



Asset Management West Point Treatment Plant

Presented to MWPAAC Subcommittees

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King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Today's Presentation

- West Point history
- Recent major asset replacements
- Equipment Service Life Factors
- Operational Issues
- Upcoming major asset replacements
- Recent capacity analysis



West Point History – Major Expansions

1966

- Original Construction
- Capacity: 125 MGD Primary Treatment

1973

- Added Sludge Dewatering to Recycle Sludge

1985

- Added Cogeneration to Produce Renewable Energy from Biogas

1995

- Primary Treatment Upgrade to 440 MGD
- Added 300 MGD Secondary Treatment



West Point History – Recent Major Asset Replacements

2011

- Replaced Chlorine Gas Disinfection with Sodium Hypochlorite

2012

- Replace Co-generation System

2013

- Influent Screenings Upgrade



West Point History – Recent Major Asset Replacements

2016

- Controls System Replacement
- Sludge Dewatering Centrifuges

2019

- Waste Gas Burners

2020

- Intermediate and Effluent Pumps Variable Frequency Drives
- Ovation Controls System Upgrades



Equipment Service Life

Around 9,000 current assets

Many WP Assets are beyond expected service life

Some conditions that reduce service life:

- Wear on equipment from rags and grit
- High process flows
- Chemical attack: hydrogen sulfide and process chemicals
- Marine environment – saltwater corrosion
- Obsolescence



Operational Issues

- Plant Equipment Age
 - Robust maintenance program has allowed WTD to significantly extend the life of existing assets.
- Piping Age
 - Starting to see corrosion in process piping
 - Chemical attack, saltwater corrosion
- Wear on Equipment from Grit and Rags
 - Damage to screenings equipment, wear on pumps
- Marine Environment / Saltwater Corrosion
 - Corrosion on level control gates, outdoor equipment, buildings and vehicles
- High Process Flows
 - Combined Sewer System
 - Rapidly changing conditions and high flows during storms take operating equipment to maximum operating capacity
- Chemical tank leaks / Chemical distribution piping leaks
 - Tanks and piping have been replaced
- Obsolescence
 - Controls system, VFDs, MCCs



Upcoming Major Asset Replacements

Raw Sewage Pumps

- In service since original construction (1960's)
- Digester gas fueled engine drives
- No redundancy to meet the 440 mgd capacity.
- Project purpose:
 - Replace engines with electric motors and variable speed drives
 - Increase firm capacity to 440 mgd
 - Pump building seismic upgrade



Upcoming Major Asset Replacements



- Secondary Aeration Mixers
 - Integral part of secondary treatment
 - Nearing end of life, new equipment also anticipated to save energy
 - New equipment will be sized to meet future flows and loadings



Upcoming Major Asset Replacements

- Power Monitoring Upgrade and Switchgear Replacement
 - Switchgear at Intermediate and Effluent Pump Stations are nearing end of life
 - New switchgear will include power monitoring equipment
 - Data recording for power system health monitoring and forensic analysis.
 - Switchgear will incorporate newest safety features to help provide arc flash protection



Upcoming Major Piping Replacements



- Low Pressure Sludge Gas (LSG)
 - Carbon steel pipe is corroding
 - Replace with corrosion resistant stainless steel
- Primary Effluent (PE), Waste Activated Sludge (WAS), and Return Activated Sludge (RAS)
 - Several sections with significant corrosion
 - Cathodic protection system is also failing
 - Project opportunities:
 - Adding isolation valves
 - Replacing obsolete flow meters
 - Piping supports seismic upgrades



Other Projects Related to Life Safety

- AECOM life safety recommendations
- Passive Bypass Weir
 - Protect plant from flooding potential
- Primary Sedimentation Tank Roof
 - Remove roof structure to eliminate seismic hazard



Future Asset Replacement / Refurbishments



Electrical System Upgrades

- Switchgear, motor control centers, power distribution panels, cables, etc. that provide power to plant equipment
- Past expected life, replacement units have long lead times



Influent and Effluent Pump Refurbishments

- Installed during secondary expansion (1993-1995)
- Vibration levels observed throughout these pump sets and visual inspections indicate refurbishment is required



Propane System Improvements

- Propane system is at end of its equipment and service life.
- This project will be coordinated with the Raw Sewage Pump replacement project and will provide an opportunity to "right-size" the propane system to meet the reduced propane needs of the plant.



Instrument (IA) and Service Air (SA) System Improvements

- Upgrade and relocate the end-of-life IA and SA equipment
- Equipment is integral to operating the plant, failures may result in permit violations



Flows and Loadings Study - West Point Process Capacity Limitations



NOTES:

- ¹ Limitations may be addressed in a current project
- ² Limitation may be addressed in an earlier project

Next Steps

- Upcoming presentations on:
 - Conveyance System
 - Further information for all plants on condition assessment, analysis, and approach



Questions?

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