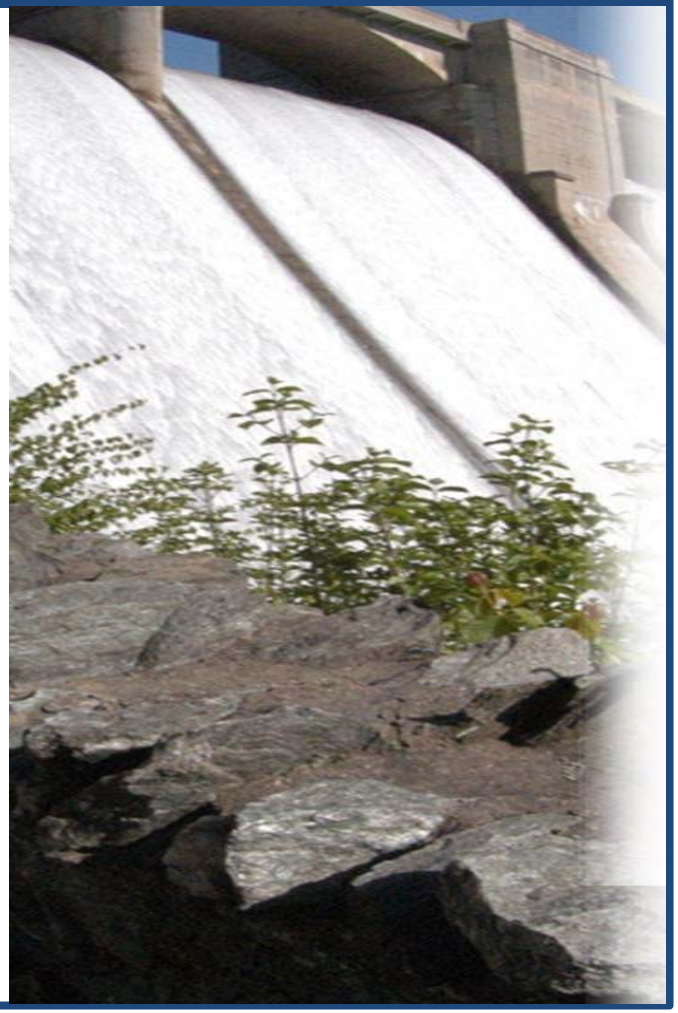
Baltimore City
Department of Public Works

CATHERINE E. PUGH
MAYOR

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS

RUDOLPH S. CHOW, P. E.
DIRECTOR



Office of Engineering and Construction
ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

Innovations in Inlet Maintenance

Olalekan Olagunju
Engineer I, Baltimore City DPW
Scott Macomber
Director of Construction, Stormwater Maintenance

STORMWATER MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

CATHERINE E. PUGH
MAYOR

Baltimore City Department of Public Works

BALTIMORE CITY DPW
DEPARTMENT OF PUBLIC WORKS
RUDOLPH S. CHOW, P.E.
DIRECTOR

Presentation Overview

- DPW Driver – Trash TMDL
- Inlet selection and installation process
  - Expansion of 2014 and 2015 pilot installation project in five neighborhoods.
- Maintenance Process
- Lessons learned

Baltimore City Trash TMDL Implementation Plan

MS4 Permit

On December 27, 2013, The Maryland Department of the Environment (MDE) reissued a National Pollutant Discharge Elimination System (NPDES) stormwater permit to the City of Baltimore. This permit lasts for 5 years and covers stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated by Baltimore City. The expiration of the Permit is December 26, 2018.

In compliance with the MS4 permit, a *Baltimore City Trash TMDL Implementation Plan* has been developed to present strategies to meet the Total Maximum Daily Load (TMDL) waste load allocations.

Baltimore City Trash TMDL Implementation Plan

On January 5, 2015, the EPA approved a "Trash TMDL" for Baltimore. The TMDL is for the Middle Branch and Northwest Portions of the Patapsco River.

The TMDL requires that the City remove 100 percent of the baseline load, which is 228,371 pounds per year.

Baltimore City Trash TMDL Implementation Plan

Table 1: Summary of Baseline Loads and TMDL for the City of Baltimore

Watershed	Annual WLA (lbs/yr)	Annual TMDL (lb/yr removed)	Daily WLA (lb/day)	Daily TMDL (lbs/day removed)
Baltimore Harbor	42,869.4	45,012.9	117.4	123.3
Gwynns Falls	93,519.3	98,195.3	256.2	269.0
Jones Falls	81,107.0	85,162.4	222.2	233.3
Total City	217,495.7	228,370.6	595.8	625.6

Note: TMDL= WLA * 5% (Margin of Safety

Baltimore City Trash TMDL Implementation Plan

Pollution Prevention Practices

- **Education and Outreach**
  - Clean Up Baltimore:
  - School Education Programs / Events and Community Presentations
  - Websites and Social Media
  - Storm Drain Art
- **Enforcement**
- **Individual Scale Waste Management**
  - Mixed Refuse and Recycling Collection
  - Pilot Municipal Can Program
  - Styrofoam Recycling
  - Bulk Trash Collection Services
  - Park Cleaning

Baltimore City Trash TMDL Implementation Plan

Pollution Prevention Practices cont'd

- **Corner Baskets**
- **Citizen Drop-off Centers**
- **Special Services**
  - Street and Alley Cleaning
  - Trash and Illegal Dumping Code Enforcement
- **Dead Animals**

Baltimore City Trash TMDL Implementation Plan

Collection at Street Level

- **Mechanical Sweeping**
- **Community Clean-Ups**
- **Community Pitch-in Program**
- **Stormwater Credit Program**

Baltimore City Trash TMDL Implementation Plan

Collection within Storm Drain or Waterways

- **Inlet Cleaning**
- **Modified Inlets (Screens and Catch Basins) Pilot Project**
- **In-line and End-of-Pipe Debris Collectors**

ENVIRONMENTAL RESTORATION CONTRACT NO. ER4069 BASIN INSERTS PHASE 2

Modified Inlets:

- **Inlet Screens:** Structural devices that fit into the storm drain inlet along the curb.

- **Inlet Inserts:** Prevents trash that gets past the screens from going into the storm drain pipes.

Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

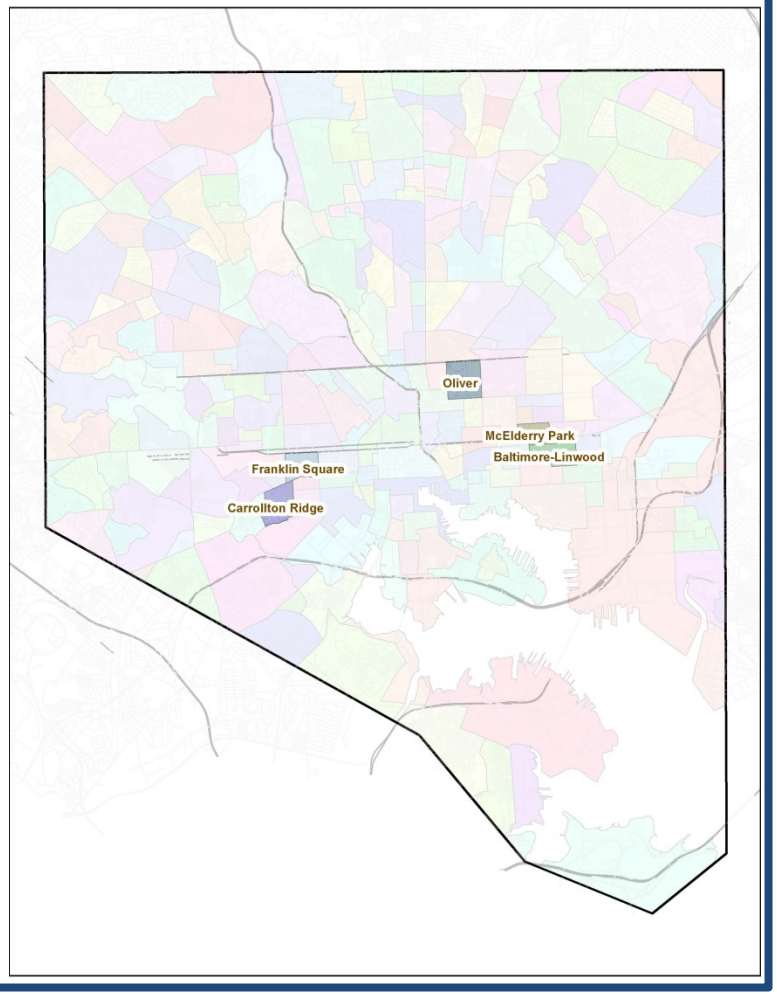
Project Neighborhoods

Neighborhoods	Total No of Inlets	No of Modified Inlets	Watershed
McElderry Park	206	140	Baltimore Harbor
Baltimore Linwood	261	87	Baltimore Harbor
Oliver	261	80	Baltimore Harbor
Franklin Square	181	49	Gwynns Falls
Carrolton Ridge	183	58	Gwynns Falls
Total	1092	414	

Office of Engineering and Construction
ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

Project Neighborhoods

- The neighborhoods were selected based on the 3-1-1 service requests for choked inlets and trash



Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

ER4069 Basin Inserts Phase 2 Scope of Work: Access of Interior of Inlet

CATHERINE E. PUGH
MAYOR

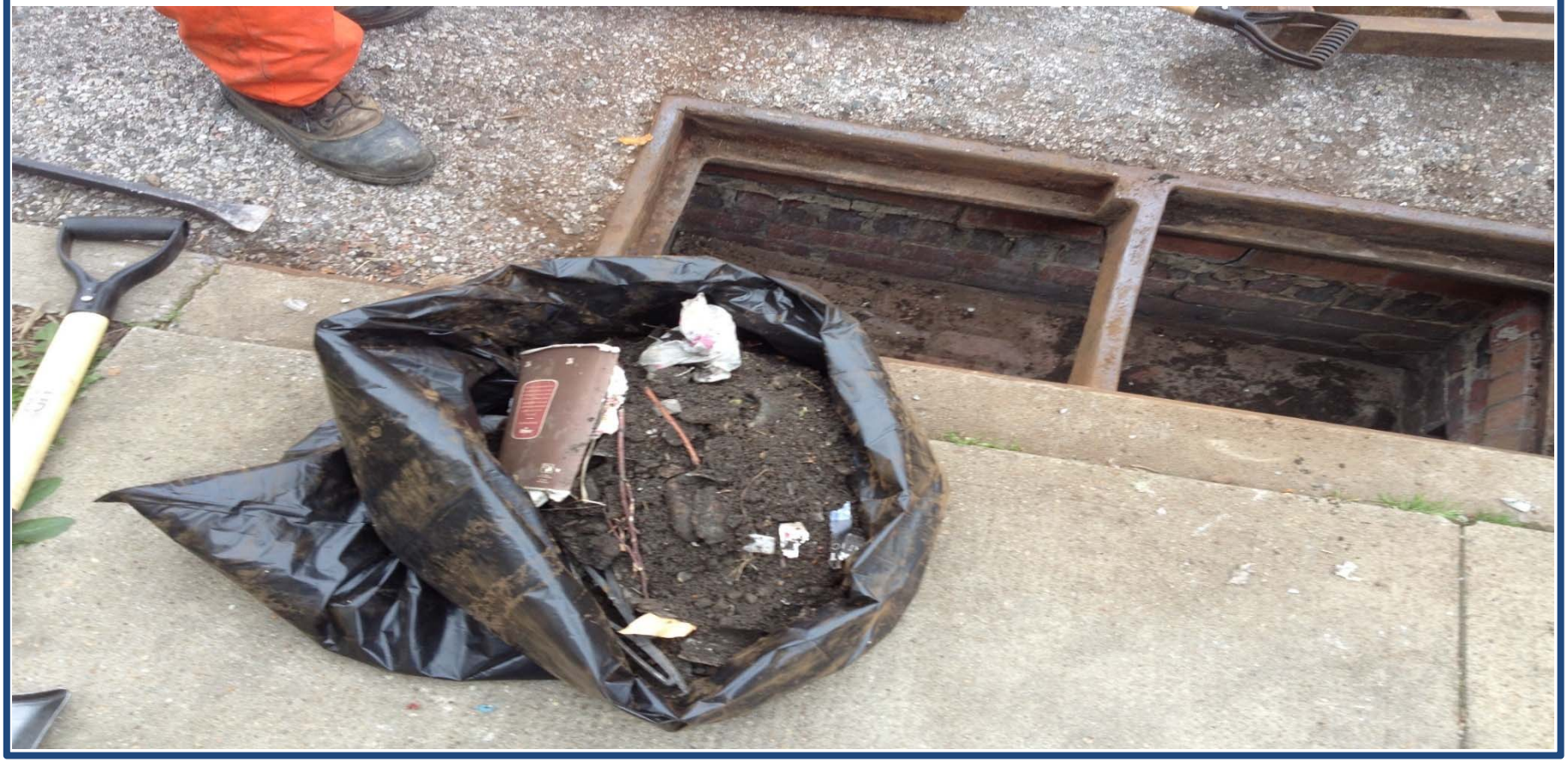
Baltimore City Department of Public Works

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS
RUDOLPH S. CHOW, P.E.
DIRECTOR

Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

ER4069 Basin Inserts Phase 2 SOW cont'd: Remove debris and dispose properly



CATHERINE E. PUGH
MAYOR

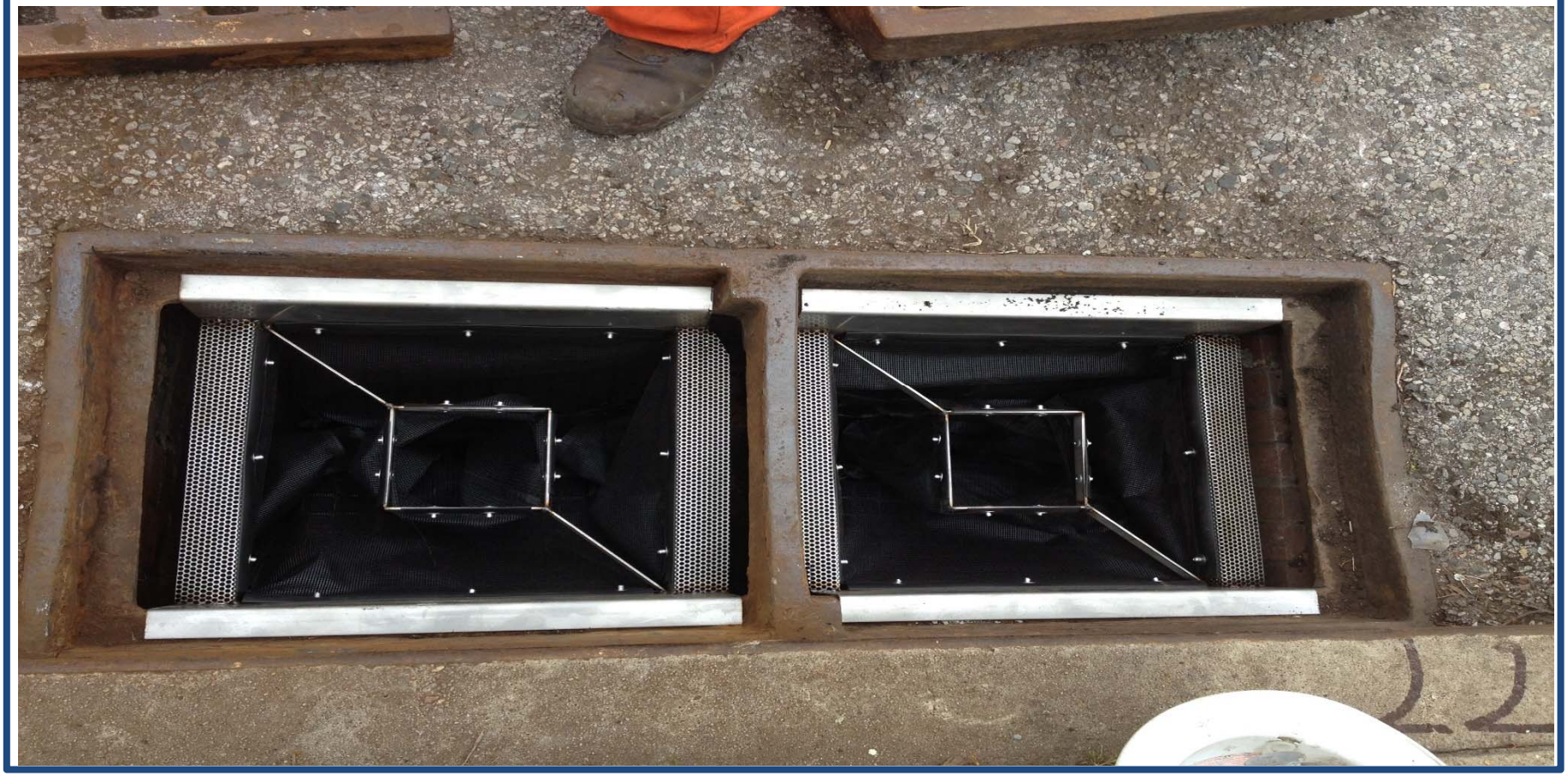
Baltimore City Department of Public Works

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS
RUDOLPH S. CHOW, P.E.
DIRECTOR

Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

ER4069 Basin Inserts Phase 2 SOW cont'd: Install Inlet Inserts



CATHERINE E. PUGH
MAYOR

Baltimore City Department of Public Works

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS
RUDOLPH S. CHOW, P.E.
DIRECTOR

Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

ER4069 Basin Inserts Phase 2 SOW cont'd: Install Automatic Retractable Screen (ARS)

CATHERINE E. PUGH
MAYOR

Baltimore City Department of Public Works

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS
RUDOLPH S. CHOW, P.E.
DIRECTOR

Storm Drain Inlet Cleaning Services Contract

Solicitation No: B50004193

SCOPE OF WORK

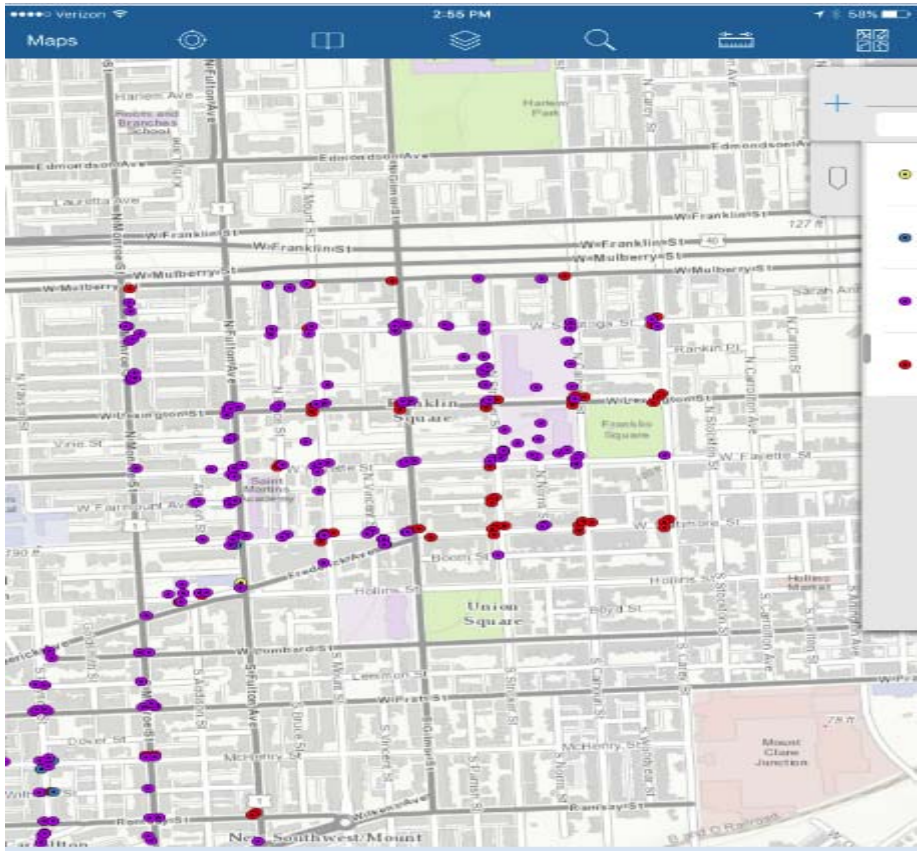
- The Contractor will remove trash and debris from Inlets and dispose properly.
- The Contractor will submit weight tickets to OEC to keep track of tonnage.

Office of Engineering and Construction

ENVIRONMENTAL ENGINEERING PROJECT DELIVERY SECTION

ESRI ArcGIS Collector App for field Data Collection with Ipad

- Free app that only requires Configuration.
- Pre & Post pictures attached to each inlet.
- Live updates submitted to GIS data staff for review.
- Perform multiple inspections.



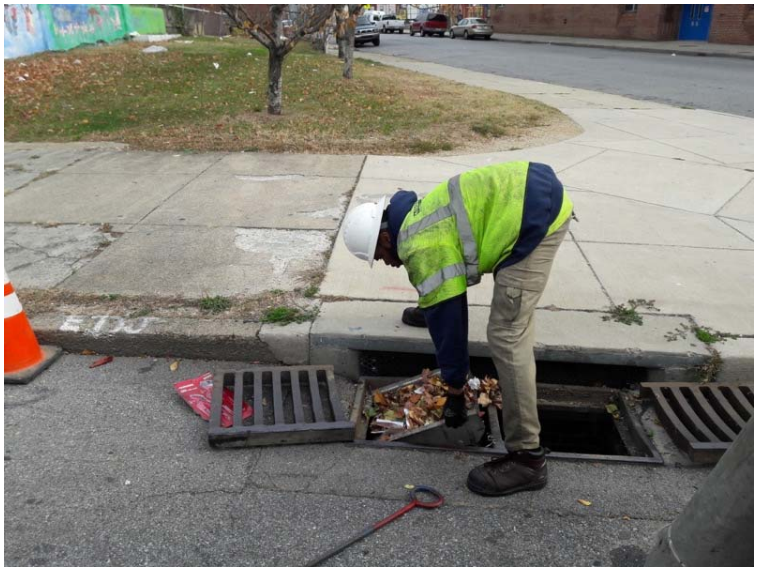
Stormwater Maintenance & Consulting

- Inlet maintenance correlated to street sweeping schedule
- Street sweeping schedule is weighted towards M/T/F – odd work weeks
- Ongoing construction can create conflicts

STORMWATER
MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

Stormwater Maintenance & Consulting

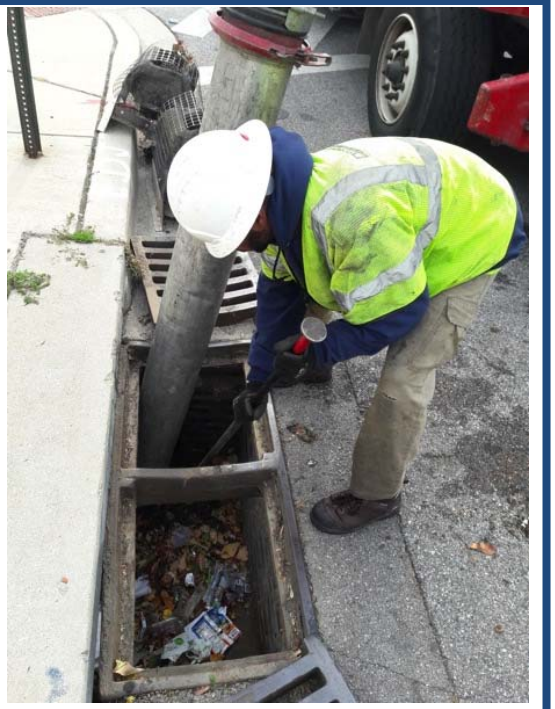
- Between traffic, access, and real life issues in the City SMC averages ~ 20 +/- per day



STORMWATER MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

Stormwater Maintenance & Consulting

- Use of small scale vacuum truck allows for efficient removal of material



STORMWATER
MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

Stormwater Maintenance & Consulting

- Material stored in covered dumpster and disposed of at sanitary landfill as needed

STORMWATER
MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

Stormwater Maintenance & Consulting

- Data collected to date:
  - Period = July – Oct 2016
  - Highly Variable
  - Yet to start return maintenance cycle to assess seasonality
  - Data not normalized to drainage area

Weight Pounds	Inlets Cleaned	Weight/Inlet
6,740	75	89.9
5,700	133	42.9
16,220	131	123.8

STORMWATER MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

Stormwater Maintenance & Consulting

- Observations to Date:
  - Inlet screens have held up well since installation
  - Amount of material varies significantly
  - Traffic, parking, and conflicts with other projects impact overall productivity

STORMWATER MAINTENANCE & CONSULTING
www.swmaintenance.com | www.mdswm.com

References

- Baltimore City Trash TMDL Implementation Plan: Implementation Plan for the Middle Branch/Northwest Branch Trash TMDL in Baltimore City. Final Document 1/4/16.

  . http://dpwapps.baltimorecity.gov/cleanwaterbaltimore/wp-content/uploads/2015/05/Trash-WIP-Final-1-4-16.pdf

- http://dpwapps.baltimorecity.gov/cleanwaterbaltimore/ms4-permit-meetings-information-and-annual-reports

Contact Information

DPW, Office Engineering and Construction (OEC)

Acting Chief - Mr. Azzam Ahmad

Abel Wolman Municipal Building

200 N. Holliday Street, Room 309

Baltimore, MD 21201

410-396-3437

Prakash Mistry, Engineer Supervisor

prakash.mistry@baltimorecity.gov

410-396-4700