Emergency Firefighting Water System
Capital Planning Committee

March 27, 2017

David Myerson, SFPUC
Bond Funding

- Earthquake Safety & Emergency Response (ESER) 2010 bond measure approval included $104.2 million for system
- ESER 2014 bond measure approval included $55 million for system
Technical Advisors

• ESER 2010
  • Thomas O’Rourke, Cornell University
  • Charles Scawthorn, U.C. Berkeley

• ESER 2010 Pipeline Assessment
  • Jack Baker, Stanford University
  • Michael O’Rourke, Rensselaer Polytechnic Institute
  • Thomas O’Rourke, Cornell University
  • Charles Scawthorn, U.C. Berkeley

• ESER 2014 and future bonds
  • Charles Scawthorn, U.C. Berkeley
Fire-Fighting Reliability – Before 2010

Citywide reliability 47%
27 FRAs below 50%

Legend
- High
- Medium
- Low

N
0 0.5 1 Miles
Project Status ESER 2010

Number of Projects

- 6: Design / bid
- 42: In construction or completed
Citywide reliability 67%
16 FRAs below 50%

Fire-Fighting Reliability – After ESER 2010

Legend
- High
- Medium
- Low
Project Status ESER 2014

Number of Projects

- 15 in construction or completed
- 8 Design / bid
Flexible Water Supply System (FWSS)

- Packaged pump units and hose units (12” diameter)
- Deployed after an earthquake where needed
- Challenges
  - Deployment And Response Time
  - Storage - No structures funded, limited space at McLaren
  - Maintenance
  - Hose testing and replacement
  - Effectiveness
- Implement New Projects:
  - AWSS pipeline – Victoria Street / Holloway Avenue
  - Potable co-benefits pipeline – Sunset & Richmond areas
## Comparison of Study Recommendations

<table>
<thead>
<tr>
<th></th>
<th>CS-199 AWSS</th>
<th>CS-199 AWSS Plus</th>
<th>2014 Spending Plan</th>
<th>Current Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Capital Cost (millions)</td>
<td>$321</td>
<td>$283</td>
<td>$147+</td>
<td>$234+</td>
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<tr>
<td>Citywide Reliability %</td>
<td>92</td>
<td>94</td>
<td>93</td>
<td>96</td>
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<tr>
<td>AWSS</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Potable Co-Benefits</td>
<td>✔</td>
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<tr>
<td>Potable Transmission Mains</td>
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<tr>
<td>Flexible Water Supply System</td>
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</table>
Potable Co-Benefits Pipeline

• Pressure in the seismically-resilient main pipeline and hydrants can be increased for improved fire suppression
• Automatically isolates the main pipeline from service connections after an earthquake
• Delivers potable water to residences and businesses daily
• Allows leveraging of resources from both bond funding and water rates
• Less underground space requirements than separate pipelines
Sunset/Richmond Potable Co-Benefits Pipeline
Potable Co-Benefits Pipeline

Normal Operation

Emergency Operation
Potable Co-Benefits Normal Operation

- Connected to service lines at 5 locations, each with seismic isolation valves
• Potable system connections closed
• Pump at reservoir activated
• High-pressure hydrants available for use
Motorized Valve – Existing AWSS
Seismic Switch – Existing AWSS
Valve Batteries – Existing AWSS
Citywide reliability 87%
5 FRAs below 50%

Legend
- High
- Medium
- Low

Fire-Fighting Reliability – after ESER 2014
## Future Projects ($ millions)

<table>
<thead>
<tr>
<th>Project</th>
<th>Project Cost</th>
<th>Water Rates</th>
<th>Developer</th>
<th>Future Bonds</th>
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<tbody>
<tr>
<td>AWSS High Pressure System</td>
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<tr>
<td>Existing pipeline improvements</td>
<td>TBD</td>
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<td>Pipeline – Diamond Street</td>
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<td>Pipeline – Holloway/Victoria Phase 2</td>
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<td>Pipeline – University Mound West</td>
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<td>Structural Improvements – Physical Plant</td>
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<td>Other Projects</td>
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<td>Land development projects</td>
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<td>Potable Co-Benefits Pipeline</td>
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<td>McLaren</td>
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<td>Richmond</td>
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<tr>
<td>Total</td>
<td>96 + TBD</td>
<td>49</td>
<td>TBD</td>
<td>47 + TBD</td>
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Fire-Fighting Reliability – Before 2010

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Fire-Fighting Reliability – After ESER 2010

Citywide reliability 67%
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Fire-Fighting Reliability – after ESER 2014

Citywide reliability 87%

5 FRAs below 50%

Legend
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- Low
Fire-Fighting Reliability – after Future Projects

Citywide reliability 96%
0 FRA below 50%

Legend
- High
- Medium
- Low
Discussion