Assessment of Fire Suppression Options for Westside

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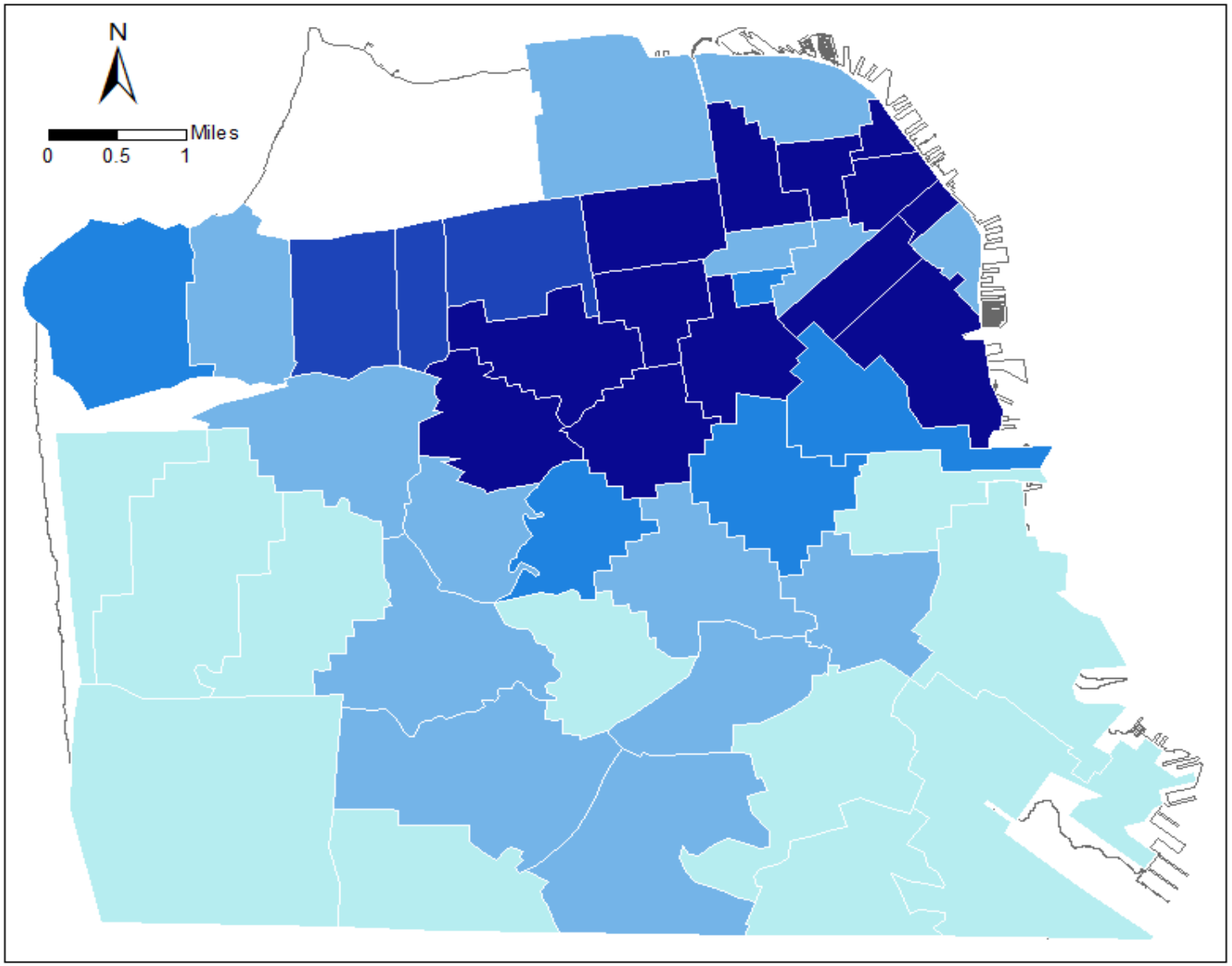
Partnership

- 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.

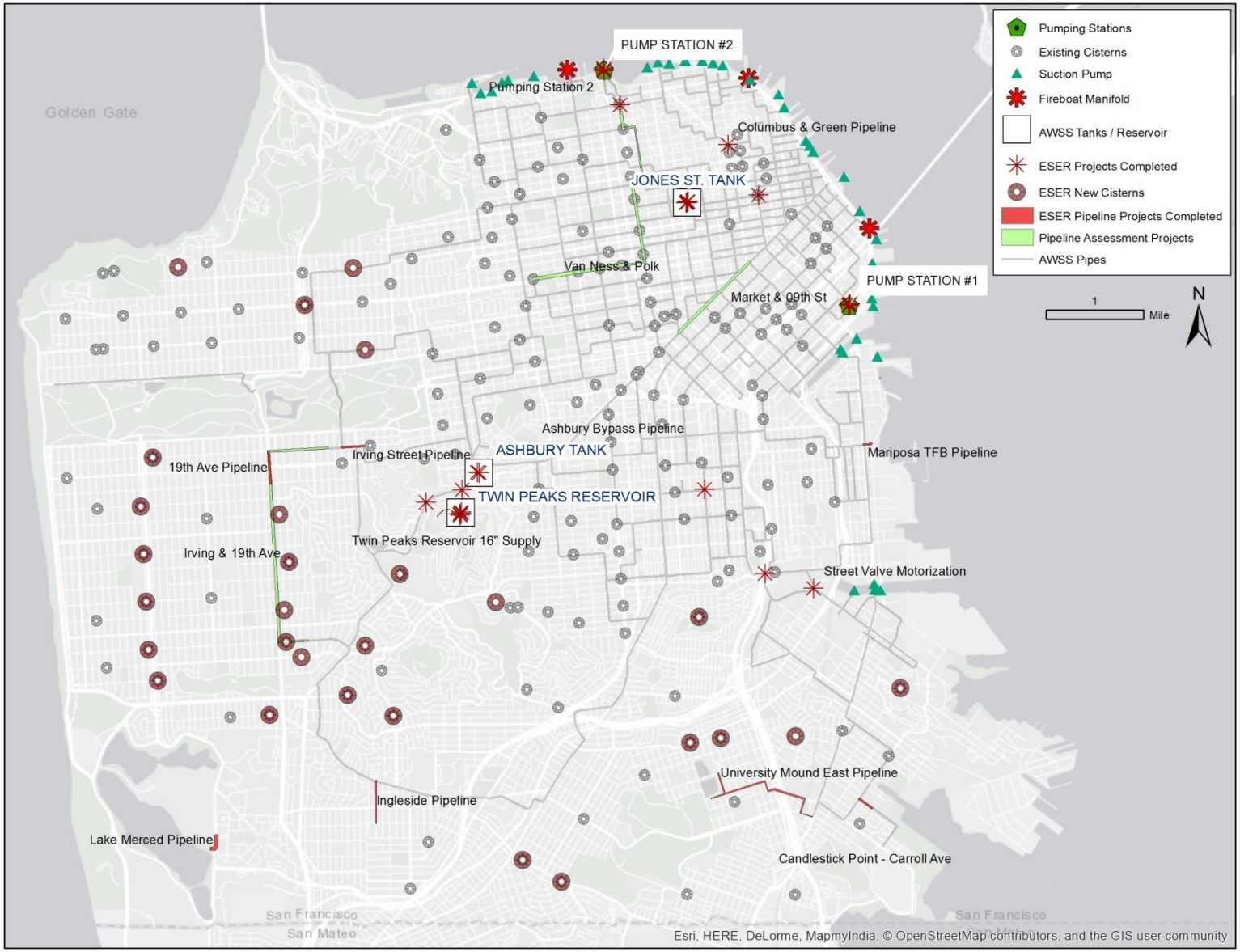
Reliability in 2010



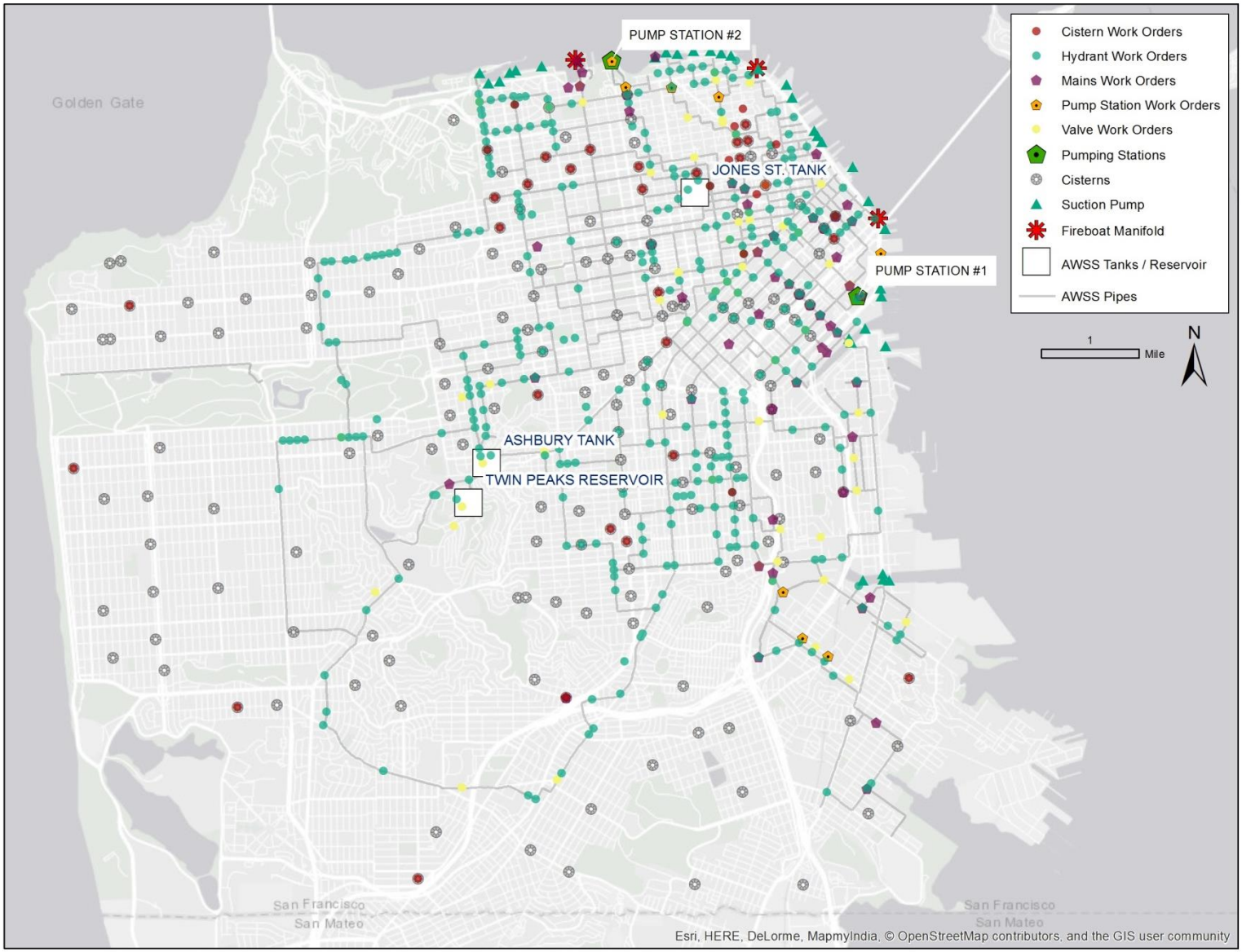
Legend

- High
- – 50%
- Low

Achievements – Capital Projects



Achievements – Maintenance



Work in Progress

- Connecting the 70 million gallon South Basin of the University Mound Reservoir to AWSS;
- 16 pipeline and tunnel projects – including Ocean Ave., Lake Merced, and Ingleside pipelines;
- 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.

Development Projects

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

- **Mission Rock**
- **Mission Bay**
- **Pier 70**
- **Potrero Powerplant**
- **Potrero HopeSF**
- **Sunnydale HopeSF**
- **Park Merced**
- **Candlestick**
- **Hunters Point/Shipyard**
- **Executive Park**
- **Visitation Valley**
- **India Basin**

GAO Committee Request

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 or better** 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.

Analysis of Supply of Potable AWSS

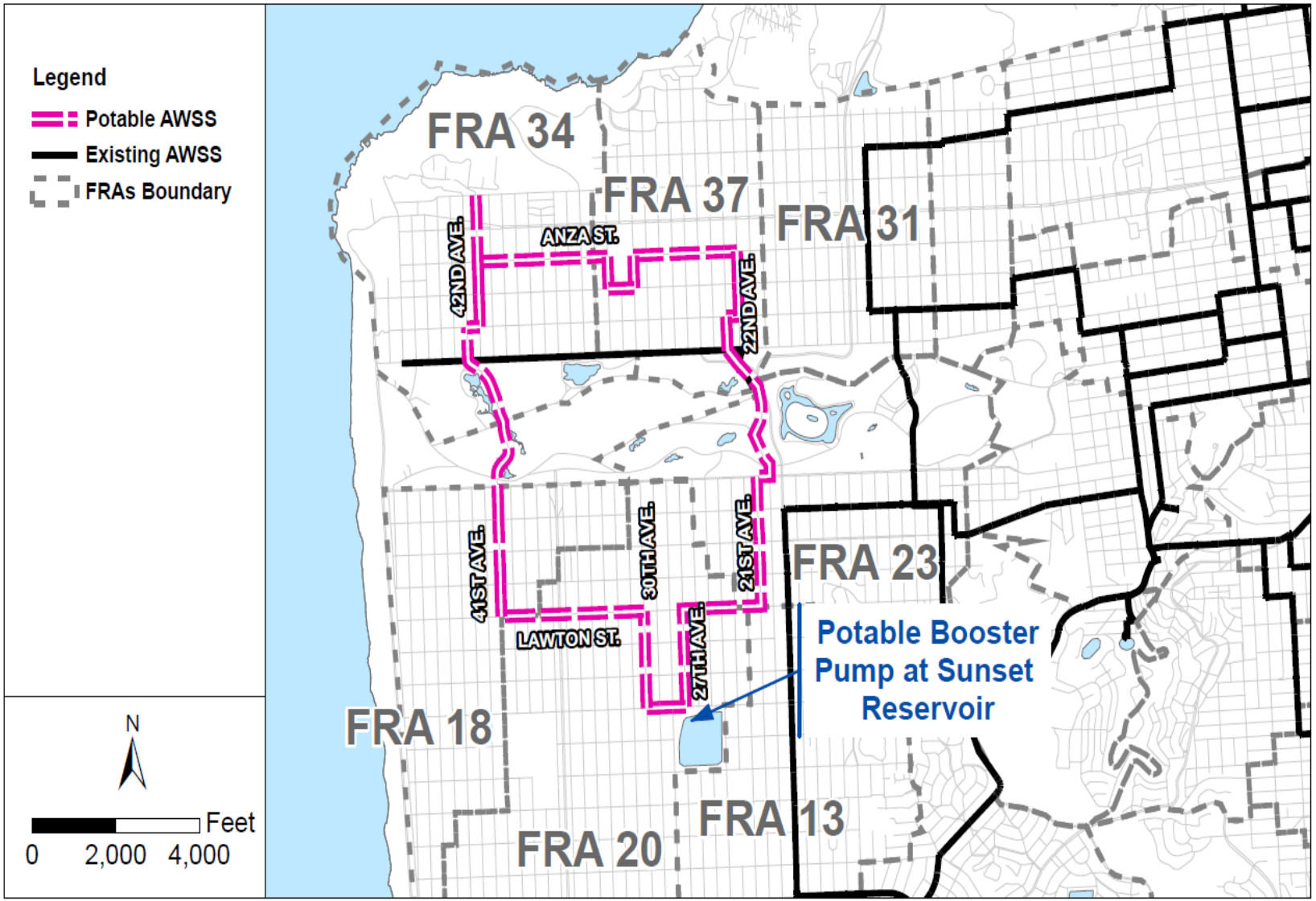
- Sunset Reservoir is the supply for Potable AWSS:
  - Connects to the seismically reinforced North Basin of Sunset Reservoir
  - The North Basin contains 90 million gallons of water, and is isolated from the South Basin.
  - The reservoir is constantly being replenished by the seismically strengthened 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

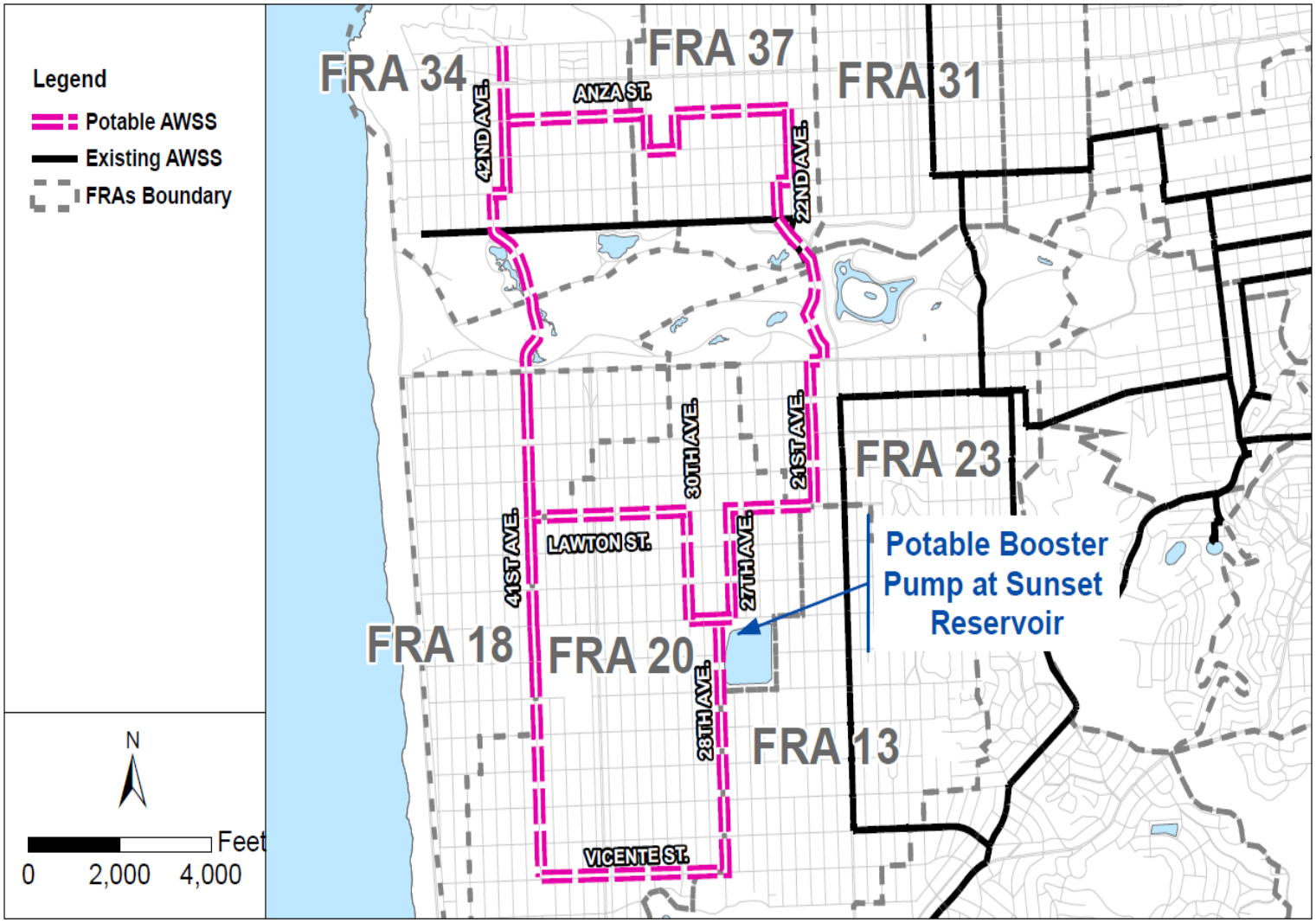
- **Potable AWSS options 8-10:**
  - Lack redundancy in their pipe networks.

- **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.

Option 11


Legend
Potable AWSS
Existing AWSS
FRAs Boundary
N
Feet
0
2,000
4,000
FRA 34
FRA 37
FRA 31
FRA 23
FRA 18
FRA 20
FRA 13
ANZA ST.
42ND AVE.
22ND AVE.
41ST AVE.
30TH AVE.
24ST AVE.
LAWTON ST.
27TH AVE.
Potable Booster Pump at Sunset Reservoir

Option 12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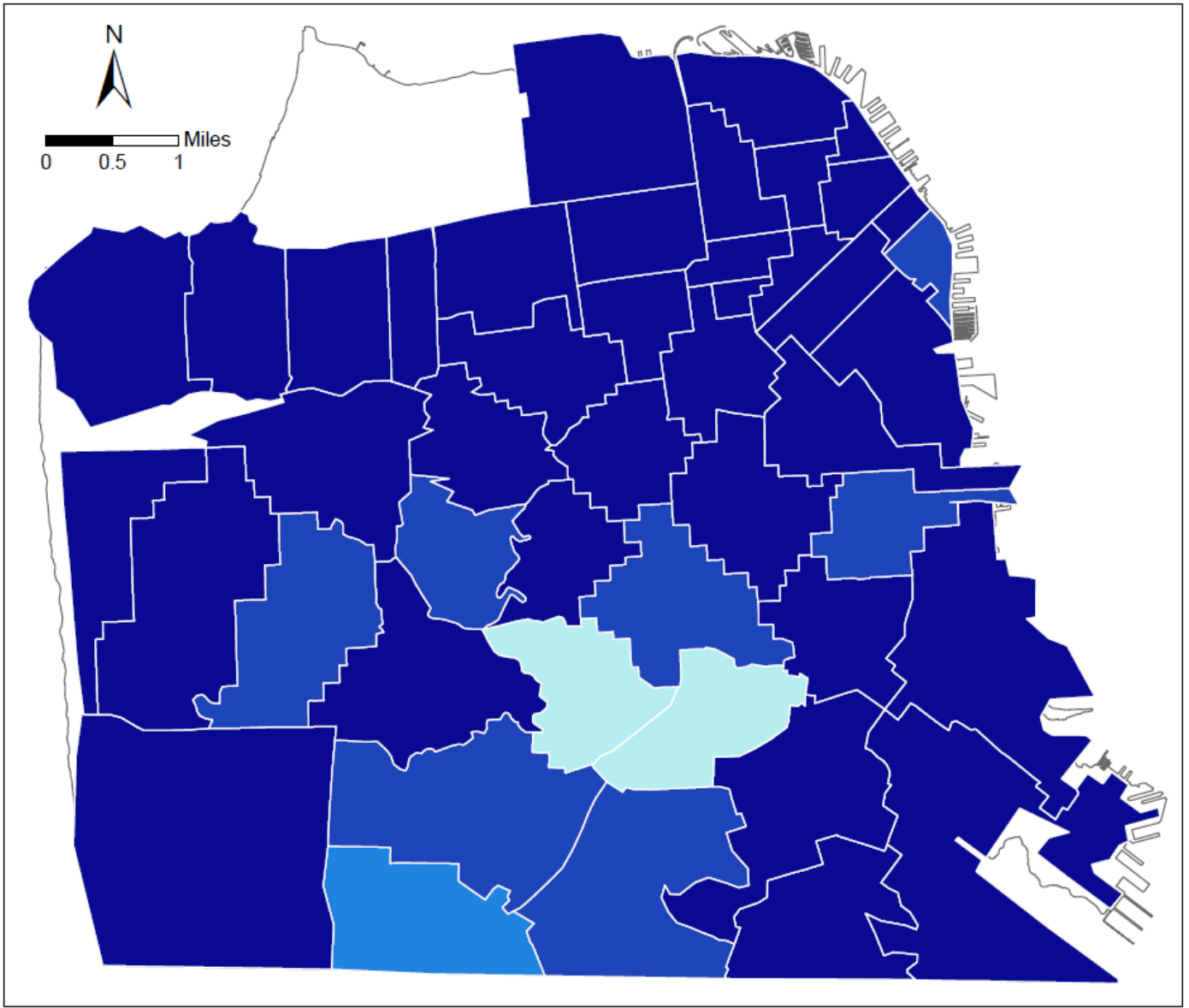
SFPUC & SFFD Recommendation

- SFPUC and SFFD Mgmt. recommend Option 12
- Perform rigorous reliability analyses and design 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.**

Reliability Scores – ESER Bond Projects & Option 12



Cost of Preferred Option

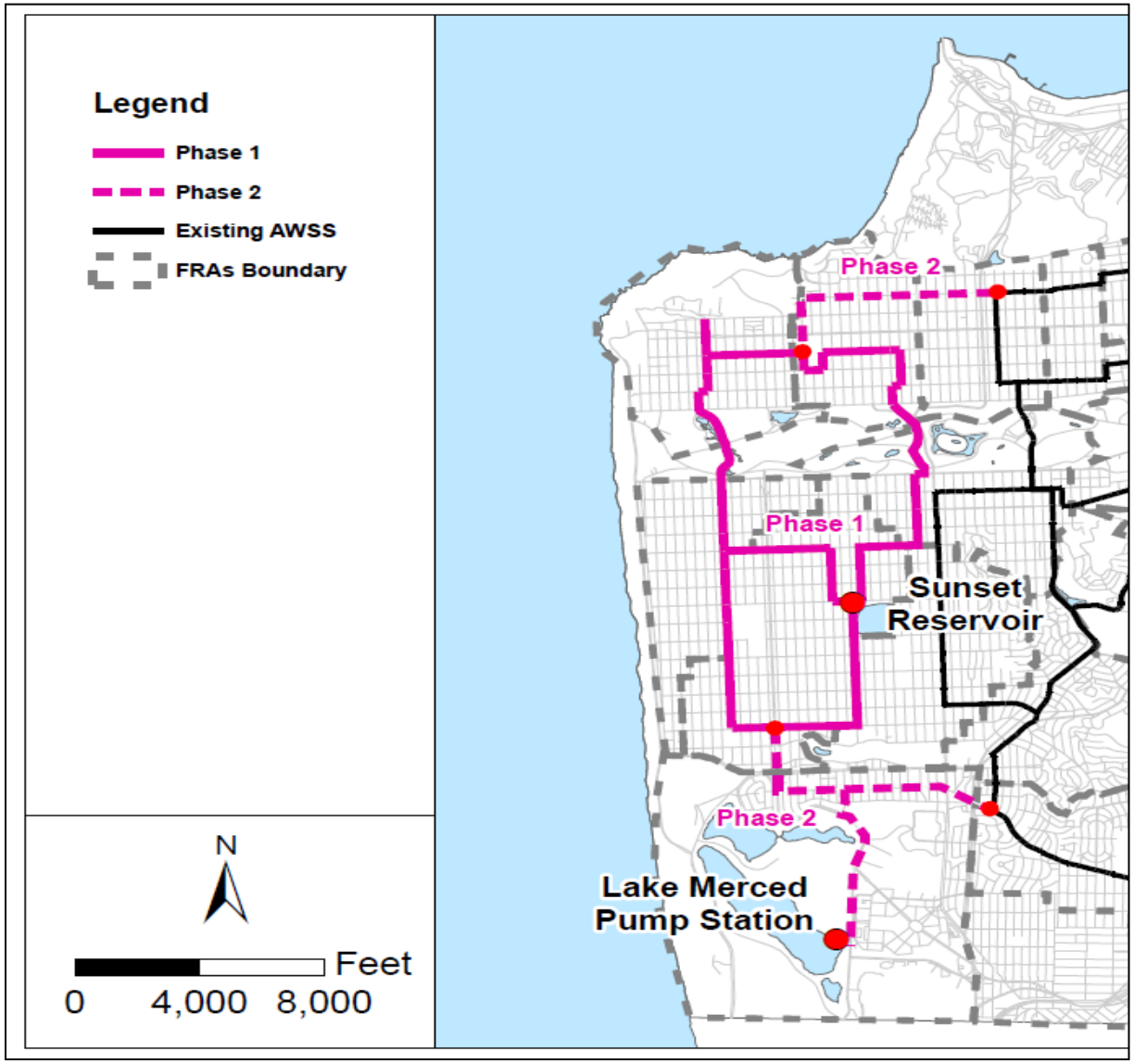
Total Estimated Cost:	$109 Million
Available Funding from SFPUC Capital Budget:	$40 million ($10 million/year for 4 years)
Estimated Total amount of Funding Needed:	$69 million

Use SFPUC funds to begin work ASAP.

Prof. Scawthorn Independent Review

- AWSS now and future needs to maintain high seismic reliability.
- Analyses are reasonable and a valuable source of information to select option(s). Continue with rigorous reliability analyses.
- Current AWSS shortfall to serve 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 is 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



Next Steps

- Complete rigorous reliability analyses with SFFD and SF Public Works.
- Looking at environmental review
- Begin design work for Option 12, including thorough review of components (pumps, valves, etc.) by agencies.
  - Analyzing Richmond District pipeline alignments (1 vs. 2 east-west pipelines) and exact locations of North-south runs.
  - Develop plan for culturally competent outreach to residents and businesses on pipeline
- Work with CPC, Mayor's Office, and Board to analyze funding options for funding shortfall.
- Complete report looking at an Ocean Beach saltwater supply to feed into system.

San Francisco Water Power Sewer

Questions?