Drainage & Wastewater (DWW) Major Programs

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Objectives

Present large programs that are
• Critical to achieving SPU’s Promise and DWW’s Mission
• Significant drivers of 2018-2023 rates

There may be choices to change the impact on rates - we will want your input in the new year.
Agenda

• DWW Mission
• 2015-2017 major projects completed
• 2018-2023
• Large programs
  o CMOM - Taking care of what we have (pipe rehabilitation)
  o Ship Canal Water Quality Project
DWW Mission

• Collect and convey wastewater in our public sanitary and combined sewer systems to protect public health and the environment by preventing sewer back-ups and overflows
  ➢ Keep it in the pipe

• Manage stormwater and drainage to reduce flooding and improve public safety, and to protect and improve receiving water and sediment quality
  ➢ Reduce pollution
Major Capital Programs & Drivers

- Green Storm Water Infrastructure
  - Natural Drainage System Partnering
  - RainWise
- Combined Sewer Overflow Program
- Sediments
- Capacity, Management, Operation and Maintenance (CMOM)
  - Rehabilitation – Pipe, pump station, outfall
- Localized Sewer Capacity
- Facilities
- Localized Flooding
- Stream Culverts
- Landslide (asset protection in landslide zones)
- Major Interagency Projects (e.g., Move Seattle, SR 99/Alaskan Way Viaduct) – Degrees of must do

Regulatory, prescriptive
Regulatory, performance based
Discretionary
Major Projects Completed, 2015-2017

- Venema Creek Natural Drainage System
- Thornton Confluence Improvements
- Ballard and Delridge Natural Drainage Systems
- Dallas Ave South Drainage Improvements & Remediation
- Windermere CSO Control Facility
- Genesee CSO Control Facilities
- Henderson Pump Station 9 Upgrade
- Henderson North CSO Control Facility
- Delridge CSO Retrofits
- Leschi CSO Retrofits
- 14th & Concord Sewer Capacity Improvement
- NW 120th Localized Flooding Improvement
- Licton Springs Localized Flooding Improvement
- Wastewater Pump Station Condition Assessment
Venema Creek Natural Drainage System
Delridge Natural Drainage System
Thornton Confluence Improvements

Before and After Photos
(2014-15 construction)
Windermere CSO Control Facility
Henderson North CSO Control Facility
Leschi CSO Retrofits

Figure 2-1 Infiltration in trunk system
Figure 2-2 Heavy Roots in trunk system
Figure 2-3 Heavy Roots in trunk system
Figure 29 Sag in trunk system

Figure 6 - Partial Blockage Downstream of MH 042-281

Option 4
- Seal NPDES 26 Outfall
- Reline ~ 1,300 ft of 21-in Pipe from Basin 28 to Basin 29 (Roots)
- Raise Weir
- Remove HydroBrake Raise Weir
- Replace ~ 1,000 ft of 15-in Pipe between Basin 31 and 34 (Sag)
- Remove HydroBrake Abandon 32B Overflow Structure
- Dry Weather Bypass
- Raise Weir
- Remove HydroBrake Replace with Orifice
- Replace ~ 500 ft of 15-in Pipe (Sag)
- ReLINE ~ 1,700 ft of 16-in Pipe (Failed Liner)
14th & Concord Sewer Capacity Improvements
Wastewater Pump Station Condition Assessment
Drainage and Wastewater Fund Revenues and Expenses (2015, $ in millions)

### Revenues
- Drainage: $102.0 (28%)
- Wastewater: $257.1 (71%)
- Other: $4.7 (1%)

### Expenses
- Treatment: $150.3 (40%)
- O&M: $80.9 (22%)
- Taxes: $47.4 (13%)
- Debt Service: $47.4 (13%)
- Cash Fin CIP: $48.2 (13%)
DWW Capital Improvement Program, 2018-2023

Taking care of what we have (pipe rehabilitation)

Primarily Ship Canal Water Quality Project

Regulatory Driven

- Regulatory, Integrated Plan, Perscriptive 38%
- Sediments, Superfund 5%
- Rehabilitation 6%
- Rehabilitation, Facilities 5%
- Transportation, Move Seattle 13%
- Transportation, Other 2%
- Discretionary (e.g. flooding, landslides) 7%
- Equipment 1%
- Miscellaneous 0%
- Technology, City-wide 1%
- Technology, SPU 1%

Regulatory, Performance Based 21%
Capacity, Management, Operations and Maintenance (CMOM) Program

Sustainable and Reliable Collection System
Strategy: know your system
Strategy: Maintenance
Strategy: Work with our customers
Strategy: Rehabilitate
Focus: Pipe Rehabilitation

Wastewater Pipe Profile by Material & Installation Decade

- Unknown
- Other
- Plastic
- Metal
- Asbestos Cement
- Reinforced Concrete Pipe
- Concrete
- Vitrified Clay

Installation Decade:
- 1889-1900
- 1901-1910
- 1911-1920
- 1921-1930
- 1931-1940
- 1941-1950
- 1951-1960
- 1961-1970
- 1971-1980
- 1981-1990
- 1991-2000
- 2001-2010
- 2011-present
- Unknown
The Rehabilitation Process

Pipe Inspection → Pipe Risk

Low Risk → No Action

High Risk → Rehab Project
Let’s be inspectors...
This is a good pipe:
Can you spot the defect?
Can you spot the defect?
Can you spot the defect?
What’s the risk?
What’s the risk?
What’s the risk?
Priority (Relative Risk)

- **Priority (Relative Risk):**
  - **0:** No action (<40)
  - **25:** Monitor (40-60)
  - **50:** Do something (>60)
  - **75:** Do something quick! (>80)

Images of different risk levels are shown with corresponding risk percentages.
Approximately 840 miles were inspected, CCTV, between 2005 and August 2016. Approximately 82 miles (9.5%) fall in high risk category (risk score > 70).
Rehab Methods

- Cured In Place Pipe (Lining): $50K; Half a day
- Spot Repair by Crews: $12k average; Few days
- Spot Repair by Contractor: $80K; Two weeks
- Full Line Replacement: $300K; Two Months
Cured In Place Pipe (Lining)

- $50K; Half day
- Chemistry
- Heat or UV Light Activated
- Small Footprint
Spot Repair: Crews

- $12K
- Few days
Spot Repair:
Contractor

- $80K
- 2 weeks
Full Line Replacement

- $300K
- 2 months
CSO Program & Ship Canal Water Quality Project (SCWQP)
Stormwater Management Projects
- South Park Water Quality Facility
- Street Sweeping Expansion – Arterials
- Natural Drainage Systems Partnering

Sewage Overflow Control Projects
- Shared projects to be built by 2025
- City storage projects to be built by 2025
- City storage projects to be built after 2030
- City sewer improvement project to be built by 2020
Drainage & Wastewater Map

- Combined System
- Partially Separated System
- Fully Separated System
Stormwater Runoff is the Problem

There’s plenty of room in the pipe for sewage, but not for stormwater

Since 2009, new development has had to manage its own runoff. Nevertheless, we still have to manage the runoff generated from hard surfaces built before 2009 because the sewer system wasn’t built for this much runoff.
Integrated Plan Benefits

Cleaner water faster
• Treats an additional 100 million gallons of polluted runoff each year

More “bang for the buck”
• Stormwater projects are 100 times more cost effective than deferred CSO projects

Deferring CSO projects provides time to implement sewer system improvements
• Could eliminate need to construct storage projects
• Could save up to $60M
Integrated Plan Projects

Enhanced Street Sweeping

South Park Water Quality Facility

Natural Drainage Systems Partnering
Piper’s, Thornton and Longfellow Watersheds
Integrated Plan Provides Greater Water Quality Benefits

- **Total Suspended Solids Removal**
  - Five deferred CSO projects
  - Three Integrated Plan stormwater projects

- 2.4 Million gallons of sewage & stormwater treated
- 108 Million gallons of stormwater treated
High $/fecal coliform Removed - Deferred

Low $/fecal coliform removed - Foundation of Integrated Plan
Progress

✓ Early action projects ($200M)
  ✓ Windermere, Genesee and Henderson
  ✓ Delridge Retrofit

✓ Launch Integrated Plan Projects
  ✓ NDS Partnering
  ✓ South Park Water Quality Facility
  ✓ Street Sweeping

✓ Launch Sewer System Improvements

✓ Launch SCWQP
Figure ES-7. Recommended Alternative Schedule
Does not include all of the currently ongoing projects. See Table ES-2 for complete list of projects.
SCWQP Project Overview Map
Tunnel Sizing

Size of Shared West Ship Canal Tunnel compared to other projects

- Smaller than the Sound Transit University Link Extension Tunnel
Tunnel Sizing – More GSI?

Q: Why do we need to build a tunnel? Can’t we manage the CSO volume using only GSI?

A: GSI alone can’t provide enough stormwater overflow storage
   - Not enough land for required storage
   - It would require an area larger than all 3 neighborhoods combined.

**TUNNEL**

- Storage capacity: 15.2 million gallons

**GSI**

- Max possible storage capacity: 2.6 million gallons
Looking at historical rainfall data 5 different ways at each outfall using past rainfall
Tunnel Sizing, Future Rainfall

Perturbed Intensity-Duration-Frequency (IDF) curves – best available science for understanding future rainfall
Discussion