Item No. 6d_supp
Meeting Date: December 10, 2019

Fire Pump Replacement

CIP C800794

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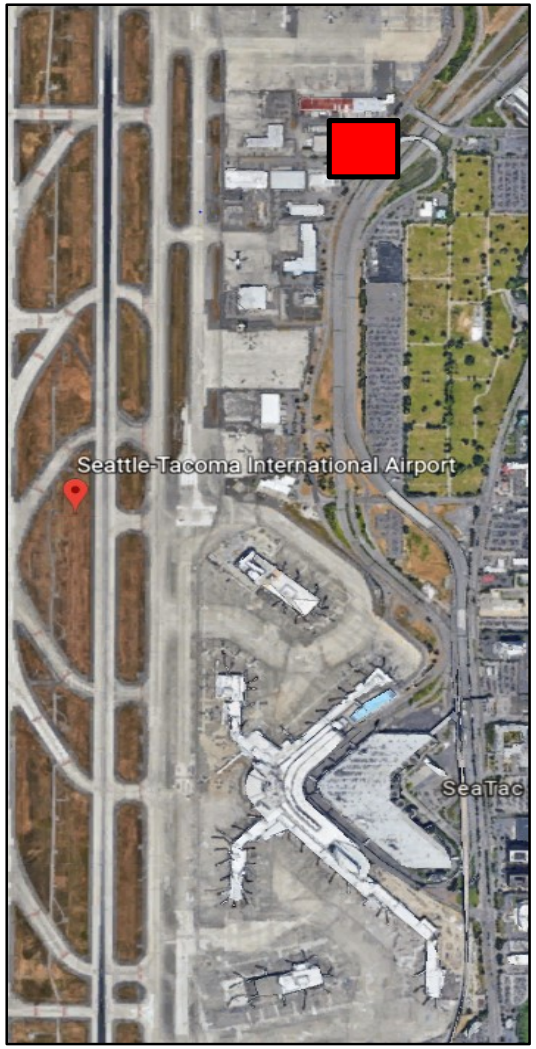
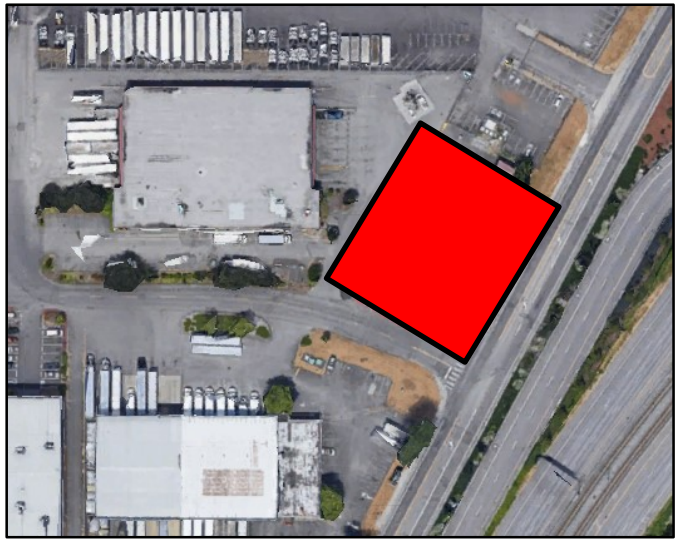
AV PMG - Infrastructure

Port of Seattle®

Project Scope and Location

- Replace four (4) emergency fire pumps
  - Originally installed in 1970's
- Install isolation valves
  - Single pump isolation for maintenance
- Install a flow meter system
  - Annual in-house certification





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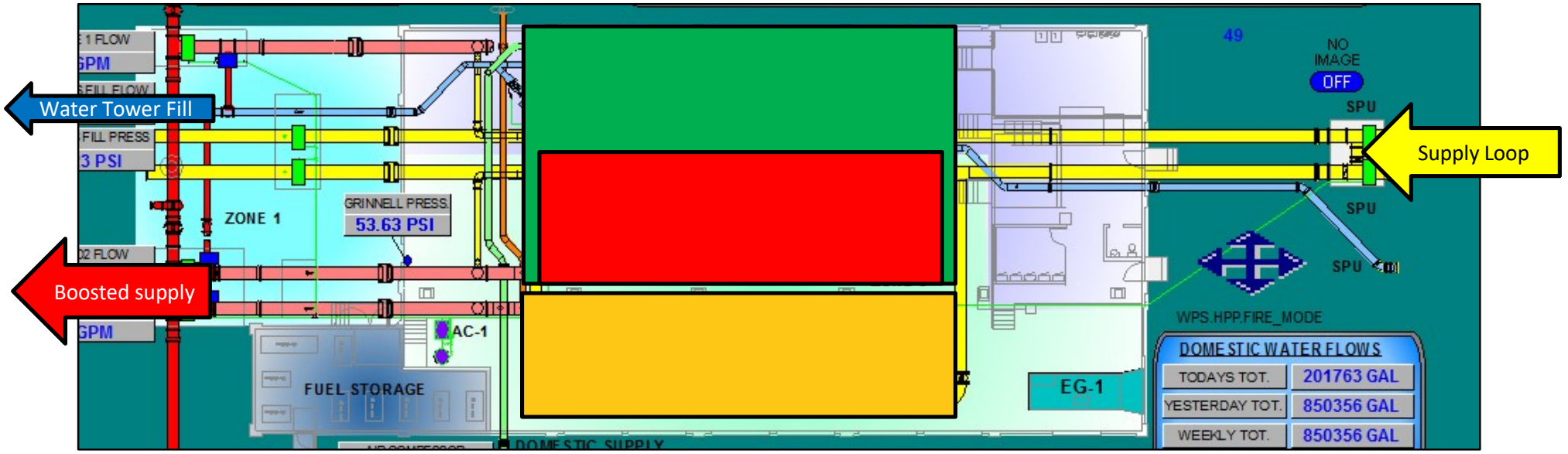


- Original Building – 1970s (Green)
- Building expansion and Pump Upgrade – 2000's (Yellow)
- Isolate and Replace
- High Flow needs
  - 19,000 GPM at 110 PSI (Hanger fire)
  - Minimum of 5 pumps needed to sustain the need

Fire Pump Replacement

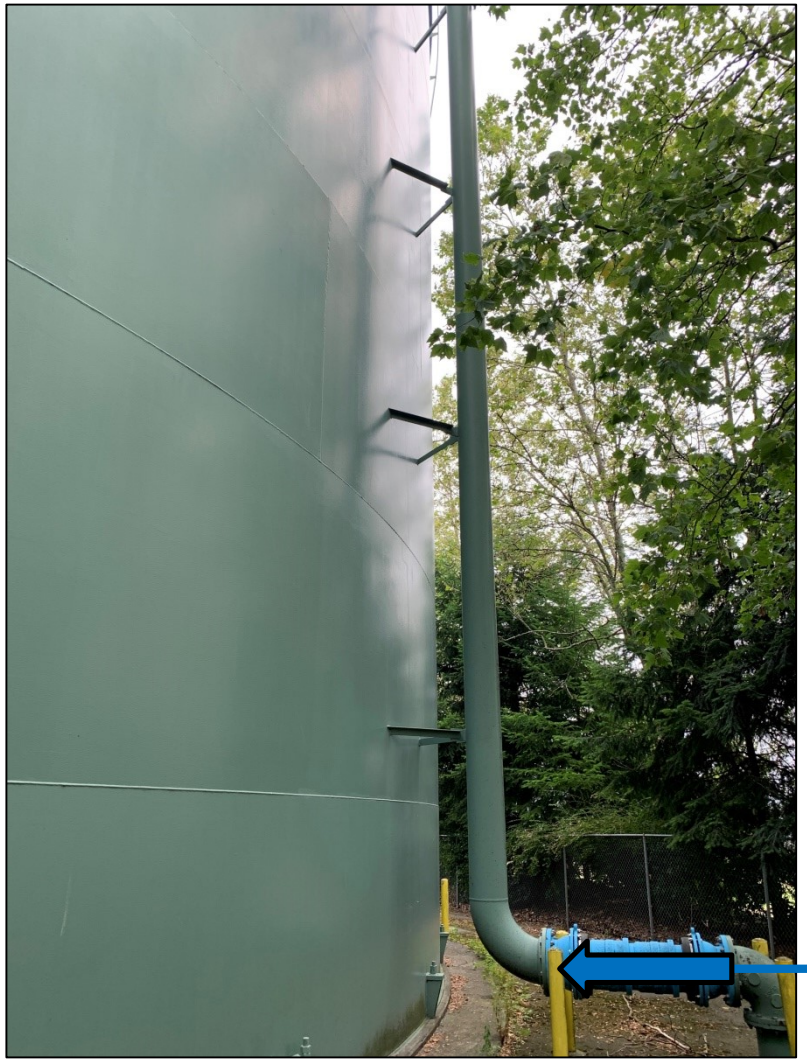
Equipment to be replaced:

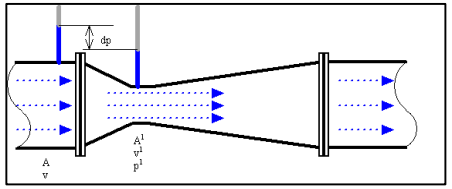
- Diesel engine
- Battery bank
- Pump head and shaft
- Controller panel
- Check valve
- Pressure relief valve

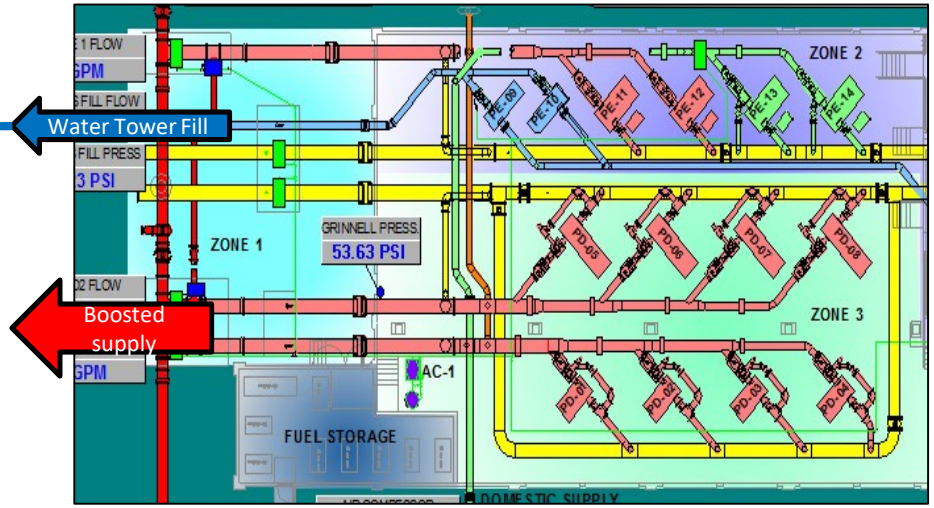
Install of new equipment:

- Isolation valve

Flow Measurement







- Annual Flow Certification
  - Bypass line
  - Linear requirements
  - Inline flow meter system (Direct pressure measurement)
  - Fill reservoir when testing

Schedule

- Commission for Design and Construction – 4 Quarter 2019 Alternate Procurement – Building Engineering Systems
- Advertise for Bid – 1st Quarter 2020
- Contract Award – 2nd Quarter 2020
- Design Complete – 4th Quarter 2020
- Construction Start – 4th Quarter 2021
- Substantial Completion – 3rd Quarter 2021

Project Risks

1. **Pump Failure** – This project will remove 4 pumps from the 10 existing used as fire protection. If one of the 6 remaining pumps has a significant failure event that takes it out of service the system will only have 5 pumps available.

   Mitigation – The system is periodically checked to ensure the pumps will operate as needed. Peak load will only require 5 pumps at a minimum to maintain coverage.

2. **Competitive market** – This project is small in comparison to other projects being advertised.

   Mitigation – Additional steps are being taken to advertise the solicitation to entice additional

Appendix

- Alternatives

Alternative 1

- Defer replacing the pumps until they are no longer operable.
- Cost Estimate: $75,000 would need to be expensed.

Pros

- This defers the expense to a later date.

Cons

- This alternative may result in additional costs if the pumps need to be replaced on an emergency need.
- This alternative removes the additional capacity if multiple pumps are out of service.
- This alternative does not address the need for an inline measurement for annual flow testing.
- This alternative does not resolve the isolation issue on the pumps if one in the bank of four needs service.
- This alternative will result in an increased maintenance cost to keep underperforming pumps in operation.

<u>This is not the recommended alternative.</u>

Alternative 2

- Replace 4 pumps only.
- Cost Estimate: $4,500,000

Pros

- The replacement pumps will have a new service life.
- Common equipment for all four pumps.
- Reduced maintenance costs.

Cons

- This alternative requires an outside contractor to certify the pumps annually.
- This does not allow for individual isolation of each pump.

<u>This is not the recommended alternative.</u>

Alternative 3 - Recomended

- Replace four fire pumps, install isolation valves, and install a flow metering system.
- Cost Estimate: $5,000,000

Pros

- This alternative provides the most reliable means to fight a fire.
- The alternative replaces four pumps, reducing costs as compared to performing two projects replacing two pumps.
- This allows for each pump to be isolated for maintenance.
- This will allow the boiler shop employees the ability to re-certify the pumps annually.

Cons

- This is the highest capital investment