DISTRIBUTION OF COLUMBIA
WATER AND SEWER AUTHORITY
Board of Directors

Meeting of the
Environmental Quality and Operations Committee

5000 Overlook Avenue, SW, Room 407
Thursday, March 15, 2018
9:30 a.m.

BY EXCEPTION ONLY *

I. Call to Order  James Patteson
                 Chairperson
9:30 a.m.

II. Path to Asset Management Work Plan  Leonard Benson
9:55 a.m.

III. Clean Rivers Update Status  Carlton Ray
10:05 a.m.

IV. Grand Opening of the Clean Rivers Tunnel System  Carlton Ray
10:10 a.m.

V. Water Main History and Associated Cost  Charles Kiely
10:20 a.m.

VI. Sewage Pumping Station Flood Protection Status  Craig Fricke
10:30 a.m.

VII. Action Items  Len Benson

Joint Use

1. Contract No.: DCFA #463 – AECOM Services of DC, Construction Management Services, Anacostia River Combined Sewer Overflow (CSO) Control Projects, Division Z – Popular Point Pumping Station Replacement and Main Outfall Sewers Diversion
2. Contract No.: DCFA #425 – HDR, Inc., Grit, Screens, and Primary Facilities Upgrades

Non Joint Use


*10:40 a.m. VIII. AWTP Status Updates  Aklile Tesfaye

1. BPAWTP Performance

*10:45 a.m. IX. Water Quality Monitoring  Charles Kiely

1. Coliform Testing
2. LCR Compliance Testing
Follow-up Items from Prior Meetings:

1. Manager, Program Services: Provide updates regarding change order rates and general contract management performance as part of the next CIP quarterly update. [To be included in the CIP Quarterly Update, May 2018]
2. AGM, Wastewater Treatment, DC Water: Provide update of research activities regarding trends and technologies that optimize treatment process capacity and facilitate energy neutral operations. [Target: April 2018 EQ&Ops Cmte Mtg]
3. The IMA Regional Committee (RC) brief the EQ & Ops Cmte on the work of the IMA RC [Target: June 2018 EQ&Ops Cmte Mtg]
4. Chief Financial Officer, DC Water: Include a definition for “Customer Affordability” as part of the discussion on Path to Achieve Asset Management. [Ongoing]
5. Interim General Manager / CEO, DC Water: Provide the Committee with DC Water testimony prepared for DC Council’s Oversight hearing on March 2, 2018. [BOD Secretary distributed to full Board, 2/28/18]
6. Interim General Manager / CEO, DC Water: Will provide the BOD with DC Water response to DOEE Public Notice of proposal to change WQS. [BOD Secretary distributed to full Board, 2/21/18]
7. Chief Engineer, DC Water: Will brief the Cmte regarding certain Engineering SOP pertinent to recommendations for contract award and projection of CIP cashflow. [Target: May 2018 EQ&Ops Cmte Mtg]
8. Chief Engineer, DC Water: Provide update on flood vulnerability and protection of other critical DC Water facilities. [On current agenda]
9. Assistant General Manager, Customer Service: Provide water main break data over the past 10 years. [On current agenda]
Path to Achieve Asset Management

District of Columbia Water And Sewer Authority
Environmental Quality & Operations Committee Meeting
March 15, 2018
Path to Achieve Asset Management

- Collaborative effort by Residents and Ratepayers, the Board of Directors, and the Executive Team
  - Explore investment in infrastructure
    - What is needed to fully meet asset management principles?
    - What are our peer utilities doing?
    - What is the cost of pro-active investment, as compared with addressing issues as they arise?
  - Exploration of alternative revenue sources
    - What funds could be available, other than from ratepayers?
  - Community outreach and education
    - Explain infrastructure investment, and consequences of investment
    - Gather ideas about addressing affordability
  - Impact on the financial plan
    - What is the impact on the operating budget, and what is the impact of pro-active investment as compared with addressing issues as they arise?
    - What could be financed through debt?
    - What are appropriate levels of PAYGO?
  - Customer affordability
    - What ways can we help ensure affordability?
    - What are our peer utilities doing to meet this challenge?
Committee Assignments

<table>
<thead>
<tr>
<th>Path to Achieve Asset Management</th>
<th>Committee Assignments</th>
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<tbody>
<tr>
<td>Explore investment in infrastructure</td>
<td>Environmental Quality and Operations Committee</td>
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<td>Exploration of alternative revenue sources</td>
<td>Finance and Budget Committee</td>
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<td>Community outreach and education</td>
<td>Retail Rates Committee</td>
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<tr>
<td>Impact on the financial plan</td>
<td>Finance and Budget Committee</td>
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<tr>
<td>Customer affordability</td>
<td>Retail Rates Committee</td>
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committee reviews/discussions are intended to ensure optimization, accountability and transparency throughout the budget preparation process
BOD Discussion and Action
Capital Improvement Program (CIP) FY’ 18 thru FY’ 27

• January 4, 2018 – Full Board Budget Workshop
• January 2018 – Committee Meetings
  • EQ & Ops Committee
  • Retail Rates Committee
  • Finance and Budget Committee
• February 2018 – Committee Meetings
  • EQ & Ops Committee
  • Retail Rates Committee
  • Finance and Budget Committee
• March 1, 2018 – Full Board Meeting
  • Approved Baseline FY 2018 – FY 2027
  • Committed to a “Pathway to Asset Management”
• March – September
  • Committee Reviews
• November
  • Budget presented to the Board
EQ & Ops Committee Proposed Work Plan

- April - What are peer utilities experiencing?
  - Age of system
  - Materials and design
  - Service life
  - Infrastructure failure experience
  - Infrastructure investment approach

- April, May & June – What is needed to fully meet asset management principles?
  - Current state of repair
  - Site visits

Explore Investment in Infrastructure

1. What is needed to fully meet asset management principles?
2. What are our peer utilities doing?
3. What is the cost of pro-active investment vs. addressing issues as they arise.
June – What is the cost of pro-active investment vs. addressing issues as they arise?

- Cost of emergency repairs
  - Direct costs
  - Indirect costs
  - Socioeconomic costs
- Other impacts
  - Continued failures, breaks, backups, etc
  - Water quality and discolored water
  - Continually adjusting priorities & changing plans
  - Capitalization of emergency repairs
  - Risk of SSO Consent Decree
  - Safety
  - Socioeconomic impacts
- Examples

Explore Investment in Infrastructure

1. What is needed to fully meet asset management principles?
2. What are our peer utilities doing?
3. What is the cost of pro-active investment vs. addressing issues as they arise?
July - What is needed to fully meet asset management principles?

- Review of previously presented scenarios
- Alternative ramp up scenarios
- Tours and site visits

Explore Investment in Infrastructure

1. What is needed to fully meet asset management principles?
2. What are our peer utilities doing?
3. What is the cost of pro-active investment vs. addressing issues as they arise?
Briefing on:

**DC Clean Rivers Project**

**Quarterly Update**

Briefing for:

**Environmental Quality & Operations Committee Meeting**

March 15, 2017
Agenda

- Overview
- Progress Summary – March 2018 Consent Decree
- Progress Summary – Remaining Projects
DC Clean Rivers Project Overview

DC Clean Rivers Project: $2.7 Billion
Nitrogen Removal: $950 Million
Total > $3.5 Billion
25yr implementation (2005–2030)
96% reduction in CSOs & flood relief in Northeast Boundary
Approx 1 million lbs/yr nitrogen reduction predicted

Controls Combined Sewer Overflows
Addresses Chronic Sewer Flooding

Place in operation by March 23, 2018

Environmental Quality and Operations Committee - *9:55 a.m. III. Clean Rivers Update Status - Carlton Ray
Clean Rivers Project Status

**Completed Projects**
- **W**: Blue Plains Tunnel Site Prep
- **A**: Blue Plains Tunnel
- **C**: CSO 019 Overflow and Diversions
- **B**: Tingey Street Diversions
- **E**: M Street Diversion Sewer
- **G**: CSO 007 Diversion Facilities
- **N**: Low Impact Development @ DC Water Facilities
- **P**: First Street Tunnel
- **S**: Irving Street Green Infrastructure

**Projects in Construction**
- **H**: Anacostia River Tunnel
- **D**: JBAB Overflow & Diversion Facilities
- **I**: Main Pumping Station Diversions
- **U**: Northeast Boundary Utility Relocations
- **Z**: Poplar Point Pumping Station & MOS Diversion
- **Y**: Blue Plains Tunnel Dewatering Pumping Station and Enhanced Clarification Facility (Managed by DWE)
- **PR-B**: CSO 021 Diversions at Kennedy Center
- **RC-A**: Rock Creek Green Infrastructure Project A
- **RC-B**: Kennedy Street Green Infrastructure (by DDOT)
- **J**: Northeast Boundary Tunnel

**Projects in Procurement**
- **PR-A**: Potomac River GI Project A

**Projects in Planning**
- **-**: Potomac Tunnel EA

Consent Decree Deadline: Place in operation all Anacostia facilities south of RFK stadium by March 23, 2018
Anacostia River Tunnel System South of RFK
Place in operation by March 23, 2018

- All Anacostia CSOs will be intercepted by the 2018 tunnel system (CSOs 005, 007, 009, 010, 011, 011a, 012, 013, 014, 015, 016, 017, 018 and 019)

- Ultimate volume of Anacostia River tunnel system in 2023 (from Blue Plains to Northeast area of the District) is about 190 million gallons

- Volume provided in 2018 (Blue Plains to RFK) is more than 100 million gallons
PROGRESS SUMMARY

MAJOR ACCOMPLISHMENTS
FY 2017 4TH QUARTER UPDATE FOR
MARCH 2018 CONSENT DECREE
Division D – JBAB Overflow and Diversion Structures Status

**Complete:**
- Drop shaft cover waterproofing and backfill
- Architectural finishes
- Electrical and instrumentation fit-out
- Startup and testing – at JBAB and remainder of tunnel sites

**Remaining:**
- Substantial completion achieved in February 2018
Division H – Anacostia River Tunnel Project Status

Complete:

- CSO 019
- CSO 018
- M Street
- CSO 007
- CSO 005
- Poplar Point

Remaining:

- Electrical and instrumentation hookups
- Startup and testing
- Removal of temporary bulkheads

Substantial completion achieved in February 2018
Division I – Main Pumping Station Diversions Project Status

**Complete:**

- CSO 009/011
- A Main Pumping Station Drop Shaft (MPS-DS) (By others)

**Remaining:**

- Electrical and instrumentation fit-out
- Startup and testing
- Punch list

Substantial completion achieved on February 15, 2018
**Division Z – Poplar Point Pumping Station Status**

- Start of Operational Demonstration occurred on February 13, 2018
- Consent Decree obligations can be met after sufficient operation has been performed in core function (pumping sewage) to demonstrate facility operation
# AECOM Construction Management Contract

## Budget

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<th>Item</th>
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<td>Original Contract Value</td>
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<td>DC Water Board in May 2017</td>
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<td>Supplemental Agreement #1</td>
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<td>Proposed Supplemental Agreement #2</td>
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<td>14% of construction cost</td>
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<td>Total</td>
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## Time

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<td>Original Duration</td>
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<td>Supplemental Agreements #1 + #2</td>
<td>549 days</td>
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<td>Final Completion</td>
<td>Dec 31, 2018</td>
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Rationale for Supplemental Agreement #2

- AECOM has performed well to date
- Value of supplemental agreement is based on:
  - Time for construction contractor to compete project
  - Estimate of staff required to address outstanding construction work, punch list, startup and closeout activities
  - Staff will be reduced as the project slows down
- Less expensive to keep CM on board than to address in another manner
  - Would lose historical knowledge
  - Would take time to get someone else up to speed
Anacostia River Tunnel Commissioning Awareness

- Consent Decree: System south of RFK must be placed in operation by March 23, 2018
- Plan for how to accomplish is included in each of the existing contractor’s work requirements (all Divisions)
- Follow up global commissioning awareness meeting held January 12, 2018
- Monthly coordination meetings between contractors with interfaces
- Important because of interconnections in system
- All ART System Project CSO Controls are active (starting from February 28, 2018)

- Attended by multiple DC Water Departments, contractors, CMs and engineers
- Make sure plan is coordinated – get everyone on the same page
- Address safety
- Address contractor interfaces and scheduling
- Identify issues, areas for improvements

Be ready to receive flow March 23, 2018
PROGRESS SUMMARY

MAJOR ACCOMPLISHMENTS 
FY 2017 4TH QUARTER UPDATE FOR REMAINING PROJECTS
Division U – Northeast Boundary Tunnel Utility Relocations

Purpose: Clear surface work sites to make way for NEBT Tunnel Contractor

- Contractor achieved Substantial Completion on November 27, 2017
- Remaining work includes punch list items, Pepco, WG, Verizon, and some weather dependent activities such as paving
- Project completed under budget

Contractor: Fort Myer Construction Corporation
Contract Price: $16.99M - Percent Complete: 96%
Financials as of February 1, 2018

Environmental Quality and Operations Committee - *9:55 a.m. III. Clean Rivers Update Status - Carlton Ray

Example: 4th & Rhode Island Ave NE
Division J – Northeast Boundary Tunnel

- Commissioned Tunnel Boring Machine on 1/23/2018
- Approved major Design Packages including CSO 019 Final TBM Breakout, W St. Final MOT and Temp Site Work, Mt. Olivet Rd 60% SOE
- Approved CSO 019 60% Force Main Relocation Maintenance of Flow
- Mobilizing to CSO 019 site on 3/5/18
- Mobilizing to Mt Olivet site on 3/14/18
- Mobilizing to W St. site on 4/20/18
- TBM arrival expected on 4/16/18

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<th>Milestone</th>
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<tr>
<td>Construction Start</td>
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<tr>
<td>Construction Complete</td>
<td>August 2023</td>
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Design-Builder: Salini Impregilo Healy JV
Contract Price: $580M - Percent Complete: 3%
Financials as of February 1, 2018
Division PR-B – CSO 021 Diversion Facilities (Kennedy Center)

Clean Rivers - CSO 021 Diversion Facilities
- DC Water under contract with Davis Construction
- Structure will intercept flows from CSO 021 and redirect them to future Potomac River Tunnel during wet weather
  - Completed construction of ~75% of Diversion Chamber
  - Drop/Vent structure ~ 80% complete
  - Ventilation Control Facility (VCF) ~ 80% complete

Kennedy Center for the Performing Arts (KCPA) Expansion
- Kennedy Center is proceeding with Whiting Turner to complete the project

- Rehearsal space, parking garage, pavilions, reflecting pool and other enhancements constructed by KCPA

Regular coordination on a tight construction site
Division RC-A – Rock Creek GI Project A

- Project facilities are being designed, permitted, and constructed in three phases:
  - Phases 1/1A and 2: Design and permitting complete; construction underway
  - Phase 3: Design and permitting underway; alley permeable pavement construction underway

- Construction started in September 2017

- Construction progress
  - Phase 1 – 80% complete
  - Phase 1A – 50% complete
  - Phase 2 – 25% complete
  - Phase 3 – 12% complete

- Functional testing of completed facilities started in October 2017

- Project scheduled to be placed in operation by March 30, 2019

Design-Build: Anchor Construction
Contract Price: $27M - Percent Complete: 25%
Financials as of February 1, 2018

Project Boundary:
Division PR-A – Potomac River Project A

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<td>Contract Award</td>
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<td>Construction NTP</td>
<td>April 30, 2018</td>
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<td>Place in Operation</td>
<td>CD Deadline June 23, 2019</td>
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- Procurement underway
- Project includes:
  - Planter Bioretention
  - Alley Permeable Pavement
  - Parking Lane Permeable Pavement

Project Boundary:
Division PR-A – Potomac River Project A
Bids, Recommendation, and Next Steps

- Bids received on February 14, 2018 included:
  - Anchor Construction Corporation $8,984,628.00
  - Corman Kokosing Construction Company $10,010,290.00
  - Fort Myer Construction Corporation $6,265,502.47
  - Engineer’s Estimate $7,763,663.46

- It is recommended that Fort Myer Construction Corporation be awarded the Division PR-A1 Construction Contract in the amount of $6,265,502.47

- Next steps:

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<th>Event</th>
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<td>EQ &amp; Ops Committee</td>
<td>March 15, 2018</td>
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<tr>
<td>Board of Directors Meeting</td>
<td>April 5, 2018</td>
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<td>Contract Award</td>
<td>April 9, 2018</td>
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<tr>
<td>Notice to Proceed</td>
<td>April 30, 2018</td>
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</tbody>
</table>
Drain the Rain! Rock Creek and Potomac Green Infrastructure Project Areas

- Voluntary, Free Downspout Disconnection Program with Rain Barrels
  - Contracted with Rock Creek Conservancy
  - Pilot implementation completed - Over 120 downspout disconnections completed to date
  - Canvassing and installations to begin in additional neighborhoods in Spring 2018
Kennedy Street GI Challenge Streetscape Project

- Kennedy Street Green Infrastructure Streetscape Project
  - Being constructed and managed with District Department of Transportation’s (DDOT) Kennedy Street Improvements Project
  - Construction of GI is underway and DDOT anticipates completion in Spring 2018.

Groundbreaking – October 21, 2016

Key Map

DDOT – Kennedy Street NW Improvement (Georgia Avenue – New Hampshire Avenue NW)

DC Water GI Challenge Streetscape (100 Block Kennedy Street NW)
Green Jobs MOA: GI Certification Program

- Status:
  - Training:
    - Three rounds of training completed Fall 2016, Spring 2017, and Fall 2017
    - Next DC training to be held beginning in April 2018
    - Interested candidates should attend mandatory informational session on March 21 (registration: tinyurl.com/GI2018MAR)
  - Exam:
    - Third National GI Certification Program (NGICP) exam held November 14, 2017
    - 15 Partner jurisdictions, in addition to DC Water, formalized to date (commitments totaling over $500K)
    - Third Train-the-Trainer workshop to be held in San Francisco March 7-9, 2018
- Website: www.ngicp.org
Green Alley Partnership with DDOT

- DC Water has partnered with DDOT to construct permeable pavement with alley work
  - Standard green alley approach to facilitate construction and permitting
  - Blanket permit via Department of Energy and Environment secured to allow for fast implementation
  - AlleyPalooza 5 launched April 20, 2017
  - DC Water funding construction of seven alleys (six in Rock Creek and one in Potomac River) under Green Alley Partnership

Benefits:
- Reduces costs for DC Water’s GI Program for CSO control
- Advances District’s *Sustainable DC Plan*
- Reduces disruption for residents
# DC Clean Rivers Schedule

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**Notes:**
- **Completed:** Projects marked with a check in the Completed column.
- **Thru March 2023:** Projects marked with a check in the Thru March 2023 row.
- **Thru March 2019:** Projects marked with a check in the Thru March 2019 row.
- **Thru Dec 2022:** Projects marked with a check in the Thru Dec 2022 row.

**Time now:**
- **25**

**Completed:**
- March 2018

**CD Deadline:**
- March 2025

**Goal 2023:**
- **Other:**
  - 1 2 3 4

**CY 2010**
- CY 2011
- CY 2012
- CY 2013
- CY 2014
- CY 2015
- CY 2016
- CY 2017
- CY 2018

**Others:**
- A/E Procurement
- Design
- Contractor Procurement
- Permitting / Engineering
- Construction
- Completed
Clean Rivers is on track to meet its planned FY18 spending.
Clean Rivers Budget for Completed Contracts

Overall Clean Rivers is $12.6 M under budget for construction contracts that are completed.

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Contract Budget</th>
<th>Cost at Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Plains Tunnel</td>
<td>$338,354,000</td>
<td>$330,561,000</td>
</tr>
<tr>
<td>Tingey Street Diversions</td>
<td>$15,553,424</td>
<td>$16,056,573</td>
</tr>
<tr>
<td>CSO 019 Diversion and Overflow Structures</td>
<td>$29,750,000</td>
<td>$27,890,000</td>
</tr>
<tr>
<td>M Street Diversions</td>
<td>$5,140,740</td>
<td>$5,080,000</td>
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<tr>
<td>Irving Street Green Infrastructure</td>
<td>$3,583,757</td>
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<tr>
<td>Low Impact Development</td>
<td>$157,675,000</td>
<td>$157,675,000</td>
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<tr>
<td>First Street Tunnel</td>
<td>$7,287,852</td>
<td>$7,287,852</td>
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<tr>
<td>Blue Plains Tunnel Site Prep</td>
<td>$6,556,000</td>
<td>$6,556,000</td>
</tr>
</tbody>
</table>

Clean Rivers Budget Performance

Environmental Quality and Operations Committee - *9:55 a.m. III. Clean Rivers Update Status - Carlton Ray
Clean Rivers Budget for Active Contracts

Clean Rivers expenditures to date on active contracts are not expected to exceed budget.
DC Water Delivers on a Cleaner Anacostia River

- Grand Opening of the Clean Rivers Tunnel System! Come Join Us!

- Looking forward to celebrating March 22, 2018
  - **Location**: 2600 Independence Avenue SE (near RFK Stadium’s Lot 8)
  - **Time**: 1-2:30 pm
water main break review:

a brief review of an operational norm

Environmental Quality and Operations Committee
Thursday March 15, 2018
agenda
historical glance: by the year

reported main breaks per fiscal year

434 553 485 539 310 417 550 584 433 408

Environmental Quality and Operations Committee - 10:10 a.m. V. Water Main History and Associated Cost - Charles Kiely
historical glance: by comparison

• how do we compare?
  • *National average: 25 breaks / 100 miles of pipe*

• DC Water: 30.6 breaks / 100 miles of pipe in FY 2017

• Based on the 2017 AWWA Utility Benchmarking Survey, breaks per 100 mile for combined utilities ranged from 10 to 49.
Environmental Quality and Operations Committee Meeting - 10:10 a.m. V. Water Main History and Associated Cost - Charles Kiely

agenda

- historical glance
- how cold is too cold
- by the dollar
- water quality did it
- ops initiatives
- q&a
how cold is too cold?

Reported Main Breaks Per Month

- FY 2013
- FY 2014
- FY 2015
- FY 2016
- FY 2017
how cold is too cold?

Reported Main Breaks Per Month
how cold is too cold?

Reported Main Breaks Per Month

- FY 2018
how cold is too cold?

Reported Main Breaks Per Month

- October: 0
- November: 50
- December: 100
- January: 150
- February: 200
- March: 250
- April: 150
- May: 100
- June: 50
- July: 0
- August: 0
- September: 0

FY 2018
how cold is too cold?

Reported Main Breaks by Day vs Average Daily Temperature

- 45-55°F
- 25-40°F
- 35-50°F
- 25-20°F
- 16°F
- 60-20°F
- 55-30°F

Reported Main Breaks

- 16°F
- 25-20°F
- 60-20°F
- 55-30°F
how cold is too cold?

Reported Main Breaks by Day vs Average Daily Temperature

- 45-55°F
- 25-40°F
- 35-50°F
- 25-20°F
- 16°F
- 60-20°F
- 55-30°F

IMT Activation

Reported Main Breaks
how cold is too cold?

• break activity has been mostly seasonal

• pipe condition plays a role
  o age, material type, etc.

• system information is very critical
  o valve status
  o pumping operations
  o CIP planning
Environmental Quality and Operations Committee - 10:10 a.m. V. Water Main History and Associated Cost - Charles Kiely

agenda

historical glance
how cold is too cold
by the dollar
water quality did it
ops initiatives
q&a
by the dollar

• the average main break costs have fluctuated between $8,000.00 - $20,000.00 per location

• operational overtime, contractor costs, and public restoration costs have been leading contributors to increased costs.

• annual expenditures in these areas have continued to expand and contract
by the dollar

water ongoing capital expenditures
($1,000’s)

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>$10,394</td>
<td>$8,608</td>
<td>$8,811</td>
<td>$7,680</td>
<td>$5,809</td>
<td>$6,017</td>
<td>$8,680</td>
<td>$7,470</td>
<td>$9,023</td>
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by the dollar

<table>
<thead>
<tr>
<th>FY</th>
<th>SPECIAL PROJECTS</th>
<th>HIGH COST JOBS &gt; $100,000</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>COST</td>
<td>#</td>
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<tr>
<td>FY 13</td>
<td>2</td>
<td>$846,140.93</td>
<td>3</td>
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<tr>
<td>FY 14</td>
<td>0</td>
<td>$0.00</td>
<td>2</td>
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<td>FY 15</td>
<td>0</td>
<td>$0.00</td>
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<tr>
<td>FY 16</td>
<td>0</td>
<td>$0.00</td>
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<tr>
<td>FY 17</td>
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<td></td>
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<td>$1,503,442.82</td>
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by the dollar

<table>
<thead>
<tr>
<th>HIGH COST JOBS</th>
<th>FISCAL YEAR</th>
<th>REPAIR</th>
<th>RESTORATION</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th St &amp; M St SW</td>
<td>16</td>
<td>$69,540.79</td>
<td>$37,658.84</td>
<td>$107,199.63</td>
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<tr>
<td>14th St &amp; New York Ave NW</td>
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<td>$68,694.68</td>
<td>$32,246.78</td>
<td>$100,941.46</td>
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<tr>
<td>4560 Macarthur Blvd NW</td>
<td>17</td>
<td>$58,486.90</td>
<td>$354,364.04</td>
<td>$412,850.94</td>
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<tr>
<td>1818 Kalorama Rd NW</td>
<td>17</td>
<td>$12,773.61</td>
<td>$96,180.03</td>
<td>$108,953.64</td>
</tr>
<tr>
<td>16th St &amp; Somerset Pl NW</td>
<td>17</td>
<td>$86,612.42</td>
<td>$26,745.00</td>
<td>$112,858.17</td>
</tr>
</tbody>
</table>
by the dollar

• 4560 MacArthur Blvd., NW Main Repair
  o Reported: May 17, 2017
  o Repaired: May 19, 2017
  o Repair: 30-inch broken water main repaired and a new 6-inch blow off valve installed
  o Asset Data:
    o Main – 30-inch cast iron
    o Org. Installed – 01.01.1860
  o ~157 years old
  o with 86% of the costs towards roadway restoration
by the dollar

• 1818 Kalorama Road, NW Main Repair
  o Reported: November 16, 2016
  o Repaired: November 17, 2016
  o Repair: 6-inch broken water main
    repaired (main broke two additional
    times during recharge)
  o Asset Data:
    o Main – 6-inch cast iron
    o Org. Installed – 07.11.1893
  o ~123 years old!
  o with 88% of the costs towards roadway
    restoration
by the dollar

repair vs restoration cost

FY 13 FY 14 FY 15 FY 16 FY 17

$47,829.70 $332,322.25 $544,779.09 $317,885.42 $586,968.03

$594,085.44 $156,883.31 $481,024.18 $599,249.40 $183,952.58

Repair Restoration

Environmental Quality and Operations Committee Meeting - 10:10 a.m. V. Water Main History and Associated Cost - Charles Kiely
water quality did it

• they tried to tell us
  • get the unlined cast iron out

• 1350 miles of pipe in the water distribution system
  • approximately 740 miles are unlined cast iron

• creates water quality challenges
  • not always the oldest pipe
water quality did it

- routine flushing within 83 areas every 1-4 months to maintain clear water

- that’s approximately 12,540 homes
  - ~ 3 blocks per area
  - ~ 50 homes per block

- working to keep it clear
water quality did it

- ice slurry traveling down the main
water quality did it

- ice pigging results
operational initiatives

• continued in-house main replacements
  o removing unlined cast mains
  o small areas/neighborhoods with highest complaints
  o dedicated internal operational resources (with support from DETS)

• improved efficiencies
  o L.A.M.B.
  o data collection and analysis
  o improved valve system data
  o cost effective system analysis (i.e. RedZone)

• continue to highlight and support addressing the WQ challenges in the system

• all working towards providing outstanding customer service.
operational initiatives

• in-house main replacement (example)

*Evarts St NE Main Replacement & Upgrade Project*
  o Replace approx. 315 feet of water main
  o Upgrade 11 lead service lines
  o Construction start: May 2018
  o Construction completion*: August 2018
  o Asset Data:
    o Main – 8-inch cast iron
    o Org. Installed – 06/24/1920
  o ~98 years old
operational initiatives

• continued in-house main replacements
  o removing unlined cast mains
  o small areas/neighborhoods with highest complaints
  o dedicated internal operational resources (with support from DETS)

• improved efficiencies
  o L.A.M.B.
  o data collection and analysis
  o improved valve system data
  o cost effective system analysis (i.e. RedZone)

• continue to highlight and support addressing the WQ challenges in the system

• all working towards providing outstanding customer service.
agenda

historical glance

how cold is too cold

by the dollar

water quality did it

ops initiatives

q&a
q&a
THANKS
Sewage Pumping Stations
Flood Protection Status

Main sewage pumping station

O Street Sewage Pumping Station

Main Sewage Pumping Station
Agenda

Introduction / Background

Pumping Station Risk Categorization

Proposed Main Pumping Station Flood Hardening Project

O Street Pumping Station and Headquarters

Summary
Introduction / Background

• Risk assessment is based on a 2014 evaluation of 2010 FEMA flood mapping
  • Currently updating with 2017 FEMA mapping
• All datums corrected to historic DC Datum based on “US Army Corps of Engineers, Flood Emergency Manual (draft, October 2015)”
• Risk impacted by infrastructure configuration
  – Elevations of entrances, floor, pumping equipment
  – Means of stormwater conveyance
  – Further investigations and site visits would be required to confirm risk level and protection requirements
## PS Flood Risk Categorization

<table>
<thead>
<tr>
<th>Pump Station (PS)</th>
<th>At Risk with 100-year Floodplain (FEMA 2010)</th>
<th>At Risk with 500-year Floodplain (FEMA 2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rock Creek PS</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2 Potomac PS</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3 3rd &amp; Const. Ave PS</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>4 Main St PS</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5 O St PS</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>6 New Poplar Point PS</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>7 East Side PS</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8 Earl Place PS</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9 Upper Anacostia PS</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Main and O Street Pump Station (PS) Inundation

Notes:
1. Risk imagery taken from current (2017) FEMA map resources website

**HIGH RISK**
(1% annual chance, or 100-year floodplain)

**MODERATE RISK**
(0.2% annual chance, or 500-year floodplain)

**Notes:**
1. Risk imagery taken from current (2017) FEMA map resources website
Main Sewage PS

500 yr Flood @ El 14.84’

100 yr Flood @ El 10.74’

MOTOR ROOM FF @ El 10.50’

Storm Side FF @ El -7.55’

Sanitary Side FF @ El – 13.20’
FEMA Grant Funding for Main PS Flood Mitigation

Hazard Mitigation Grant
PDMCPJ-03-DC-2014-002

Flood Mitigation to Elev. +13.8 ft.
(i.e., above FEMA 100-year event; ~equiv. to Cat 2 Hurricane surge)

Scope of Grant
• Interior watertight doors
• Disconnect floor drains
• Sealing of building penetrations
• Exterior doorway protection
• Modification of elevator shaft
• Parging of ventilation shaft
• Modifications to inflatable dam control structures
• Exterior equipment protection (e.g., hvac and transformers)

Project budget: $1,598,569
Grant support: 75%
Completion date: 09/30/2018
New Headquarters Building

O Street PS and Headquarters

Interior first floor level: +15.0 ft. (both HQ and PS)
Exterior grade level: +11.0 ft.

500-year flood: +14.84 ft.
100-year flood: +10.74 ft.
Summary

• Two of nine stations currently at risk under a 100-yr flood
  • Six of nine stations at risk under a 500-yr flood
• Project currently proposed for Main PS to protect it to over the 100-year flood
• Currently no funding included in CIP for flood protection at any of the other sewage pump stations.
• DC Water Emergency Management Plan
  – Addresses flood preparation for all DC Water facilities including pumping stations
ENGINEERING SERVICES SUPPLEMENTAL AGREEMENT

Construction Management Services, Anacostia River Combined Sewer Overflow (CSO) Control Projects, Division Z - Poplar Point Pumping Station Replacement and Main Outfall Sewers Diversion (Joint Use)

Approval to execute Supplemental Agreement No. 2 for $740,000.00. The modification exceeds the General Manager’s approval authority.

CONTRACTOR/SUB/VENDOR INFORMATION

<table>
<thead>
<tr>
<th>PRIME:</th>
<th>SUBS:</th>
<th>PARTICIPATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AECOM Services of DC 3101 Wilson Boulevard Suite 900 Arlington, VA 22201 Headquarters Los Angeles, CA 90067</td>
<td>SZ PM Consultants, Inc. Oakton, VA Savin Engineers, PC Washington, DC Sigma Associates, Inc. Detroit, MI MBE MBE WBE</td>
<td>27.9% 4.7% 19.5%</td>
</tr>
</tbody>
</table>

DESCRIPTION AND PURPOSE

Original Contract Value: $4,891,074.00
Value of Previous Supplemental Agreement: $1,992,719.57
Value of this Supplemental Agreement: $740,000.00
Cumulative SA Value, including this SA: $2,732,719.57
Current Contract Value, Including this SA: $7,623,793.57
Original Contract Time: 958 Days (2 Years, 8 Months)
Time Extension, this SA: 214 Days
Total SA contract time extension: 549 Days (1 Year, 8 Months)
Contract Start Date: 11-15-2014
Contract Completion Date: 12-31-2018

Purpose of the Contract:
To provide onsite construction management (CM) of Division Z – Poplar Point Pumping Station Replacement (DC Clean Rivers Project) construction contract.
This work is required by Consent Decree.

Original Contract Scope:
- Provide CM and other services to assist DC Water with construction of Division Z. Division Z includes construction of a new 55 MGD Poplar Point Sewage Pumping Station (PP-PS), the Anacostia Main Interceptor (AMI) Diversion Chamber, the AMI Diversion Sewer, the Emergency Overflow Structure, the 42" Force Main, the Discharge Connection Chamber, and the Main Outfall Sewers Diversion Chamber.
- Provide CM services to assist DC Water with the replacement of the Barry Road sewer.
- Work in cooperation and consultation with DC Water and the DC Clean Rivers Project Program Consultants Organization to effectively manage the construction work required to provide completed Division Z facilities.
- Provide field inspection services for the oversight of the construction work as well as oversight during startup and operational training for the newly constructed PP-PS.
Previous Supplemental Agreement Scope:
- To extend onsite CM of Division Z Poplar Point Pumping Station Replacement and Main Outfall Sewers Diversion due to unforeseen delay in the construction of the project. The Contractor will be working 24/7 to recover schedule which requires augmented CM manpower to provide appropriate construction oversight.
- Extend CM, contract administration and resident engineering and inspection services by 335 days to assist DC Water with Division Z Construction Contract.

Current Supplemental Agreement Scope:
- To extend onsite CM of Division Z Poplar Point Pumping Station Replacement due to further unforeseen delays in the construction of the project. The Contractor will be working extended hours which requires augmented CM manpower to provide appropriate construction oversight.
- Extend CM, contract administration and resident engineering and inspection services by 214 days to assist DC Water with Division Z Construction Contract.

Future Supplemental Agreement Scope:
- No future supplemental agreement is anticipated at this time.

<table>
<thead>
<tr>
<th>PROCUREMENT INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Type:</td>
</tr>
<tr>
<td>Commodity:</td>
</tr>
<tr>
<td>Contractor Market:</td>
</tr>
<tr>
<td>Award Based On:</td>
</tr>
<tr>
<td>Contract Number:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUDGET INFORMATION</th>
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</thead>
<tbody>
<tr>
<td>Funding: Capital</td>
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<tr>
<td>Service Area: Combined Sewer Overflow</td>
</tr>
<tr>
<td>Department: DC Clean Rivers Project</td>
</tr>
<tr>
<td>Department Head: Carlton M. Ray</td>
</tr>
<tr>
<td>Project: CY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ESTIMATED USER SHARE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
</tr>
<tr>
<td>District of Columbia</td>
</tr>
<tr>
<td>Federal Funds</td>
</tr>
<tr>
<td>Washington Suburban Sanitary Commission</td>
</tr>
<tr>
<td>Fairfax County</td>
</tr>
<tr>
<td>Loudoun County &amp; Potomac Interceptor</td>
</tr>
<tr>
<td>Total Estimated Dollar Amount</td>
</tr>
</tbody>
</table>

Leonard R. Benson 13-7-18
Chief Engineer

Dan Bae 3/9/18
Director of Procurement

Matthew T. Brown 3/18/18
Chief Financial Officer

Henderson J. Brown, IV Date
Interim CEO and General Manager
DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET

ACTION REQUESTED

ENGINEERING SERVICES:
Grit, Screening and Primary Facilities Upgrades
(Joint Use)

Approval to execute an architectural and engineering services contract for $1,000,000.

CONTRACTOR/SUB/VENDOR INFORMATION

<table>
<thead>
<tr>
<th>PRIME:</th>
<th>SUBS:</th>
<th>PARTICIPATION:</th>
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</thead>
<tbody>
<tr>
<td>HDR Engineering, Inc.</td>
<td>Milhouse Engineering &amp; Const., Inc.</td>
<td>MBE 33.0%</td>
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<tr>
<td>11820 Fountain Way, Suite 204</td>
<td>Gaithersburg, MD.</td>
<td></td>
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<tr>
<td>Newport News, VA</td>
<td>PDH Associates, Inc.</td>
<td>WBE 7.1%</td>
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<tr>
<td>23606</td>
<td>Potomac, MD.</td>
<td></td>
</tr>
<tr>
<td>Headquarters</td>
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<tr>
<td>Omaha, Nebraska 68114</td>
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</table>

DESCRIPTION AND PURPOSE

Contract Value, Not-To-Exceed: $1,000,000
Contract Time: 240 Days (0 Years, 8 Months)
Anticipated Contract Start Date: 05-01-2018
Anticipated Contract Completion Date: 12-27-2018

Other firms submitting proposals/qualification statements:
CDM Smith
GHD Group*
Hazen and Sawyer
JMT*
O’Brien & Gere (OBG)
RK&K

*Asterisk indicates short listed firms.

Purpose of the Contract:
The Grit, Primary and Screens Facilities have experienced accelerated deterioration due to a corrosive environment caused by hydrogen sulfide gases. As a result, electrical equipment needs to be evaluated as well as ancillary equipment and processes in an effort to provide continued reliable service for another 20 years. This contract serves to provide engineering services for the development of a concept finalization/preliminary design report (CF/PDR), participation in Value Engineering Study and provide design lock-in documentation for work identified through a condition assessment.

A Future Supplemental Agreement will follow once the concept finalization/preliminary design report and design lock-in has been undertaken. The supplemental agreement will include design, bid phase services, O&M Manual development, services during construction, start-up phase, and commissioning phase assistance.

Contract Scope:
- Undertake field reviews and develop a condition assessment.
- Develop a Basis of Design memorandums.
- Define an opinion of probable construction costs.
- Produce a concept finalization/preliminary design report.
- Participate in value engineering workshops, and formalization of design lock-in documentation.
### PROCUREMENT INFORMATION

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<th>Contract Type:</th>
<th>Lump Sum</th>
<th>Award Based On:</th>
<th>Highest Ranking Score</th>
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<tr>
<td>Commodity:</td>
<td>Engineering Design Services</td>
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<td>Contractor Market:</td>
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### BUDGET INFORMATION

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<th>Capital</th>
<th>Department:</th>
<th>Wastewater Engineering (DWE)</th>
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<tr>
<td>Service Area:</td>
<td>Wastewater Treatment</td>
<td>Department Head:</td>
<td>Diala Dandach</td>
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<td>Project:</td>
<td>BQ</td>
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### ESTIMATED USER SHARE INFORMATION

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<th>Share %</th>
<th>Dollar Amount</th>
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<tr>
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<td>Washington Suburban Sanitary Commission</td>
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<tr>
<td>Fairfax County</td>
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<td>$ 83,800.00</td>
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<td>Loudoun County &amp; Potomac Interceptor</td>
<td>4.56%</td>
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<td><strong>Total Estimated Dollar Amount</strong></td>
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<td>$ 1,000,000.00</td>
</tr>
</tbody>
</table>

Leonard R. Benson, Chief Engineer 13-7-18

Matthew T. Brown, Chief Financial Officer 13/8/18

Dan Bae, Director of Procurement 13/9/18

Henderson J. Brown IV, Interim CEO and General Manager
DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BOARD OF DIRECTORS CONTRACTOR FACT SHEET

ACTION REQUESTED

CONSTRUCTION CONTRACT
Division PR-A1 – Potomac River Project A1 (GI)
(Non-Joint Use)

Approval to execute a construction contract for $6,265,502.47

CONTRACTOR/SUB/VENDOR INFORMATION

<table>
<thead>
<tr>
<th>PRIME:</th>
<th>SUBS:</th>
<th>PARTICIPATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Myer Construction Corporation 2237 33rd Street, NE Washington, DC 20018 (CBE)</td>
<td>CBE Eligible Amounts:</td>
<td>99.7%</td>
</tr>
<tr>
<td></td>
<td>Total Eligible $5,129,342.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CBE* Total $5,114,342.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See Attachment A for List of firms.</td>
<td></td>
</tr>
</tbody>
</table>

*Based upon the Green Infrastructure (GI) Memorandum of Understanding with the District of Columbia, this contract shall utilize best efforts to maximize Certified Business Enterprise (CBE) participation, with a goal that at least 50% of the dollar amount of this contract be awarded to CBEs. No Federal funding (i.e. EPA) will be used for this contract.

DESCRIPTION AND PURPOSE

Contract Value, Not-To-Exceed: $ 6,265,502.47
Contract Time: 320 Days (0 Years, 10 Months)
Anticipated Contract Start Date (NTP): 04-30-2018
Anticipated Contract Completion Date: 03-16-2019
Bid Opening Date: 02-14-2018
Bids Received: 3

Other Bids Received
- Anchor Construction Corporation
- Corman Kokosing Construction Company $8,984,628.00 $10,010,290.00

Purpose of the Contract:
Provide construction of Division PR-A1 – Potomac River Project A1 (GI) in support of DC Clean Rivers Project.
This work is required by a Consent Decree.

Contract Scope:
- Construct Green Infrastructure (GI) practices located in the public Right of Way (ROW) to manage 1.2" of rain falling on the equivalent of approximately eight (8) impervious acres within the Potomac River watershed

Federal Grant Status:
- Construction Contract is not eligible for Federal grant funding assistance.
### PROCUREMENT INFORMATION

**Contract Type:** Fixed Price  
**Award Based On:** Lowest responsive, responsible bidder  
**Commodity:** Construction  
**Contract Number:** 150220  
**Contractor Market:** Open Market

### BUDGET INFORMATION

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<thead>
<tr>
<th>Funding:</th>
<th>Capital</th>
<th>Department:</th>
<th>DC Clean Rivers Project</th>
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<tr>
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<td>Combined Sewer</td>
<td>Department Head:</td>
<td>Carlton Ray</td>
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<tr>
<td>Project:</td>
<td>CZ</td>
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### ESTIMATED USER SHARE INFORMATION

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<th>Dollar Amount</th>
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<tr>
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<tr>
<td>Federal Funds</td>
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<td>$</td>
</tr>
<tr>
<td>Washington Suburban Sanitary Commission</td>
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<td>$</td>
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<tr>
<td>Fairfax County</td>
<td>0.00%</td>
<td>$</td>
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<tr>
<td>Loudoun County &amp; Potomac Interceptor</td>
<td>0.00%</td>
<td>$</td>
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<tr>
<td><strong>Total Estimated Dollar Amount</strong></td>
<td>100.00%</td>
<td>$6,265,502.47</td>
</tr>
</tbody>
</table>

---

Leonard R. Benson  
Chief Engineer  
1/3-7-18

Dan Bae  
Director of Procurement  
3/9/18

Matthew T. Brown  
Chief Financial Officer  
3/19/18

Henderson J. Brown, IV  
Interim CEO and General Manager  
1
Average plant performance for the month was excellent with all effluent parameters well below the seven-day and monthly NPDES permit requirements. The monthly average influent flow was 290 MGD. There was 110 MG of Excess Flow during this reporting period. The following Figures compare the plant performance with the corresponding NPDES permit limits.

This graph illustrates the monthly average influent flow to the plant. The design average flow is 370 MGD. Blue Plains has a revised 4-hour peak flow capacity of 511 MGD through complete treatment. Flows up to 336 MGD in excess of the 511 MGD peak capacity receive primary treatment, disinfection and dechlorination.

The Ammonia Nitrogen (NH3-N) is a measure of the nitrogen found in ammonia. For the month, effluent NH3-N concentration averaged 0.29 mg/L and is below the average 11.1 mg/L limit.

The Total Phosphorus (TP) is a measure of the particulate and dissolved phosphorus in the effluent. The annual average effluent TP concentration is 0.08 mg/L, which is below the 0.18 mg/L annual average limit.
Carbonaceous Biochemical Oxygen Demand (CBOD) is a measure of the amount of dissolved oxygen required for the decomposition of organic materials. The effluent CBOD concentration averaged 3.75 mg/L (partial month), which is below the 5.0 mg/L limit.

pH is a measure of the intensity of the alkalinity or acidity of the effluent. The minimum and maximum pH observed were 6.3 and 6.7 standard units, respectively. The pH was within the permit limits of 6.0 and 8.5 for minimum and maximum respectively.

Dissolved Oxygen (DO) is a measure of the atmospheric oxygen dissolved in wastewater. The DO readings for the month are within the permit limits. The minimum daily average is 8.6 mg/L. The minimum instantaneous DO reading is 8.1 mg/L. The minimum permit limits are 5.0 mg/L and 4.0 mg/L respectively.

E. coli is an indicator of disease causing organisms (pathogens). The E. coli permit limit is 126/100mL. The E. coli geometric mean is 1.3 /100mL, and well below the permit limit.
Winter Weather Impact on Plant Performance

Despite higher than average monthly temperature recorded for the month of February 2018, the Washington Metropolitan Region received above normal total precipitation (4.79 inches as measured at National Airport) and few days of below freezing temperatures at the beginning of the month. Two of the numerous wet weather events resulted in peak influent flows exceeding 511 MGD and total excess flow of 110 Million Gallons (MG) that received treatment through Preliminary, Primary, Disinfection, and Dechlorination treatment processes; before the flow was discharged through Outfall 001.
At the beginning of the month, higher than average concentrations of TSS and CBOD were measured in the effluent. They occurred immediately following the below freezing temperatures on February 2nd and 3rd and wet weather event on February 4th, that resulted in a daily average and peak influent flows of 354 MGD and 684 MGD respectively. The deicing materials, applied on roads during freezing temperatures, were washed into the treatment process during the subsequent wet weather event. This event had an adverse impact on the treatment process creating a higher level of microscale size colloidal particles with poor settling characteristics and difficult to remove in the plant’s effluent filters. The colloidal particles load appears to be the source of the above average concentrations of TSS and CBOD observed in the final effluent.

The plant’s operators, process engineering, and research staff worked diligently to monitor and mitigate the impact and develop control strategies for future use. As shown on the figure below, both effluent TSS and CBOD concentrations have declined to normal levels. All effluent quality parameters were below the weekly and monthly average NPDES permit limits.
Plant Influent Flow Trend

The graph below shows a long-term influent flow trend to the plant ending February 2018. While for any given month the flow is weather dependent, the 12-month rolling average influent flow has remained at or below 300 MGD since February 2011.
Blue Plains Total Nitrogen (TN) Removal – Performance

The graph below shows 12-month rolling TN discharge, in million pounds per year, over a 10-year period ending February 2018. In February 2018, the monthly average TN concentration and total load in the effluent were 4.44 mg/L and 296,600 lbs. respectively.

During the 2017 calendar year, the total pounds of nitrogen discharged in the effluent was 2,835,177 and is below the NPDES permit discharge limit of 4,377,580 lbs. /year. The performance corresponds to annual average influent flow of 269 MGD, maximum month flow of 308 MGD, and average monthly wastewater temperatures above 17 °C observed during the calendar year. The Blue Plains Enhanced Nitrogen Removal Facility (ENRF) is designed to meet the TN discharge limits at influent loads corresponding to annual average flows of 370 MGD, maximum month flows of 485 MGD, and operating wastewater temperatures below 12 °C.
Note: Since the commissioning of ENRF, the 12-month rolling average TN concentration and load in the effluent continued to decline and reached the lowest level in March of 2016. Although the TN load in the effluent remained well below the permit limit, the slight but steady increase since March of 2016 was mostly caused by higher concentrations of refractory dissolved organic nitrogen (rDON) in the filtrate (liquid removed from dewatering class A biosolids) returned for treatment in the plant’s secondary and enhanced nitrogen removal processes. The rDON concentrations are within anticipated levels and have stabilized as shown on the chart below (green line).

The monthly average TN concentrations in recent months (November and December 2017) were slightly elevated due to scheduled major outages of Nitrification Reactors. In November 2017, half of the 12 Nitrification Reactors were removed from service for six consecutive days to replace 20 inch discharge valves on 21 return sludge pumps associated with the reactors. Replacement work on the remaining six reactors was completed in December 2017. Both shutdowns and the subsequent startups were successfully completed with full compliance of all NPDES permit requirements.
Plains Electricity Generation and Usage

In February 2018, the average energy consumed at Blue Plains was 693 megawatt hours per day (MWH/day) or 2.42 MWH of electricity per million gallon of wastewater processed through complete treatment. The Combined Heat and Power (CHP) facility generated an average of 192 MWH/day, making up for 28% of total energy consumed at Blue Plains. The remaining 501 MWH/day was purchased from PEPCO.

The graph above is based on power monitors installed at the Main Substation and CHP, and reflects average energy consumed at Blue Plains in MWH/day. Of the total use, the energy purchased from PEPCO and net energy supplied by CHP are indicated by the blue and orange highlights, respectively. The graph below shows the monthly value of the net electricity produced by CHP by assuming unit price of $78/MWH of electricity.
CHP Operation and Maintenance Status

The recent repair works, completed on two of the three Heat Recovery Steam Generators (HRSG), have significantly improved the reliability of the CHP to produce and supply adequate high pressure steam to the Thermal Hydrolysis Process (THP) and maximize use of digester gas for electricity production. The average electrical energy production rate, in MWH/day, in February 2018 was the highest achieved since the beginning of the contract operation period on July 1, 2016.

The annual reconciliation of the contract operation period that ended on September 30, 2017 is still in progress. The reconciliation will include, amongst other items, reimbursement payments for any power production shortfalls under the Digester Gas Electrical Power Production Guarantee, as set forth in the contract.
RESOURCE RECOVERY

In February, biosolids hauling averaged 470 wet tons per day (wtpd). The average percent solids for the Class A material was 32.5%. The graph below shows average daily biosolids produced and the associated monthly cost for reuse (transportation and application cost) for a three-year period ending February 2017. In February, diesel prices averaged $3.29/gallon, and with the contractual fuel surcharge, the weighted average biosolids reuse cost (taking into account the marketed material) was $41.46 per wet ton.

The average quantities of Class A biosolids transported and applied on farms by the two major contracts (WSSC’s Recyc and DC Water’s Nutriblend) and the quantities marketed as Bloom are shown on the graph above. In February, 736 wet tons of Bloom were distributed to two customers.
Product Quality

All biosolids produced during the month of February met Class A Exceptional Quality (EQ) requirements required by EPA. The graph below shows the EPA regulated heavy metals average concentrations in the Class A biosolids. The concentrations are considerably below the regulated exceptional quality limits (EPA-503 Exceptional Quality Limits) and the national average (EPA-2009 Survey Average).

The graph below shows both Vector Attraction Reduction (VAR) and Fecal Coliform (FC) results in the Class A product, both of which are required to maintain the Class A Exceptional Quality (EQ) status. Vector Attraction Reduction is measured by the reduction in Volatile Solids (VS) or organic compounds that may be odorous and attract nuisance vectors such as flies and rodents. DC Water anaerobic digesters reduced VS by over 65 percent, well above the required 38 percent minimum. In addition, the graph shows fecal coliforms levels in the Class A product. Fecal coliforms are indicators of disease causing organism (pathogens), and must be below 1,000 MPN/g to meet Class A standards. The FC levels in the Class A product are two orders of magnitude less than the maximum allowable level.
Bloom Marketing

Bloom sales for the current calendar year, through February 28th, totaled 1,119 tons and represents 6% of the 20,000 tons goal.

Bloom Reuse and Value Map

This map shows where Bloom was reused on agricultural land and sold into the market as a soil amendment product in January 2018. Marketing activations occurred exclusively in MD and DC, since this is where we have permits to do so. We just received our Distribution and Marketing permit for the state of VA, and are beginning to make sales calls in the state.
CLEAN WATER QUALITY AND TECHNOLOGY

The Department of Clean Water Quality and Technology includes the research and development, pretreatment and laboratory programs. A summary of activities for each group is provided below.

Research and Development

The research and development team focuses on research topics associated with the planning and operation of Blue Plains. The current focus of research is to optimize treatment process capacity and to work toward achieving energy neutral operations. Activities during December and January included continued work by our research team in the carbon removal/redirection, nitrogen removal, and solids treatment focus areas. In addition, members of the R&D team were involved with the activities below.

Developing a Comprehensive Plant-wide Model for Colloids Flocculation and Carbon Capture

As part of the ongoing investigation of options for optimizing Blue Plains Secondary Treatment capacity and energy balances, the research and development team started working with Dynamita to develop a model using the Sumo software to simulate carbon capture in high rate biological treatment systems. Although biological process models have been used in the wastewater treatment industry for many years, most of the development effort has been focused on nitrogen removal systems operating at solids retention times (SRT, or sludge age) longer than three days. As a result, the available process models are less accurate for simulating performance of high-rate secondary treatment processes. Alternatives for enhancing the Blue Plains secondary treatment capacity require operation at lower SRT, and a modeling tool is needed to properly assess these options.

In the existing process models, organic material in the wastewater is quantified as chemical oxygen demand (COD). The COD is classified into various “fractions” based on the size of the organic compounds (i.e. soluble COD, colloidal COD and particulate COD) and the biodegradability (i.e. biodegradable and un-biodegradable). Within the models, the colloidal COD is first quickly flocculated and converted to particulate COD. This flocculation rate occurs almost instantly and is therefore considered “non-limiting” from the perspective of affecting the overall treatment rates. Particulate COD is converted to easily degradable organics (soluble COD) via a process called hydrolysis. Soluble COD is biologically oxidized and converted to energy and new biomass.

However, in high-rate systems that are designed to reduce the energy for oxidizing COD and improve capture of COD for energy recovery, the flocculation of particulate and colloidal COD cannot be assumed to occur instantaneously and the mechanisms and time for this step must be accounted for within the model. The flocculation process is dependent on biological activity and the ability of the organisms to stick together and form flocs by producing natural polymers called EPS (or extracellular polymeric substances). In addition, under high rate conditions, organisms can store soluble
substrate before they are able to oxidize it. A structure for updating the existing models to account for colloidal material and extra polymeric substrate “EPS” generation, flocculation of colloidal and particulate material, and internal storage in microbial cells is shown in Figure 1.

Figure 1. Biological processes added and modified for the removal and capture of organics. [SB,m = monomer soluble biodegradable COD; SB,poly = polymer soluble biodegradable COD; SVFA = Volatile Fatty Acids; XSTO = Storage particulate COD; XMEPS = Specific EPS content; XE = Endogenous particulate COD; XB = Biodegradable particulate COD; XU = Un-biodegradable particulate COD; CB = Biodegradable colloidal COD; CU = Un-biodegradable colloidal COD]

The model will be tested using data from various pilot and full scale processes with wide range of wastewater characteristics, process configurations, and operational conditions. The model will then be incorporated into the plant-wide mechanistic model for Blue Plains for use in developing strategies for operating the secondary system to increase capacity and improve the energy balance to reduce cost of operation.

AVN Controller Prototype Testing – Phase 2

DC Water is working to develop a standalone controller for application of the AVN control strategy for optimization of nitrogen removal processes. With the assistance of Gray Matter Systems, a prototype controller was developed and tested at Blue Plains. A second stage of demonstration testing was initiated in January at the short-cut nitrogen
removal pilot plant being operated by Hampton Roads Sanitation District. Testing will continue over the next month using remote access, and full documentation of the controller strategy will be completed.

Blue Plains Main Laboratory

The Main Laboratory staff conducts analyses on Blue Plains AWTP effluent for NPDES Permit requirements, as well as on biosolids, pretreatment samples, storm water runoff, and process samples, on a daily basis, 365 days a year. The laboratory currently analyzes approximately 2,800 samples each month and conducts approximately 8,000 analyses, including Total Suspended Solids; Volatile Suspended Solids; Total and Volatile Solids; Ammonia Nitrogen; Nitrite and Nitrate Nitrogen; Total, Soluble, and Ortho Phosphorus; Total and Soluble Kjeldahl Nitrogen; Carbonaceous Biochemical Oxygen Demand; Chemical Oxygen Demand; Total Alkalinity and Hardness; and Fecal Coliform and E. Coli microbiological testing.

In addition to comprehensive testing to support operation of liquid stream processes, the laboratory analyzes Belt Filter Press cake samples for fecal coliform bacteria for DC Water’s Class A Biosolids reporting, as well as digester samples from the new Cambi Thermal Hydrolysis and Anaerobic Digestion facility, including Total and Volatile Solids, Total and Volatile Suspended Solids, Ammonia Nitrogen, alkalinity and pH. Fecal coliforms in the BFP dewatered cake and TS and VS upstream and downstream of the digestion process are monitored to show compliance with 40 CFR 503 Pathogen and Vector Attraction Reduction requirements.

The laboratory also assisted the Department of Sewer Services conducting microbiological analysis of water samples for E. coli bacteria, as well as monitoring the Northeast Boundary Swirl Facility Effluent for NPDES compliance. Laboratory staff also participated in the WWOA Executive Board.

This month the laboratory continued analysis of samples from the new Filtrate Treatment Facility which removes nitrogen from the belt press dewatering filtrate. Parameters analyzed include ammonia, nitrate, and nitrite nitrogen; ortho-phosphorus; COD; TSS; VSS and alkalinity.

Water Quality & Pretreatment

The Blue Plains Water Quality & Pretreatment group manages the Industrial Pretreatment Program, including temporary dewatering dischargers from construction and other activities, as well as the Hauled Waste Program. A new program for Dental Dischargers is being implemented as new regulations were finalized requiring compliance with reporting and best management practices as well as installation of an amalgam separator, for those dental facilities placing or removing dental amalgam fillings. Staff also provide specialized sampling and program management support for the Blue Plains NPDES permit, including PCB monitoring and storm water management.
Staff, with contractor support, is currently updating the Blue Plains Storm Water Pollution Prevention Plan (SWPPP), conducting inspections of storm water structures and facilitating cleaning and repairs, as well as coordinating quarterly Blue Plains Storm Water Committee meetings and other SWPPP compliance activities. Staff also developed a sampling plan this month to provide a preliminary assessment of loadings from selected locations in the collection system.

**Industrial Pretreatment Program**

DC Water currently manages twelve (12) Significant Industrial User (SIU) and eighteen (18) Non-Significant Industrial User (NSIU) wastewater discharge permits. DC Water reviewed semi-annual monitoring reports for all SIUs this month as well as monthly self-compliance monitoring reports for six (6) SIUs and one NSIU. All SIUs and NSIUs are in compliance with discharge standards for the current month.

Enforcement-related activities included the following:

- The Naval Research Laboratory (NRL) continued to comply with their Administrative Order for the PCB violation, including submittal of follow-up monthly monitoring and a monthly progress report.

- A Notice of Violation (NOV) was issued this month to the Bureau of Engraving and Printing for a petroleum oil and grease violation of 206 mg/L at outfall 14 on November 7, 2017. Follow-up monitoring demonstrated compliance with the discharge limit of 100 mg/L. Since the monitoring was not required in their permit, the facility was not determined to be in Significant Non-Compliance (SNC).

- A NOV was issued this month to the Capitol Power Plant for a pH violation at outfall 001 on January 16, 2018. The pH was below 5.0 for four minutes, with a minimum pH of 4.5.

DC Water began preparing the annual Pretreatment Program report to EPA this month. Two SIUs were determined to be in SNC for 2017: NRL and the Naval Support Facility Carderock. These facilities will be published in The Washington Post next month.

DC Water currently manages 71 Temporary Discharge Authorization (TDA) permits, primarily for construction site discharges of groundwater and/or surface runoff in the combined sewer area. Four new TDA permits were issued this month. All TDA permits are currently in compliance with discharge standards.
Hauled Waste Program

As of the end of the current month, the hauled waste program had 31 permitted haulers authorized to discharge domestic septage, portable toilet waste, grease trap waste, groundwater or surface runoff, and other types of waste, if approved in advance and have been characterized and meet pretreatment standards. Staff renewed three hauled waste permits this month under the old fee structure. Hauled waste permits, effective after February 1, 2018, are being issued under the new volumetric fee structure.

DC Water received 1,064 hauled waste loads (2,312,101 gallons) from permitted haulers this month. Manifest forms from each truck entering the plant are collected by the security guards and picked up daily by Pretreatment staff. Data is entered into an Excel spreadsheet to track the volume and type of loads being discharged daily and the results of sampling. Staff are using the new access database developed by Process Engineering to enter hauled waste loads and will be able to sort and analyze data to easily determine monthly volumes for each type of waste received and to provide volumes for billing for those haulers subject to the new fee structure. Two hauled waste samples were collected this month to check compliance with discharge standards.

NPDES Permit Sampling

Staff collected the bimonthly effluent metals, including low level mercury, at outfall 002 this month.
### Status Report of Public Fire Hydrants for DC Water Services Committee - March 5, 2018

<table>
<thead>
<tr>
<th></th>
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<td>(OOS)</td>
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<td>22</td>
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<tr>
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<td>0.27%</td>
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<td>OOS - due to inaccessibility or temp construction work</td>
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<td>19</td>
<td>19</td>
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</table>

Note: The number of public hydrants in the DC Water system fluctuates; this number fluctuates as hydrants are added and removed during development or construction activities as well as at the request of the Fire Dept.

### Breakdown of Public Fire Hydrants Out-of-Service (OOS) as of March 5, 2018

<table>
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<th>Breakdown of Defective</th>
<th>0-7 Days</th>
<th>8-14 Days</th>
<th>15-30 Days</th>
<th>31-60 Days</th>
<th>61-90 Days</th>
<th>91-120 Days</th>
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<td>Hydrant Needs Repair/Investigation</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Needs Valve Investigation for Low Flow/Pressure or Shut Test for Replacement</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Needs Replacement</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>14</td>
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<tr>
<td>Total</td>
<td>22</td>
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### Breakdown of Others

<table>
<thead>
<tr>
<th></th>
<th>0-7 Days</th>
<th>8-14 Days</th>
<th>15-30 Days</th>
<th>31-60 Days</th>
<th>61-90 Days</th>
<th>91-120 Days</th>
<th>&gt; 120 Days</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporarily OOS as part of operations such as a main repair</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>17</td>
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<tr>
<td>Construction* - OOS</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>8</td>
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<tr>
<td>Obstructed Hydrant – OOS hydrant due to operation impeded by an obstruction.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Fire hydrants not accessible due to construction activities. Also includes new hydrants which have not yet been commissioned or old hydrants which will be abandoned as part of ongoing construction projects.

### Status of Private Fire Hydrants - Based on FEMS Inspection Reporting

- **Private Hydrants:** 1,318
  - **In Service:** 1,179
  - **Out-of-Service (OOS):** 139
Map of Public Out-of-Service Hydrants
March 5, 2018

Legend
OOS Hydrants
- Defective
- New Construction
- Obstructed
- Temporary