



King County

Protecting Our Waters

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Progress Report on the Ovivo CSO Rapid Treatment Pilot

Presentation to MWPAAC E&P Subcommittee

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What is Ovivo CSO Rapid Treatment Technology?

- **Patterned after Ovivo's stormBLOX; polymeric membrane technology to treat raw sewage during wet-weather flows**
- **Potential to apply the treatment technology at Combined Sewer Overflow (CSO), Sanitary Sewer Overflow (SSO), or stormwater sites**
- **Technology employs a physical/chemical treatment process comprised of three key elements:**
 - Screening
 - Addition of a coagulation aid
 - High rate filtration using silicon carbide membranes



Why are we interested in this technology for CSOs?

- **Effective barrier to bacteria without disinfection**
 - Potentially eliminates need for chlorine or UV disinfection
 - Potentially eliminates need for de-chlorination
- **Effective removal of other constituents**
 - Phosphorus
 - Metals
 - BOD
 - Nitrogen?



Silicon Carbide Flat Sheet Membrane



How could this technology help with CSO treatment?

- **May address many of our current exceedance issues at wet weather treatment stations**
 - Fecal coliform
 - TSS
 - Settleable solids
 - Chlorine
 - pH (due to de-chlorination)



Silicon Carbide Module Stacks



Vendor demonstration of treatment technology (Oct. 2017)

- **Ovivo's initial demonstration of ability of technology to treat simulated CSO/SSO flow**
- **Conducted tests on various parameters over two days of testing in Austin, TX**
- **Opportunity to test the system beyond recommended limits**





What were the vendor demonstration results on simulated CSO/SSO flows?

- **Total Suspended Solids**
 - 95 - >99% reduction
- **Biochemical Oxygen Demand**
 - 71-92% reduction
- **Fecal Coliforms**
 - All <400/100mL
 - Majority 1/100mL
- **Total Phosphorus**
 - 97-99% reduction
- **Copper**
 - 99% reduction
- **Zinc**
 - 51-94% reduction



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What else did we learn from the vendor demonstration?

Coagulant addition is **CRITICAL**

- System went to shutdown after a period of time with zero coagulation addition
- Redundant chemical pumps and sufficient coagulant is a necessity

Solids in the tank need to be managed

- Small amount of thickened wastewater could be returned to the interceptor or hold until after storm
- Managing solids allows maximum permeate flux to be maintained without degradation transmembrane pressure (TMP)

System recovery was extremely fast with chemical clean

- After system was forced to shutdown, a 15 minute chemical clean allowed the system to return to normal parameters
- Cleaning can be automated with no labor required other than monitoring



Currently under commissioning phase at West Point Treatment Plant

- Pilot equipment arrived mid-February
- Pilot size 28 ft x 8.5 ft x 17 ft
- Average operating flow rate: **0.3 mgd**
- Max flow rate: **0.5 mgd**
- Currently addressing mechanical and sub-system issues preventing reliable operation for 24 hours
- Project team has developed a schedule and action plan to address issues affecting commissioning with the goal to be fully commissioned in July



Conduct Process Testing at West Point (July-September 2019)

- Confirmation of maximum permeate flux
 - 24-hour period
 - At lower water temperatures
 - Confirm how CSO alkalinity affects polymer addition
- Determine the optimum Total Suspended Solids level in filtration basin
 - Filtration basin holding and wasting strategy
- Verify ability for immediate start-up
- Confirm treatment reliability and effluent quality



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Potential for Performance Testing at Elliott West Wet-weather Treatment Station (September 2019-April 2020)

- Test and characterize performance of platform on actual CSO flows
- Develop design criteria for full-scale treatment technology use
- Confirm treatment reliability and effluent quality for CSO treatment



Summary

- **Technology appears worthy of piloting to test feasibility for use in CSO treatment applications**
- **Technology may provide another tool to address future regulatory requirements and improve water quality**
- **Continued evaluation of the technology is critical to determine its viability in CSO applications**





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Questions?

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