants have been trapped by structural collapse; and,

WHEREAS, The Auxiliary Water Supply System does not cover the entire geographic areas of the City and County of San Francisco; and,

WHEREAS, The SFFD's Portable Water Supply System has been proven effective in the above-ground transmission of water for fire fighting purposes; and,

WHEREAS, The Portable Water Supply System works in conjunction with and can supplement the existing Auxiliary Water Supply System, and therefore the Portable Water Supply System is capable of partially mitigating the possible lack of domestic water system availability following a major earthquake; and,

WHEREAS, the number of units currently comprising the SFFD's existing Portable Water Supply System is not adequate to supply all areas of San Francisco where the Auxiliary Water Supply System does not extend; and

WHEREAS, the proposed design for expanding the Portable Water Supply System has been shown to be a highly cost effective and functionally adaptable method of providing the means by which firefighters can attack multiple conflagrations simultaneously;

WHEREAS, the SFFD is working with Senator Dianne Feinstein and Speaker of the House Nancy Pelosi in seeking these grant funds, now therefore, be it

RESOLVED, That the Fire Commission encourages the Fire Department to actively pursue grant funds in the amount of \$9.785 million from the Federal government, to expand the Portable Water Supply System and train SFFD uniformed members, the Fire Reserve, and other members of the community who may assist the SFFD in times of disaster.

Adopted at the Regular Meeting of the San Francisco Fire Commission on January 14, 2010.

Ayes:

4 (Makras, Nakajo, Lau, Evans)

Nays:

0

Monica Quattrin, Commission Secretary

## Appendix N

## Frequently Asked Questions - Fire Suppression Water Systems



1) What is the Auxiliary Water Supply System, and what is its primary function?

The Auxiliary Water Supply System (AWSS) is a non-potable fire-suppression water system that was built the decade following the catastrophic 1906 San Francisco earthquake. The purpose of the AWSS is to provide the San Francisco Fire Department (SFFD) with a high-pressure fire suppression water system that can be utilized during large fires. The system is vital for protection against the loss of life, homes, and businesses from fire following an earthquake and non-earthquake multiple-alarm fires.

There are two aspects of the AWSS that are critical to its success:

- Distribution infrastructure: The AWSS consists of over 135 miles of high-pressure pipeline and hydrants. The system utilizes approximately 30 seismically-reliable motorized valves, allowing the SFPUC to valve off sections of the system, to ensure that pressure is maintained in areas where fires are occurring.
- 2. The water supply that feeds into the AWSS distribution infrastructure. The primary source of the AWSS is the SFPUC's Hetch Hetchy Water System.

The original AWSS system consisted of three reservoirs and two seawater pumping stations. Their capacities:

- 10.5 million gallon Twin Peaks Reservoir,
- · 0.5 million gallon Ashbury Heights Tank, and
- · 0.75 million gallon Jones Street Tank.
- Seawater pump station #1: 10,000 GPM (located in SOMA)
- Seawater pump station #2: 10,000 GPM (located near Aquatic Park)

In 2010, the management of the AWSS was transferred to the San Francisco Public Utilities Commission (SFPUC). A shared goal of the SFPUC and SFFD is doing the following to expand and improve the reliability of the water supply serving the AWSS. The agencies have undertaken the following to do so:

- 95% completion of the \$4.8 billion Water System Improvement Program (WSIP), providing robust seismic upgrades to the pipelines, reservoirs, and infrastructure that supply water to San Francisco and the greater Bay Area;
- Added a larger pipe to increase the speed of re-filling the Twin Peaks reservoir from the 11 million gallon Summit Reservoir;
- Connecting the 70 million gallon South Basin of the University Mound Reservoir to AWSS (expected completion in 2018);
- Replaced the engines and installed remote control capabilities for Seawater pump station #1 to allow for remote operation;
- Structural and seismic upgrades of Seawater pump station #2 (expected completion in 2020);
- Designing the installation of a pump station at Lake Merced to feed into the AWSS in the future if funding is available;

- Analyzing the usage of the 90 million gallon North Basin of Sunset Reservoir as a water Supply for a Potable AWSS in the Sunset and Richmond Districts; and
- Investigating the installation of a seawater pump station at Ocean Beach to serve as a secondary source of water for fire suppression for the Sunset and Richmond Districts.

In addition to the AWSS, the SFPUC's low-pressure drinking water system and its low-pressure hydrants, as well as approximately 180 cisterns throughout San Francisco, can be pumped and utilized by SFFD Fire Trucks for fire-suppression.

2) Is the AWSS located throughout San Francisco? If not, why?

The AWSS was built after the 1906 earthquake, and its location, primarily in the northeast portion of San Francisco, corresponds to the location of the central business district and the majority of the city's population at that time.

The San Francisco Public Utilities Commission (SFPUC), SFFD, and San Francisco Public Works (SFPW) are committed to increasing fire protection throughout San Francisco. Since the passage of the Earthquake Safety and Emergency Response Bond in 2010, the three agencies have been implementing projects to improve the system's seismic reliability and range of coverage. The three agencies will continue to implement projects utilizing new and proven technologies that improve upon the original system design. There have been many advancements in earthquake resistant pipeline design and materials, hydrants, and seismic valves since the early 1900s, and the SFPUC intends to use the best possible technology available to meet the performance standards of the SFFD. Please standby for future updates to the SFPUC webpage for images, graphics, and maps showcasing the original AWSS system, recent upgrades, and future projects.

3) Who manages the AWSS, the SFPUC or the SFFD? How does the SFFD know that the AWSS system is being adequately and reliably maintained?

The SFFD owned and managed the AWSS and the fire hydrants on the potable water system from the early 1900s until 2010. During this time the SFFD collaborated with staff from San Francisco Public Works (SFPW) to implement upgrades to the system. In 2010, the AWSS was transferred to the SFPUC, the City's experts in water supply piping systems. By bringing in the SFPUC to work with SFFD and SFPW, City leaders created an interagency team with all of the expertise needed to manage, operate, and update the AWSS.

The SFFD is considered the end user of the system, and therefore system improvements and expansion completed by SFPUC must meet the rigorous and high-quality standards of the SFFD. The SFFD and SFPUC meet monthly to discuss operations of the AWSS, report on maintenance activities, review capital and developmental project design and status, and communicate on policies and procedures that affect both departments.

This partnership presents the best of both worlds for San Franciscans. The women and men of SFFD are internationally-recognized for their expertise, experience, and bravery in fighting fires. Similarly, the SFPUC, with its Hetch Hetchy Water System, is recognized as one of the top water agencies in the world. The SFPUC has hundreds of engineers that are experts in designing, expanding, and improving water systems. Additionally, the SFPUC has over 80 plumbers and dozens of construction management experts in-house that are dedicated to providing high-quality maintenance and oversight of the construction projects needed to keep the AWSS functioning for the SFFD's use.

With the two agencies working together, in partnership with SFPW, the City of San Francisco has the experts it needs to successfully operate, expand, and improve the AWSS.

4) What are the SFPUC and SFFD doing to increase fire protection in the areas of the City that do not have the AWSS?

When the SFPUC took over control of the system, the agency worked with SFFD to complete a review of all existing facilities and a comprehensive Planning Study.

The analysis modeled the hydraulic reliability of the existing AWSS after a major earthquake. In this context of this study, hydraulic reliability is defined as the percentage of the water needed by SFFD to fight fires that would be met by the AWSS and other sources after a 7.8 earthquake on the San Andreas Fault.

Our analysis showed that the 2010 AWSS was 47% reliable, and thus only able to provide about half of the water needed for city-wide firefighting following a 7.8 earthquake. Utilizing this information, the SFPUC, SFFD, and SFPW identified projects that would increase system reliability and could be funded by the 2010 and 2014 Earthquake Safety and Emergency Response (ESER) Bonds authorized by San Francisco voters. Decisions on which projects to implement utilizing bond funds are based on a given project's ability to improve the reliability score for the Fire Response Area that the given project serves and to increase the likelihood of delivering water after an earthquake.

Bond-funded projects make seismic upgrades to the system and repair, replace, and extend system components to increase the ability to provide adequate water for firefighting. Funding is allocated to repair, replace, and extend system components to improve the ability to provide adequate water for firefighting purposes following a major earthquake and during multiple-alarm fires from other causes. This includes repairs and upgrades to core facilities, pipelines, and tunnels, and construction of new cisterns.

The following projects have been completed utilizing the funds from the 2010 and 2014 bonds:

- Installation of 30 new cisterns (with 15 of these cisterns installed in the Sunset and Richmond districts);
- Reliability upgrades at the three primary source supplies Twin Peaks Reservoir, Ashbury Heights Tank, and Jones Street Tank;
- Added a larger pipe to increase the speed of re-filling the Twin Peaks reservoir from the 11 million gallon Summit Reservoir;
- Replaced the engines and installed remote control capabilities for Seawater pump station #1 to allow for remote operation;
- 6 pipeline and tunnel projects.

The following projects are in construction and/or design phase:

- Connecting the 70 million gallon South Basin of the University Mound Reservoir to AWSS (expected completion in 2018);
- 16 pipeline and tunnel projects;
- Motorizing critical seismically-reliable valves for remote control, and improving the electronic control system of the valves; and
- Structural and seismic upgrades of Seawater pump station #2 (expected completion in 2020);
- Designing the installation of a pump station at Lake Merced to feed into the AWSS in the future if funding is available;
- Preliminary analysis for a Potable AWSS for the Sunset and Richmond Districts. *Additional information on that system can be found in questions* 6-11.

Once fully completed, the projects implemented with the ESER 2010 bond funds will increase the citywide reliability score from 47% to 67%. The full completion of the projects implemented with the ESER 2014 bond funds will increase the citywide reliability score from 67% to 87%. Construction of additional recommended future projects will increase the citywide reliability score to 96%.

5) Who makes decisions about the selection and implementation of AWSS projects? Who reviews the progress and implementation of AWSS capital projects?

Overseeing the selection and implementation of AWSS projects is the Management Oversight Committee consisting of SFPUC General Manager Harlan Kelly, SFFD Chief Joanne Hayes-White, SFPW Director Mohammed Nuru, and SFPUC Assistant General Manager of Water Steve Ritchie.

The San Francisco Capital Planning Committee, consisting of the City Administrator and including the President of the Board of Supervisors, the Mayor's Budget Director, the Controller, the City Planning Director, the Director of Public Works, the Airport Director, the Executive Director of the Municipal Transportation Agency, the General Manager of the Public Utilities System, the General Manager of the Recreation and Parks Department, and the Executive Director of the Port of San Francisco, reviews the progress and implementation of AWSS capital projects. Capital Planning Committee meetings are open to the public. Please find more info at the Committee's webpage.

6) Are the SFPUC and SFFD looking at something called a Potable AWSS for fire suppression on the Westside of San Francisco. What is a Potable AWSS? How does it function? How is it different from the existing AWSS?

The word "potable" is defined as "safe to drink". The Potable AWSS currently under analysis will connect to the 90 million gallon North Basin of the Sunset Reservoir, and will provide a high-pressure firefighting system for the SFFD to fight fires in the Richmond and Sunset Districts. The Potable AWSS will meet the same rigorous standards required by SFFD to fight large fires, and will utilize the same earthquake resistant pipes, seismically-reliable valves, hydrants, and components utilized by the AWSS, and therefore will be designed to function at the high-pressure level required by SFFD. The Potable AWSS project is currently in the planning and analysis phase. The SFPUC will work with SFFD to design the system with operational capabilities and design criteria standards equal to or exceeding the existing AWSS.

The Potable AWSS will also have roughly 5 connections to potable water pipes in the Sunset and Richmond districts. These connections will utilize the same valves as the 30 valves the existing AWSS currently uses to isolate sections of the AWSS to maintain system pressure. Additionally, these 5 valves will be tested at the same schedule as the existing valves to ensure their performance during an incident. During non-fire events, the Potable AWSS pipeline will be one of many pipes supplying drinking water to the Richmond and Sunset districts.

In the event of a major fire, the approximately five isolation valves will be closed automatically, remotely, or manually, which are the same methods that the 30 valves on the existing AWSS utilize. These five isolation valves will be closed so that the Potable AWSS will be disconnected from the City's low-pressure water system and therefore can provide reliable high-pressure water for fire-fighting. If the Potable AWSS is isolated for fire-fighting use, homes and businesses will continue to be served by other redundant low-pressure drinking water distribution pipes, assuming that those low-pressure pipes have not incurred numerous breaks and leaks during the earthquake.

An additional benefit of the Potable AWSS is that it will be designed and constructed to meet required AWSS performance standards, and the system will be rated to meet drinking water standards. This means that after firefighting following an earthquake, the Potable AWSS will be able to provide drinking water to the Sunset and Richmond Districts even if the City's low-pressure drinking water distribution system incurs numerous breaks and leaks.

7) Does the Potable AWSS provide an equivalent amount of fire suppression when compared to the existing AWSS? Does the Potable AWSS provide the water pressure and supply of water needed by SFFD to fight small and large fires?

Yes. The Potable AWSS will be designed to meet all SFFD performance requirements. The SFFD will not reduce or lower their robust performance standards, and therefore the SFPUC must design, construct, maintain, and operate the Potable AWSS system to meet these standards. The SFPUC is currently working in conjunction with SFFD to design a system that will have pressure and performance capabilities equal to or exceeding AWSS.

8) Does the Potable AWSS use the same type of earthquake resistant piping and valves as the AWSS?

Yes. The Potable AWSS will use earthquake resistant piping that is equal or better than the current AWSS piping design standard. Additionally, the Potable AWSS will utilize the same seismically-reliable valves as the 30 existing valves currently utilized by the AWSS to isolate sections of the system to ensure supply reliability in areas with fires. The hydrants utilized will also be the same as the existing AWSS. All of these components will be able to property function at the high-pressure levels required by SFFD.

9) The Potable AWSS relies on automatic valves to boost the water pressure to the level needed to fight big fires. What if the automatic valves fail, will SFFD be without the water they need to fight big fires? Does the existing AWSS rely on these automatic valves to fight fires? Does the Potable AWSS rely on more of these valves than the existing AWSS?

The potable AWSS will be isolated after an earthquake from the remainder of the distribution system by seismically-reliable motorized valves using the same method and equipment as current AWSS valves. All valves, future and existing, have redundant safeguards and a maintenance program that will ensure their performance. The valves can be operated manually if the valve actuators fail, just like the existing AWSS motorized valves. The valves are utilized by the existing AWSS and the future Potable AWSS to isolate sections of pipe to ensure that the systems provide the water supply and pressure needed by SFFD to fight big fires.

The quantity of the motorized valves on the future Potable AWSS will be dependent on the length of the Potable AWSS pipeline constructed, but is anticipated to be approximately 5 valves.

10) Are there other cities that have implemented a Potable AWSS? Or do other cities utilize systems similar to the existing AWSS?

Only one other city in the world, Vancouver, B.C. Canada, has been identified as having an isolated secondary firefighting system similar to the existing AWSS. Vancouver's system is less than 10 miles in length, while ours has over 135 miles.

To our knowledge, all other cities rely on their low-pressure potable water system and hydrants for fire-fighting. In Japan, a country that has similar seismic risk to that of San Francisco, cities utilize a system similar to the proposed Potable AWSS. The Japanese system is designed similar to our proposed Potable AWSS – for fighting a large fire after an earthquake, seismically-reliable water transmission mains and hydrants are isolated from the rest of the distribution system using seismically-reliable valves. This allows the Japanese's seismically reliable mains to be increased in pressure and used for fire-fighting. After the fires are suppressed, the Japanese system is used to provide drinking water to residents and businesses.

Recently a team of Japanese water engineers came to San Francisco to showcase the success of their piping system and their experience using Kubota pipes to SFPUC and SFFD staff. The Japanese team highlighted the success of their system and its piping in its utilization after earthquakes to fight fires.

Japan's successful implementation and use of a system similar to the proposed Potable AWSS showcases that the approach and technology do work in fighting fires after a major earthquake.

11) Is the SFPUC is proposing to fill the Potable AWSS from Sunset Reservoir. How much water is in Sunset Reservoir?

The North and South Basins have a combined capacity of 176 million gallons. The North Basin, with a capacity of 90 million gallons, will be connected to the Potable AWSS. The North Basin recently underwent a \$64 million seismic upgrade, and is designed to withstand a 7.9 San Andreas Fault earthquake. It can be isolated from the South Basin, and therefore all 90 million gallons could be used for firefighting purposes.

12) Can Sunset Reservoir provide enough water for SFFD and civilian use during a fire? How long will the water in Sunset Reservoir last if it the reservoir is unable to be re-filled by the SFPUC's Hetch Hetchy Water System, the SFFD is utilizing the Potable AWSS to fight a fire, and civilians are utilizing the reservoir?

If firefighting requires a flow of 14,000 gallons per minute for the Sunset and Richmond districts, the 90 million gallon water supply in the North Basin of Sunset Reservoir will last for 4.5 days. This assumes that no additional water is added from the Hetch Hetchy Water System, which is <u>very</u> unlikely. Please see question #12 for additional info.

During an emergency situation, the South basin of Sunset Reservoir will be isolated from the North Basin, allowing the North Basin to be used solely for firefighting purposes. The 86 million gallon South Basin will still be connected to the City's low-pressure drinking water distribution piping system so that residents and businesses can receive drinking water while fires are being fought. In an Earthquake situation, residents and businesses may not receive continuous drinking water from the South Basin as fires are being fought, if there are breaks and/or leaks in the low-pressure drinking water pipes that connect to the South Basin. After the fires are put out, the Potable AWSS, connected to the North Basin, will be able to provide drinking water to the Sunset and Richmond Districts, even if the City's low-pressure drinking water distribution system incurs numerous breaks and leaks.

13) Will Sunset Reservoir be able to function after an earthquake? How long will it take for the water supplying Sunset Reservoir to arrive to the reservoir if there is a major earthquake?

In 2008, seismic improvements to the North Basin of Sunset Reservoir were completed for \$64 million under the SFPUC's Water System Improvement Program (WSIP). Also under the WSIP, seismic improvements were made on the pipelines leading to Sunset Reservoir. Thus, it is anticipated that the reservoir can be replenished from the Hetch Hetchy Water System within 24 hours of a major seismic event. Therefore, the Hetch Hetchy Water System will be able to re-fill the North Basin of the Sunset Reservoir prior to the Potable AWSS draining it after 4.5 days of use.

The Hetch Hetchy Water System consists of 9 reservoirs, capable of supplying up to 265 million gallons of water per day. The WSIP includes \$4.8 billion in upgrades to the system, increasing its seismic reliability and ability to provide water to the Bay Area after a large earthquake.

14) The Pacific Ocean is right next to the Westside of San Francisco. Why aren't we filling the Potable AWSS from there? Doesn't the AWSS use Bay Water?

The primary water source for the existing AWSS is the 10 million gallon Twin Peaks Reservoir, 0.5 million gallon Ashbury Heights Tank, and 0.75 million gallon Jones Street Tank. As part of the AWSS bond-funded projects, the Summit Reservoir, with its 11 million gallons of storage, can now be better used by the AWSS. This reservoir serves as a back-up, and would only be utilized by the AWSS during a large fire.

If additional water sources are needed, there are 2 seawater pump stations on the east side of San Francisco that can be utilized to supply a back-up water supply to the AWSS. There have been no known uses of these 2 stations during a fire since their installation in the early 1900s.

The Sunset Reservoir North Basin, with its large capacity and seismic reliability, provides an excellent, existing supply that can be used for the proposed Potable AWSS at no additional cost to rate payers. This reservoir is nine times larger than the existing Twin Peaks reservoir, the primary source utilized by the AWSS.

In the future, an existing SFPUC pump station at Lake Merced will be modified to pump Lake Merced water into new AWSS pipelines that will be installed by the Park Merced development project. Eventually, the Park Merced AWSS pipeline could be connected to the existing AWSS pipeline near Ocean Avenue. Current work will connect the 140 million gallon University Mound Reservoir to the existing AWSS.

The SFPUC is also analyzing new seawater pump stations that could be developed along Ocean Beach and by Hunters Point Shipyard, and will provide updates to the public as the analysis is completed. These future pump stations could serve as back-up supplies for the AWSS and Potable AWSS. Please note that the Potable AWSS would have to be converted to an AWSS if seawater was used, which would cause the system to lose the benefit of being a seismically reliable potable water distribution system for the Sunset and Richmond Districts.

15) How long will it take to install the Potable AWSS in the Sunset and Richmond District? I want fire-suppression in the Westside of San Francisco ASAP.

The Potable AWSS is in the planning phase. Pipeline construction could begin in 2019 if the Management Oversite Committee gives direction to proceed with this project. SFPUC is requesting approval for funding of one mile of pipeline per year at \$10 million per mile. Depending on the final length of Potable AWSS pipeline, the construction could be completed in four to eight years. A four-mile pipeline would take four years, while an eight-mile pipeline would take eight years. Each mile of pipeline installed provides significantly greater firefighting protection.

Please note that because the Potable AWSS option provides potable water benefits to the Sunset and Richmond Districts, bond funding **and** SFPUC rate payer funds could be used to pay for its implementation.

The same is not true if a traditional AWSS is deployed in the Sunset and Richmond Districts. Traditional AWSS systems can only utilize bond funding. Due to this distinction, a traditional AWSS would likely have a longer implementation timeline than a Potable AWSS because there is not enough bond funding in place to complete a traditional AWSS at this time. A Potable AWSS project could begin implementation more quickly using SFPUC rate payer funds.

16) How do population growth and new buildings affect firefighting reliability, and will AWSS be expanded to growing areas of San Francisco, such as new development areas in the east and southeast areas of San Francisco?

As new developments and population growth occur in San Francisco, the water required for firefighting to address post-earthquake fires may change. SFPUC is modelling the effects of new developments on AWSS capacity requirements, both within the new developments and in the City as a whole. The SFPUC and SFFD are working together to specify new AWSS piping and hydrants required within the new developments. Additionally, developers are required to contribute financing towards, or construct, AWSS facilities such as pipelines or pump stations, for additional firefighting needs. These requirements are specified in the Development Agreements approved by the Board of Supervisors for new, large development projects.

# Appendix O

|   | т  |  | T  | I              |                           |                    |             |   |            |             | I                                |
|---|--|--|--|----------------|---------------------------|--------------------|-------------|---|------------|-------------|----------------------------------|
| Project Name<br>Cisterns  | o Planning                                       | o Design   | Procurement or<br>Bid/Award                      | O Construction | Substantial<br>Completion | - Final Completion | o Cancelled | o Postponed                             | % Complete | Total<br>30 | SFPW<br>Construction<br>Contract |
| Physical Plant  | 3  | 0  | 0  | 2              | 0                         | 0                  | 0           | 1                                       | 4          | 10          |                                  |
| Ashbury Tank  | -  | 0  | U  |                | 0                         |                    | l           |   | 1          | 10          |                                  |
| Jones Street Tank   | <u> </u>   | <b></b>  |  |                |                           |                    |             |   | 1          |             |                                  |
| Lake Merced Pumping Station - conventional AWSS   | 1  | <b></b>  |  | l              |                           |                    |             |   |            |             |                                  |
| Lake Merced Pumping Station - potable AWSS  | 1  | <del>                                     </del> | <b></b>  |                |                           |                    |             |   |            |             |                                  |
| Pumping Station 1   | Ħ  |  | <del>                                     </del> | 1              |                           |                    |             |   |            |             |                                  |
| Pumping Station 2   |  |  | <b>i</b>   | 1              |                           |                    |             |   |            |             |                                  |
| Twin Peaks Reservoir  |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Twin Peaks Reservoir Joint Sealing  |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Sunset Reservoir Pumping Station - potable AWSS   | 1  |  |  |                |                           |                    |             |   |            |             |                                  |
| University Mound Pumping Station - conventional AWSS  |  |  |  |                |                           |                    |             | 1                                       |            |             |                                  |
| Pipelines & Tunnels   | 1  | 2  | 2  | 3              | 0                         | 0                  | 5           | 6                                       | 9          | 28          |                                  |
| 4th Street Connection   |  |  |  |                |                           |                    | 1           |   |            |             |                                  |
| Clarendon Supply  | <u> </u>   |  | 1  |                |                           |                    |             |   |            |             |                                  |
| Control System  |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Fillmore & Haight   |  |  |  |                |                           |                    |             | 1                                       |            |             | <b>✓</b>                         |
| Fort Mason Pier 2 Seawater Manifold   | <u> </u>   |  |  |                |                           |                    |             | 1                                       |            |             |                                  |
| Jones Street Tank Valves  | <u> </u>   |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Pipeline Repairs  |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Planning Study (CS-199)   |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Pumping Station 1 Tunnel  | <u> </u>   |  | ļ  |                |                           |                    |             | 1                                       |            |             |                                  |
| Seawater Fireboat Manifolds Evaluation  | ļ  |  | <b> </b>   |                |                           |                    |             |   | 1          |             |                                  |
| Seawater Suction Connections Street Valve Motorization  | <b></b>  | <u> </u>   | ļ  | <u> </u>       |                           |                    |             | 1                                       | 1          |             |                                  |
| Twin Peaks Reservoir 16" Supply   | -  |  | <u> </u>   |                |                           |                    |             |   | 1          |             |                                  |
| 19th Avenue Pipeline  | ├  | -  | 1  |                |                           |                    |             |   | 1          |             | <b>-</b>                         |
| Ashbury Bypass Pipeline   | ├  | <del> </del>                                     | <del>  '</del>                                   | 1              |                           |                    |             |   |            |             | <u> </u>                         |
| Candlestick Point - Carroll Avenue  | ├  | <u> </u>   | <del> </del>                                     |                |                           |                    |             |   | 1          |             | · ·                              |
| Columbus & Green Pipeline   | ├  | <u> </u>   | <b>-</b>   |                |                           |                    |             |   | 1          |             |                                  |
| FWSS - Lake Merced  | <del> </del>                                     | <b>-</b>   | <b>-</b>   |                |                           |                    | 1           |   | •          |             |                                  |
| FWSS - McLaren Park Tanks   | <u> </u>   |  | <b>i</b>   |                |                           |                    | 1           |   |            |             |                                  |
| FWSS - Street Crossings   | <u> </u>   |  |  |                |                           |                    | 1           |   |            |             |                                  |
| FWSS - Sunset Reservoir   |  |  |  |                |                           |                    | 1           |   |            |             |                                  |
| Ingleside Pipeline  |  |  |  |                |                           |                    |             | 1                                       |            | _           |                                  |
| Irving Street Pipeline  |  |  |  | 1              |                           |                    |             |   |            |             | ~                                |
| Lake Merced Pipeline  |  | 1  |  |                |                           | 100                |             |   |            |             |                                  |
| Mariposa TFB Pipeline   |  |  |  | 1              |                           |                    |             | 111111111111111111111111111111111111111 |            |             |                                  |
| TFB Mission Rock - South Pipeline   |  | 1  |  |                |                           |                    |             |   |            |             |                                  |
| Westside Potable AWSS Pipeline  | 1  |  |  |                |                           |                    |             |   |            |             |                                  |
| University Mound East Pipeline  |  |  |  |                |                           |                    |             | 1                                       | L          |             |                                  |
| Assessments   | 0  | 0  | 0  | 0              | 0                         | 0                  | 0           | 0                                       | 12         | 12          |                                  |
| Ashbury Heights Valve House Evaluation Jones Street Tank Generator Foundation Evaluation        | ļ  | ļ  | <b> </b>   |                |                           |                    |             |   | 1          |             |                                  |
| Jones Street Tank Generator Foundation Evaluation  Jones Street Tank Retaining Walls Assessment | <u> </u>   | <u> </u>   | ļ  |                |                           |                    |             |   | 1          |             |                                  |
| Jones Street Tank Valve House Evaluation  | ├  |  | <b>-</b>   |                |                           |                    |             |   | +          |             |                                  |
| ESER 2014 Project Recommendations   |  |  | <b></b>  |                |                           |                    |             |   | 1          |             |                                  |
| Pipeline Network Surge Analysis   | ┼  | <del> </del>                                     | <b>-</b>   |                |                           |                    |             |   | 1          |             |                                  |
| Pumping Station 1 Foundation & Well Evaluation  | ├  | <del> </del>                                     | <del> </del>                                     |                |                           |                    |             |   | 1          |             |                                  |
| Pumping Station 1 Tunnel Evaluation (PS1 to bay)  | <del>                                     </del> | <u> </u>   | <b></b>  |                |                           |                    |             |   | 1          | <u> </u>    |                                  |
| Pumping Station 2 Discharge Tunnels Evaluation  | _  |  | <b> </b>   |                |                           |                    |             |   | 1          |             |                                  |
| Pumping Station 2 Well Evaluation   | <b>†</b>   |  |  |                |                           |                    |             |   | 1          |             |                                  |
| Twin Peaks Reservoir Forebays Evaluation  | <u> </u>   | <u> </u>   |  |                |                           |                    |             |   | 1          |             |                                  |
| Twin Peaks Reservoir Tunnel Evaluation  |  |  |  |                |                           |                    |             |   | 1          |             |                                  |
|   | 1  |  |  |                |                           |                    |             |   |            |             |                                  |
|   | 4  | 2  | 2  | 5              | 0                         | 0                  | 5           | 7                                       | 55         | 80          |                                  |
|   | Ė  | ΙĒ   | <del>                                     </del> | Ť              |                           |                    |             |   |            |             |                                  |
|   |  |  | <u>_</u>   |                |                           | 5                  |             |   |            |             |                                  |
|   | 1  |  | Procurement or<br>Bid/Award                      | ءِ ا           | 100                       | Final Completion   |             |   |            |             |                                  |
|   |  |  | ᇢᇢ   | ₽              | ial                       | l du               | _           | ठू                                      |            |             | tio                              |
|   | J G  | ۱_   | en   | 2              | eti e                     | e                  | <u> </u>    | ) ne                                    | ete        |             | ಚ ಜ                              |
|   | Planning   | Design   | Procureme<br>Bid/Award                           | Construction   | Substantial<br>Completion | 0                  | Cancelled   | Postponed                               | Complete   |             | SFPW<br>Construction<br>Contract |
|   | a <sub>n</sub>                                   | es   | ğġ   | 8              | du<br>no                  | na                 | au          | lso                                     | 10         |             | SFPW<br>Consti<br>Contra         |
|   | Lα   | ĹŐ   | [ 6 8  | Ű              | ดับ                       | Ē                  | Ü           | ا م                                     | Įΰ         | Total       | あびび                              |

# Appendix P

# Candidate EFWS Projects 5/8/2019

| Projects  | Project<br>Cost (\$M)<br>(2018 \$) | No. of FRA's<br>Directly<br>Benefited | Hydraulic<br>Power (MW)                          | Project<br>Cost/MW<br>(\$M) | Scaling Factor<br>to Lowest<br>\$/MW |
|---|------------------------------------|---------------------------------------|--|-----------------------------|--------------------------------------|
| Pipeline Projects   |                                    |                                       |  |                             |                                      |
| Conv. AWSS PL - Diamond Street  | 4                                  | 1                                     | 0.7  | 6                           | 1.0                                  |
| Westside Seawater Supply PL   |                                    |                                       | TBD  |                             |                                      |
| 3 Conv. AWSS PL - Lake Merced   | 4                                  | 1                                     | 0.1  | 25                          | 4.2                                  |
| 4 Conv. AWSS PL - College Hill Supply   | 34                                 | 0                                     | 0.8  | 43                          | 7.1                                  |
| 5 PEFWS   | 195                                | 8                                     | 4.1  | 44                          | 7.3                                  |
| 6 Conv. AWSS PL - Ingleside (Phase 1)   | 6                                  | 1                                     | 0.1  | 53                          | 8.8                                  |
| 7 Conv. AWSS PL - Stanford Heights Supply                                     | 18                                 | 0                                     | 0.3  | 60                          | 10.1                                 |
| 8 Conv. AWSS PL - University Mound East                                       | 23                                 | 4                                     | 0.4  | 67                          | 11.2                                 |
| 9 Conv. AWSS PL - Ingleside (Phase 2)   | 14                                 | 1                                     | 0.2  | 78                          | 13.0                                 |
| 10 Conv. AWSS PL - University Mound West                                      | 19                                 | 2                                     | 0.2  | 112                         | 18.7                                 |
| Subtotal Pipeline Projects  | 317                                |                                       | 6.8  |                             |                                      |
| Supply Projects   |                                    |                                       |  |                             |                                      |
| 1 Potable EFWS - Lake Merced PS   | 40                                 | 8                                     | 4.6  | 9                           | 1.3                                  |
| 2 Conv. AWSS Lake Merced PS   | 10                                 | 2                                     | 1.5  | 7                           | 1.0                                  |
| 3 Potable EFWS - Sunset PS  | 34                                 | 8                                     | 4.6  | 7                           | 1.1                                  |
| 4 Conv. AWSS University Mound PS  | 20                                 | 10                                    | 2.6  | 8                           | 1.2                                  |
| 5 Conv. AWSS Manifold - Pier 33-1/2<br>6 PS1 Well                             | 5                                  | 0                                     | 0.4  | 13                          | 1.9                                  |
|   | 2                                  | 0                                     | 0.1  | 13                          | 2.1                                  |
| 7 Westside Seawater PS  |                                    | 0                                     | TBD  | 04                          | 0.4                                  |
| 8 Conv. AWSS Manifold - Fort Mason Pier 1 9 Conv. AWSS College Hill Supply PS | 8                                  | 0                                     | 0.4  | 21                          | 3.1                                  |
| 10 Twin Peaks Forebays  | 25<br>6                            | 0                                     | 0.2  | 25<br>26                    | 3.8                                  |
| 11 Twin Peaks Tunnel  | 8                                  | 0                                     | 0.2  | 34                          | 5.2                                  |
| 12 PS1 Tunnel (Phases 1 and 2)  | 13                                 | 0                                     | 0.2  | 43                          | 6.6                                  |
| 13 Conv. AWSS Stanford Heights Supply PS                                      | 26                                 | 0                                     | 0.6  | 43                          | 6.6                                  |
| 14 PS2 Discharge Tunnels  | 5                                  | 0                                     | 0.0  | 67                          | 10.3                                 |
| 15 PS2 Well   | 4                                  | 0                                     | 0.04   | 89                          | 13.7                                 |
| Subtotal Supply Projects  | 206                                |                                       | 16.8   |                             |                                      |
| Infirm Zone Projects  |                                    |                                       |  |                             |                                      |
| 1 Conv. AWSS PLs - Infirm Zone 7  | 16                                 | 1                                     | 0.21   | 79                          | 1.0                                  |
| 2 Conv. AWSS PLs - Infirm Zone 9  | 10                                 | 1                                     | 0.03   | 320                         | 4.1                                  |
| 3 Conv. AWSS PLs - Infirm Zone 3, 4, 5  | 33                                 | 3                                     | 0.05   | 666                         | 8.5                                  |
| 4 Conv. AWSS PLs - Infirm Zone 1, 2   | 32                                 | 2                                     | 0.04   | 790                         | 10.1                                 |
| 5 Conv. AWSS PLs - Infirm Zone 6  | 18                                 | 1                                     | 0.00   |                             |                                      |
| 6 Conv. AWSS PLs - Infirm Zone 8  | 7                                  | 1                                     | 0.00   |                             |                                      |
| 7 Conv. AWSS PLs - Infirm Zone 10   | 19                                 | 1                                     | 0.00   |                             |                                      |
| Subtotal Infirm Zone Projects   | 135                                |                                       | 0.3  |                             |                                      |
| Other Projects  |                                    |                                       |  |                             |                                      |
| 1 Conv. AWSS PL - PIPE - Bryant & 11th  | 16                                 | 0                                     | 0.15   | 104                         | 1                                    |
| 2 Conv. AWSS PL - PIPE - Dolores & 20th                                       | 9                                  | 0                                     | 0.05   | 197                         | 1.9                                  |
| 3 Conv. AWSS PL - PIPE - Brannan St.  | 36                                 | 0                                     | 0.04   | 953                         | 9.2                                  |
| 4 Conv. AWSS PL - PIPE - Market St.   | 28                                 | 0                                     | 0.03   | 871                         | 8.4                                  |
| 5 Ashbury Valve House   | 5                                  | 0                                     |  |                             |                                      |
| 6 Jones St Generator Foundation   | 1                                  | 0                                     |  |                             |                                      |
| 7 Jones St Valve House  | 5                                  | 0                                     |  |                             |                                      |
| 8 PS2 Remote Operation and Engine Repl.                                       | 12                                 | 0                                     | ļ  |                             |                                      |
| 9 Miscellaneous Repairs   | 15                                 | 0                                     | ļ  |                             |                                      |
| 10 Conv. AWSS PL - Surge Protection   | 4                                  | 0                                     | ļ  |                             |                                      |
| 11 Conv. AWSS PL - Valve Renovation Subtotal Other Projects                   | 6<br><b>136</b>                    | 0                                     | 0.3  |                             |                                      |
|   | 1 100                              |                                       | J 5.5  |                             |                                      |
| Development Projects  1 Potrero PL  | 14                                 | 1                                     |  |                             |                                      |
| 2 Southern Area Supply Projects   | 166                                | 5                                     | <del>                                     </del> |                             |                                      |
| Subtotal Development Projects   | 180                                |                                       |  |                             |                                      |
| Grand Total   | 974                                |                                       | 19   |                             |                                      |
|   | 1 7,7                              |                                       |  |                             |                                      |

<sup>1)</sup> MW=Hydraulic power (MW)
(1 MW = 1,341 hp)
2) S=Scaling factor to lowest \$/MW

# Appendix Q

By Jim Castleberry
The night of the Oct. 17 earthquake was not the first time San Francisco the Department had to call on its Portable Water Supply System, but it was by far the most important.

When firefighters responded to a blaze in the Marina District, they were horrified to learn that all the water lines in a 40 sauare block area surrounding the fire were broken and

With no water pressure, firefighters could only watch as the fire raged out of control and threatened to explode into the largest blaze in the city since

But the city had one more card to play - its ace in the hole.

Division Chief Harry Brophy issued the call for the Fireboat Phoenix and the department's Portable Water Supply System (PWSS).

For Assistant Chief Frank Blackburn, who developed the PWSS, and fellow firefighters, it was the test they had been waiting for. The one that would determine once and for all if the PWSS, hailed as ingenious by some and a boondoggle by others, really worked. "I told the guys that this was the Super Bowl," Blackburn said.

Fortunately for the city, the PWSS performed perfectly.

As the Phoenix pumped water from the Bay, firefighters set up portable hydrants on Divisadero Street that allowed them to stretch hoses all the way to the fire at Beach Street.

Within an hour after the system was hooked up, the fire had been brought under control.

San Francisco's Board of Supervisors rewarded Blackburn with a commendation, thanking him not only for the development of the system but his quick work in putting it to use on Oct. 17.

"Without those portable hydrants, along with the fireboat, the city probably would have hurned to the ground,"

Supervisor Terrance Hallinan said. "Blackburn knew where all the hydrants were and as soon as it hit, he rounded them up and set them into operation. It was a key to turning that whole situation around."

The key to the PWSS is the portable hydrant designed by Blackburn from old Gleeson pressure-reducing valves and other spare parts lying around the department's repair shop.

Using the hydrants, firefighters can pump from the Bay, a lake or underground distern and lay a grid of hose covering several blocks.

The portable hydrants not only allow water pressure to be maintained, they also let firefighters hook up pumper trucks or fire hoses along the line so fires in multiple locations can be banfed.

"Say there was a fire on Van Ness Avenue and all the water mains were broken," Blackburn said. "The PWSS would let you pump water from the Bay, all the way up Van Ness. People say it can't work, but it does, proved it on Oct. 17."

Blackburn dídn't working on the portable hydrants and PWSS until 1984. By 1985 a prototype was ready and they were in regular use by 1986.

The PWSS helped put out a five alarm fire at First and Townsend street in 1987 and was also used at Hetch Hetchy later that year to protect buildings threatened by a fire burning in Yosemite National Forest.

"We drafted water from the Tuolumne River for that one," Blackburn said, "It's amazing, All you need is a body of water. "It's something that San Francisco should really by proud of." said Dr. Charles Scawthorn, a researcher who has done extensive study of the risk posed to San Francisco by

fire. In 1987 Scawthorn wrote a report for the insurance industry on the conflagration risk in San Francisco following a major earthquake similar to 1906.

His report foresees widespread destruction with billions of dollars in property losses and dozens of major fires – similar in size to the Marina fire - after a magnitude 8.3 or larger quake.

Everything that happened on Oct. 17 confirmed my findings, he said. "But the PWSS is obviously going to greatly improve the chance of the city surviving 'The Big One.' won't save it entirely but at least we'll be able to limit the losses."

The Portable Water Supply System includes:

- Four hose wagons that earry 4,000 to 5,000 feet of large, five inch diameter hose that connect to the portable hydrants (normal firehose is only three inches in diameter.

-- Underground cisterns located throughout the northern and eastern sections of the city that can be filled with water to supply trucks along the way.

-- Portable hydrants that allow water to flow freely for long distances at a very high pressure. Scuviliarn recommends a large-scale expansion of the PIVSS.

"If there are only four hose wagons, you can only fight fires in four locations," Scawthorn said. "After a big quake there will be fires breaking out all over the city. '

The Fire Commission has indicated its desire to expand the system and cleared the way for building of more cistems in the outer Sunset and Richmond residential neighborhoods.

Plans are also underway to purchase more large-diameter hose, if the money can be found.

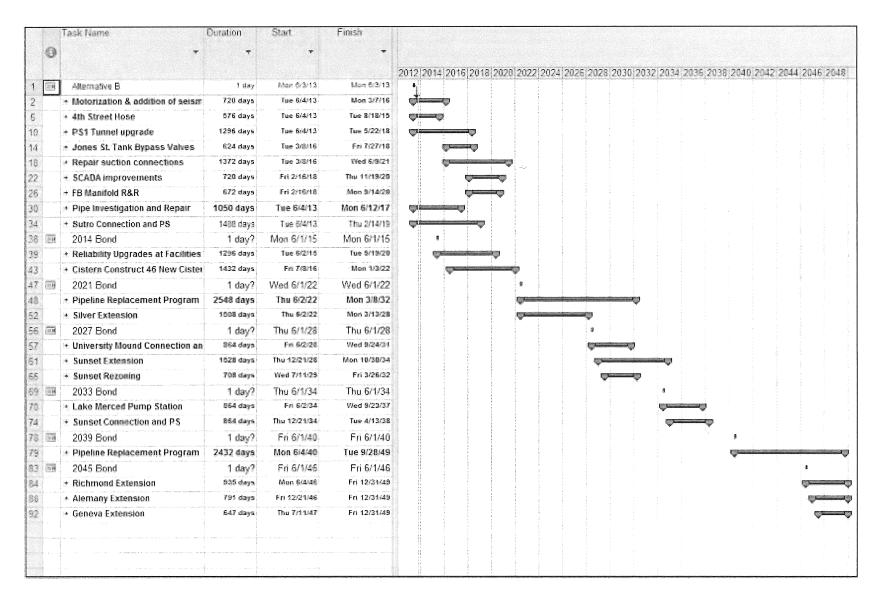
Blackburn calls it the best defense a city like San Francisco can have against fire following an earthquake.

"When a major quake occurs and water mains are broken, the answer is the PWSS." he said. If you don't have it, you won't put the fires out."

1990 article on the Portable Water Supply System, an adjunct to the AWSS, and its use during the post-earthquake fires in October 1989.

# Appendix R

Figure 5-1. Preferred Alternative Planning Level Schedule



#### Carroll, John (BOS)

From:

Carroll, John (BOS)

Sent:

Thursday, July 25, 2019 3:49 PM

To:

**BOS-Supervisors** 

Cc:

BOS-Legislative Aides; 'Calvillo, Angela (angela.calvillo@sfgov.org)'; Somera, Alisa (BOS); Civil Grand Jury; Kittler, Sophia (MYR); Karunaratne, Kanishka (MYR); Power, Andres (MYR); Ma, Sally (MYR); Peacock, Rebecca (MYR); Rosenfield, Ben (CON); Rydstrom, Todd (CON); Stevenson, Peg (CON); Lediju, Tonia (CON); Newman, Debra; Campbell, Severin (BUD); Holober, Reuben (BUD); Millman Tell, Jennifer (BUD); Rasha Harvey; Lori Campbell; Kelly, Naomi (ADM); Khaw, Lynn (ADM); Strong, Brian (ADM); Raphael, Deborah (ENV); Gallotta, Peter (ENV); Sheehan, Charles (ENV); Nicholson, Jeanine (FIR); Ludwig, Theresa (FIR); Nakajo, Stephen (FIR); Conefrey, Maureen (FIR); Kelly, Jr, Harlan (PUC); Ellis, Juliet (PUC); Scarpulla, John; Whitmore, Christopher (PUC); Caen, Ann Moller (PUC); Hood, Donna (PUC);

Mchugh, Eileen (BOS); GIVNER, JON (CAT)

Subject:

2018-2019 Civil Grand Jury Report - Act Now Before it is Too Late: Aggressively Expand and

Enhance Our High-Pressure Emergency Firefighting Water System

Categories:

190786, 190785

Supervisors:

Please find linked below the 2018-2019 Civil Grand Jury report, entitled: **Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System,** as well as a press release memo from the Civil Grand Jury and an informational memo from the Clerk of the Board.

Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System

Civil Grand Jury Press Release - July 17, 2019

Clerk of the Board Memo - July 24, 2019

I invite you to review the entire matter on our <u>Legislative Research Center</u> by following the link below:

Board of Supervisors File No. 190785

Thank you,

John Carroll
Assistant Clerk
Board of Supervisors
San Francisco City Hall, Room 244
San Francisco, CA 94102
(415) 554-4445



Click here to complete a Board of Supervisors Customer Service Satisfaction form.

The Legislative Research Center provides 24-hour access to Board of Supervisors legislation and archived matters since August 1998.

Disclosures: Personal information that is provided in communications to the Board of Supervisors is subject to disclosure under the California Public Records Act and the San Francisco Sunshine Ordinance. Personal information provided will not be redacted. Members of the public are not required to provide personal identifying information when they communicate with the Board of Supervisors and its committees. All written or oral communications that members of the public submit to the Clerk's Office regarding pending legislation or hearings will be made available to all members of the public for inspection and copying. The Clerk's Office does not redact any information from these submissions. This means that personal information—including names, phone numbers, addresses and similar information that a

#### **BOARD of SUPERVISORS**



City Hall 1 Dr. Carlton B. Goodlett Place, Room 244 San Francisco 94102-4689 Tel. No. 554-5184 Fax No. 554-5163 TDD/TTY No. 554-5227

#### **MEMORANDUM**

Date:

July 24, 2019

To:

Honorable Members, Board of Supervisors

From:

Angela Calvillo, Clerk of the Board

Subject:

2018-2019 CIVIL GRAND JURY REPORT - Act Now Before it is Too Late:

Aggressively Expand and Enhance Our High-Pressure Emergency

Firefighting Water System

On July 17, 2019, the 2018-2019 Civil Grand Jury issued a press release, publicly announcing issuance of their report, entitled:

#### Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System

On July 18, 2019, the Civil Grand Jury issued an updated report, including appendices which we inadvertently omitted from the July 17 public release.

Pursuant to California Penal Code, Sections 933 and 933.05, the Board must:

- 1. Respond to the report within 90 days of receipt, or no later than October 15, 2019; and
- 2. For each finding the Department response shall:
  - agree with the finding; or
  - disagree with the finding, wholly or partially, and explain why.
- 3. For each recommendation the Department shall report that:
  - the recommendation has been implemented, with a summary of how it was implemented;
  - the recommendation has not been, but will be, implemented in the future, with a timeframe for implementation;
  - the recommendation requires further analysis, with an explanation of the scope of the analysis and timeframe of no more than six months from the date of release; or
  - the recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Pursuant to San Francisco Administrative Code, Section 2.10, in coordination with the Committee Chair, the Clerk will schedule a public hearing before the Government Audit and Oversight Committee to allow the Board the necessary time to review and formally respond to the findings and recommendations.

Civil Grand Jury Report Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 23, 2019 Page 2

The Budget and Legislative Analyst will prepare a resolution, outlining the findings and recommendations for the Committee's consideration, to be heard at the same time as the hearing on the report. These matters are anticipated for hearing in Government Audit and Oversight during a regular committee meeting in September 2019.

If you have any questions, please contact John Carroll, Assistant Clerk, at (415) 554 4445.

Attachments:

July 17, 2019 Press Release; and

July 18, 2019 Updated Report: Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water

System

Honorable Garrett L. Wong, Presiding Judge Sophia Kittler, Mayor's Office Kanishka Karunaratne Cheng, Mayor's Office Andres Power, Mayor's Office Sally Ma, Mayor's Office Rebecca Peacock, Mayor's Office Jon Givner, Office of the City Attorney Ben Rosenfield, City Controller Todd Rydstrom, Office of the Controller Peg Stevenson, Office of the Controller Tonia Lediju, Office of the Controller Alisa Somera, Office of the Clerk of the Board Debra Newman, Office of the Budget and Legislative Analyst Severin Campbell, Office of the Budget and Legislative Analyst

Reuben Holober, Office of the Budget and Legislative Analyst

Jennifer Millman Tell, Office of the Budget and Legislative Analyst

Rasha Harvey, 2018-2019 Foreperson, San Francisco Civil Grand Jury

Lori Campbell, 2017-2018 Foreperson, San Francisco Civil Grand Jury

Naomi M. Kelly, City Administrator, Office of the City Administrator

Lynn Khaw, Office of the City Administrator Brian Strong, Office of the City Administrator Debbie Raphael, Director, Department of the Environment

Peter Gallotta, Department of the Environment Charles Sheehan, Department of the Environment Jeanine Nicholson, Chief, Fire Department Theresa Ludwig, Fire Department Stephen Nakajo, President, Fire Commission Maureen Conefrey, Fire Commission Harlan L. Kelly, Jr., General Manager, San Francisco Public Utilities Commission

Juliet Ellis, San Francisco Public Utilities

Commission

John Scarpulla, San Francisco Public Utilities Commission

Christopher Whitmore, San Francisco Public **Utilities Commission** 

Ann Moller Caen, President, San Francisco Public **Utilities Commission** 

Donna Hood, San Francisco Public Utilities Commission



#### FOR IMMEDIATE RELEASE

Contacts: Rasha Harvey, Foreperson, 415-716-8258

Stephen Garber, Committee Chairperson, 510-682-4693

\*\*\* PRESS RELEASE \*\*\*

# ACT NOW BEFORE IT IS TOO LATE: AGGRESSIVELY EXPAND AND ENHANCE OUR EMERGENCY FIREFIGHTING WATER SYSTEM

San Francisco, CA, July 17, 2019 – San Francisco is notoriously vulnerable to fires following a major earthquake. Today, the City has a seismically safe high-pressure Auxiliary Water Supply System (AWSS) -- separate and distinct from the low-pressure municipal water supply system -- that provides excellent firefighting protection to parts of the City. However, the Civil Grand Jury found that large parts of the City, such as the outer Richmond, outer Sunset, and Bayview/Hunters Point, among others, do not have a high-pressure AWSS, and would be particularly vulnerable to fire damage when the next major earthquake strikes.

City leaders have known about this deficiency for decades, but have yet to develop concrete plans or a timeline to provide a robust emergency firefighting water supply for all neighborhoods. In 2014, the US Geological Survey estimated that there is a 72 percent chance of a 6.7 or greater magnitude earthquake striking the Bay Area by 2043. Plans to develop a seismically safe high-pressure AWSS for the western portion of the City are now moving forward. However, at the City's current pace and funding levels, expansion of AWSS protections to inadequately protected neighborhoods will not be completed for 35 years or more – well after the USGS predicts that one or more major earthquakes will strike. The Civil Grand Jury, therefore, recommends that, by the end of 2020, the City present a detailed plan to extend AWSS protections to all neighborhoods, with an accelerated completion date of no later than 2034.

As an interim measure, the Grand Jury strongly recommends that the Mayor and the Board of Supervisors approve the San Francisco Fire Department's (SFFD) request to replace and expand its portable water supply system (PWSS). Comprised of specially equipped trucks ("hose tenders"), the PWSS can distribute pressurized water from many sources for long distances, and can be built and operational in one to two years. The Grand Jury recommends that these new PWSS hose tenders be strategically placed in Districts 1, 4, 7, and 11 -- neighborhoods lacking in AWSS protections. Although the Mayor's draft budget includes funds for 4 new hose tenders, this is barely sufficient to replace the current inventory of 5 tenders, all of which are past their useful lives.

The Grand Jury also recommends that the San Francisco Public Utilities Commission and the SFFD jointly develop "best practices" to ensure the proper maintenance of all AWSS assets, and that these agencies adopt and implement annual emergency response exercises, which include simulated earthquake drills using both AWSS and PWSS assets.

#### ACT NOW BEFORE IT IS TOO LATE

Experts tell us that San Francisco is overdue for another major earthquake like the one that devastated the City in 1906. Nevertheless, City officials have not prioritized plans to expand the high-pressure emergency firefighting water supply to all neighborhoods. This is a problem that threatens the lives and property of over one-third of our City's residents. City officials should make the expansion of emergency firefighting protections to all San Franciscans a matter of high priority, before it is too late.

Civil Grand Jury reports may be viewed online at <a href="http://civilgrandjury.sfgov.org/report.html">http://civilgrandjury.sfgov.org/report.html</a>.

###

| Report Title<br>[Publication Date]   | F# | Finding (text may be duplicated due to spanning and multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Finding Response<br>(Agree/Disagree) | Finding Response Text | R#<br>[for F#]            | Recommendation<br>(text may be duplicated due to spanning and<br>multiple respondent effects)  | Respondent Assigned by<br>CGJ<br>[Response Due Date] | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text |
|--|----|---|--|--------------------------------------|-----------------------|---------------------------|--|--|--|------------------------------|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | Mayor<br>[September 15, 2019]                        |                                      |                       | [for F1-F6]               | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.                                     | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F4 |   | Mayor<br>[September 15, 2019]                        |                                      |                       | R2<br>[for F1-F6]         | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | Mayor<br>[September 15, 2019]                        |                                      |                       | R1<br>[for F1-F6]         | By no later than December 31, 2020, the Mayor, the SFPU, the SFFU, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.                                      | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | Mayor<br>[September 15, 2019]                        |                                      |                       | R2<br>[for F1-F6]         | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | Mayor<br>[September 15, 2019]                        |                                      |                       | R8<br>[for F5, F6<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034. | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.   |  |                                      |                       | R1<br>[for F1-F6]         | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.                                     | Mayor<br>[September 15, 2019]                        |  |                              |
| Act Now Before It is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  |  |                                      |                       | R2<br>[for F1-F6          | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Mayor<br>[September 15, 2019]                        |  |                              |

| Act Now Before It Is  | r.c   | Turt of the state | T   |     |   |                                  |   |  |  |
|---|-------|---|---|-----|---|----------------------------------|---|--|--|
| Too Late:   | F6    | Unless the City increases funding levels, it will   | Mayor   |     |   | R4                               | As interim measure, by no later than June 30,   | Mayor  |  |
| Aggressively Expand   |       | be several decades (i.e., after the USGS predicts   | [September 15, 2019]  |     |   | [for F6-F7]                      | 2021, the City should purchase the 20 new   | [September 15, 2019]   |  |
|   |       | one or more major earthquakes will occur)   |   |     |   | 1                                | PWSS hose tenders being requested by the  |  |  |
| and Enhance Our<br>High-Pressure  |       | before the southern parts of the City have a  |   |     |   |                                  | SFFD, to replace and expand its currently   |  | 그는 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그   |
|   |       | high-pressure, multi-sourced, seismically safe  |   |     |   |                                  | inadequate inventory.   |  |  |
| Emergency<br>Firefighting Water   |       | emergency firefighting water supply.  |   | 1   |   | 1                                |   |  |  |
| System  |       |   |   | ì   |   | - [                              |   |  |  |
| [July 17, 2019]   |       |   |   |     |   |                                  |   |  |  |
|   |       |   |   |     |   |                                  |   |  |  |
| Act Now Before It Is  | F6    | Unless the City increases funding levels, it will   | Mayor   |     |   | R8                               | By no later than June 30, 2022, the Mayor and   | Mayor  |  |
| Too Late:   |       | be several decades (i.e., after the USGS predicts   | [September 15, 2019]  |     |   | 1                                | the Board of Supervisors should analyze   | [September 15, 2019]   |  |
| Aggressively Expand   |       | one or more major earthquakes will occur)   |   |     |   | F11]                             | whether to propose a separate bond for the  | [September 15, 2015]   |  |
| and Enhance Our   |       | before the southern parts of the City have a  |   |     |   | 1 223                            | development of a high-pressure, multi-sourced,  |  | Test of the Control o |
| High-Pressure   |       | high-pressure, multi-sourced, seismically safe  |   |     |   |                                  | seismically safe emergency water system for   |  |  |
| Emergency   |       | emergency firefighting water supply.  |   |     | • |                                  |   |  |  |
| Firefighting Water  |       | amangana, manganang nasai sappi,  |   |     |   | 1                                | those parts of the City that don't currently have   |  |  |
| System  |       |   |   |     |   |                                  | one, with a target date of completing   |  |  |
| [July 17, 2019]   |       |   |   |     |   |                                  | construction by no later than June 30, 2034.  |  |  |
|   |       |   |   |     |   |                                  |   |  |  |
| Act Now Before It Is  | F11   | The City does not have a timeline to fund and   | Mayor   |     |   | R8                               | By no later than June 30, 2022, the Mayor and   | Mayor  |  |
| Too Late:   |       | complete development of a high-pressure,  | [September 15, 2019]  | 1   |   | [for F5, F6,                     | the Board of Supervisors should analyze   | [September 15, 2019]   | W 13.1   |
| Aggressively Expand   |       | multi-sourced, seismically safe emergency   |   |     |   | F11]                             | whether to propose a separate bond for the  |  |  |
| and Enhance Our   |       | water supply for all parts of the City, including   |   |     |   |                                  | development of a high-pressure, multi-sourced,  |  |  |
| High-Pressure   |       | poor neighborhoods that historically have not   |   |     |   |                                  | seismically safe emergency water system for   |  |  |
| Emergency   |       | been as well protected as the downtown  |   |     |   |                                  | those parts of the City that don't currently have   |  | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |
| Firefighting Water  |       | business district and many richer   |   |     |   |                                  | one, with a target date of completing   |  |  |
| System  |       | neighborhoods.  |   |     |   |                                  | construction by no later than June 30, 2034.  | '  |  |
| [July 17, 2019]   |       |   |   |     |   |                                  | To later trialisance 50, 2054.  |  |  |
| Act Now Before It Is  | F1    | Fires resulting from an earthquake represent a  | General Manager, San  |     |   | R1                               | Dunal lateration December 25 ages of  | G 114 -  |  |
| Too Late:   |       | significant risk of widespread damage and   | Francisco Public Utilities  |     |   |                                  | By no later than December 31, 2020, the   | General Manager, San   | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |
| Aggressively Expand   |       | potential loss of life in San Francisco.  | Commission  |     |   | [for F1-F6]                      | Mayor, the SFPUC, the SFFD, and the Office of   | Francisco Public Utilities   | the contract of the contract o |
| and Enhance Our   |       | potential loss of the in San Francisco.   |   |     |   |                                  | Resilience and Capital Planning should jointly  | Commission   |  |
| High-Pressure   |       |   | [September 15, 2019]  |     |   |                                  | present to the Board of Supervisors a detailed  | [September 15, 2019]   |  |
| Emergency   |       | ,   |   |     |   |                                  | plan to ensure the City is well prepared to fight   |  |  |
|   |       |   |   | i i |   | ĺ                                | fires in all parts of San Francisco in the event of   | i  |  |
| Firefighting Water  |       |   |   |     |   |                                  | a 1906-magnitude (7.8) earthquake.  |  | and the second s |
|   |       |   |   | 1   |   |                                  |   |  |  |
| System  |       |   |   | 1   |   |                                  |   |  |  |
| [July 17, 2019]   |       |   |   | -   |   |                                  |   |  |  |
| [July 17, 2019]<br>Act Now Before It Is   | F1    | Fires resulting from an earthquake represent a  | General Manager, San  |     |   | R2                               | The plan discussed in Recommendation R1   | General Manager, San   |  |
| [July 17, 2019]  Act Now Before It Is Too Late:   | F1    | Fires resulting from an earthquake represent a significant risk of widespread damage and  | General Manager, San<br>Francisco Public Utilities  | -   |   |                                  | The plan discussed in Recommendation R1   | General Manager, San<br>Francisco Public Utilities   |  |
| [July 17, 2019]  Act Now Before It Is  Too Late:  Aggressively Expand   | F1    |   |   |     |   | R2<br>[for F1-F6]                | should include a detailed proposal, including   | Francisco Public Utilities   |  |
| [July 17, 2019]  Act Now Before It Is Too Late:   | F1    | significant risk of widespread damage and   | Francisco Public Utilities<br>Commission  |     |   |                                  | should include a detailed proposal, including financing sources, for the installation within 15   | Francisco Public Utilities<br>Commission   |  |
| [July 17, 2019]  Act Now Before It Is  Too Late:  Aggressively Expand   | F1    | significant risk of widespread damage and   | Francisco Public Utilities  |     |   |                                  | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced,  | Francisco Public Utilities   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our   | F1    | significant risk of widespread damage and   | Francisco Public Utilities<br>Commission  |     |   |                                  | should include a detailed proposal, including<br>financing sources, for the installation within 15<br>years of a high-pressure, multi-sourced,<br>seismically safe emergency water system for   | Francisco Public Utilities<br>Commission   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   | F1    | significant risk of widespread damage and   | Francisco Public Utilities<br>Commission  |     |   |                                  | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have  | Francisco Public Utilities<br>Commission   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency   | F1    | significant risk of widespread damage and   | Francisco Public Utilities<br>Commission  |     |   |                                  | should include a detailed proposal, including<br>financing sources, for the installation within 15<br>years of a high-pressure, multi-sourced,<br>seismically safe emergency water system for   | Francisco Public Utilities<br>Commission   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water   | F1    | significant risk of widespread damage and   | Francisco Public Utilities<br>Commission  |     |   |                                  | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have  | Francisco Public Utilities<br>Commission   |  |
| [July 17, 2019] Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  |       | significant risk of widespread damage and potential loss of life in San Francisco.  | Francisco Public Utilities<br>Commission<br>[September 15, 2019]  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | Francisco Public Utilities<br>Commission<br>[September 15, 2019]   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is   | F1 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is   | Francisco Public Utilities Commission [September 15, 2019] General Manager, San   |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the  | Francisco Public Utilities Commission [September 15, 2019]   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late:   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities   |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of  | Francisco Public Utilities<br>Commission<br>[September 15, 2019]<br>General Manager, San<br>Francisco Public Utilities   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities   |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed  | Francisco Public Utilities<br>Commission<br>[September 15, 2019]<br>General Manager, San<br>Francisco Public Utilities   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water  |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water  |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission   |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System   |       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission  |     |   | [for F1-F6]<br>R1<br>[for F1-F6] | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019]   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]   |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | [for F1-F6]<br>R1<br>[for F1-F6] | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities                                 |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Now Before It Is Too Late:   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission Commission |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand  | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced,  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities                                 |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission Commission |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission Commission |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission Commission |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Ligh-Pressure Emergency Firefighting Water System Emergency Firefighting Water System   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission Commission |     |   | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019]  | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]  R2 [for F1-F6]   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is   | F2    | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission Commission           |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late:   | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1905-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than December 31, 2020, the Mayor, the SFPDC, the SFPD, and the Office of   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand   | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our  | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11,  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area.  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Firefighting Water Firefighting Water Firefighting Water Firefighting Water Firefighting Water | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area.  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than Ducember 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City swell prepared to fight   | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Emergency Firefighting Water System   | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Firefighting Water Firefighting Water Firefighting Water Firefighting Water Firefighting Water | F2 F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately  | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  |     |   | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of | Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019]  General Manager, San Francisco Public Utilities Commission [September 15, 2019] |  |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is    | F4  | The City's high-pressure emergency water supply system, (known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F1-F6] | years of a high-pressure, multi-sourced,<br>seismically safe emergency water system for<br>those parts of the City that don't currently have<br>one, i.e., by no later than June 30, 2034.   | [September 15, 2019]   |  |
|--|-----|--|--|--|-------------|--|--|--|
| Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]                         | r5  | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F1-F6] | By no later than December 31, 2020, the<br>Mayor, the SFPUC, the SFFD, and the Office of<br>Resilience and Capital Planning should jointly<br>present to the Board of Supervisors a detailed<br>plan to ensure the City is well prepared to fight<br>fires in all parts of San Francisco in the event of<br>a 1906-magnitude (7.8) earthquake. | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5  | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.                      | [September 15, 2019]   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6  | be several decades (i.e., after the USGS predicts one or more major earthquakes will occur)  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUc, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.                   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6  | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.                      | [September 15, 2019]   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F8  | Redundancy is an important feature of an emergency firefighting water system.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F8-F9] | The SFPUC, the SFFD and the SF Department of<br>the Environment should study adding salt-<br>water pump stations to improve the<br>redundancy of water sources, especially on the<br>west side. Findings and recommendations<br>from this study should be presented to the<br>Board of Supervisors by no later than June 30,<br>2021.          | Francisco Public Utilities<br>Commission   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F9  | western part of the City do not include any high-  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F8-F9] | The SFPUC, the SFFD and the SF Department of<br>the Environment should study adding salt-<br>water pump stations to improve the<br>redundancy of water sources, especially on the<br>west side. Findings and recommendations<br>from this study should be presented to the<br>Board of Supervisors by no later than June 30,<br>2021.          | Francisco Public Utilities<br>Commission   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F10 | The "reliability scores" being used by the SFPUC impart an overly optimistic impression of the protection provided.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  | [for F10]   | The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |  |

| A -+ N D - C U -1  |     | Test and the second sec |  | <br> |                   |   |  |
|--|-----|--|--|------|-------------------|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency   | F11 | The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |      |                   |   |  |
| Firefighting Water<br>System<br>[July 17, 2019]  |     | business district and many richer neighborhoods.   |  |      |                   |   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F12 | The SFPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention.  | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |      | R9<br>[for F12]   | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFPD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F13 | In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.   | General Manager, San<br>Francisco Public Utilities<br>Commission<br>[September 15, 2019] |      | R10<br>[for F13]  | By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F1  | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]                          |      | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.           |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F1  | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]                          |      | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.               |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F2  | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and in oat reliable source for water supply for firefightling after a major earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]                          |      |                   | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.           |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F2  | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and in oat eliable source for water supply for firefighting after a major earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]                          |      | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.               |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F3  | Approximately 30 cisterns have recently been added with funds from ESER bonds, but cisterns only have up to about an hour of water supply and thus do not provide sufficient water for fighting fires following a major earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]                          |      | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should Jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.           |  |

|   |     |  | r  |     |   |          |                   |   |  |   |  |
|---|-----|--|--|-----|---|----------|-------------------|---|--|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System | F3  | added with funds from ESER bonds, but  | Chief, San Francisco Fire Department [September 15, 2019]  Chief, San Francisco Fire Department [September 15, 2019] |     |   |          | R1                | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake. | Chief, San Francisco Fire Department [September 15, 2019]  Chief, San Francisco Fire Department [September 15, 2019] |   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure   | ·F4 | The City's high-pressure emergency water<br>supply system, known as the Auxiliary Water<br>Supply System (AWSS), does not cover large<br>parts of Supervisorial Districts 1, 4, 7 and 11,<br>roughly one-third of the City's developed area.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |     |   |          | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |   |  |
| Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is  | F4  | As a result, these districts are not adequately protected from fires after a major earthquake.  The City's high-pressure emergency water   | Chief, San Francisco Fire  |     |   |          | R5                | those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  The SFFD should strategically locate the  | Chief, San Francisco Fire  | - |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]   |     | supply System, known as the Auxiliary Water<br>Supply System (AWSS), does not cover large<br>parts of Superisorial Districts 1, 4, 7 and 11,<br>roughly one-third of the City's developed area.<br>As a result, these districts are not adequately<br>protected from fires after a major earthquake. | Department<br>[September 15, 2019]   |     |   |          | [for F4]          | majority of the PWSS have tenders in areas that<br>at present only have low-pressure hydrants<br>and/or cisterns.   |  |   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F5  | emergency firefighting water supply will be costly but is essential to protect the City.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |     | • |          | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUc, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019]   | F5  | emergency firefighting water supply will be costly but is essential to protect the City.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |     |   |          | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F6  | be several decades (i.e., after the USGS predicts<br>one or more major earthquakes will occur)<br>before the southern parts of the City have a<br>high-pressure, multi-sourced, seismically safe<br>emergency firefighting water supply.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |     |   |          | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointy present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |   |  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6  | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.                       | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  | . 1 |   | ) 4<br>- | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019]  |   |  |

| A . A . A  | e -  |   | T   |   | 1 |                   |   |  |
|--|------|---|---|---|---|-------------------|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water  | F6   | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   | R4<br>[for F6-F7] | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  Chief, San Francisco Fire Department [September 15, 2019]   |  |
| System<br>[July 17, 2019]  |      |   | ,   |   |   |                   |   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water [July 17, 2019]                                | F7   | The existing Portable Water Supply System (PWSS) Inventory is inadequate. Investing in more PWSS hose tenders would provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multi-sourced, seismically safe emergency water supply can be developed in those areas. | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] | Ú |   | R4<br>[for F6-F7] | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  Chief, San Francisco Fire Department [September 15, 2019]   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F8   | Redundancy is an important feature of an emergency firefighting water system.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   | R6<br>[for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding saltwater pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.                          |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F9 . | Current plans to extend protections to the western part of the City do not include any high-<br>pressure water sources north of Golden Gate<br>Park.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   | R6<br>[for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding saltwater pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.                          |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F10  | The "reliability scores" being used by the SFPUC<br>impart an overly optimistic impression of the<br>protection provided.   | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   | R7<br>[for F10]   | The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.  |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F11  | The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   |                   |   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F13  | In the 2015 MOU between the SFFD and the SFPUC, the two agencies agreed to conduct joint AWSS trainings annually, but there is no formal protocol outlining specific joint AWSS exercises or drills using hypothetical disaster scenarios, such as a major earthquake.  | Chief, San Francisco Fire<br>Department<br>[September 15, 2019] |   |   | R10<br>[for F13]  | By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |      |   |   |   |   | R9<br>[for F12]   | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. |  |

| Act Now Before Its   5   Unless the city increases funding levels, it will be everal decided (e.g., after the USDS predicts) (spermber 15, 2019)    Too Late:    Act Now Before Its   Foundation   Found |  |
|--|--|
| one or more major earthquakes will occur) and Enhance Our high-Pressure, multi-sourced, selsmically safe emergency Firefighting Water System Duly 17, 2019] Act Now Before it b Too Late: Regressively Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts) one more major earthquakes will occur) before the southern past of the City have a high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts) one more major earthquakes will occur) before the southern past of the City have a high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Englishing Water System Duly 17, 2019]  Act Now Before it b Too Late: Regressively Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Englishing Water System Uply 17, 2019]  Act Now Before it b Too Late: Regressively Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Englishing Water System One are more major earthquakes will occur) the control of the city have a high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Englishing Water System One are more major earthquakes will occur) the control of the City have a high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Expand and Enhance Our high-pressure, multi-sourced, selsmically safe emergency firefighting water supply.  Expand and Enhance Ou |  |
| before the southern parts of the City have a light-pressure, miltisourced, selsmically safe emergency frefighting water supply.  Act Now Before it is 10 Late:  Duly 17, 2019]  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Emergency Firefighting water supply.  Act Now Before it is 10 Late:  Be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificats one or more major earthquakes will occur be several decades (i.e., after the USS) specificate one of the development of a high-pressure, multi-sourced, sessmically safe emergency will occur be not one of the development of a high-pressure, multi-sourced, sessmically safe emergency with the sourced sessmically safe emergency will occur be not one of the development of a high-pressure, multi-sourced, sessmically safe emergency wit |  |
| High-pressure, multi-sourced, seismically safe emergency Firefighting Water System (July 17, 2019) Act Now Before It Is 100 Late:    Duries the City increase funding levels, it will consider the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency (firefighting Water System) (July 17, 2019) Act Now Before It Is 100 Late:    Duries the City increases funding levels, it will consider the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergency (firefighting Water System Court ligh-pressure, multi-sourced, seismically safe emergenc |  |
| Emergency Firefighting Water System [July 17, 2019]  Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water supply.  Act Now Before it is Too Late: Act Now Before it is Too Late: Act Now Before it is Too Late: Act Now Before it is Too Late: Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before it is Too Late: Act  |  |
| Firefighting Water System July 17, 2019] Act Now Before It is Too Late: Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System July 17, 2019] Act Now Before It is Genergency High-Pressure Hull-System |  |
| System   Cliuly 17, 2019    Act Now Before It Is   F6   Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the southern parts of the City have a high-pressure mergency firefighting Water System (Duty 17, 2019)   Act Now Before It Is   F6   Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the southern parts of the City have a high-pressure, multi-sourced, selsmically safe emergency increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decades (i.e., after the USGS predicts or large and the city increases funding levels, it will be several decad   |  |
| July 17, 2019   Act Now Before It Is Too Late:   |  |
| Act Now Before It Is 10 o Late: Agressively Expand and Enhance Our High-Pressure, multi-sourced, seismically safe emergency water supply.    City Administrator   City Administra |  |
| Too Late:  Agressively Expand and Enhance Our High-Pressure Emergency Firefighting Water Supress one or more major earthquakes will occur)  Act Now Before It is Too Late:  Aggressively Expand and Enhance Our High-Pressure, multi-sourced, seismically safe emergency stems (September 15, 2019)  Act Now Before It is Too Late:  Aggressively Expand and Enhance Our High-Pressure, multi-sourced, seismically safe emergency stems (September 15, 2019)  Act Now Before It is Too Late:  Aggressively Expand and Enhance Our High-Pressure, multi-sourced, seismically safe emergency stems (September 15, 2019)  Act Now Before It is Too Late:  Agressively Expand and Enhance Our High-Pressure, multi-sourced, seismically safe emergency  |  |
| Foo Late: Agressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City had on't currently have cone, with a target date of completing construction by no later than June 30, 2024, the Mayor and complete development of a high-pressure, multi-sourced, seismically safe emergency water system for the System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is Firefighting Water System [July 17, 2019]  ACR NOW Before It Is  |  |
| Aggressively Expand and Enhance Our before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency Firefighting Water system [July 17, 2019]  Act Now Before It is Emergency Firefighting Water system [Outher parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  City Administrator [September 15, 2019]  Act Now Before It is Emergency Firefighting Water system [Outher parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  Act Now Before It is Emergency Firefighting Water system [Outher parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City had don't currently have one, with a target date of completing construction by no later than June 30, 2034.  Act Now Before It is F11 The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City had on't currently have one, with a target date of completing construction by no later than June 30, 2022, the Mayor and complete development of a high-pressure, water supply for all parts of the City, including water supply for all parts of the C |  |
| and Enhance Our High-Pressure high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City hat don't currently have one, i.e., by no later than June 30, 2024, the Mayor and Enhance Our High-Pressure system [July 17, 2019]  Act Now Before It is 100 Late: Aggressively Expand and Enhance Our High-Pressure water supply.  Act Now Before It is 100 Late: Aggressively Expand and Enhance Our water supply for all parts of the City, Induding and Enhance Our water supply for all parts of the City, Induding water supply for all parts of the City, Induding water supply for all parts of the City, Induding water supply of all parts of the City, Induding water supp |  |
| High-Pressure Emergency Firefighting Water System [Cluly 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [Duly 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [Duly 17, 2019]  Act Now Before It Is Too Late: Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Finefighting Water System [Duly 17, 2019]  Act Now Before It Is Too Late: Act Now Before It Is Superpose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency Firefighting Water System [Duly 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply of all parts of the City have a high-pressure, multi-sourced, seismically safe emergency Firefighting water supply.  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply for all parts of the City, increases funding levels, it will City Administrator [September 15, 2019]  Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply.  Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, increases funding levels, it will court for those parts of the City had don't currently have one, i.e., by no later than June 30, 2022, the Mayor and City Administrator [September 15, 2019]  Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency whether to propose a separate bond for the development of a high-pressure, multi-sourced, whether to propose a separate bond for the development of a high-pressure, multi-sourced, whether to propose a separate bond for the development of a high-pressure, multi-sourced, whether |  |
| Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Integrated water Generating Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Generating Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply.  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply of all parts of the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) be for the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  Spetember 15, 2019]  Spetember 15, 2019]  Spetember 15, 2019]  Spetember 15, 2019]  Spetember 15, 2019]  Spetember 15, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our water supply for all parts of the City, including  |  |
| Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late:  |  |
| System   [July 17, 2019]   Act Now Before It Is   F0   Unless the City increases funding levels, it will   City Administrator   (September 15, 2019)   (Septem   |  |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply for all parts of the City, including  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our Water supply for all parts of the City, including   |  |
| Too Late:  be several decades (i.e., after the USGS predicts one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  high-pressure high-pressure, multi-sourced, seismically safe emergency water supply.  Firefighting Water System  [July 17, 2019]  Act Now Before It is Too Late:  Aggressively Expand one or more major earthquakes will occur)  high-pressure, multi-sourced, seismically safe emergency water supply.  Firefighting Water System  [July 17, 2019]  Act Now Before It is Too Late:  Aggressively Expand one or more major earthquakes will occur)  high-pressure, multi-sourced, seismically safe emergency water supply.  Firefighting Water supply.  The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City water supply for all parts of the City water supply for all parts of the City water supply for all parts of the City water supply for all parts of the City water supply for all parts of the City water supply for all parts of  |  |
| Too Late:  be several decades (i.e., after the USGS predicts one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  high-pressure high-pressure, multi-sourced, seismically safe emergency water supply.  Act Now Before It is Too Late:  Aggressively Expand one or more major earthquakes will occur)  Act Now Before It is Aggressively Expand one or more major earthquakes will occur)  Act Source Aggressively Expand one or more major earthquakes will occur)  Act Now Before It is Too Late:  Aggressively Expand one or more major earthquakes will occur)  Act Now Before It is One Lite:  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  hefore the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  City Administrator  [September 15, 2019]  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will occur)  Aggressively Expand one or more major earthquakes will one or or those personne or or tho |  |
| Aggressively Expand and Enhance Our High-Pressure, and Expand and Enhance Our High-Pressure, and Expand and Enhance Our High-Pressure, and Expand and Enhance Our High-Pressure, and Expand and Enhance Our water supply for all parts of the City have a high-pressure, and Expand and Enhance Our water supply for all parts of the City have a high-pressure, multi-sourced, seismically safe emergency as a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-sourced, seismically safe emergency as esparate bond for the development of a high-pressure, multi-so |  |
| and Enhance Our High-Pressure  | j.   |
| High-Pressure high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  High-pressure Emergency Firefighting Water System [July 17, 2019]  Act Now Before It is Too Late: Aggressively Expand multi-sourced, seismically safe emergency water supply.  City Administrator [September 15, 2019]  R8 By no later than June 30, 2022, the Mayor and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including  City Administrator [September 15, 2019]  Whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including  |  |
| Emergency Firefighting Water Firefighting Water System  [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand and Enhance Our  water supply for all parts of the City, including  emergency firefighting water supply.  Emergency  multi-sourced, seismically safe emergency in those parts of the City, tand undown to those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  City Administrator  [September 15, 2019]  [September 15, 2019]  Whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe and the complete several parts of the City, including  |  |
| Firefighting Water System [July 17, 2019]  Act Now Before It Is Too Late: complete development of a high-pressure, multi-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including   |  |
| System [July 17, 2019]  Act Now Before It Is Too Late: Aggressively Expand multi-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including   |  |
| [July 17, 2019]  Act Now Before It Is Too Late: Complete development of a high-pressure, adgress/wely Expand and Enhance Our water supply for all parts of the City, including   |  |
| Act Now Before It Is The City does not have a timeline to fund and complete development of a high-pressure, and Enhance Our water supply for all parts of the City, including  Too Late:  Aggressively Expand and Enhance Our  The City does not have a timeline to fund and complete development of a high-pressure, and the complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including  City Administrator [September 15, 2019]  Whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including  | , and the second |
| Too Late: complete development of a high-pressure, Aggressively Expand and Enhance Our water supply for all parts of the City, including [September 15, 2019] [September 15, 2019 |  |
| Too Late: complete development of a high-pressure, Aggressively Expand and Ith-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including [September 15, 2019] [If pressure, Aggressively Expand whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including [September 15, 2019] [September 15, 2019] whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including [September 15, 2019] [September 15, 2 |  |
| Aggressively Expand multi-sourced, seismically safe emergency and Enhance Our water supply for all parts of the City, including water supply for all parts of the City, including water supply for all parts of the City, including  |  |
| and Enhance Our water supply for all parts of the City, including development of a high-pressure, multi-sourced,   |  |
|  |  |
|  |  |
| Emergency been as well protected as the downtown those parts of the City that don't currently have   |  |
| Firefighting Water business district and many richer one, with a target date of completing   |  |
| System neighborhoods. construction by no later than June 30, 2034.   |  |
| [July 17, 2019]  |  |
| Act Now Before It Is F6 Unless the City increases funding levels, it will Chief Resilience Officer.  |  |
| by no later than December 31, 2020, the Chief Resilience Officer,  | 2  |
| [tiol rand) Mayor, the arrot, and the office of the city   |  |
| Resilience and capital Planning should jointly   Administrator   | 1  |
| present to the board of Supervisors a detailed [[September 15, 2019]]  | i de la fille de la fille de la fille de la fille de la fille de la fille de la fille de la fille de la fille  |
| pian to ensure the city is wen prepared to right   |  |
| in estimation parts of sain transisco in the event of  |  |
| Fidelighting Water   | The state of the s |
|  |  |
| [July 17, 2019]  |  |
| Act Now Before It Is F6 Unless the City increases funding levels, it will Chief Resilience Officer, R2 The plan discussed in Recommendation R1 Chief Resilience Officer,   |  |
| Too Late: be several decades (i.e., after the USGS predicts Office of the City   |  |
| Aggressively Expand one or more major earthquakes will occur) Administrator financing sources, for the installation within 15 Administrator  |  |
| and Enhance Our before the southern parts of the City have a [September 15, 2019] years of a high-pressure, multi-sourced, [September 15, 2019]  |  |
| High-Pressure high-pressure, multi-sourced, seismically safe seismically safe seismically safe seismically safe  | n nagati k   |
| Emergency emergency firefighting water supply.   |  |
| Firefighting Water one, i.e., by no later than June 30, 2034.  |  |
| System Story and the story and the story and s |  |
| [July 17, 2019]  |  |
|  |  |
| no by no facel than June 30, 2022, the Mayor and Chief Resilience Officer,   |  |
| [tot 13, 10, die Board of Supervisors should alrialyze   Office of the City  |  |
| TIII] whether to propose a separate boild for the Administrator  |  |
| development of a high-plessure, muta-sourced, [[septembel 15, 2015]  |  |
| High-Pressure high-pressure, multi-sourced, seismically safe seismically safe emergency water system for   |  |
| Emergency emergency firefighting water supply. those parts of the City that don't currently have   |  |
| one, with a target date of completing  |  |
| System construction by no later than June 30, 2034.  |  |
| Challet 7 2010   |  |
| [July 17, 2019]  |  |
| [luly 17, 2019]  |  |
| [July 17, 2019]  Act Now Before It is F11 The City does not have a timeline to fund and Chief Resilience Officer,  Too Late: Complete development of a high-pressure, Office of the City  Office of the City  Office of the City   |  |
| [July 17, 2019]  Act Now Before It is Too Late: Complete development of a high-pressure, Aggressively Expand Multi-sourced, seismically safe emergency Mornitary Morni |  |
| Cluly 17, 20.19   Act Now Before It is   F11   The City does not have a timeline to fund and complete development of a high-pressure, agreessively Expand   Multi-sourced, seismically safe emergency   Administrator   Admi   |  |
| Chief Resilience Officer,      |  |
| Chief Resilience Officer, Office of the City Adgressively Expand and Enhance Our High-Pressure poor neighborhoods that historically have not Too.  |  |
| Cluly 17, 2019   Act Now Before It is   F11   The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency and Eigh-pressure poor neighborhoods that historically have not been as well protected as the downtown   Clief Resilience Officer, Office of the City administrator   September 15, 2019   Se   |  |
| Chief Resilience Officer, Office of the City Adgressively Expand and Enhance Our High-Pressure High-Pressure Pressure    |  |
| Chief Resilience Officer, Office of the City   |  |

| Act Now Before It Is |     |   |                          |                                       |       | R6          | The SFPUC, the SFFD and the SF Department of        | Director, San Francisco  |   |                |
|----------------------|-----|---|--------------------------|---------------------------------------|-------|-------------|---|--------------------------|---|----------------|
| Too Late:            |     |   |                          |                                       |       | [for F8-F9] | the Environment should study adding salt-           | Department of the        |   |                |
| Aggressively Expand  |     |   |                          |                                       |       |             | water pump stations to improve the                  | Environment              | 1                                       |                |
| and Enhance Our      |     |   |                          |                                       |       |             | redundancy of water sources, especially on the      | [September 15, 2019]     | _                                       |                |
| High-Pressure        |     |   |                          |                                       |       |             | west side. Findings and recommendations             |                          |   | 2.43           |
| Emergency            |     |   |                          |                                       |       |             | from this study should be presented to the          |                          | 1.4                                     |                |
| Firefighting Water   |     |   |                          |                                       |       |             | Board of Supervisors by no later than June 30,      |                          |   |                |
| System               |     |   |                          |                                       |       |             | 2021.   |                          |   |                |
| [July 17, 2019]      |     |   |                          |                                       |       |             |   |                          |   |                |
| Act Now Before It Is | F6  | Unless the City increases funding levels, it will | Budget and Legislative   | · · · · · · · · · · · · · · · · · · · |       | R3          | The Board of Supervisors should direct the          | Budget and Legislative   |   |                |
| Too Late:            |     | be several decades (i.e., after the USGS predicts |                          |                                       |       |             |   | Analyst Office, Board of |   |                |
| Aggressively Expand  |     |   | Supervisors              |                                       |       | [[01 -1-10] |   | Supervisors              |   | 3.55           |
| and Enhance Our      |     |   |                          | i                                     |       | i i         |   |                          |   |                |
|                      |     |   | [September 15, 2019]     |                                       |       |             |   | [September 15, 2019]     |   |                |
| High-Pressure        |     | high-pressure, multi-sourced, seismically safe    |                          | :                                     |       |             | have sufficient water supplies for the              |                          |   |                |
| Emergency            |     | emergency firefighting water supply.              |                          |                                       |       |             | anticipated demand for water to fight fires         |                          |   |                |
| Firefighting Water   |     |   |                          |                                       |       |             | following a major earthquake similar in             |                          | 4                                       |                |
| System               |     |   |                          |                                       |       |             | magnitude to the 1906 earthquake, and (b)           |                          |   |                |
| [July 17, 2019]      |     |   |                          |                                       |       |             | options to address the issue in both the short      |                          |   |                |
|                      |     |   |                          |                                       |       |             | term and the long term. The Board should            |                          |   |                |
|                      |     |   |                          |                                       |       | l .         | issue its request by no later than December 31,     |                          |   |                |
|                      |     |   |                          |                                       |       |             | 2019, and the Budget and Legislative Analyst        |                          |   |                |
|                      |     |   |                          |                                       |       |             | should complete its report by no later than         |                          |   |                |
|                      |     |   |                          |                                       |       | 1           | December 31, 2020.                                  |                          |   |                |
| Act Now Before It Is | F11 | The City does not have a timeline to fund and     | Budget and Legislative   |                                       |       |             |   |                          |   | 1              |
| Too Late:            |     | complete development of a high-pressure,          | Analyst Office, Board of |                                       |       |             |   |                          |   |                |
| Aggressively Expand  |     |   | Supervisors              |                                       |       |             |   |                          |   |                |
| and Enhance Our      |     |   | [September 15, 2019]     |                                       |       |             |   |                          |   |                |
| High-Pressure        |     | poor neighborhoods that historically have not     |                          |                                       |       |             |   |                          |   |                |
| Emergency            |     | been as well protected as the downtown            |                          |                                       |       |             |   |                          |   |                |
| Firefighting Water   |     | business district and many richer                 |                          |                                       |       | 1           |   | Ì                        |   |                |
| System               |     | neighborhoods.                                    |                          |                                       |       |             |   |                          |   |                |
| [July 17, 2019]      |     |   |                          | }                                     |       |             |   |                          |   |                |
| 1                    |     |   |                          |                                       |       |             |   |                          |   |                |
| Act Now Before It Is | F4  | The City's high-pressure emergency water          | Board of Supervisors     |                                       |       |             | By no later than December 31, 2020, the             | Board of Supervisors     | No.                                     |                |
| Too Late:            |     | supply system, known as the Auxiliary Water       | [October 15, 2019]       |                                       |       | [for F1-F6] | Mayor, the SFPUC, the SFFD, and the Office of       | [October 15, 2019]       |   |                |
| Aggressively Expand  |     | Supply System (AWSS), does not cover large        |                          |                                       |       |             | Resilience and Capital Planning should jointly      |                          |   | 6.50           |
| and Enhance Our      |     | parts of Supervisorial Districts 1, 4, 7 and 11,  |                          |                                       |       |             | present to the Board of Supervisors a detailed      |                          |   |                |
| High-Pressure        |     | roughly one-third of the City's developed area.   |                          |                                       |       |             | plan to ensure the City is well prepared to fight   |                          |   |                |
| Emergency            |     | As a result, these districts are not adequately   |                          |                                       |       | 1           | fires in all parts of San Francisco in the event of | 1                        |   |                |
| Firefighting Water   |     | protected from fires after a major earthquake.    |                          |                                       |       |             | a 1906-magnitude (7.8) earthquake.                  |                          | ·                                       |                |
| System               |     |   |                          |                                       |       |             |   |                          |   |                |
| [July 17, 2019]      |     |   |                          | 1                                     |       |             |   |                          |   | HAND SEPTEMBER |
| Act Now Before It Is | F4  | The City's high-pressure emergency water          | Board of Supervisors     |                                       |       | R2          | The plan discussed in Recommendation R1             | Board of Supervisors     |   |                |
| Too Late:            |     | supply system, known as the Auxiliary Water       | [October 15, 2019]       |                                       |       |             | should include a detailed proposal, including       | [October 15, 2019]       |   |                |
| Aggressively Expand  |     | Supply System (AWSS), does not cover large        |                          |                                       |       | 1           | financing sources, for the installation within 15   |                          |   |                |
| and Enhance Our      |     | parts of Supervisorial Districts 1, 4, 7 and 11,  |                          |                                       |       |             | years of a high-pressure, multi-sourced,            |                          |   |                |
| High-Pressure        |     | roughly one-third of the City's developed area.   |                          |                                       |       |             | seismically safe emergency water system for         |                          |   |                |
| Emergency            |     | As a result, these districts are not adequately   | 1                        |                                       |       | 1           | those parts of the City that don't currently have   |                          | 1                                       |                |
| Firefighting Water   |     | protected from fires after a major earthquake.    |                          |                                       |       |             | one, i.e., by no later than June 30, 2034.          |                          |   |                |
| System               |     | protected from mes after a major eartifuake.      |                          |                                       |       |             | one, i.e., by no later than sune 30, 2034.          |                          |   |                |
| [July 17, 2019]      |     |   |                          |                                       |       |             |   |                          |   |                |
|                      |     |   |                          |                                       |       |             |   |                          |   | <u> </u>       |
| Act Now Before It Is | F4  | The City's high-pressure emergency water          | Board of Supervisors     |                                       |       |             | The Board of Supervisors should direct the          | Board of Supervisors     |   |                |
| Too Late:            |     | supply system, known as the Auxiliary Water       | [October 15, 2019]       |                                       |       | [for F1-F6] | Budget and Legislative Analyst to study through     | [October 15, 2019]       |   |                |
| Aggressively Expand  |     | Supply System (AWSS), does not cover large        | 1                        |                                       |       |             | an equity lens and issue a report to the Board      |                          |   |                |
| and Enhance Our      |     | parts of Supervisorial Districts 1, 4, 7 and 11,  | 1                        |                                       |       |             | regarding (a) which areas of the City do not        |                          | -                                       |                |
| High-Pressure        |     | roughly one-third of the City's developed area.   | 1                        |                                       |       | 1           | have sufficient water supplies for the              |                          |   |                |
| Emergency            |     | As a result, these districts are not adequately   |                          |                                       |       |             | anticipated demand for water to fight fires         |                          |   |                |
| Firefighting Water   |     | protected from fires after a major earthquake.    |                          |                                       |       |             | following a major earthquake similar in             |                          |   |                |
| System               |     |   |                          |                                       |       |             | magnitude to the 1906 earthquake, and (b)           |                          |   |                |
| [July 17, 2019]      |     |   |                          |                                       |       | 1           | options to address the issue in both the short      |                          | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - |                |
|                      |     |   |                          |                                       |       |             | term and the long term. The Board should            |                          | 1 |                |
|                      |     |   |                          |                                       |       | 1           | issue its request by no later than December 31,     |                          |   |                |
|                      |     |   |                          |                                       |       |             | 2019, and the Budget and Legislative Analyst        |                          |   |                |
|                      |     |   |                          |                                       |       | 1           | should complete its report by no later than         |                          |   |                |
|                      |     |   |                          |                                       |       |             | December 31, 2020.                                  |                          |   |                |
| Act Now Before It Is | F5  | A high-pressure, multi-sourced, seismically safe  | Board of Supervisors     |                                       |       | R1          | By no later than December 31, 2020, the             | Board of Supervisors     |   |                |
| Too Late:            | 1   | emergency firefighting water supply will be       | [October 15, 2019]       |                                       |       |             | Mayor, the SFPUC, the SFFD, and the Office of       | [October 15, 2019]       |   |                |
| Aggressively Expand  |     | costly but is essential to protect the City.      | [04(02), 25, 2025]       |                                       |       | [1011210]   | Resilience and Capital Planning should jointly      | [001000, 13, 2013]       |   |                |
| and Enhance Our      |     | protect the city.                                 |                          |                                       |       |             | present to the Board of Supervisors a detailed      |                          | <u> </u> -                              |                |
| High-Pressure        |     |   |                          |                                       |       |             | plan to ensure the City is well prepared to fight   |                          |   |                |
| Emergency            |     | 1   |                          |                                       |       |             | fires in all parts of San Francisco in the event of |                          |   |                |
| Firefighting Water   |     |   |                          |                                       |       | 1           | a 1906-magnitude (7.8) earthquake.                  |                          |   |                |
| System System        | 1   |   |                          |                                       | 9,107 | 1           | a 1900-magnitude (7.0) earthquake.                  |                          |   |                |
| [July 17, 2019]      |     |   |                          |                                       |       | 1           |   |                          |   |                |
| [2017 17, 2019]      | 1   |   |                          |                                       |       | 1           |   |                          |   |                |
|                      |     |   |                          |                                       |       |             |   |                          |   |                |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is    |    | costly but is essential to protect the City.  | [October 15, 2019]                         |  | R2<br>[for F1-F6]          | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | Board of Supervisors<br>[October 15, 2019] |  |
|--|----|---|--|--|----------------------------|---|--|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | Board of Supervisors<br>[October 15, 2019] |  | R3<br>[for F1-F6]          | The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020. | Board of Supervisors<br>[October 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F5 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | Board of Supervisors<br>[October 15, 2019] |  | R8<br>[for F5, F6,<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  | Board of Supervisors<br>[October 15, 2019] |  |
| Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]                         | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply. | Board of Supervisors<br>[October 15, 2019] |  | R1<br>[for F1-F6]          | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should Jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | Board of Supervisors<br>[October 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  |  |  |                            | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   |  |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>(July 17, 2019) | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | [October 15, 2019]                         |  | R3<br>[for F1-F6]          | The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020. |  |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] | F6 | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | Board of Supervisors<br>[October 15, 2019] |  | R4<br>[for F6-F7]          | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | Board of Supervisors<br>[October 15, 2019] |  |

| Act Now Before It Is<br>Too Late:  |          |  | T  |   |     |                                  |  |   |     |  |
|--|----------|--|--|---|-----|----------------------------------|--|---|-----|--|
|  | F6       | Unless the City increases funding levels, it will  | Board of Supervisors   |   |     | R8                               | By no later than June 30, 2022, the Mayor and  | Board of Supervisors  |     |  |
|  |          | be several decades (i.e., after the USGS predicts  | [October 15, 2019]   |   |     | [for F5, F6,                     | the Board of Supervisors should analyze  | [October 15, 2019]  |     |  |
| Aggressively Expand  |          | one or more major earthquakes will occur)  | 1  | * |     | F11]                             | whether to propose a separate bond for the   | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,   | 1.  |  |
| and Enhance Our  |          | before the southern parts of the City have a   |  |   |     |                                  | development of a high-pressure, multi-sourced,   |   |     | and the second s |
| High-Pressure  |          | high-pressure, multi-sourced, seismically safe   |  |   |     |                                  |  |   |     |  |
| Emergency  |          | emergency firefighting water supply.   |  |   |     |                                  | seismically safe emergency water system for  |   |     | The second second second second second second second second second second second second second second second se  |
| Firefighting Water   |          | emergency mengiting water supply.  |  |   |     |                                  | those parts of the City that don't currently have  |   |     |  |
|  |          |  |  |   |     | 1                                | one, with a target date of completing  |   |     |  |
| System   |          |  |  |   |     |                                  | construction by no later than June 30, 2034.   |   |     |  |
| [July 17, 2019]  |          |  |  |   |     |                                  |  |   |     |  |
| Act Now Before It Is   | F11      | The City does not have a timeline to fund and  | Board of Supervisors   |   |     |                                  |  |   |     |  |
| Too Late:  | '        | complete development of a high-pressure,   |  |   |     | R8                               | By no later than June 30, 2022, the Mayor and  |   |     |  |
|  |          |  | [October 15, 2019]   |   |     | [for F5, F6,                     | the Board of Supervisors should analyze  | [October 15, 2019]  |     |  |
| Aggressively Expand  |          | multi-sourced, seismically safe emergency  |  |   | · · | F11]                             | whether to propose a separate bond for the   |   |     |  |
| and Enhance Our  |          | water supply for all parts of the City, including  |  |   |     |                                  | development of a high-pressure, multi-sourced,   |   |     |  |
| High-Pressure  |          | poor neighborhoods that historically have not  |  |   |     |                                  | seismically safe emergency water system for  |   |     |  |
| Emergency  |          | been as well protected as the downtown   |  |   |     |                                  | those parts of the City that don't currently have  | · ·   |     |  |
| Firefighting Water   |          | business district and many richer  |  |   |     | 1                                | one, with a target date of completing  |   |     |  |
| System   |          | neighborhoods.   |  |   |     | 1                                |  |   |     |  |
| [July 17, 2019]  |          | The State of the S |  |   |     |                                  | construction by no later than June 30, 2034.   |   |     |  |
|  |          |  |  |   |     |                                  |  |   |     |  |
| Act Now Before It Is   |          |  |  |   |     | R6                               | The SFPUC, the SFFD and the SF Department of   | Board of Supervisors  |     |  |
| Too Late:  | ļ        |  |  |   |     | Ifor ER-EQ1                      |  | [October 15, 2019]  | 1   |  |
| Aggressively Expand  |          |  |  |   |     | [101 10-13]                      |  | [October 15, 2019]  | 1   |  |
| and Enhance Our  |          |  |  |   |     | 1                                | water pump stations to improve the   |   |     |  |
| High-Pressure  |          |  |  |   | •   |                                  | redundancy of water sources, especially on the   |   |     |  |
|  |          |  |  |   |     | 1                                | west side. Findings and recommendations  |   |     |  |
| Emergency  |          | 1  |  |   |     | 1                                | from this study should be presented to the   |   | 1   |  |
| Firefighting Water   |          |  | 1  |   |     |                                  | Board of Supervisors by no later than June 30,   |   |     |  |
| System   |          |  |  |   |     | 1                                | 2021.  |   |     |  |
| [July 17, 2019]  |          |  |  |   |     |                                  |  |   |     |  |
|  | -        |  |  |   |     |                                  |  |   |     |  |
| Act Now Before It Is   |          |  |  |   |     | R7                               | The SFPUC should (a) continue its efforts to   | Board of Supervisors  |     |  |
| Too Late:  |          |  |  |   |     | [for F10]                        | complete a more detailed analysis of   | [October 15, 2019]  | 1 1 |  |
| Aggressively Expand  |          |  |  |   |     | (                                | emergency firefighting water needs (including  | [00:000:13, 2015]   |     |  |
| and Enhance Our  |          |  |  |   |     |                                  |  |   | 1   |  |
| High-Pressure  |          |  |  |   |     |                                  | above-the-median needs) by neighborhood,   |   |     | •  |
| Emergency  |          |  |  |   |     |                                  | and not just by FRA, and (b) present a   |   |     |  |
|  | }        |  | 1  |   |     |                                  | completed analysis to the Board of Supervisors   |   | 1   | Control of the Contro |
| Firefighting Water   |          | *  |  |   |     |                                  | by no later than June 30, 2021.  |   |     |  |
| System   |          |  |  |   |     |                                  |  |   |     |  |
| [July 17, 2019]  |          |  |  |   |     |                                  |  |   | 1   |  |
| Act Now Before It Is   | F1       | Financial and the second secon |  |   |     |                                  |  |   |     |  |
|  | 11       | Fires resulting from an earthquake represent a   | President, San Francisco   |   |     | R1                               | By no later than December 31, 2020, the  | President, San Francisco  |     |  |
| Too Late:  |          | significant risk of widespread damage and  | Public Utilities Commission  |   |     | [for F1-F6]                      | Mayor, the SFPUC, the SFFD, and the Office of  | Public Utilities Commission   |     | *  |
| Aggressively Expand  |          | potential loss of life in San Francisco.   | [September 15, 2019]   |   |     |                                  | Resilience and Capital Planning should jointly   | [September 15, 2019]  | 1   | and the second of the second o |
| and Enhance Our  |          |  |  |   |     |                                  | present to the Board of Supervisors a detailed   |   |     |  |
| High-Pressure  |          |  |  |   |     |                                  | plan to ensure the City is well prepared to fight  |   |     |  |
| Emergency  |          |  |  |   |     | 1                                |  |   | 1   |  |
| Firefighting Water   |          |  |  |   |     |                                  | fires in all parts of San Francisco in the event of  |   |     |  |
| System   |          |  |  |   |     |                                  | a 1906-magnitude (7.8) earthquake.   |   | 1   |  |
|  |          |  |  |   |     | 1                                |  |   |     |  |
| [July 17, 2019]  |          |  |  |   |     | 1                                |  |   | 1 1 |  |
|  |          |  |  |   |     |                                  |  |   |     |  |
| Act Now Before It Is   | F1       | Fires resulting from an earthquake represent a   | President San Francisco  |   |     |                                  | The electron dis December 11 D | D 11 10 m   |     |  |
| Act Now Before It Is   | F1       | Fires resulting from an earthquake represent a   | President, San Francisco   |   |     |                                  | The plan discussed in Recommendation R1  | President, San Francisco  |     |  |
| Too Late:  | F1       | significant risk of widespread damage and  | Public Utilities Commission  |   |     | 1                                | should include a detailed proposal, including  | Public Utilities Commission   |     |  |
| Too Late:<br>Aggressively Expand   | F1       |  |  | - |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15  | Public Utilities Commission   |     |  |
| Too Late:<br>Aggressively Expand<br>and Enhance Our  | F1       | significant risk of widespread damage and  | Public Utilities Commission  | - |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced,   | Public Utilities Commission   |     |  |
| Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure   | F1       | significant risk of widespread damage and  | Public Utilities Commission  |   |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced,   | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency  | F1       | significant risk of widespread damage and  | Public Utilities Commission  |   |     | 1                                | should include a detailed proposal, including<br>financing sources, for the installation within 15<br>years of a high-pressure, multi-sourced,<br>seismically safe emergency water system for  | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water   | F1       | significant risk of widespread damage and  | Public Utilities Commission  | · |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency  | F1       | significant risk of widespread damage and  | Public Utilities Commission  |   |     | 1                                | should include a detailed proposal, including<br>financing sources, for the installation within 15<br>years of a high-pressure, multi-sourced,<br>seismically safe emergency water system for  | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System  | F1       | significant risk of widespread damage and  | Public Utilities Commission  |   |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  |          | significant risk of widespread damage and potential loss of life in San Francisco.   | Public Utilities Commission<br>[September 15, 2019]  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is   | F1<br>F2 | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is  | Public Utilities Commission<br>[September 15, 2019]  |   |     | 1                                | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have   | Public Utilities Commission<br>[September 15, 2019]   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late:   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major   | Public Utilities Commission<br>[September 15, 2019]  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the   | Public Utilities Commission<br>[September 15, 2019]   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is  | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late:   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for   | Public Utilities Commission<br>[September 15, 2019]  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly  | Public Utilities Commission<br>[September 15, 2019]   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand Ligh-Pressure High-Pressure   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of 5an Francisco in the event of   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water  |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of 5an Francisco in the event of   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water  |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission  |   |     | [for F1-F6]                      | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of 5an Francisco in the event of   | Public Utilities Commission<br>(September 15, 2019)  President, San Francisco Public Utilities Commission   |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]   | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]   |   |     | (for F1-F6)<br>R1<br>[for F1-F6] | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System July 17, 2019] Act Now Before It Is   |          | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is  | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco                             |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1  | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco                          |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late:  | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand  | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for earthquake and is not a reliable source for   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco                             |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to flight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our  | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15   | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for earthquake and is not a reliable source for   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced,  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our  | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure  | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water   | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Emergency Firefighting Water System Emergency Firefighting Water System            | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |
| Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water Firefighting Water Firefighting Water   | F2       | significant risk of widespread damage and potential loss of life in San Francisco.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake and is not a reliable source for water supply for firefighting after a major   | Public Utilities Commission<br>[September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |   |     | R1 [for F1-F6]                   | should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have  | Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission |     |  |

| Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] | F4 F4 | Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019] |  | [for F1-F6]       | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should Jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034. | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] |  |
|---|-------|---|--|--|-------------------|---|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F5    | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  |   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F5    | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently havione, i.e., by no later than June 30, 2034.  |   |  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6    | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency fireflighting water supply.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  |   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6    | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R2<br>[for F1-F6] | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently havone, i.e., by no later than June 30, 2034.   | е   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F8    | Redundancy is an important feature of an emergency firefighting water system.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R6<br>[for F8-F9  | The SFPUC, the SFFD and the SF Department of the Environment should study adding saltwater pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.  | Public Utilities Commission<br>[September 15, 2019]                             |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F9    | Current plans to extend protections to the western part of the City do not include any high pressure water sources north of Golden Gate Park.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R6<br>[for F8-F9  | The SFPUC, the SFFD and the SF Department of the Environment should study adding salt-water pump stations to improve the redundancy of water sources, especially on thwest side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.   | Public Utilities Commission<br>[September 15, 2019]                             |  |

| Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019] Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Fireflighting Water System [July 17, 2019] | F10 | The "reliability scores" being used by the SFPUC impart an overly optimistic impression of the protection provided.  The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods. | President, San Francisco Public Utilities Commission [September 15, 2019]  President, San Francisco Public Utilities Commission [September 15, 2019] |  | R7<br>[for F10]   | The SFPUC should (a) continue its efforts to complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisors by no later than June 30, 2021.  | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] |  |
|---|-----|---|--|--|-------------------|---|---|--|
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F12 | The SFPUC has not developed a number of the routine maintenance plans recommended in a 2014 report (CS-199), and has not adequately defined which AWSS valves are "critical" and therefore require increased attention.   | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019]  |  | R9<br>[for F12]   | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices" for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans. | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  |     |   |  |  | R10<br>[for F13]  | By no later than June 30, 2020, the 2015 MOU between the SFPUC and the SFFD should be amended to include a detailed roadmap for annual emergency response exercises, including simulated disaster and earthquake drills involving the AWSS and the PWSS.  | President, San Francisco<br>Public Utilities Commission<br>[September 15, 2019] |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F1  | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  | R1<br>[for F1-F6] | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.            | President, San Francisco<br>Fire Commission<br>[September 15, 2019]             |  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F1  | Fires resulting from an earthquake represent a significant risk of widespread damage and potential loss of life in San Francisco.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  | R2<br>[for F1-F6  | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.               |   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  |     | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  | R1<br>[for F1-F6  | By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.            |   |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F2  | The municipal water supply system (MWSS) is highly vulnerable to damage from a major earthquake and is not a reliable source for water supply for firefighting after a major earthquake.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  | R2<br>[for F1-F6  | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.               |   |  |

| Act Now Before It Is                                       | F3 | Approximately 30 cisterns have recently been   | President, San Francisco                    |   |             | R1          | By no later than December 31, 2020, the  | President, San Francisco                |   |
|--|----|--|---|---|-------------|-------------|--|---|---|
| Too Late:  |    | added with funds from ESER bonds, but  | Fire Commission                             |   |             |             | Mayor, the SFPUC, the SFFD, and the Office of  | Fire Commission                         |   |
| Aggressively Expand  |    | cisterns only have up to about an hour of water  | [September 15, 2019]                        |   |             |             | Resilience and Capital Planning should jointly   | [September 15, 2019]                    |   |
| and Enhance Our<br>High-Pressure                           |    | supply and thus do not provide sufficient water for fighting fires following a major earthquake. |   |   |             | l           | present to the Board of Supervisors a detailed<br>plan to ensure the City is well prepared to fight      |   |   |
| Emergency  |    | To righting the stollowing a major earthquake.   |   |   |             |             | fires in all parts of San Francisco in the event of  |   |   |
| Firefighting Water   |    |  |   |   |             |             | a 1906-magnitude (7.8) earthquake.   |   |   |
| System   |    |  |   |   |             |             |  |   |   |
| [July 17, 2019]  |    |  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F3 | Approximately 30 cisterns have recently been   | President, San Francisco                    |   | -           | R2          | The plan discussed in Recommendation R1  | President, San Francisco                |   |
| Too Late:  |    | added with funds from ESER bonds, but  | Fire Commission                             |   |             | [for F1-F6] | should include a detailed proposal, including  | Fire Commission                         |   |
| Aggressively Expand<br>and Enhance Our                     |    | cisterns only have up to about an hour of water supply and thus do not provide sufficient water  | [September 15, 2019]                        |   |             |             | financing sources, for the installation within 15 years of a high-pressure, multi-sourced,               | [September 15, 2019]                    |   |
| High-Pressure  |    | for fighting fires following a major earthquake.   |   |   |             |             | seismically safe emergency water system for  |   |   |
| Emergency  |    |  |   |   |             |             | those parts of the City that don't currently have  |   |   |
| Firefighting Water   |    |  |   |   |             |             | one, i.e., by no later than June 30, 2034.   |   |   |
| System   |    |  |   |   |             |             |  |   |   |
| [July 17, 2019]  |    |  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F4 | The City's high-pressure emergency water   | President, San Francisco                    |   |             |             | By no later than December 31, 2020, the  | President, San Francisco                |   |
| Too Late:<br>Aggressively Expand                           |    | supply system, known as the Auxiliary Water<br>Supply System (AWSS), does not cover large        | Fire Commission                             |   |             | [for F1-F6] | Mayor, the SFPUC, the SFFD, and the Office of<br>Resilience and Capital Planning should jointly          | Fire Commission<br>[September 15, 2019] |   |
| and Enhance Our  |    | parts of Supervisorial Districts 1, 4, 7 and 11,   | [September 15, 2019]                        |   |             |             | present to the Board of Supervisors a detailed   | [September 15, 2019]                    |   |
| High-Pressure  |    | roughly one-third of the City's developed area.  |   |   | · ·         |             | plan to ensure the City is well prepared to fight  |   | :   |
| Emergency  |    | As a result, these districts are not adequately  |   |   |             |             | fires in all parts of San Francisco in the event of  |   |   |
| Firefighting Water   |    | protected from fires after a major earthquake.   |   |   | ·           |             | a 1906-magnitude (7.8) earthquake.   |   |   |
| System   |    |  |   |   |             |             |  |   |   |
| [July 17, 2019]  |    |  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F4 | The City's high-pressure emergency water   | President, San Francisco                    |   |             | R2          | The plan discussed in Recommendation R1  | President, San Francisco                |   |
| Too Late:<br>Aggressively Expand                           |    | supply system, known as the Auxiliary Water<br>Supply System (AWSS), does not cover large        | Fire Commission<br>[September 15, 2019]     |   |             | [for F1-F6] | should include a detailed proposal, including financing sources, for the installation within 15          | Fire Commission                         |   |
| and Enhance Our  |    | parts of Supervisorial Districts 1, 4, 7 and 11,   | [September 13, 2015]                        |   |             |             | years of a high-pressure, multi-sourced,   | [September 15, 2015]                    |   |
| High-Pressure  |    | roughly one-third of the City's developed area.  |   |   |             |             | seismically safe emergency water system for  |   |   |
| Emergency  |    | As a result, these districts are not adequately  |   |   |             |             | those parts of the City that don't currently have  |   |   |
| Firefighting Water   |    | protected from fires after a major earthquake.   |   |   |             |             | one, i.e., by no later than June 30, 2034.   |   |   |
| System<br>[July 17, 2019]                                  |    |  |   |   |             |             |  |   |   |
|  |    |  |   |   |             |             |  |   |   |
| Act Now Before It is<br>Too Late:                          | F4 | The City's high-pressure emergency water<br>supply system, known as the Auxiliary Water          | President, San Francisco<br>Fire Commission |   | 1           | R5          | The SFFD should strategically locate the   | President, San Francisco                |   |
| Aggressively Expand  |    | Supply System (AWSS), does not cover large   | [September 15, 2019]                        |   |             | [for F4]    | majority of the PWSS hose tenders in areas that<br>at present only have low-pressure hydrants            | [September 15, 2019]                    |   |
| and Enhance Our  |    | parts of Supervisorial Districts 1, 4, 7 and 11,   | [September 15, 1615]                        |   |             |             | and/or cisterns.   | [Jeptember 25, 2025]                    |   |
| High-Pressure  |    | roughly one-third of the City's developed area.  |   | - |             |             |  |   |   |
| Emergency  |    | As a result, these districts are not adequately  |   |   |             |             |  |   |   |
| Firefighting Water<br>System                               |    | protected from fires after a major earthquake.   |   |   |             |             |  |   | et in the Section   |
| [July 17, 2019]  |    | -  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F5 | A high-pressure, multi-sourced, seismically safe   | Drasidant San Francisco                     |   |             | R1          | By no later than December 31, 2020, the  | President, San Francisco                |   |
| Too Late:  | 13 | emergency firefighting water supply will be  | Fire Commission                             |   |             |             | Mayor, the SFPUC, the SFFD, and the Office of  | Fire Commission                         |   |
| Aggressively Expand  |    | costly but is essential to protect the City.   | [September 15, 2019]                        |   |             | 1           | Resilience and Capital Planning should jointly   | [September 15, 2019]                    |   |
| and Enhance Our  |    |  |   |   |             |             | present to the Board of Supervisors a detailed   |   |   |
| High-Pressure  |    |  |   |   |             |             | plan to ensure the City is well prepared to fight  |   |   |
| Emergency<br>Firefighting Water                            |    |  |   |   |             |             | fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.                   |   |   |
| System System  |    |  |   |   |             |             | a 1906-magnitude (7.6) earthquake.   |   |   |
| [July 17, 2019]  |    |  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F5 | A high-pressure, multi-sourced, seismically safe   | President, San Francisco                    |   | <u> </u>    | R2          | The plan discussed in Recommendation R1  | President, San Francisco                |   |
| Too Late:  |    | emergency firefighting water supply will be  | Fire Commission                             |   |             |             | should include a detailed proposal, including  | Fire Commission                         |   |
| Aggressively Expand  |    | costly but is essential to protect the City.   | [September 15, 2019]                        |   |             |             | financing sources, for the installation within 15  | [September 15, 2019]                    |   |
| and Enhance Our  |    |  |   |   |             | 1           | years of a high-pressure, multi-sourced,   |   |   |
| High-Pressure<br>Emergency                                 |    |  |   |   |             |             | seismically safe emergency water system for<br>those parts of the City that don't currently have         |   |   |
| Firefighting Water   |    |  |   |   |             |             | one, i.e., by no later than June 30, 2034.   |   |   |
| System   |    |  |   |   |             |             | ,,,  |   |   |
| [July 17, 2019]  |    |  |   |   |             |             |  |   |   |
| Act Now Before It Is                                       | F6 | Unless the City increases funding levels, it will  | President, San Francisco                    | 1 |             | R1          | By no later than December 31, 2020, the  | President, San Francisco                | 10 44 5 44 44   |
| Too Late:  |    | be several decades (i.e., after the USGS predicts  |   |   |             | [for F1-F6] | Mayor, the SFPUC, the SFFD, and the Office of  | Fire Commission                         |   |
| Aggressively Expand  |    | one or more major earthquakes will occur)  | [September 15, 2019]                        |   |             |             | Resilience and Capital Planning should jointly   | [September 15, 2019]                    |   |
|  |    |  | 1   | 1 |             | 1           | present to the Board of Supervisors a detailed   | 1                                       | 1 A Company of the |
| and Enhance Our  |    | before the southern parts of the City have a   |   |   |             | l .         |  | .                                       |   |
| High-Pressure  |    | high-pressure, multi-sourced, seismically safe   |   |   | 43          |             | plan to ensure the City is well prepared to fight  |   |   |
|  |    |  |   |   |             |             |  |   |   |
| High-Pressure<br>Emergency<br>Firefighting Water<br>System |    | high-pressure, multi-sourced, seismically safe   |   |   | A Septiment |             | plan to ensure the City is well prepared to fight<br>fires in all parts of San Francisco in the event of |   |   |
| High-Pressure<br>Emergency<br>Firefighting Water           |    | high-pressure, multi-sourced, seismically safe   |   |   |             |             | plan to ensure the City is well prepared to fight<br>fires in all parts of San Francisco in the event of |   |   |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand | F6  | one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | President, San Francisco Fire Commission [September 15, 2019]  President, San Francisco Fire Commission [September 15, 2019] |  | R4                | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the | ř   |   |
|---|-----|---|--|--|-------------------|---|---|---|
| and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  |     | before the southern parts of the City have a<br>high-pressure, multi-sourced, seismically safe<br>emergency firefighting water supply.  |  |  |                   | SFFD, to replace and expand its currently inadequate inventory.   |   |   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]                            | F7  | The existing Portable Water Supply System (PWSS) inventory is inadequate. Investing in more PWSs hose tenders would provide a relatively quick, cost-effective interim means to improve protection of the southern and western parts of the City until a high-pressure, multi-sourced, seismically safe emergency water supply can be developed in those areas. | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  |                   | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019] |   |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F8  | Redundancy is an important feature of an<br>emergency firefighting water system.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  |                   | The SFPUC, the SFFD and the SF Department of the Environment should study adding saltwater pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.  | Fire Commission<br>[September 15, 2019]                             | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |
| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F9  | Current plans to extend protections to the western part of the City do not include any high pressure water sources north of Golden Gate Park.   | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  | R6<br>[for F8-F9] | The SFPUC, the SFFD and the SF Department of the Environment should study adding saltwater pump stations to improve the redundancy of water sources, especially on the west side. Findings and recommendations from this study should be presented to the Board of Supervisors by no later than June 30, 2021.  | Fire Commission<br>[September 15, 2019]                             |   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]                            | F10 | The "reliability scores" being used by the SFPUC<br>impart an overly optimistic impression of the<br>protection provided.   | Fire Commission<br>[September 15, 2019]  |  |                   |   |   |   |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]                            | F11 | The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.  | President, San Francisco<br>Fire Commission<br>[September 15, 2019]  |  |                   |   |   |   |
| Act Now Before it Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]                            |     |   |  |  | R9<br>[for F12]   | By no later than December 31, 2020 the SFPUC, with the advice and subject to the approval of the SFFD, should (a) implement "best practices for the maintenance of AWSS assets, and (b) redefine which AWSS valves in the system are "critical," and, therefore, require more attention and priority in the SFPUC's maintenance plans.  | Fire Commission   |   |

| Act Now Before It Is |     |               |                | R10       | By no later than June 30, 2020, the 2015 MOU | President, San Francisco |                   |  |
|----------------------|-----|---------------|----------------|-----------|--|--------------------------|-------------------|--|
| Too Late:            |     |               | to the African | [for F13] | between the SFPUC and the SFFD should be     | Fire Commission          | 100               |  |
| Aggressively Expand  |     |               |                | 1         | amended to include a detailed roadmap for    | [September 15, 2019]     | 140 1 100 201     |  |
| and Enhance Our      |     |               |                |           | annual emergency response exercises,         |                          |                   |  |
| High-Pressure        |     | 8 G. A. S. S. |                |           | including simulated disaster and earthquake  |                          | Elizabeth Charles |  |
| Emergency            | · · |               |                |           | drills involving the AWSS and the PWSS.      |                          |                   |  |
| Firefighting Water   |     |               |                | ł         |  |                          |                   |  |
| System               |     | \$78          |                | 1         |  |                          |                   |  |
| [July 17, 2019]      |     |               |                |           |  |                          |                   |  |

| Report Title [Publication Date] Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System | F# F4 F4 | Finding (text may be duplicated due to spanning and multiple respondent effects)  The Citry's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the Citry's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  The Citry's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the Citry's developed area. As a result, these districts are not adequately protected from fires after a major earthquake. | Respondent Assigned by CGJ [Response Due Date] Board of Supervisors [October 15, 2019]  Board of Supervisors [October 15, 2019] | Finding Response<br>(Agree/Disagree) | Finding Response Text | R2<br>[for F1-F6] | Recommendation (text may be duplicated due to spanning and multiple respondent effects) By no later than December 31, 2020, the Mayor, the SFPUC, the SFFDC, and the Office of Resilience and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034. | Respondent Assigned by CGJ [Response Due Date] Board of Supervisors [October 15, 2019]  Board of Supervisors [October 15, 2019] | Recommendation<br>Response<br>(Implementation) | Recommendation Response Text |
|---|----------|--|---|--------------------------------------|-----------------------|-------------------|--|---|--|------------------------------|
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F4       | The City's high-pressure emergency water supply system, known as the Auxiliary Water Supply System (AWSS), does not cover large parts of Supervisorial Districts 1, 4, 7 and 11, roughly one-third of the City's developed area. As a result, these districts are not adequately protected from fires after a major earthquake.  | Board of Supervisors<br>[October 15, 2019]  |                                      |                       | [for F1-F6]       | The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than   | Board of Supervisors<br>[October 15, 2019]  |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F5       | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | Board of Supervisors<br>[October 15, 2019]  |                                      |                       | [for F1-F6]       | December 31, 2020. By no later than December 31, 2020, the Mayor, the SFPUC, the SFFD, and the Office of Resillence and Capital Planning should jointly present to the Board of Supervisors a detailed plan to ensure the City is well prepared to fight fires in all parts of San Francisco in the event of a 1906-magnitude (7.8) earthquake.  | Board of Supervisors<br>[October 15, 2019]  |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F5       | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | Board of Supervisors<br>[October 15, 2019]  |                                      |                       |                   | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.  | Board of Supervisors<br>[October 15, 2019]  |  |                              |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F5       | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  | Board of Supervisors<br>[October 15, 2019]  |                                      |                       |                   | The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analys should complete its report by no later than December 31, 2020.   | Board of Supervisors<br>[October 15, 2019]  |  |                              |

| Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System | F5<br>F6 | A high-pressure, multi-sourced, seismically safe emergency firefighting water supply will be costly but is essential to protect the City.  Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply. | [October 15, 2019]                         | r | R1 [for F1-F6]             | the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  By no later than December 31, 2020, the   | Board of Supervisors [October 15, 2019]  Board of Supervisors [October 15, 2019] |     |  |
|---|----------|---|--|---|----------------------------|---|--|-----|--|
| [July 17, 2019] Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System [July 17, 2019]  | F6       | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sources, esismically safe emergency firefighting water supply.  | Board of Supervisors<br>[October 15, 2019] |   |                            | The plan discussed in Recommendation R1 should include a detailed proposal, including financing sources, for the installation within 15 years of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, i.e., by no later than June 30, 2034.   | Board of Supervisors<br>[October 15, 2019]                                       |     |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6       | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | Board of Supervisors<br>[October 15, 2019] |   | R3<br>[for F1-F6]          | The Board of Supervisors should direct the Budget and Legislative Analyst to study through an equity lens and issue a report to the Board regarding (a) which areas of the City do not have sufficient water supplies for the anticipated demand for water to fight fires following a major earthquake similar in magnitude to the 1906 earthquake, and (b) options to address the issue in both the short term and the long term. The Board should issue its request by no later than December 31, 2019, and the Budget and Legislative Analyst should complete its report by no later than December 31, 2020. | Board of Supervisors<br>[October 15, 2019]                                       |     |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6       | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  |  |   | R4<br>[for F6-F7]          | As interim measure, by no later than June 30, 2021, the City should purchase the 20 new PWSS hose tenders being requested by the SFFD, to replace and expand its currently inadequate inventory.  | Board of Supervisors<br>[October 15, 2019]                                       |     |  |
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F6       | Unless the City increases funding levels, it will be several decades (i.e., after the USGS predicts one or more major earthquakes will occur) before the southern parts of the City have a high-pressure, multi-sourced, seismically safe emergency firefighting water supply.  | Board of Supervisors<br>[October 15, 2019] |   | R8<br>[for F5, F6,<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced, seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.  | [October 15, 2019]   |     |  |
| Act Now Before it is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019]  | F11      | The City does not have a timeline to fund and complete development of a high-pressure, multi-sourced, seismically safe emergency water supply for all parts of the City, including poor neighborhoods that historically have not been as well protected as the downtown business district and many richer neighborhoods.  | Board of Supervisors<br>[October 15, 2019] |   | R8<br>[for F5, F6,<br>F11] | By no later than June 30, 2022, the Mayor and the Board of Supervisors should analyze whether to propose a separate bond for the development of a high-pressure, multi-sourced seismically safe emergency water system for those parts of the City that don't currently have one, with a target date of completing construction by no later than June 30, 2034.   | [October 15, 2019]   | : 1 |  |

| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |  |  | RG<br>[for F8- | The SFPUC, the SFFD and the SF Department or<br>9) the Environment should study adding salt-<br>water pump stations to improve the<br>redundancy of water sources, especially on the<br>west side. Findings and recommendations<br>from this study should be presented to the<br>Board of Supervisors by no later than June 30,<br>2021. | [October 15, 2019] |  |
|--|--|--|----------------|--|--------------------|--|
| Act Now Before It Is<br>Too Late:<br>Aggressively Expand<br>and Enhance Our<br>High-Pressure<br>Emergency<br>Firefighting Water<br>System<br>[July 17, 2019] |  |  | R7<br>(for F1  | The SFPUC should (a) continue its efforts to old complete a more detailed analysis of emergency firefighting water needs (including above-the-median needs) by neighborhood, and not just by FRA, and (b) present a completed analysis to the Board of Supervisoriby no later than June 30, 2021.  |                    |  |



July 15, 2019

Angela Calvillo Clerk of the San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Ms. Calvillo,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Eate: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Budget and Legislative Analyst San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Sir or Madam,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Sandra Lee Fewer Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Fewer,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Catherine Stefani Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Stefani,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Aaron Peskin Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Peskin,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Gordon Mar Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Mar,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Vallie Brown
Supervisor
San Francisco Board of Supervisors
City Hall, Room 244
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Dear Supervisor Brown,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Matt Haney Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Haney,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Norman Yee President San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear President Yee,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Rafael Mandelman Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Mandelman,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Hillary Ronen
Supervisor
San Francisco Board of Supervisors
City Hall, Room 244
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Dear Supervisor Ronen,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Shamann Walton
Supervisor
San Francisco Board of Supervisors
City Hall, Room 244
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Dear Supervisor Walton,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Ahsha Safai Supervisor San Francisco Board of Supervisors City Hall, Room 244 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Supervisor Safai,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than October 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Naomi M. Kelly City Administrator Office of the City Administrator City Hall, Room 362 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Ms. Kelly,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Brian Strong Chief Resilience Officer Office of the City Administrator City Hall, Room 362 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Mr. Strong,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Debbie Raphael Director San Francisco Department of the Environment 1455 Market Street, Suite 1200 San Francisco, CA 94103

Dear Ms. Raphael,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Jeanine Nicholson Fire Chief San Francisco Fire Department 698 Second Street San Francisco, CA 94107

Dear Chief Nicholson,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Stephen Nakajo President San Francisco Fire Commission 1765 Sutter Street San Francisco, CA 94115

Dear President Nakajo,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

The Honorable London Breed Mayor of San Francisco City Hall, Room 200 1 Dr. Carlton B. Goodlett Place San Francisco, CA 94102

Dear Mayor Breed,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Harlan L. Kelly, Jr. General Manager San Francisco Public Utilities Commission 525 Golden Gate Avenue, 13th Floor San Francisco, CA 94102

Dear General Manager Kelly,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,



July 15, 2019

Ann Moller Caen President San Francisco Public Utilities Commission 525 Golden Gate Avenue, 13th Floor San Francisco, CA 94102

Dear President Caen,

The 2018-2019 Civil Grand Jury will release a report entitled, "Act Now Before It Is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System" to the public on Wednesday, July 17, 2019. Enclosed is an advanced copy. By order of the Presiding Judge of the Superior Court, Hon. Garrett L. Wong, this report is to be kept confidential until the date of release.

California Penal Code §933(c) requires a response to be submitted to the Presiding Judge no later than September 15, 2019.

California Penal Code §933.05 states that as to each finding, the response must indicate one of the following:

- 1. The respondent agrees with the finding; or
- 2. The respondent disagrees with the finding, wholly or partially, with an explanation.

As to each recommendation, the response must indicate one of the following:

- 1. The recommendation has been implemented, with a summary of the implementation;
- 2. The recommendation has not yet been, but will be implemented in the future, with a timeframe for implementation;
- 3. The recommendation requires further analysis, with an explanation, scope, and parameters of that analysis, and a timeframe for discussion not more than six months from the publication of the grand jury report; or
- 4. The recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

Please e-mail your response to Presiding Judge Wong at <u>CGrandJury@sftc.org</u> or mail to 400 McAllister Street, Room 008, San Francisco, CA 94102-4512.

Respectfully,

#### TO THE BOARD OF SUPERVISORS FROM JAMES DALESSANDRO -September 19, 2019: File # #190786

AUTHOR OF "1906" and FILM MAKER OF "THE DAMNEDEST, FINEST RUINS"

DEAR SUPERVISORS: At five o'clock on the afternoon of April 19, 1906 - 36 hours after the catastrophic San Andreas fault rupture - 5 ships of the U.S. Navy's Pacific Squadron arrived at the Golden Gate to face a mountain of flames 1,500 feet high.

Utilizing their ships' massive steam pumps and an unlimited supply of saltwater, they stopped the fire along the entire Embarcadero – crucial to our rebuilding. They stopped the flames from leaping Van Ness Avenue, sparing the scant housing stock of Pacific Heights, the Fillmore, Sunset and Richmond Districts. They evacuated 100,000 desperate people on the waterfront. Over 38 hours, they pumped several hundred MILLION gallons of saltwater to check the fire's spread and save untold numbers of lives.

On October 17, 1989, following the Loma Prieta Earthquake, another naval vessel – our Fireboat Phoenix - pumped salt water onto the Marina fire for 14 hours, delivering 5 ½ MILLION gallons of salt water. It almost certainly prevented a repeat of 1906. Think of that for a moment, please - 5 ½ MILLION GALLONS OF SALT WATER to stop a single fire of only ¼ of a city block. If they had not stopped it there – where and how would they have stopped it?

So where are we today?

Despite 10's of millions of dollars from bond issues, provided overwhelmingly by San Francisco voters over the previous decades, 15 neighborhoods – 400,000 citizens – have no auxiliary, high-pressure water system to save homes, business, or lives. Why? Because the Public Utility Commission, which now controls the Auxiliary Water Supply System, has proposed one preposterous alternative after another to avoid expanding the AWSS. To further exacerbate our jeopardy, they have failed to maintain the EXISTING AWSS to where one seriously doubts its ability to function in an emergency.

Instead of expanding the AWSS, the PUC first proposed to buy 15 miles of cumbersome 12-inch hose. That was to be rolled out by the 24 on duty firefighters in the Sunset and Richmond Districts BEFORE they started fighting fires or rescuing citizens. Supervisor Peskin and others stopped that absurdity.

So now the PUC – instead of expanding the High Pressure SALTWATER SYSTEM with 3 pumping stations along the Bay and Pacific Ocean – is proposing that we comingle the POTABLE DRINKING WATER of the Sunset Reservoir with the brackish, POLLUTED WATER OF LAKE MERCED. The minute the Lake Merced Water enters

the MUNICIPAL WATER SUPPLY SYSTEM at least 400,000 people will be candidates for a wide variety of water born diseases.

Perhaps members of the PUC could drink unfiltered Lake Merced water for a week or two and let us all know how they fare? Or tell us how they plan to defend the massive lawsuits by our neighbors in the South Bay – who own 2/3rds of Sunset Reservoir's drinking water.

As you sit here today, the massive diesel pumping stations that supply the EXISTING AWSS – one station at Fort Mason, the other directly beneath the office of the Fire Chief on Townsend Street – are without an attendant capable of activating the system to supply salt water to the downtown's EXISTING high pressure hydrants.

The other parts of the EXISTING system, the levers and gates inside Jones Street on Nob Hill, which control nearly 12 million gallons of water from the Twin Peaks and Ashbury Heights Tanks – has not had an attendant on site in more than 20 years.

The PUC allegedly has someone somewhere who will control those massive Jones Street gates and valves and high-pressure water flow by means of a laptop computer. It is unclear what he or she knows about fire fighting, or how he or she would receive information on where that water is needed. It is also unclear if that system can deliver water, since some firefighters have stated the lack of regular flushing and maintenance has left hydrants clogged with sediment.

And now, our Mayor, a former Fire Commissioner, has cut \$100,000 from the NERT budget – Neighborhood Emergency Response Team - curtailing the training of volunteers willing to risk their lives to rescue their neighbors.

I urge the Board of Supervisors to immediately appoint a Blue Ribbon Commission comprised of people who understand the science of fire suppression, and care about what happens to this city and its citizens. A Commission who will challenge the Public Utilities Commission and over ride the unconscionable support from some, but not all senior members of the Fire Department, past and present. The neglect and delays have pushed this city, its citizens and visitors to the brink of catastrophe.

The recent findings of the 2019 Civil Grand Jury, crying ACT NOW, come with an ominous footnote. Their findings echo those of the 2003 Civil Grand Jury. And of bond issues dating back to 1986 and 1908. The neglect of our current system by the PUC, and their preposterous ideas to further endanger us all, must be stopped.

It appears, dear Board, that the task is yours as the last vestige of hope and sanity.

James Dalessandro

**Print Form** 

# **Introduction Form**

By a Member of the Board of Supervisors or the Mayor

Time stamp or meeting date I hereby submit the following item for introduction (select only one): П 1. For reference to Committee. (An Ordinance, Resolution, Motion, or Charter Amendment) 2. Request for next printed agenda Without Reference to Committee.  $\boxtimes$ 3. Request for hearing on a subject matter at Committee. inquires" 4. Request for letter beginning "Supervisor 5. City Attorney request. 6. Call File No. from Committee. 7. Budget Analyst request (attach written motion). 8. Substitute Legislation File No. 9. Reactivate File No. 10. Question(s) submitted for Mayoral Appearance before the BOS on Please check the appropriate boxes. The proposed legislation should be forwarded to the following: **Small Business Commission** ☐ Ethics Commission ☐ Youth Commission ☐ Planning Commission ☐ Building Inspection Commission Note: For the Imperative Agenda (a resolution not on the printed agenda), use a Imperative Form. Sponsor(s): Clerk of the Board Subject: Hearing - Civil Grand Jury Report - Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System The text is listed below or attached: Hearing on the recently-published 2018-2019 Civil Grand Jury Report, entitled "Act Now Before it is Too Late: Aggressively Expand and Enhance Our High-Pressure Emergency Firefighting Water System." Signature of Sponsoring Supervisor:

For Clerk's Use Only:

190785