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The Town of Groton, CT Looks to the Future:

Upgrades to the WPCF Effluent Pump Station and WPCF Resiliency

Presented by:

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Agenda

- Facility overview
- Original discharge to Fort Hill Brook & WQ Concerns
- Effluent Pump Station & Relocated NPDES Discharge
- Current EPS Upgrades
- WPCF Hardening & Resiliency Measures

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WPCF Pre-Upgrade

Post-Upgrade - 2010

Fort Hill Brook & Mumford Cove

- Original facility NPDES discharge to Fort Hill Brook
- Drains to Mumford Cove
- Water quality concerns with mixing and dilution in Mumford Cove
- 1985 CTDEP orders Town to relocate discharge to Thames River

Fort Hill Brook & Mumford Cove

Force Main & Gravity Sewer Installed 1986

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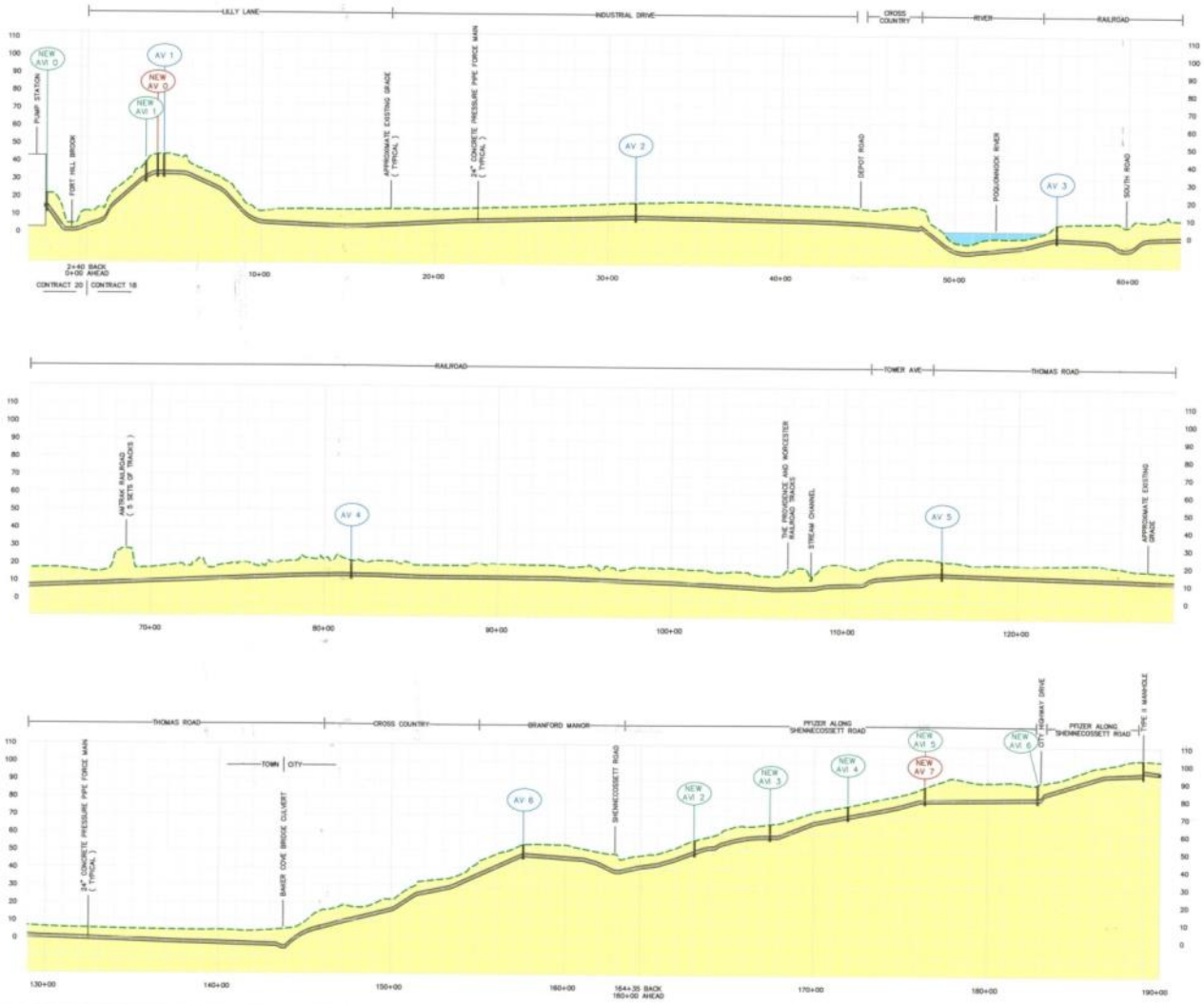
Effluent Force Main Profile



MAP REFERENCES:

1. "CONSTRUCTION CONTRACT 18, WATER POLLUTION CONTROL FACILITY, OUTFALL SEWER", BY HAYDEN/MEGMAN CONSULTING ENGINEERS, AUGUST 1986, "AS BUILT" RECORD SET DATED MAY 1988
2. PRICE BROTHERS LAYING SCHEDULE, PROJECT # 173.86M, 11-12-86 THROUGH 2-6-87
3. "FINAL REPORT FOR FUSS & O'NEILL, INC., TOWN OF GROTON, CT EFFLUENT FORCE MAIN", ADVANTICA TECHNOLOGIES, NOVEMBER 21, 2001
4. "FINAL REPORT FOR FUSS & O'NEILL, INC., TOWN OF GROTON, CT EFFLUENT FORCE MAIN", BY ADVANTICA TECHNOLOGIES, JANUARY 15, 2003

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Effluent Pump Station

- Constructed 1986
- 6 vertical turbine pumps
- Pumping Capacity

  8,400 gpm (12.2 MGD)
- Electrical feed from "A" Service only
- Controls using Local Bubbler System and water levels in clearwell

Effluent Pump Station

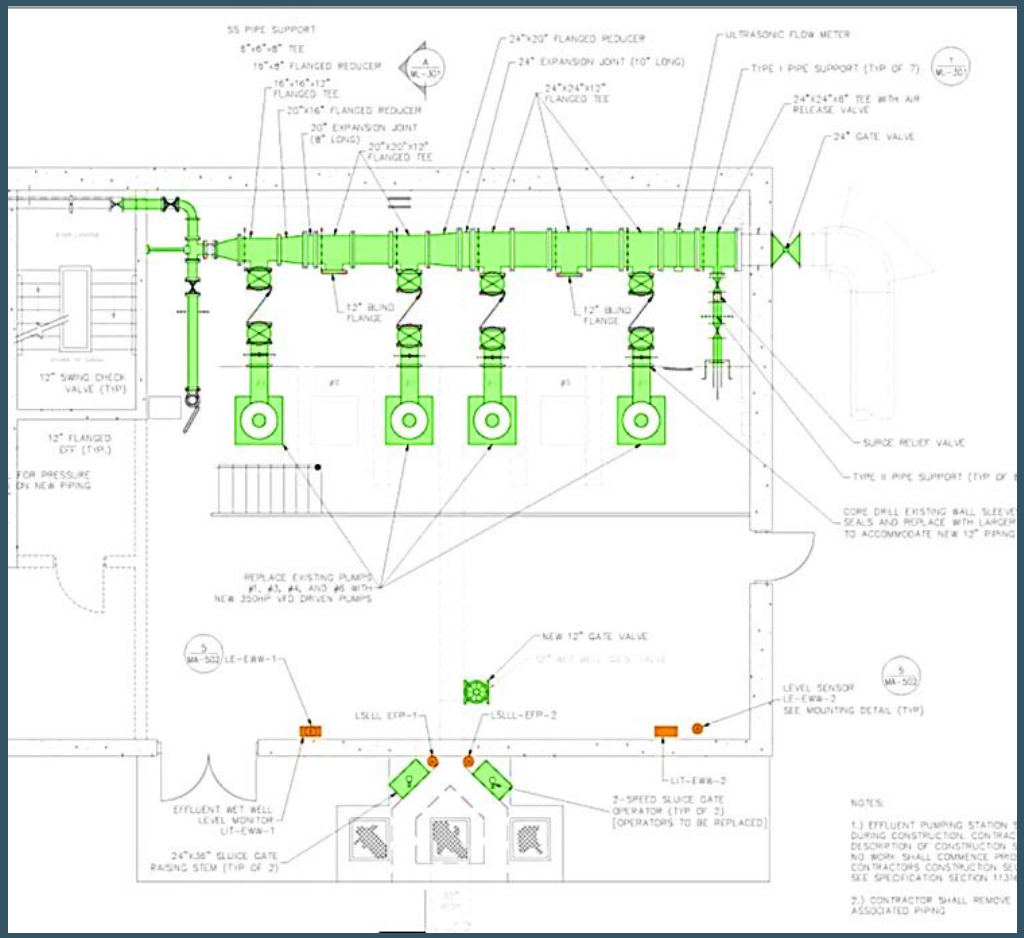
Existing Pump Room

- 3 levels, located over twin wet wells

Pumping Improvements

Improvements Include:

- Increase Capacity -10,420 gpm - 15 MGD
  - **4 - 350 HP Vertical Turbine Pumps**
  - **Plus low flow jockey pump**
- Piping Gallery improvements
  - **Gate Valves, Check Valves**
  - **Flowmeter, Flanged Fittings**
  - **Expansion Joints**
  - **Plant Water Piping Improvements**
  - **Piping Supports and Thrust Blocks**
  - **New Air Release Valve for Transient Flows**
- Valve improvements in Wetwell
  - **Isolation Valve for Wetwells**
  - **Electrically Actuated Sluice Gates**
- Controls improvement
  - **Connect to Overall SCADA System**
  - **Level Sensors**
  - **Backup floats**



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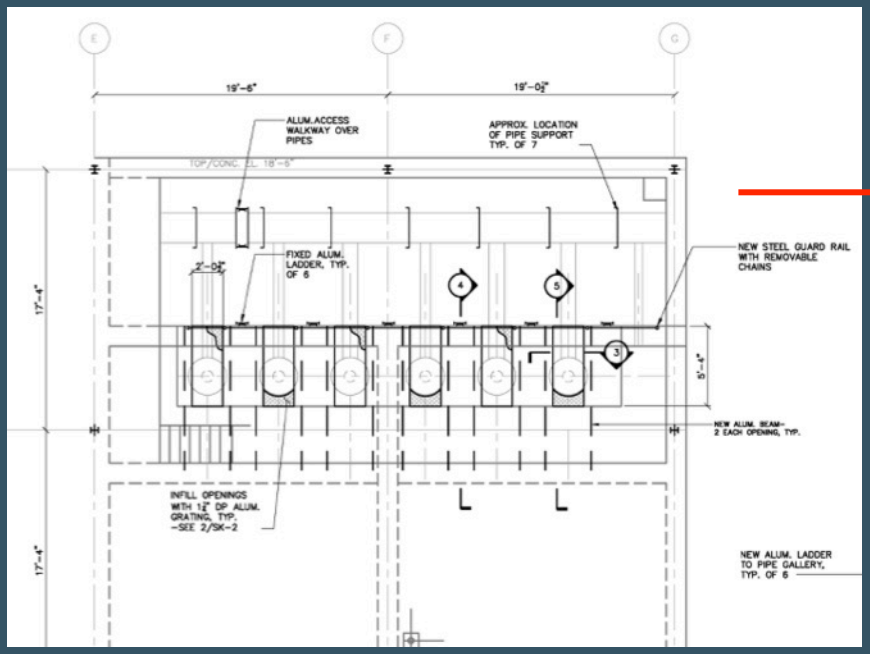
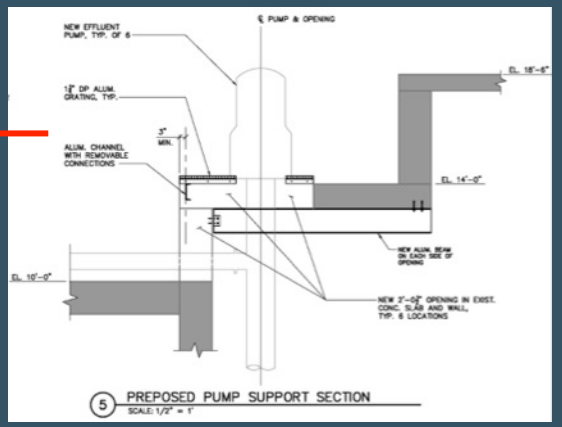
Pump Manifold & Access Improvements

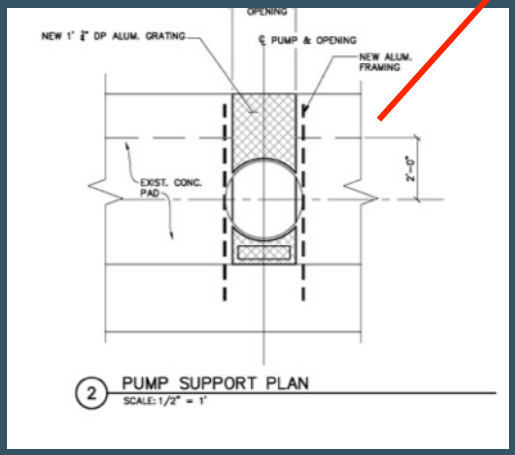


Issues with Existing Pipe Gallery

- Difficult to isolate pumps for removal or maintenance
- Unable to isolate one side of Clearwell
- Need to Re-direct Flow to temporary discharge to Fort Hill Brook

Pump Manifold & Access Improvements

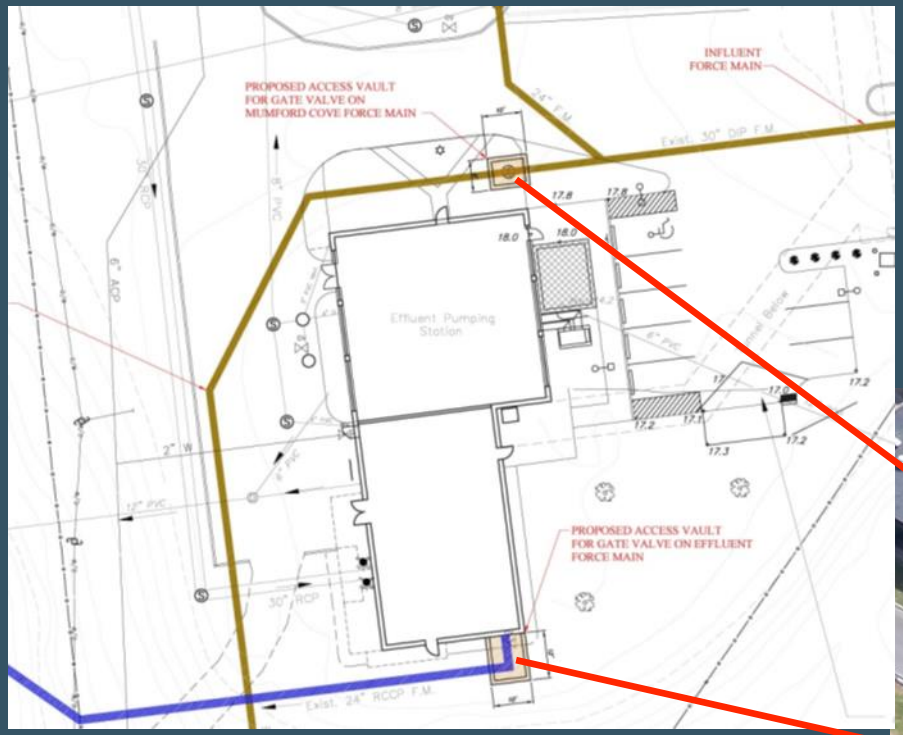




Manifold Upgrade

- Open floor around pumps for access
- Structural modifications to pump floor
- Addition of Valves on discharge to isolate pumps
- Able to keep wetwell in operation

Exterior Improvements



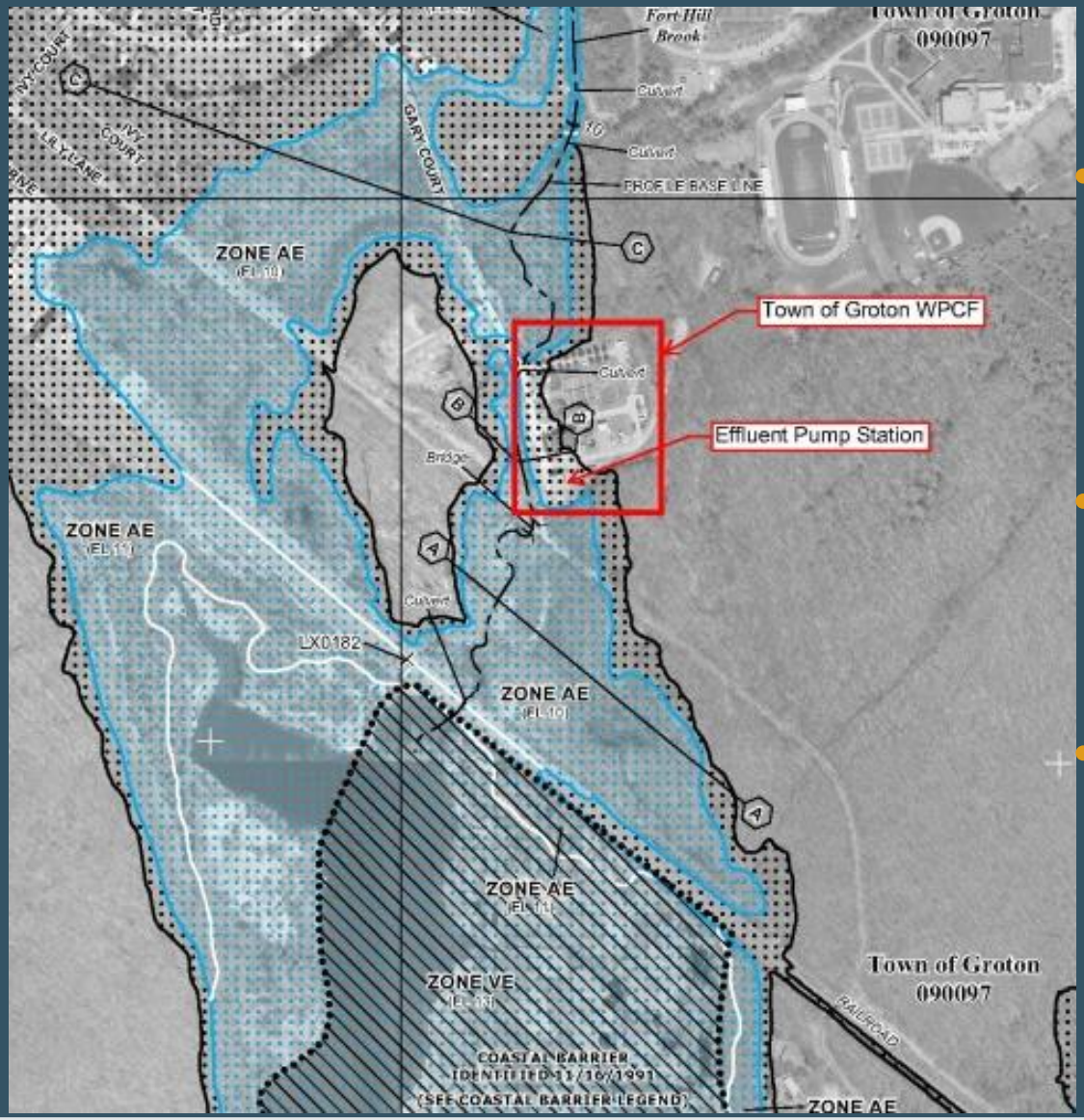
New Valve Vault for Mumford Cove FM

- Provide Access for Valve Maintenance
- Provide Operational Reliability - Routine Exercising
- Provide Operational Flexibility for maintenance or repair

New Valve Vault for EPS Force Main

- Provide Access for Valve Maintenance
- Provide Operational Reliability - Routine Exercising
- Provide Flexibility if Need to Take EPS FM Offline

Flooding Risk



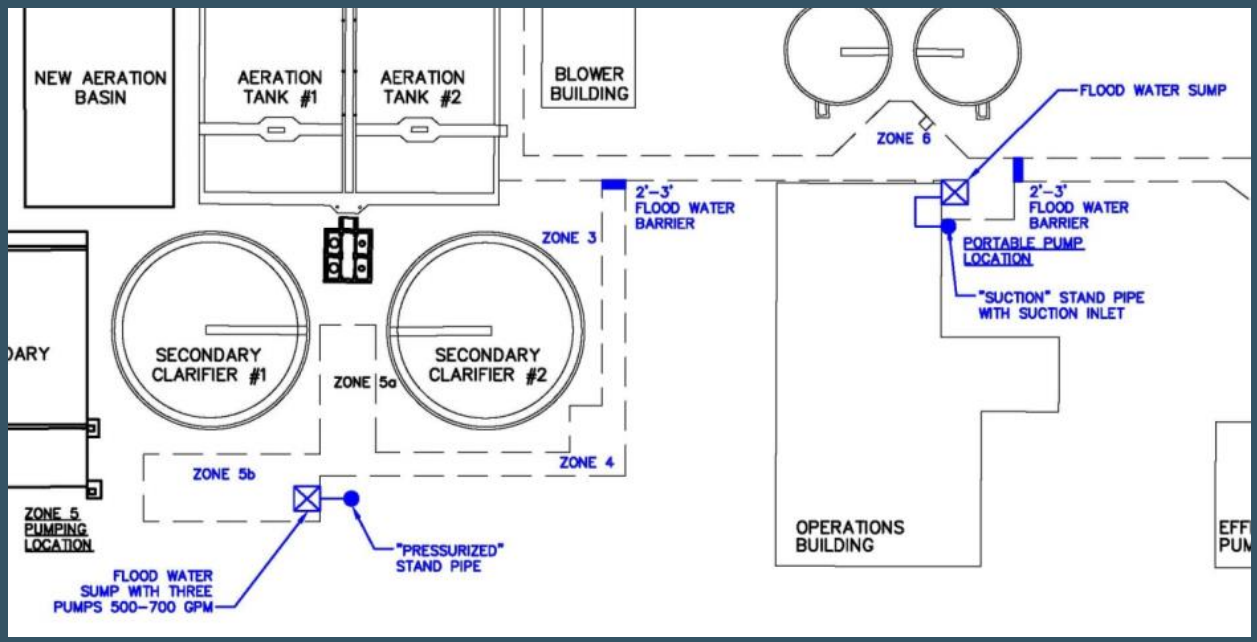
- The majority of the WPCF site is outside of the 1% chance flood
- Portion of site is designated "Other Flood Area"
- Risk assessment notes concern with increased storm severity & occurrence

WPCF Tunnel System

- Lowest portions of existing tunnel system at risk for flooding
  - Fort Hill Brook
  - Internal sources

Hardening & Resiliency Measures

- Tunnel Entry Blocking – Various openings will have flood proof doors or barrier walls
- Tunnel Flood Alarm System - A "flood alarm" system in tunnels, including simple floats in the sump pits
- Tunnel Dewatering - Installation of flood sumps (with pumps)
- Stormwater sumps – standpipes and portable generator connection/control panel to allow for portable pump connection



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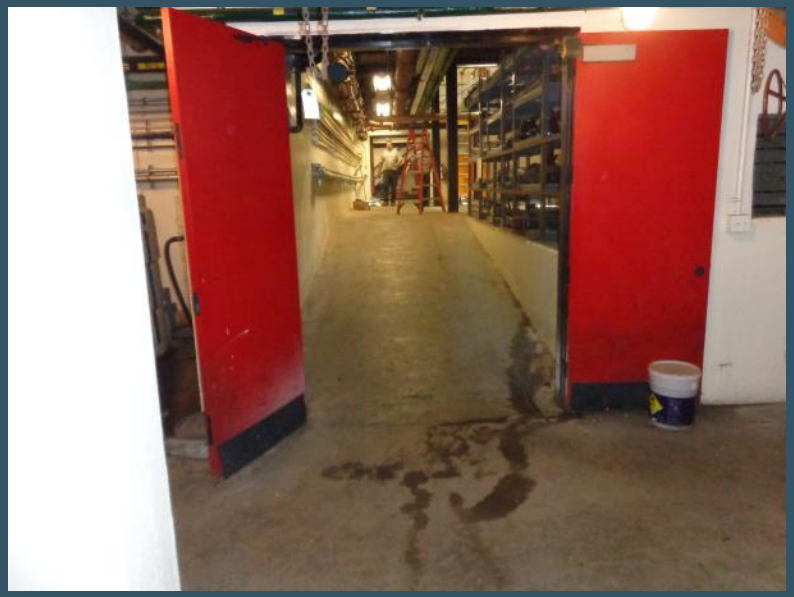
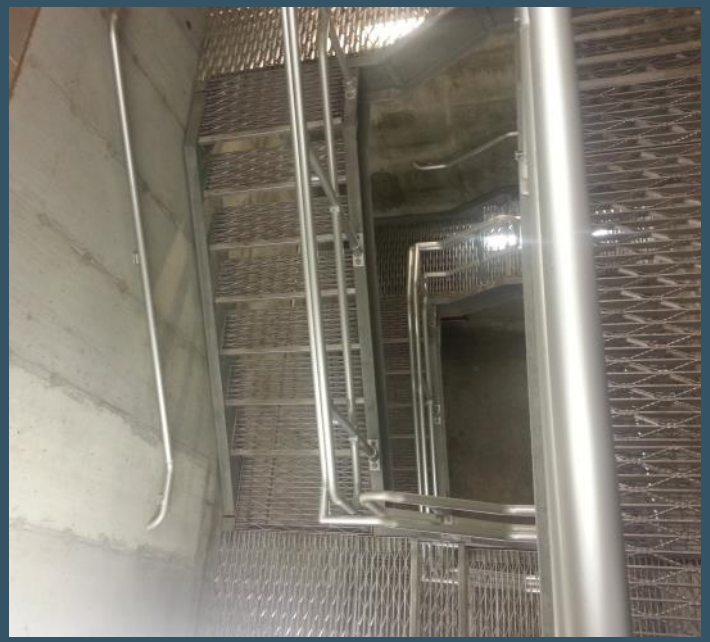
Hardening & Resiliency Measures

- Tunnel Entry Blocking
  - Flood proof doors
  - Batter boards



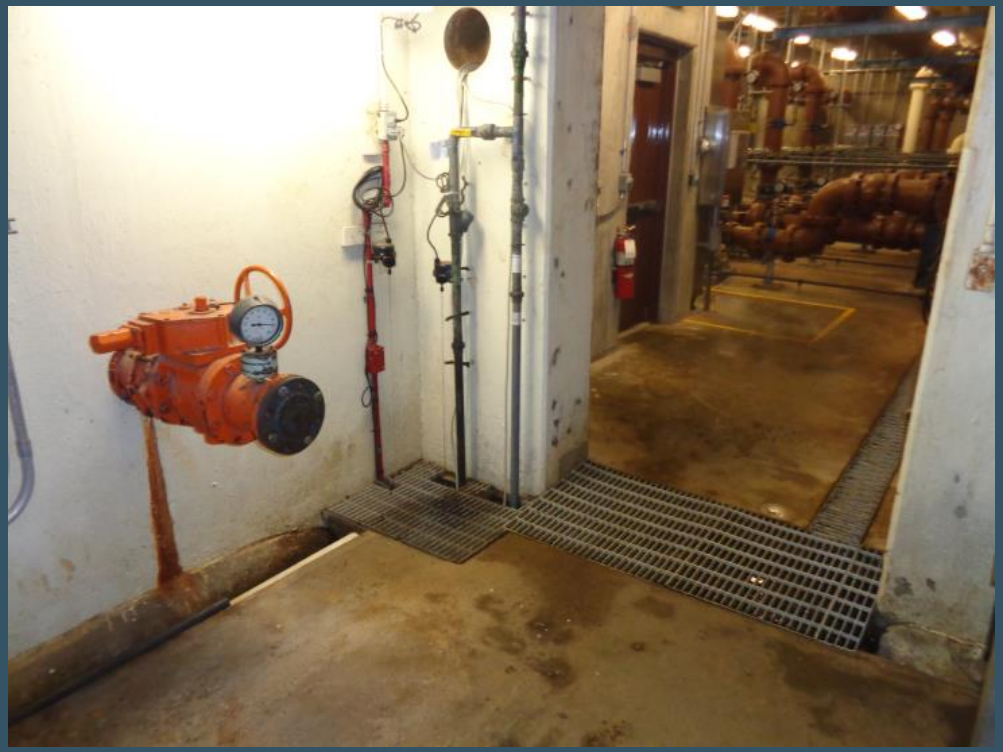
Hardening & Resiliency Measures

- Tunnel Entry Blocking - Zone 5 and EPS stair towers will have Flood proof doors or barrier walls



Hardening & Resiliency Measures

- Tunnel Flood Alarm System - A "flood alarm" system in tunnels in existing and one new sump



Relocate ‘A’ Service Entrance

- Facility has 2 electrical services (‘A’ and ‘B’)
- ‘A’ Service entrance is located in tunnel
- Distribution panel
- Automatic transfer switch

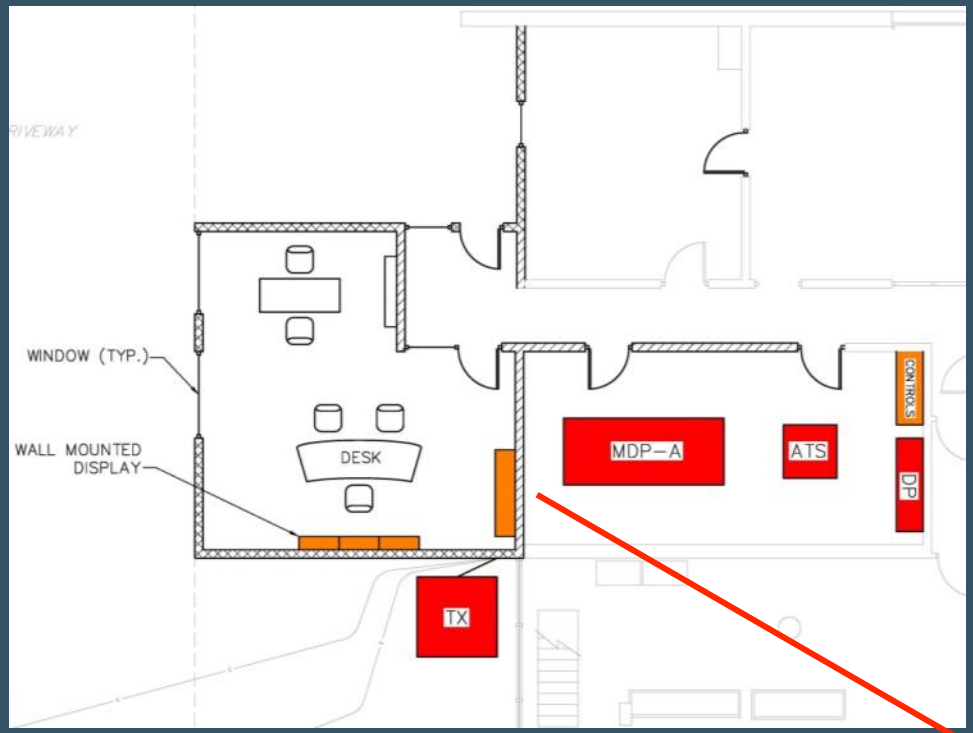
At risk if tunnels flood

Existing Operations & Control Center

- 1970's vintage annunciator wall panel – functions as oversized "junction box"
- Antiquated relays, wiring and signals for existing controls & SCADA
- Existing fiber optic loop system: many connections due to growth over time

Reliability issues with overall facility control

Operations & Control Center Upgrade



New Operations & Control Room

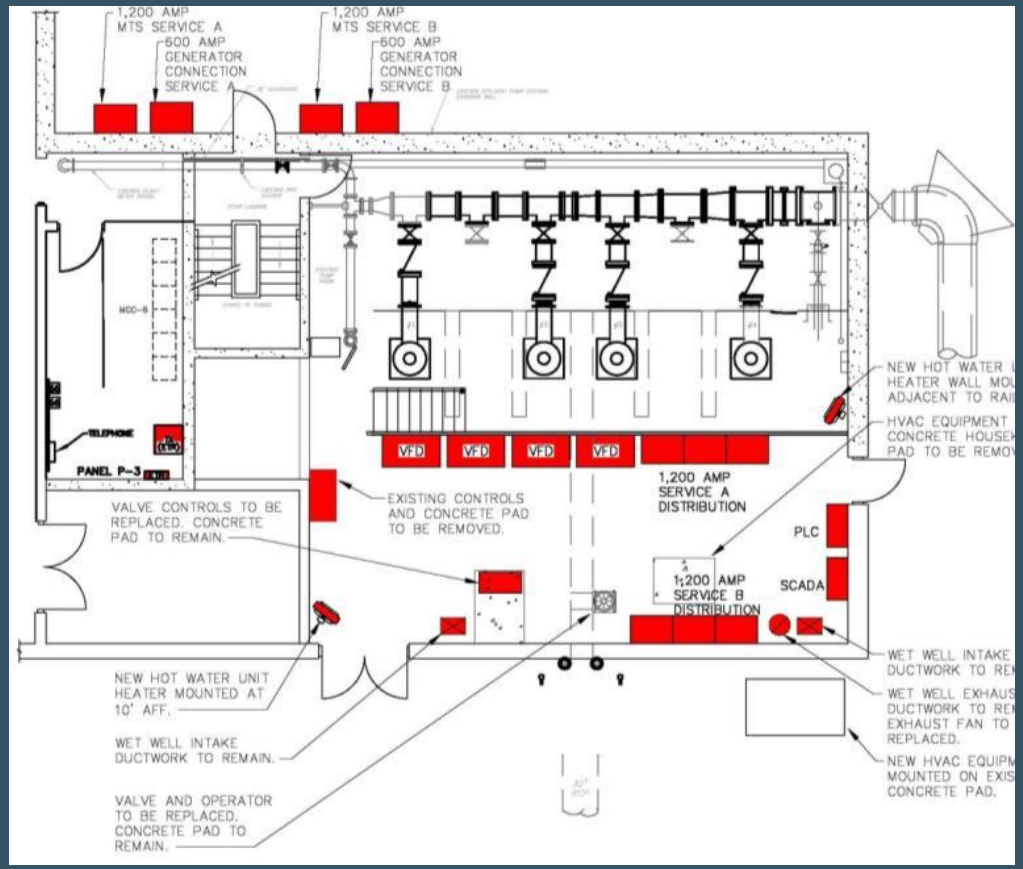
- Extend building footprint
- New power transformer for "A" Service
- Wall mounted displays with SCADA control screens
- Additional Meeting Area

Repurpose Existing Control Room

- Relocate 'A' Service entrance
- Main distribution panel for "A" Service
- New ATS for "A" Service generator
- Distribution panel for Lighting, HVAC
- Controls Junction Boxes

Electrical/HVAC Improvements

- Pumps Equipped with VFD's
- New Lighting for Area
- Power split between Two Services
  - 1,200 Amp Service from "A" Service
  - 1,200 Amp Service from "B" Service
- New PLC Control Panel for Pump Station
- Redundancy/Reliability for Backup Power
  - Manual Transfer Switch - 1,200 Amp "A" Service
  - Manual Transfer Switch - 1,200 Amp "B" Service
  - Portable Generator Conn. - "A" Service
  - Portable Generator Conn. "B" Service
- Unit Heaters connected to Hot Water and Existing System
- HVAC Equipment w/ Dehumidification
  - New Interior Duct System
  - Wetwell Exhaust Fan



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Acknowledgments

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