



Pittsburgh  
Water & Sewer  
Authority

**Volunteers Field  
Green Stormwater Infrastructure Project**

January 16, 2019

# PITTSBURGH HAS A STORMWATER MANAGEMENT PROBLEM

Pittsburgh averages 38 inches of rain a year

- Rainfall no longer falls evenly across the year
- More severe storms, dump more rain quicker

Pittsburgh's aging stormwater infrastructure was built for a different time, less population, & for communities that had more green space & less pavement



*“Heavy Rains Cause Flash Flooding Across Western, PA Region,” CBS Pittsburgh, June 20, 2018 at 4:36 pm*

# LOCAL CHANGES TO MANAGE STORMWATER

- Pennsylvania and Allegheny County's Stormwater Ordinance – Act 167
- In Pittsburgh – no one agency is responsible for stormwater
- PWSA is assuming stormwater responsibilities from City and forming a Stormwater Division
- Pittsburgh's stormwater ordinances need to change

# ADDRESSING FLOODING AND WATER QUALITY ISSUES

- PWSA has federal & state requirements to reduce combined sewer overflows, mitigate basement backups & Total Maximum Daily Load
  - Citywide Green First Plan
  - Saw Mill Run Integrated Watershed Management Plan
- Systemwide problem requiring a multi-decade solution
  - National Storm Control Policies Vary From 1 Year to 100 year frequency storms
  - There will always be a larger storm event that the system can't handle
- Shared responsibilities between the City, PWSA & its residents





# SAW MILL RUN WATERSHED



## THE PROBLEM –

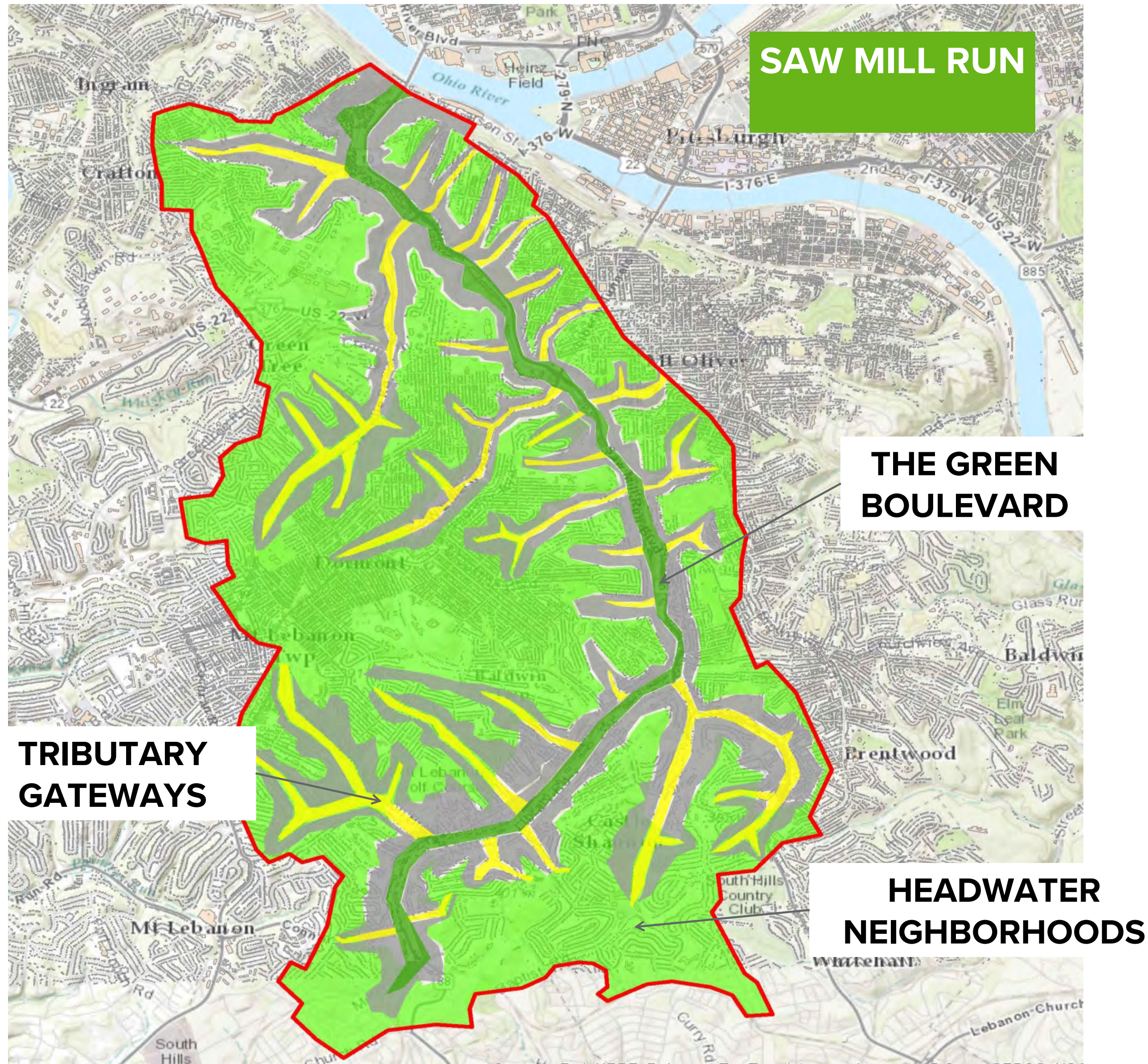
We have a **STORMWATER MANAGEMENT** problem resulting in:

- Poor Water Quality
- CSOs/SSOs
- Illicit Discharges – sewage in storm sewers
- Surface Flooding
- Basement Sewage Flooding
- Sewers that are 80 – > 100 years old
- Total Maximum Daily Load DEP Requirements

We need an **AFFORDABLE PLAN** to address **ALL OF THESE ISSUES**







# INTEGRATED WATERSHED MANAGEMENT PLAN GOAL

Complement traditional, end-of-pipe solution for the CSOs & SSOs in the watershed with a combination of green, gray and watershed-wide elements that will:

Achieve regulatory compliance

- Address other water quality & quantity issues,
- Improve quality of life,
- Contribute to economic development



# INTEGRATED WATERSHED MANAGEMENT PRIORITIES

1 **Reduce peak flows and mitigate flooding** in the watershed



2 **Stabilize and Restore Streambank** to improve aquatic habitat, flow regime, and reaeration





# INTEGRATED WATERSHED MANAGEMENT PRIORITIES

**3** Use **Green Stormwater Infrastructure** to treat stormwater to reduce sediment and phosphorous



**4** Eliminate sources of dry and wet weather fecal coliform bacteria getting into the stream, (illicit discharges).





# INTEGRATED WATERSHED MANAGEMENT PRIORITIES

**5** **Rehabilitate infrastructure** that may allow sewage to enter the stream or allows I/I into the separate sanitary sewer system.



**6** **Treat largest acid mine drainage sources along** Route 51/Library Rd. intersection and sites in Mt. Washington.







# WHAT IS GREEN STORMWATER INFRASTRUCTURE?

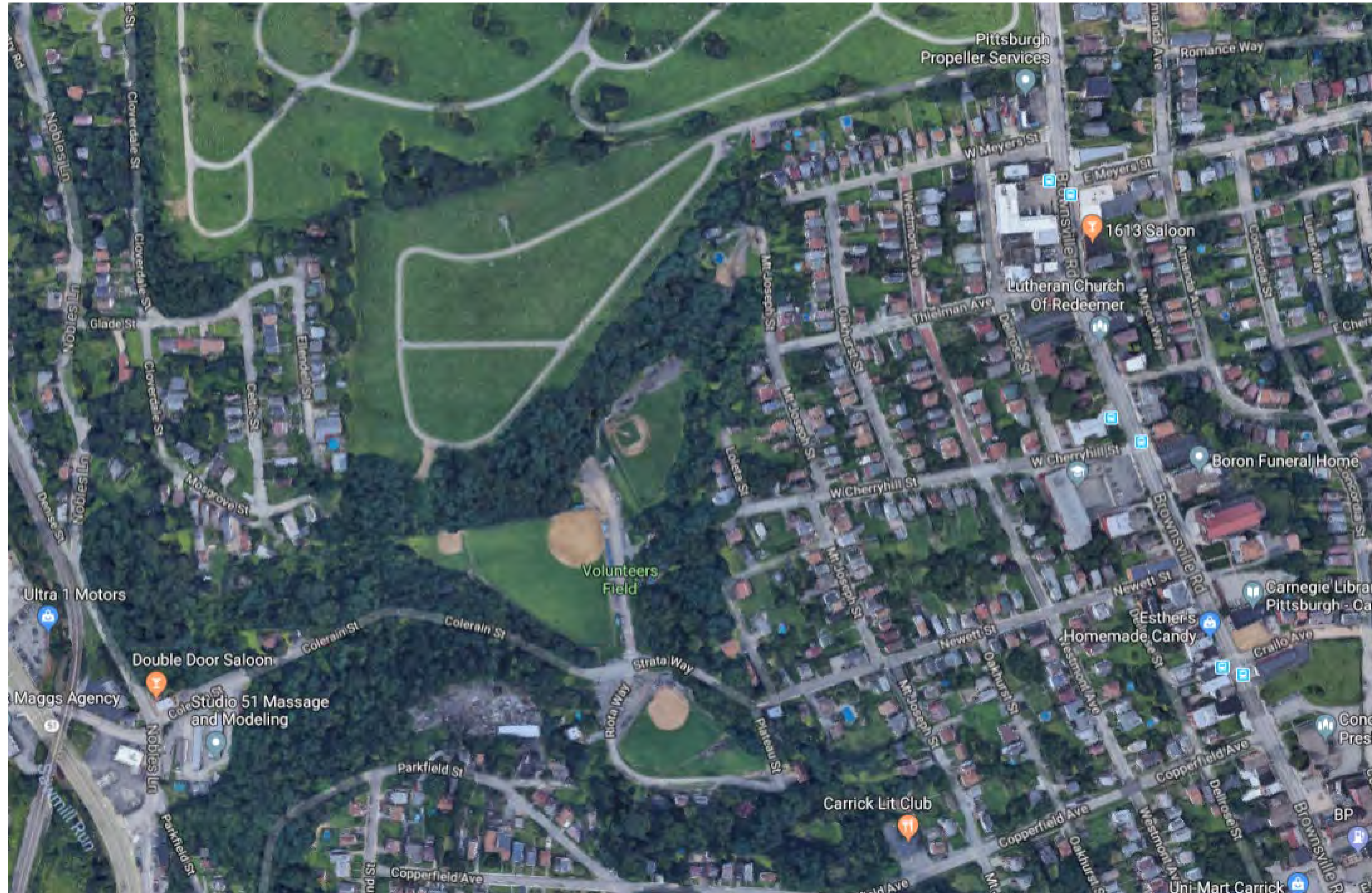


# GREEN STORMWATER INFRASTRUCTURE





# VOLUNTEERS FIELD



# PROJECT OBJECTIVES

- Develop a Neighborhood Stormwater Plan
- Identify an Early Action Project
- Develop Green Stormwater Infrastructure (GSI) concept  
Design to:
  - Reduce sediment and phosphorus loads
  - Capture the first 1.5 inches of rainfall from the contributing drainage area
  - Reduce the peak flows and volume rushing to SMR



# NEIGHBORHOOD STORMWATER PLAN

- 130 acre drainage area
  - ~42 impervious acres
- 130 Million gallons runoff per year
- TMDL- Pollutant Loading (~38" annual rainfall)
  - 159,000 lbs TSS
  - 420 lbs TP
- Loading (typical rainfall event 1.5")
  - 6,300 lbs TSS
  - 17 lbs TP





# EARLY ACTION PROJECT

## Volunteers Field



- Early Action project
- Bioretention Area (GSI-1) located along Plateau St. and Riota Way
- ~1- acre Impervious Area Treated
- Drainage improvements at BMP outfall



# EARLY ACTION PROJECT

## Volunteers Field

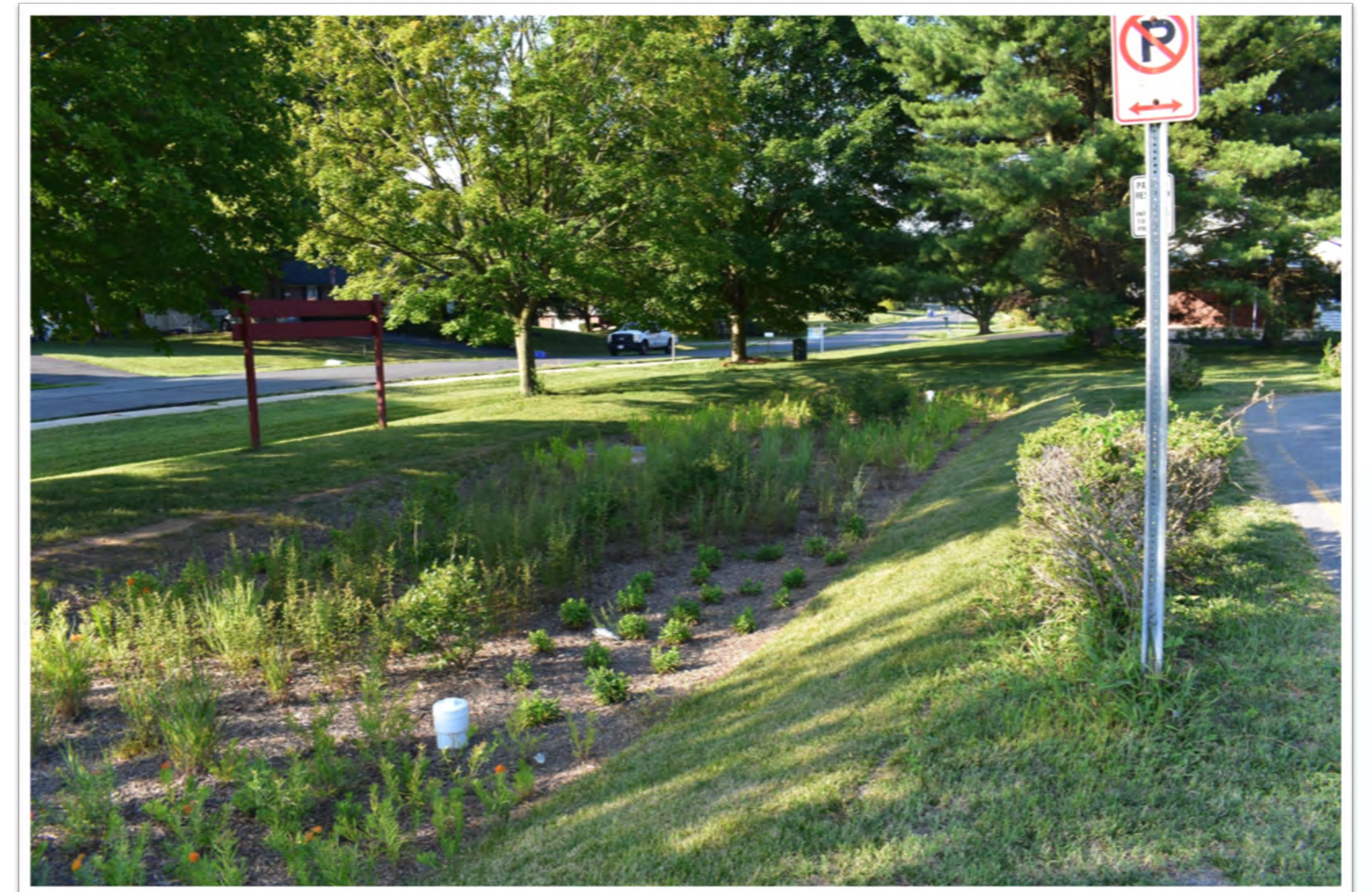




# EARLY ACTION PROJECT

## Volunteers Field

- Shallow, vegetated areas collecting & filtering runoff
- 24-48hr drain time. No standing water during dry periods.



- Vegetated to promote evapotranspiration and pollutant reduction
- Low maintenance landscaping



# EARLY ACTION PROJECT

## Volunteers Field



Bioretention (GSI-1) Summary		
Total Drainage Area	2.48	acres
Impervious Drainage Area	0.97	acres
Annual Pollutant Loading (TSS)	2,781	lbs/year
Annual Pollutant Reduction (TSS)	2,205	lbs/year
Annual Pollutant Loading (TP)	8.7	lbs/year
Annual Pollutant Reduction (TP)	6.5	lbs/year
Annual Runoff Volume Generated	748,600	gallons/year
Annual Runoff Volume Managed, within BMP	728,700	gallons/year



# EARLY ACTION PROJECT

## Volunteers Field

### TIMELINE: Bioretention (GSI-1)

- Design Phase Completion:  
**May 2019**
- Anticipated Construction Start:  
**June 2019**
- Anticipated Completion:  
**September 2019**
- 7:00 am – 6:00 pm, Monday-Friday





# FIELD DRAINAGE / SEDIMENT REDUCTION

## Volunteers Field



- Sedimentation observed at Fields 1 & 2
- Drainage patterns causing excessive sediment loading
- Existing inlets clogged with sediment
- Immediate action to reduce sediment in park area
- Inlets in playing field



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## Volunteers Field



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# FIELD DRAINAGE / SEDIMENT REDUCTION

## Volunteers Field

Investigated 3 Options for Sediment Reductions at Fields 1 & 2:

- Option 1 – Inlet filter bags in existing catch basins
- Option 2 – Re-grade the ballfields, install new inlets / drains
- Option 3 – Install subsurface drainage – outfield areas only



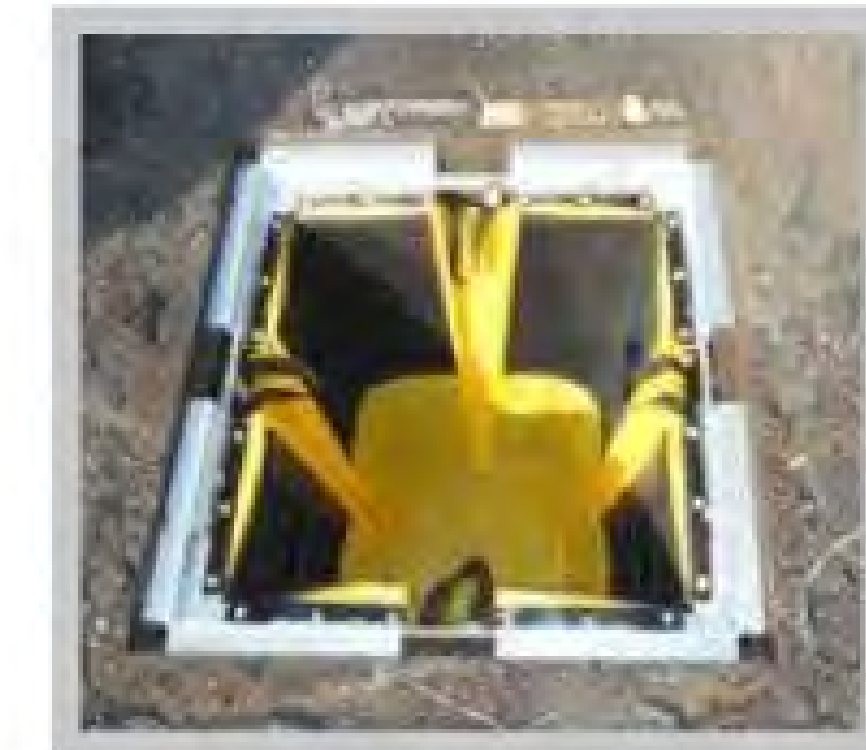


# OPTION 1 – INLET FILTER BAGS

- Easy install – installed within existing catch basins
- Filters surface runoff – capturing sediment
- Maintenance intensive – inspect / clean on routine basis
- Higher lifecycle costs due to maintenance needs



GrateMaster ready for installation



Type A: Standard Model



Type C: X-TEX Model

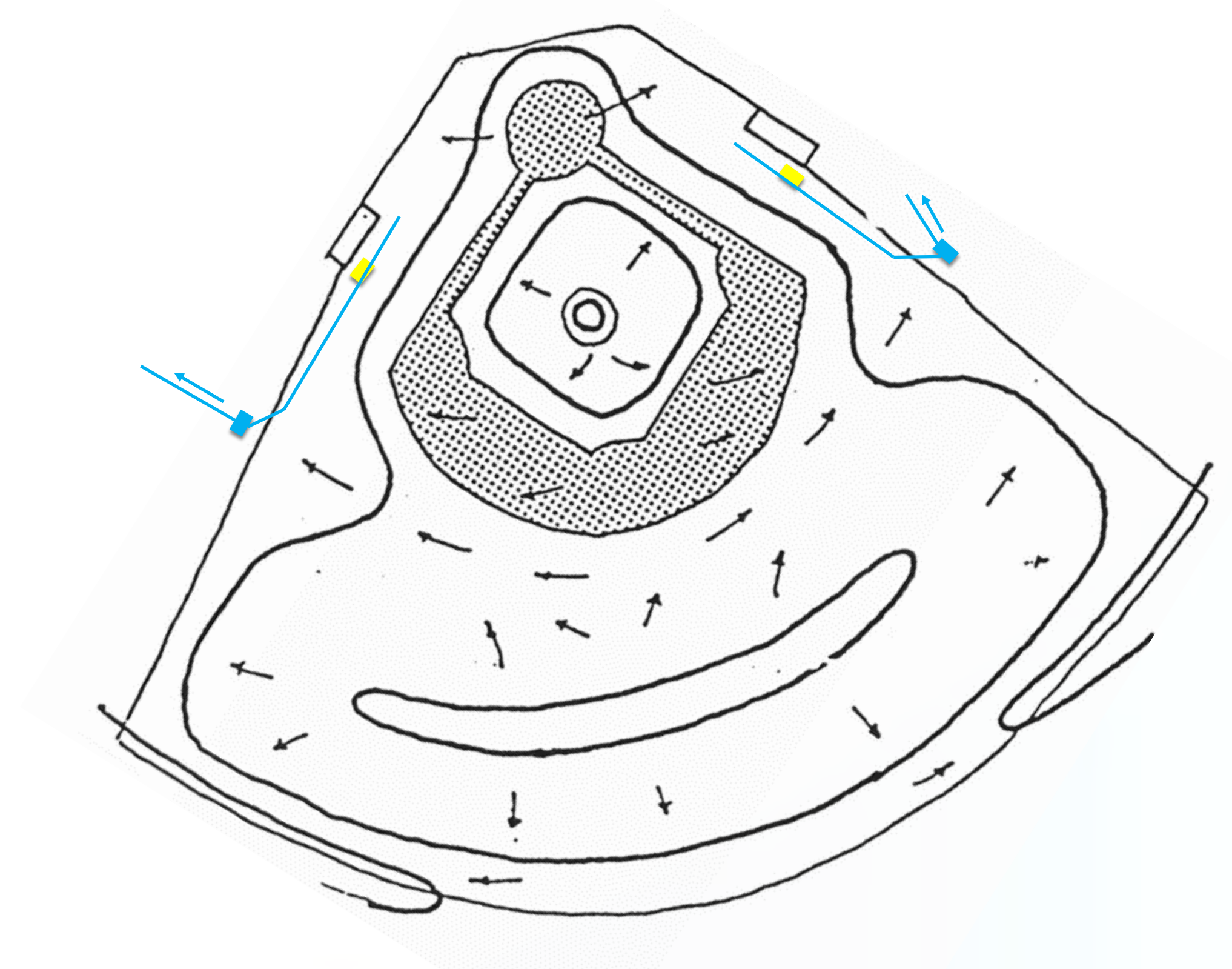
\*GrateMaster  
images from ACF  
Environmental



# OPTION 2 – RE-GRADING THE BALLFIELDS



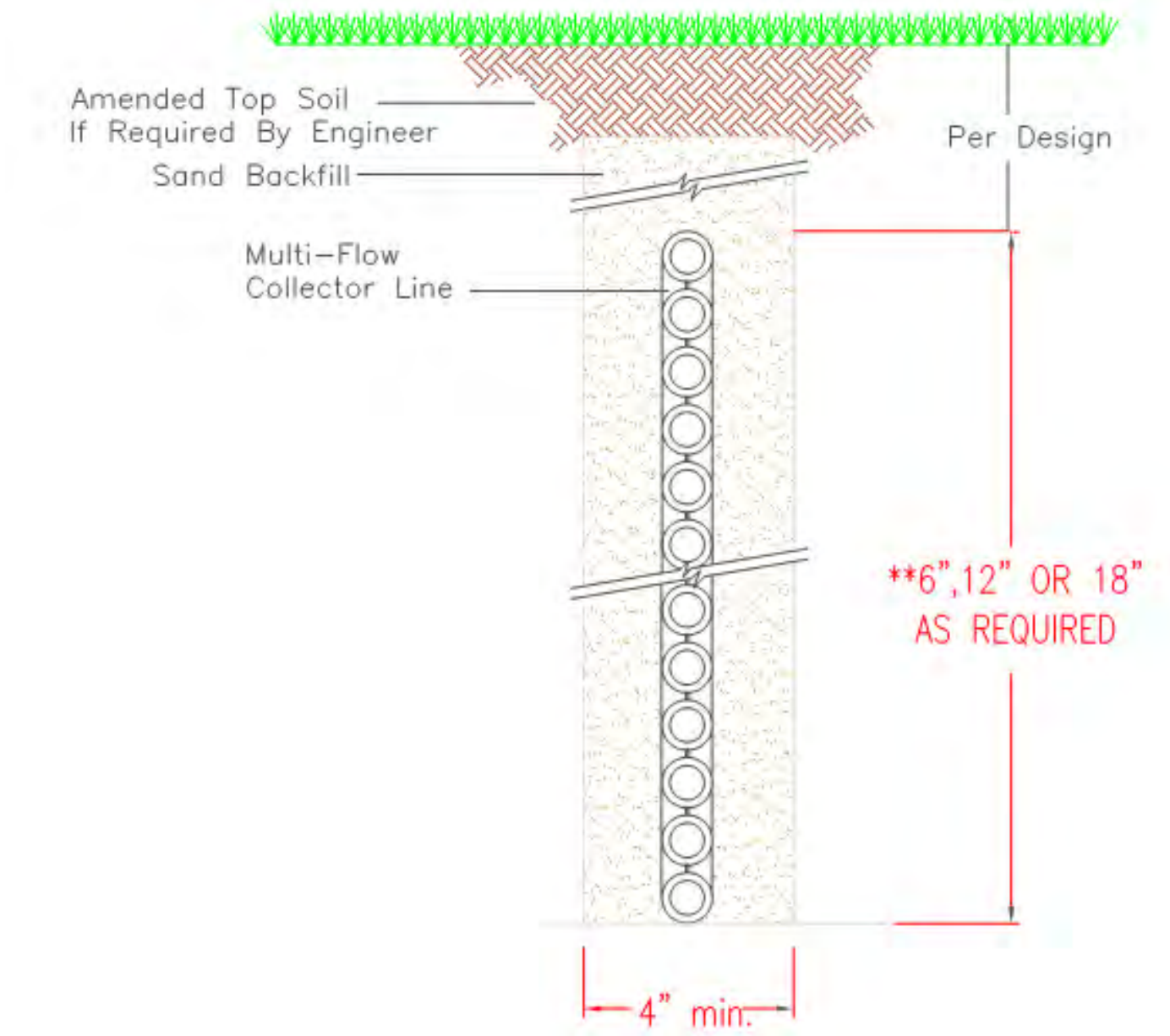
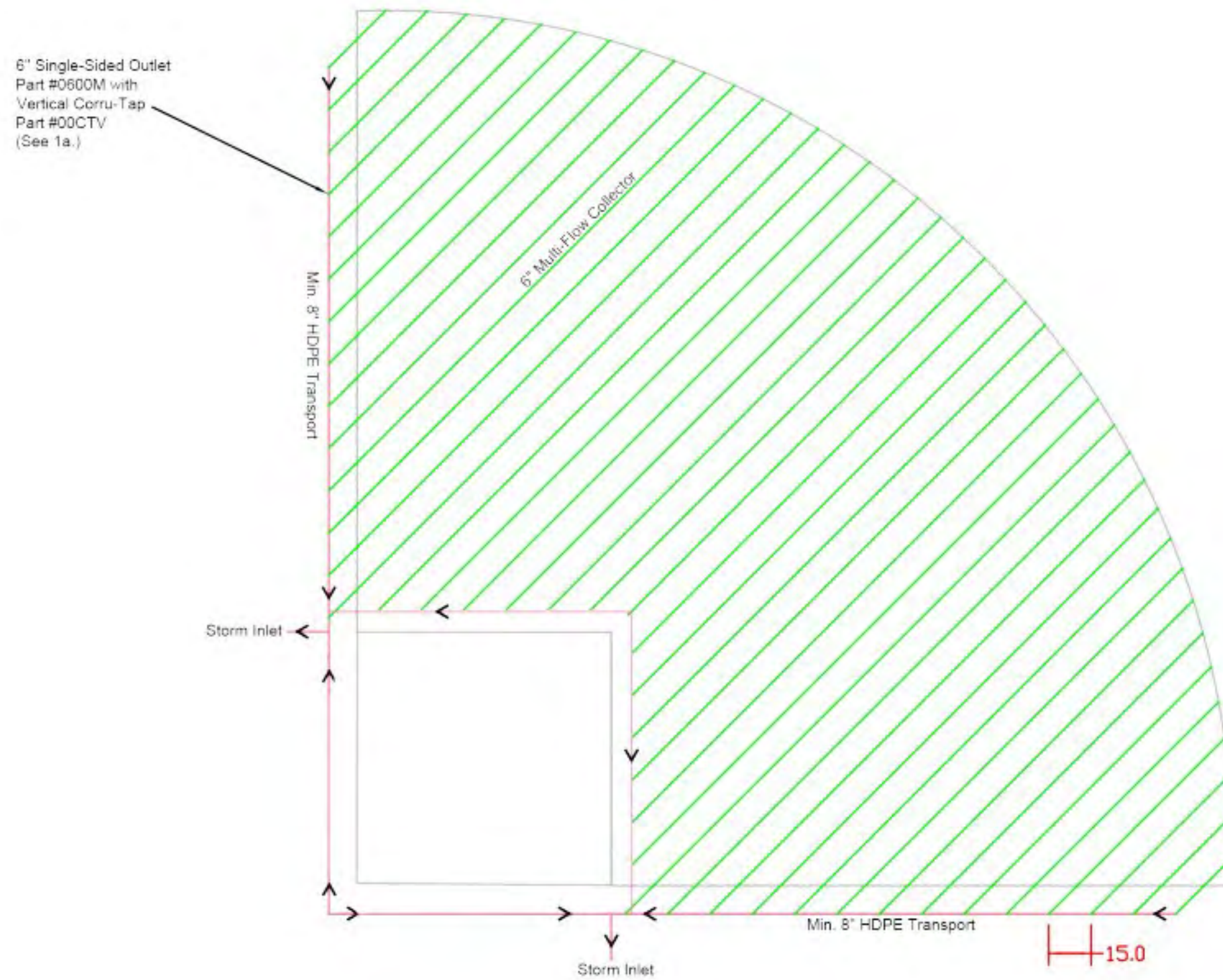
Existing Drainage at VF #2



Typical Grading Plan –  
VF 1 & 2



# OPTION 3 – OUTFIELD SUBSURFACE DRAINAGE SYSTEM





# FIELD DRAINAGE / SEDIMENT REDUCTION

## Volunteers Field

- Option 1 – Inlet filter bags in existing catch basins
- Option 2 – Re-grade the ballfields, install new inlets / drains
- Option 3 – Install subsurface drainage – outfield areas

Sediment Reduction / Cost Summary at Volunteers Fields 1 & 2				
Existing TSS Loading = 4,490 lbs/year				
	Inlet Filter Bags (incl. all 6 catch basins near Fields 1&2)	Ballfield Regrading (Fields 1&2)	Outfield Subsurface Drainage System (Fields 1&2)	Combined Regrading and Subsurface Drainage (Fields 1&2)
Potential TSS Reductions (lbs/year, based on 20-yr lifecycle)	3,889	2,926	2,240	4,221
% TSS Reduction	87%	65%	50%	94%
Cost per lb removed	\$116.72	\$52.12	\$68.66	\$70.20



# FIELD DRAINAGE / SEDIMENT REDUCTION

## Volunteers Field

### TIMELINE: Re-grading the Ballfields

- Design Phase Completion:  
**September 2019**
- Anticipated Construction Start:  
**November 2019**
- Anticipated Completion:  
**March 2020**
- 7:00 am – 6:00 pm, Monday-Friday







# SHARED STORMWATER RESPONSIBILITIES

*We are all in this together. There are civic and private responsibilities for managing stormwater. Collectively we can create flood prepared communities that are safer, healthier places to live.*





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Should you have any questions, do not hesitate to contact:

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**To receive project updates, leave your email on the sign-in sheet.**