Assessment of Fire Suppression Options for Westside

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Partnership

- Since 2010 - SFPUC, SFFD, and Public Works have been implementing projects to improve the AWSS.
- SFFD is the end user: System improvements and expansion must meet SFFD quality standards.
- SFPUC employs the City’s experts in the design, construction, operation & maintenance of water systems.
- SF Public Works provides project management expertise and guidance.
- Hydraulic Modeling utilized to guide decision making.
Work in Progress

- Connecting the 70 million gallon South Basin of the University Mound Reservoir to AWSS;
- 16 pipeline and tunnel projects;
- Continued motorizing of valves for remote control, and improvement of their electronic control system;
- Structural and seismic upgrades of Seawater pump station #2; and
- Design of pump station at Lake Merced.
March 2017 - Government and Audit Oversight Committee request:

1. Report analyzing options for Westside:
   a) AECOM Contracted to analyze 12 options:
      i. Expansion of AWSS – 7 options
      ii. Installation of a Potable AWSS – 5 options
   b) Collaborative review of report by SFPUC & SFFD
   c) Final recommendation by Chief and General Manager

2. Independent Review by 3rd party expert
   a) Professor Charles Scawthorn to perform review
Potable AWSS

- Designed to meet the robust performance standards required by SFFD to fight large fires.
- Utilizes the same earthquake resistant pipes, seismically-reliable valves, hydrants, and components utilized by the AWSS.
- In addition, system rated to meet drinking water standards:
  - During non-fires, minimal connections to low-pressure water system by seismically reliable valves.
  - If fire occurs, valves are closed and the pressure of the system is increased via redundant pumps.
- Main Ancillary Benefit: After firefighting following an earthquake, system is 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.
Criteria for Analysis

- Options 1-7: Expansion of AWSS
- Options 8-12: Potable AWSS

Criteria for Analysis:
- Modeled and analyzed for hydraulic performance fighting fires after a 7.8 earthquake.
- Reliability of water supplies
- Design of piping network
- Impacts to other areas served by AWSS
- Ancillary benefits
- Cost
Analysis of AWSS Options

• Modeling results show there is **not enough supply and pressure in the current AWSS** to effectively serve the Richmond District.

• Piping network can be configured to increase pressure in Richmond District, but it reduces pressures to below performance levels in other areas of City.

• There is **not enough pressure to reach the Sunset District**.

• Need to add supplies from Sunset Reservoir or Lake Merced.

• For about the same cost of an AWSS for Richmond District only, both the Richmond and Sunset districts can be served using a Potable AWSS network.
Sunset Reservoir is the supply for Potable AWSS:

- Connects to the seismically reinforced North Basin of Sunset Reservoir
- The North Basin contains 90 million gallons of water, and is isolated from the South Basin.
- The reservoir is constantly being replenished by the seismically strengthened Hetch Hetchy system, and will receive water within 24 hours of a big earthquake.
- To empty the reservoir, ALL of the fire department’s engines pumping at maximum capacity for 24 hours, with no refill from Hetchy System:
  - SFFD Confirmed they would never have all engines pumping from this reservoir.
  - Hetchy will refill it within 24 hours.
Potable AWSS Piping Analysis

• **Potable AWSS options 8-10:**
  • Lack redundancy in their pipe networks.

• **Potable AWSS options 11-12:**
  • Inherently greater reliability due to redundant looped pipe networks.
  • Meet the performance requirements of SFFD and SFPUC.
  • Do not negatively impact performance of existing AWSS.
  • Can be designed to assure post-earthquake reliability comparable to the existing AWSS reliability.
SFPUC & SFFD Recommendation

- SFPUC and SFFD Mgmt. recommend Option 12
- Perform detailed design and analysis to ensure performance requirements of SFFD are met.
- Design for agility and the flexibility to add new technologies and water sources to the system in the future.
- Design to allow the piping network to be extended in the future to serve additional areas.
Cost of Preferred Option

Total Estimated Cost: $109 Million

Available Funding from SFPUC Operating Budget: $40 million ($10 million/year for 4 years)

Total amount of Bond Funding Needed: $69 million

Use SFPUC funds to begin work ASAP.
Professor Scawthorn Findings

• Analyses are reasonable and a valuable source of information to select an option for further design and analysis.

• A fundamental shortfall of capacity exists in the current AWSS to serve the Richmond and Sunset districts.

• For about the same cost of AWSS for Richmond District only, both the Richmond and Sunset districts can be served using a Potable AWSS network.

• Due to its location, size and recent seismic reinforcement, Sunset Reservoir could be a reasonable source.

• A phased implementation program for option 12 is suggested resulting in an integrated, multi-sourced, redundant, highly reliable fire-suppression system for the Richmond and Sunset Districts.
Option 12 – Conceptual Future Integration

Phase 1

Phase 2

Phase 2
Next Steps

• February 7th – presentation at Government Audit and Oversight Committee.

• Work with CPC to analyze funding options for balance of project ($69 million).

• Determine priority equipment and their cost.

• Begin design work for Option 12, including thorough review of components (pumps, valves, etc.) by agencies.
Questions?