

A Seminar Series on Innovative and Comprehensive Stormwater Management to
Produce Multiple-Benefits in the Appalachian Plateau – Final Report



IRISE Stormwater Symposium

November 30, 2023 9:00am–3:00pm
University of Pittsburgh


Research, Education, Outreach

PITT | IRISE

2023 University of Pittsburgh IRISE Stormwater Symposium Agenda

Click on presentation title to advance to presentation slides

9:00 AM – 9:10 AM Opening Remarks: Joe Szczur, Director—IRISE

9:10 AM – 9:20 AM Overview/Logistics: Dan Bain

Emerging Stormwater Regulations – Justin Kerns (Moderator)

9:20 AM – 9:35 AM *Draft PCSM Manual Update:* Sean Furjanic, PE, Environmental Program Manager, PA DEP [Remote]

9:35 AM – 9:50 AM *An Overview of the City of Pittsburgh Stormwater Design Manual:* Kyla Prendergast, City of Pittsburgh, Department of City Planning

9:50 AM – 10:00 AM Emerging Stormwater Regulations Panel Discussion

10:00 AM – 10:15 AM Break

Maintenance – Sarah Cordek (Moderator)

10:15 AM – 10:30 AM *Stormwater Retrofits and Maintenance for Water Quality:* Jim Pillsbury, PE Hydraulic Engineer and Hank Bradish, Hydrologic Technician, Westmoreland County Conservation District

10:30 AM – 10:45 AM *PennDOT Maintenance Programs:* Rich Heineman, Roadway Programs Manager, PennDOT

10:45 AM – 11:00 AM *Coordination Across the Design, Construction, and Maintenance Phases:* Tyler Mercer & Caitlin Hulle, PennDOT District 11

11:00 AM – 11:15 AM Maintenance Panel Discussion

Special Topics – Dan Bain (Moderator)

11:15 AM – 11:35 AM *Vegetation in Stormwater Control Measures:* Mark Fiely, Horticulturist, Ernst Conservation Seeds

11:35 AM – 11:55 AM *Funding Stormwater Infrastructure:* Catherine Tulley, Southwestern Pennsylvania Commission

12:00 PM – 1:00 PM Lunch

Cross-Jurisdictional Coordination – Megan Guy (Moderator)

1:00 PM – 1:15 PM *County-level Participation in Municipal Stormwater Management:* Matt Trepal, Planning Division Manager, Allegheny County Economic Development

1:15 PM – 1:30 PM *Sharpsburg Stormwater Management and Cross Jurisdictional Coordination:* Brittany Reno, Mayor of Sharpsburg

1:30 PM – 1:45 PM *Etna Stormwater Management and Cross Jurisdictional Coordination:* Mary Ellen Ramage, Manager Borough of Etna

1:45 PM – 2:00 PM *Influence of Industrialization/Commercialization on Transportation Stormwater Management:* Sarah Cordek, Transportation Engineer for the Federal Highway Administration, PA Division

2:00 PM – 2:15 PM Cross-Jurisdictional Coordination Panel Discussion

2:15 PM – 2:30 PM Break

2:30 PM – 3:00 PM Open Discussion of Symposium Content and Next Steps – Dan Bain

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An Overview of the City of Pittsburgh Stormwater Design Manual

Kyla Prendergast, AICP

Senior Environmental Planner

Department of City Planning

City of Pittsburgh

Kyla.Prendergast@pittsburghpa.gov

<https://pittsburghpa.gov/dcp/stormwater>





Agenda

- »»» Overview & Goals
- »»» Pittsburgh & Stormwater
- »»» New Code v. Old Code
- »»» Stormwater Design Manual
- »»» Q+A

Overview & Goals

Objectives for Today's Session

- *Briefly* cover Pittsburgh's stormwater conditions
- Highlight key differences between the new and old stormwater code
- Overview of the Stormwater Design Manual
- Question + Answers

Pittsburgh & Stormwater

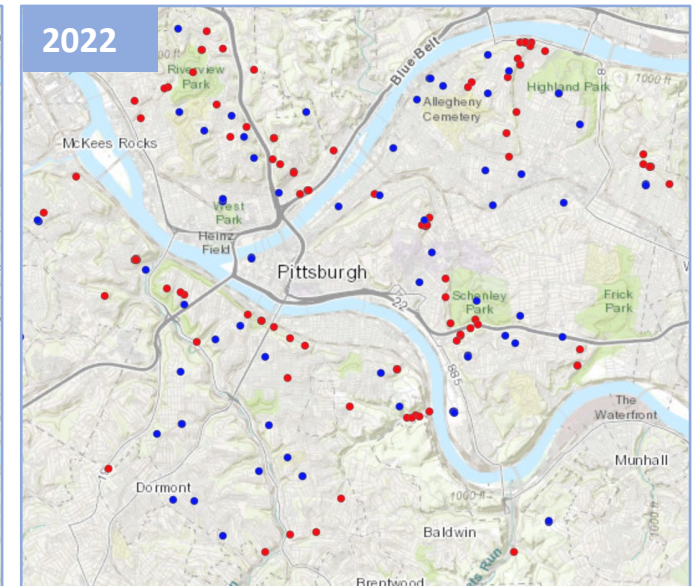
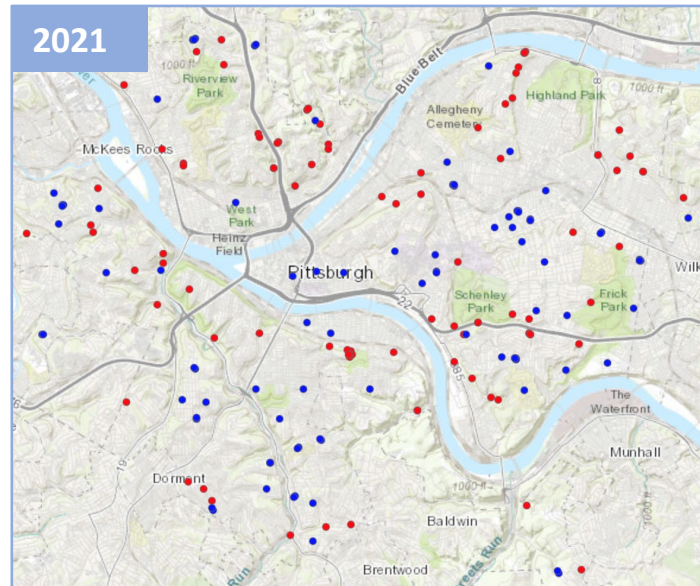
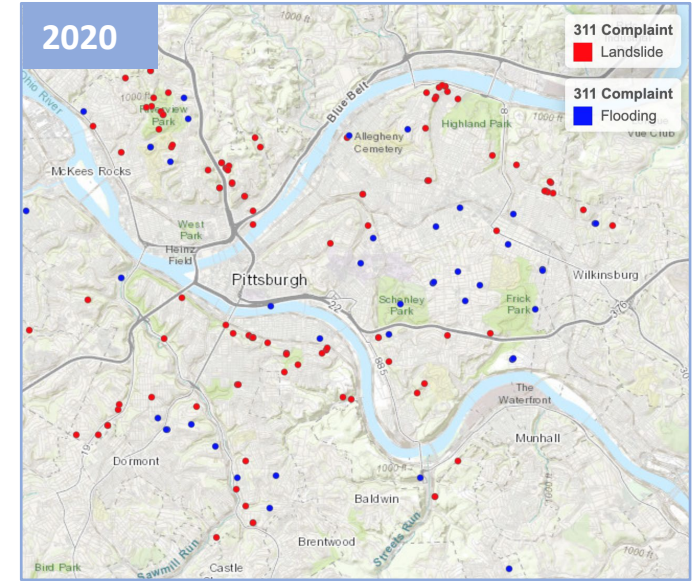
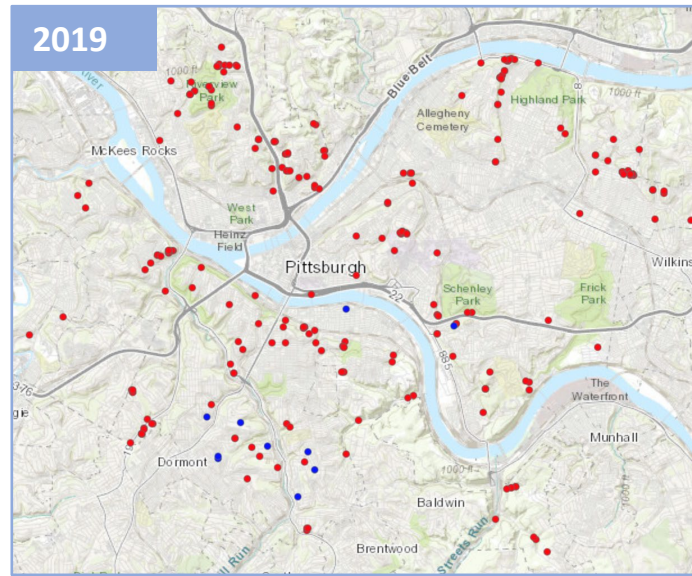
Historic Flooding in Pittsburgh



Current Flooding in Pittsburgh

Year	Rainfall (in.)	311 Flooding Calls	311 Landslide Calls
2019	52.46	10	270
2020	39.33	44	111
2021	40.53	94	92
2022	42.58	73	106

311 Complaint	
●	Landslide
●	Flooding



Future Flooding in Pittsburgh

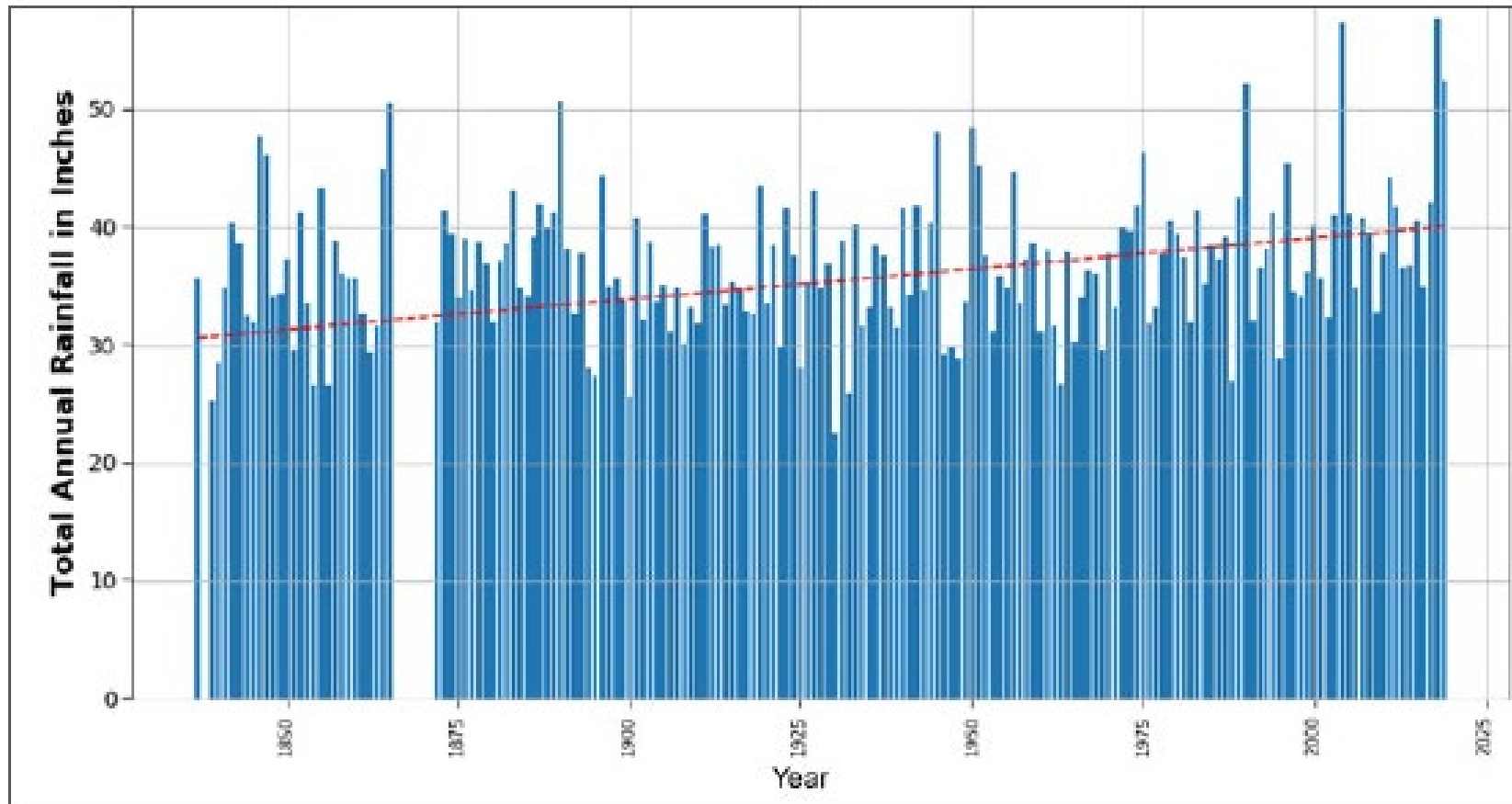


Figure 1.1. Annual Recorded Rainfall 1837 to 2019 in Pittsburgh

New Code
v. Old Code

Highlight of Major Code Changes

- All stormwater-related regulations relocated to Title Thirteen
- Use of climate change projection rainfall model for BMP design and sizing
- Public Health and Safety Release Rate Watersheds
- Two-step approval process (conceptual and site plan review)
- Introduction of Design Manual
- Stormwater Permit and Inspection program

Climate Change Projected Rainfall

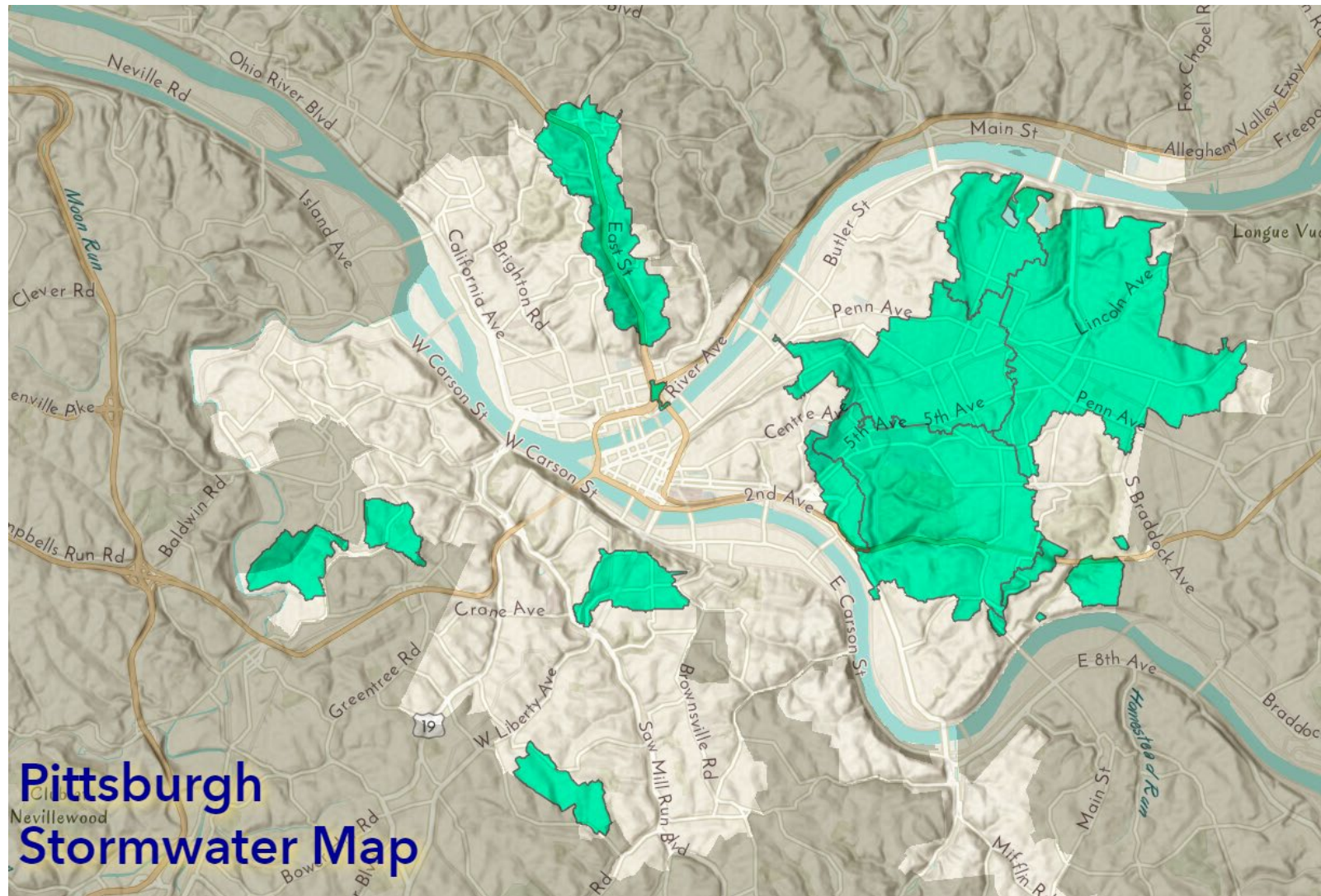
TABLE 2.3. 24-HOUR DURATION FUTURE CLIMATE CHANGE RAINFALL VALUES FOR THE CITY OF PITTSBURGH

(Table adapted from RAND (2020) – results from Carnegie Mellon University)

Return Period (years)	Average Future Rainfall Depth (inches)
1	2.1
2	2.3
5	3.3
10	3.9
25	4.8
50	5.6
100	6.4

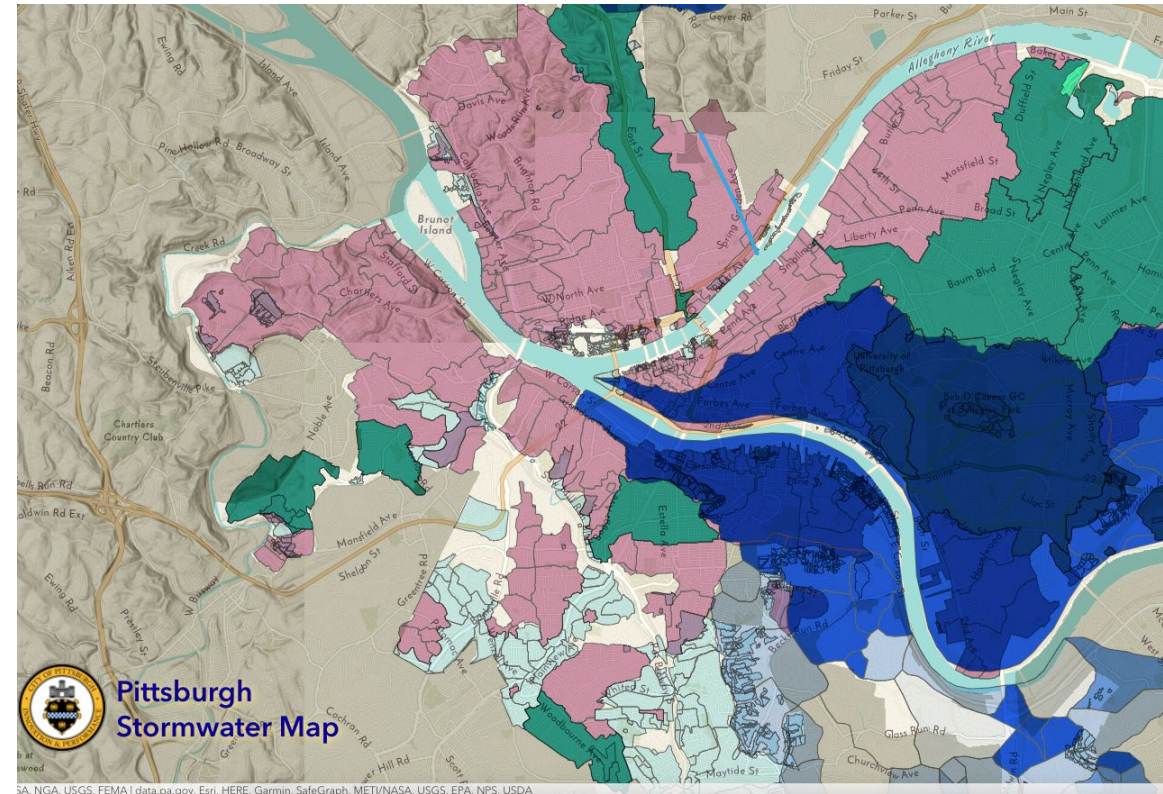
If the present-day NOAA Atlas 14 rainfall depth value is higher than the future climate projection rainfall value, the NOAA Atlas 14 value shall apply for modeling analysis purposes.

Public Health and Safety Watersheds



Stormwater Map

- Includes previously accessible environmental data (e.g., landslide prone soils, steep slopes, etc.)
- New data:
 - PADEP impaired waters
 - Act 167 watersheds
 - Public health and safety watersheds
 - Watersheds and sewersheds
 - RIV
- Data will be kept up-to-date in the online GIS interface hosted by the City and will be available for download [here](https://gis.pittsburghpa.gov/pghstormwater/).



<https://gis.pittsburghpa.gov/pghstormwater/>

THE CITY OF PITTSBURGH

STORMWATER DESIGN MANUAL



DECEMBER 2021

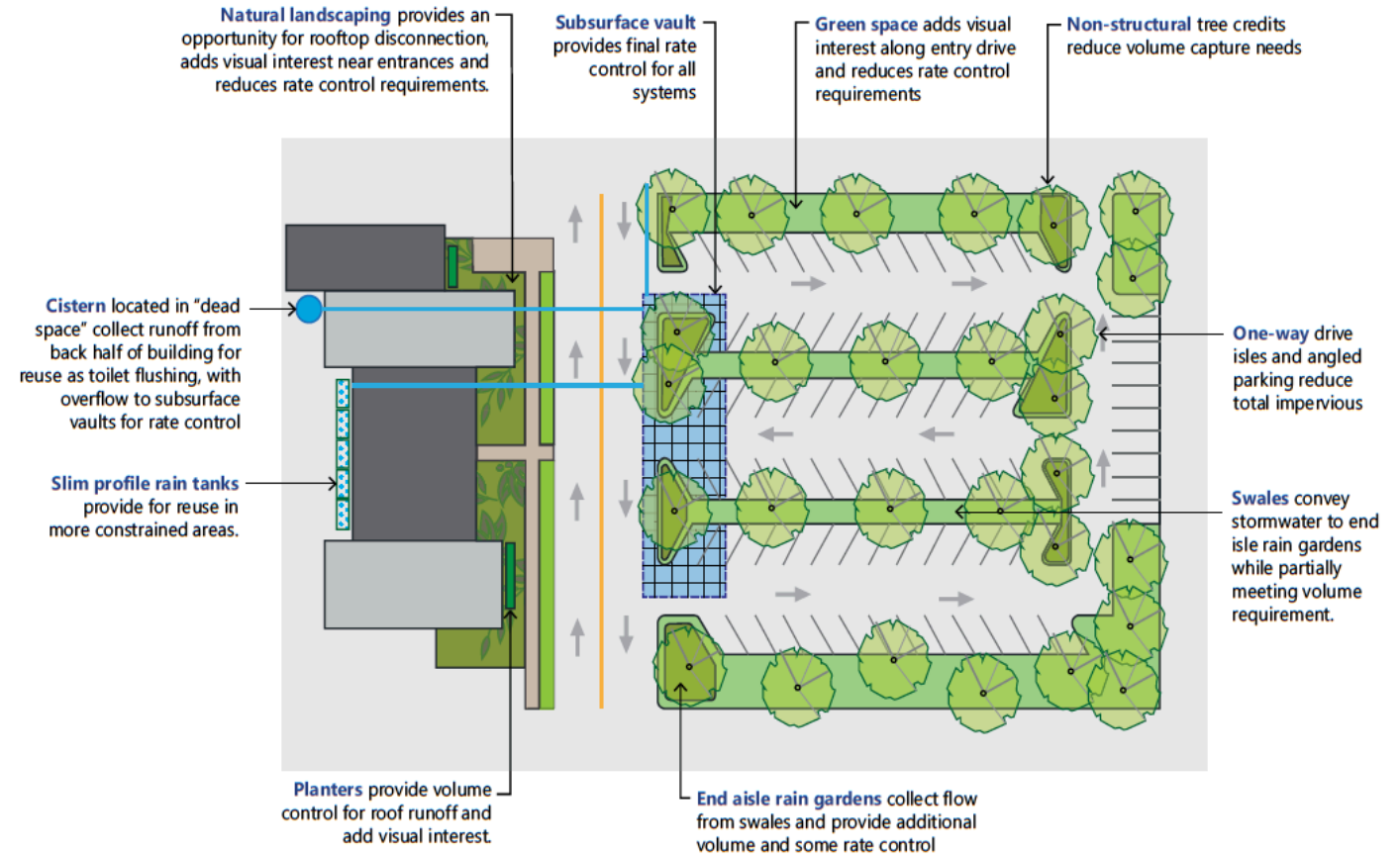
Stormwater Design Manual

Design Manual Contents

- 1.0 Introduction and Purpose
- 2.0 Stormwater Management Requirements
- 3.0 Integrating Stormwater Management with Site Design
- 4.0 Stormwater Best Management Practice Design Standards
- 5.0 Stormwater Plan Review Requirements
- 6.0 Construction Guidance
- 7.0 Operations and Maintenance

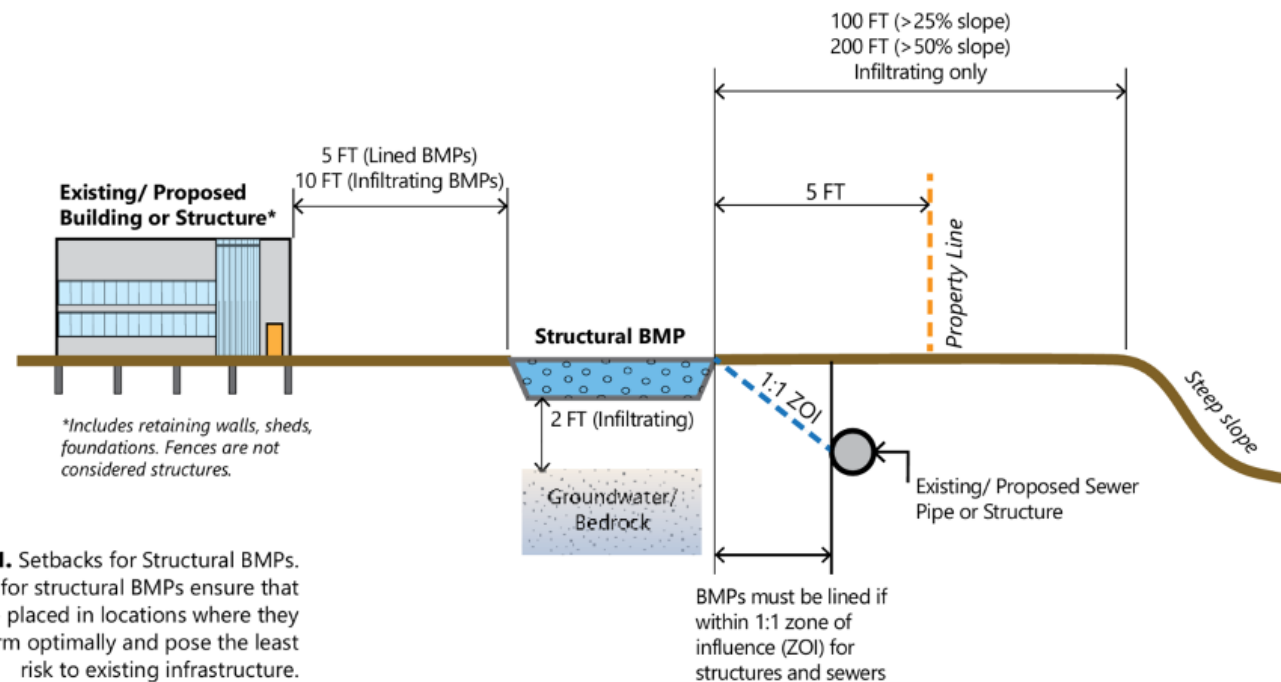
Stormwater Best Practices

- Bioinfiltration
- Bioretention
- Constructed wetlands
- Green roof
- Cistern with reuse
- Porous pavement
- Sand Filter
- Subsurface detention with media filtration
- Dry extended detention basin with media filtration
- Volume control offsets
- Fee in-lieu



Siting Considerations

Figure 4.1. Setbacks for Structural BMPs. Setbacks for structural BMPs ensure that BMPs are placed in locations where they can perform optimally and pose the least risk to existing infrastructure.



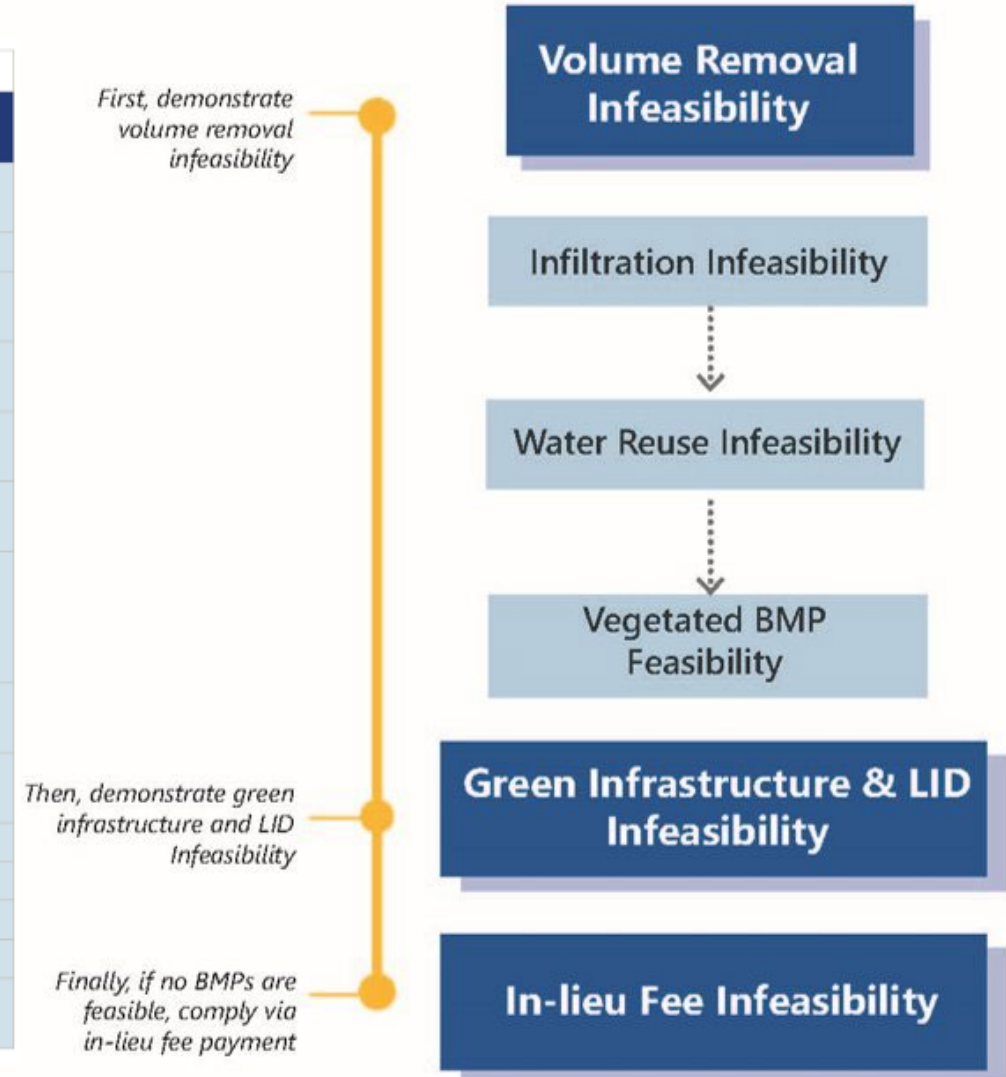
Things to consider:

- Infiltration rates
- Groundwater conditions
- Stormwater hotspots
- Location of existing basements and underground garages
- Specific pollutants on site
- Undermining
- Soil types

Fee In-Lieu & Technical Infeasibility

TABLE 3.8. REPORT REQUIREMENTS FOR TECHNICAL INFEASIBILITY CRITERIA

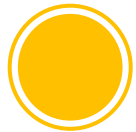
Technical infeasibility criteria	Report requirement
Excessive sediment loading	Quantitative analysis (see excessive sediment loading narrative section) showing why proposed use will generate sediment loading that will make BMP maintenance infeasible.
Steep slopes	Topographic mapping showing that the area exceeds slope thresholds, including offsets..
Landslide prone or undermined areas	Mapping showing the areas as landslide prone or undermined and area certification from a geotechnical engineer that the area is landslide prone.
Low infiltration	Infiltration testing in accordance with Section 3.4 and Appendix B demonstrating insufficient infiltration rates.
Insufficient water reuse	Narrative explaining why the proposed condition has insufficient need for water reuse or why water uses are infeasible..
Environmental contamination	Report prepared by an environmental professional stipulating that infiltration or other BMPs cannot be installed due to environmental contamination.
Potential for settlement or subsidence/presence of uncompacted fill/ Uncompacted urban fill	Report prepared by a geotechnical engineer, including boring logs, showing that BMP cannot be located in a specific areas due to the potential for settlement based on soil bearing capacity. Applicants must also note why over excavation of material is not possible (up to 3 ft of removal).
Floodplain/Floodway	FEMA-compliant mapping of floodway in a published flood insurance rate map or flood insurance study or similar study. Inundation analysis for floodplains/floodways around small streams.
Wetlands	Wetland delineation report prepared in accordance with current USACE methods prepared by an individual with expertise in wetland delineation.
Groundwater	Monitoring well data or boring logs indicating seasonal high groundwater levels.
Riparian buffers	Delineation of riparian buffers along mapped watercourses.
Mature trees	Topographic survey locating mature trees by category. Certified arborist report indicating tree condition.
Setbacks	Offsets from field surveyed or proposed structure/utility locations and property boundaries.
Bedrock	Boring logs indicating depth of refusal due to bedrock. Note that weathered bedrock can typically be excavated and replaced and is not considered a limiting layer.



BMP Options



BMP technology is feasible



BMP technology is feasible with modifications to the design

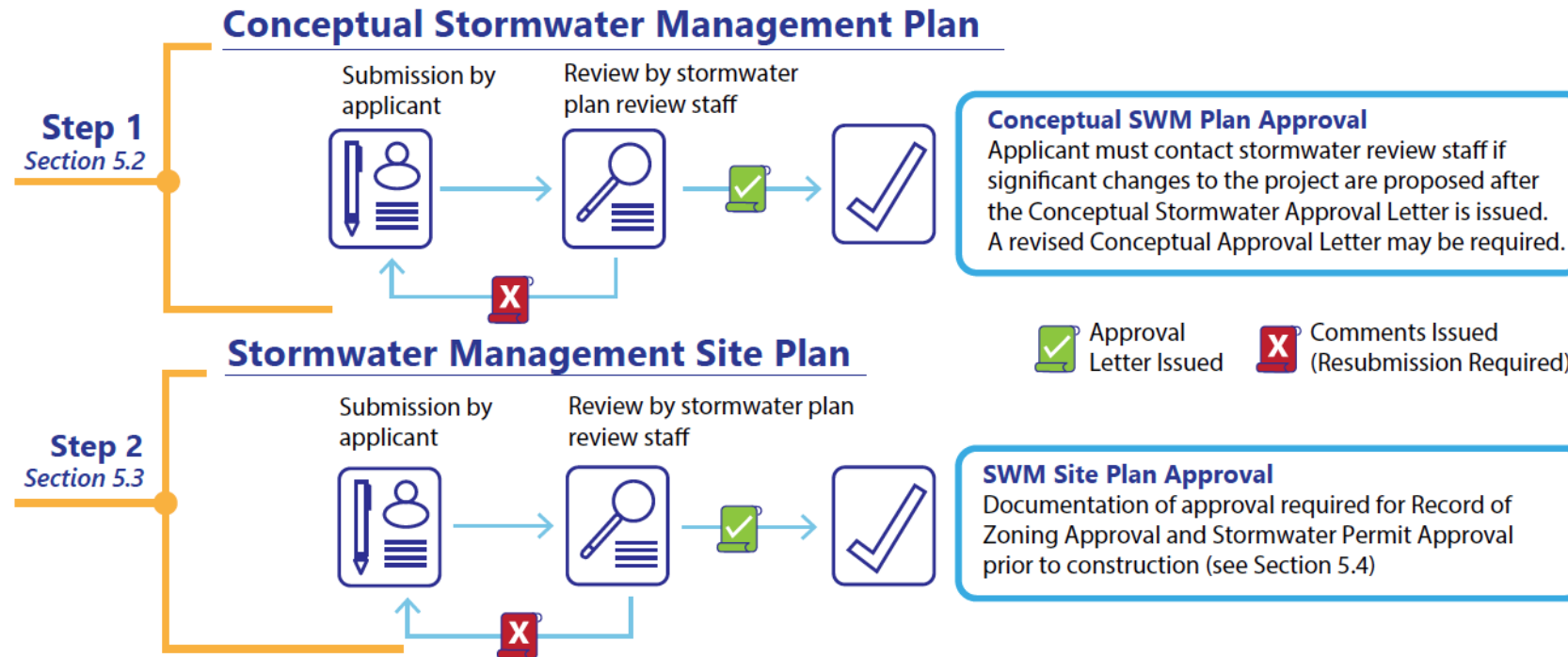


BMP technology is infeasible (constraints prevent BMP implementation in all cases)

Category	Bioretention	Bioinfiltration	Green Roof	Dry Extended Basins	Constructed Wetland/ Wet Pond	Porous Pavement	Cisterns	Subsurface Infiltration	Sand Filter	Subsurface Detention
Elevated sediment loading	●	●	●	●	●	●	●	●	●	●
Excessive sediment loading	✗	✗	✗	●	●	✗	●	✗	✗	●
Slope (0-8%)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Slope (8-15%)	●	●	✓	●	●	●	✓	●	●	●
Slope (>15%)	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
Slope (>25%)	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Landslide prone	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
Low infiltration	✓	✗	n/a	✓	✓	●	✓	✗	✓	✓
Undermined areas	●	✗	n/a	●	✗	●	✓	✗	✓	●
Environmental contamination areas	●	✗	n/a	●	✗	●	●	✗	●	●
Unconsolidated Urban Fill < 3 Ft.	●	●	n/a	●	●	●	●	●	●	●
Unconsolidated Urban Fill > 3 Ft.	✗	✗	n/a	✗	✗	✗	✗	✗	✗	✗
Floodway	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Floodplain	●	●	✓	●	●	✗	●	●	●	●
Wetlands	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Within 2 ft. of seasonal high groundwater	●	✗	n/a	✗	✓	✗	✓	✗	✓	✗
Riparian buffers	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Within 2 ft. of bedrock	●	✗	n/a	●	●	●	✓	✗	✓	●
Mature tree or high value mature tree removal or critical root zone disturbance	●	●	n/a	●	●	●	●	✗	●	✗
Exceptional value mature tree removal or critical root zone disturbance	✗	✗	n/a	✗	✗	✗	✗	✗	✗	✗
Utilities within setback thresholds	✗	✗	n/a	✗	✗	✗	✗	✗	✗	✗
Buildings and structures within setback thresholds	✗	✗	n/a	✗	✗	✗	✗	✗	✗	✗
Roof slope > 8%	n/a	●	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
✓ BMP Applicable/Feasible ● BMP Potentially Applicable/Feasible With Modifications ✗ BMP Not Applicable/Infeasible										

Figure 3.1. BMP Applicability Factors for Typically Encountered Underlying Conditions Site Constraints

Stormwater Permit Application Process



Volume Control Requirements

1303.03

Do not increase the post-development total runoff volume for all storms equal to or less than the two-year, twenty-four-hour duration rainfall event.

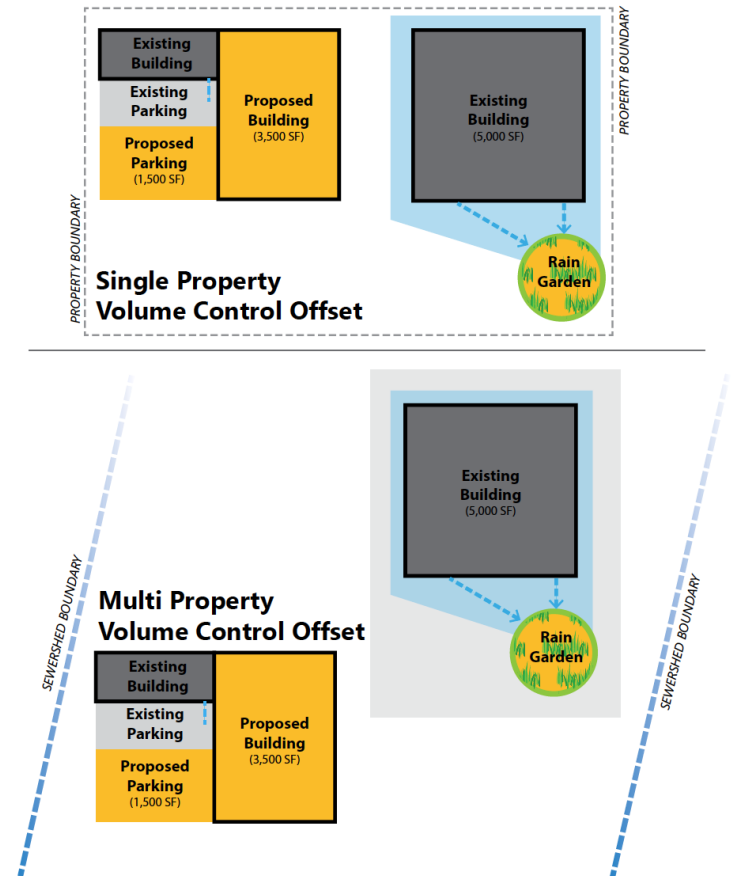
Runoff from at least the annual 95th percentile rainfall event using future climate change rainfall projections shall be permanently removed from the runoff flow, i.e., it shall not be released into the sewer system or surface waters of this Commonwealth.

Removal options include reuse, evaporation, transpiration, and infiltration.

For modeling purposes, existing (pre-development) non-forested pervious areas shall be calculated using permeability coefficients for meadow in good condition, in an effort to be as conservative as possible in existing conditions modeling.

Volume Control Offset

- Provides applicants with more flexibility in complying with the volume control requirement.
- Useful for projects where the regulated activity is occurring within a more constrained portion of a property.
- Must be on a property with the same owner.
- Must be in the same sewershed.



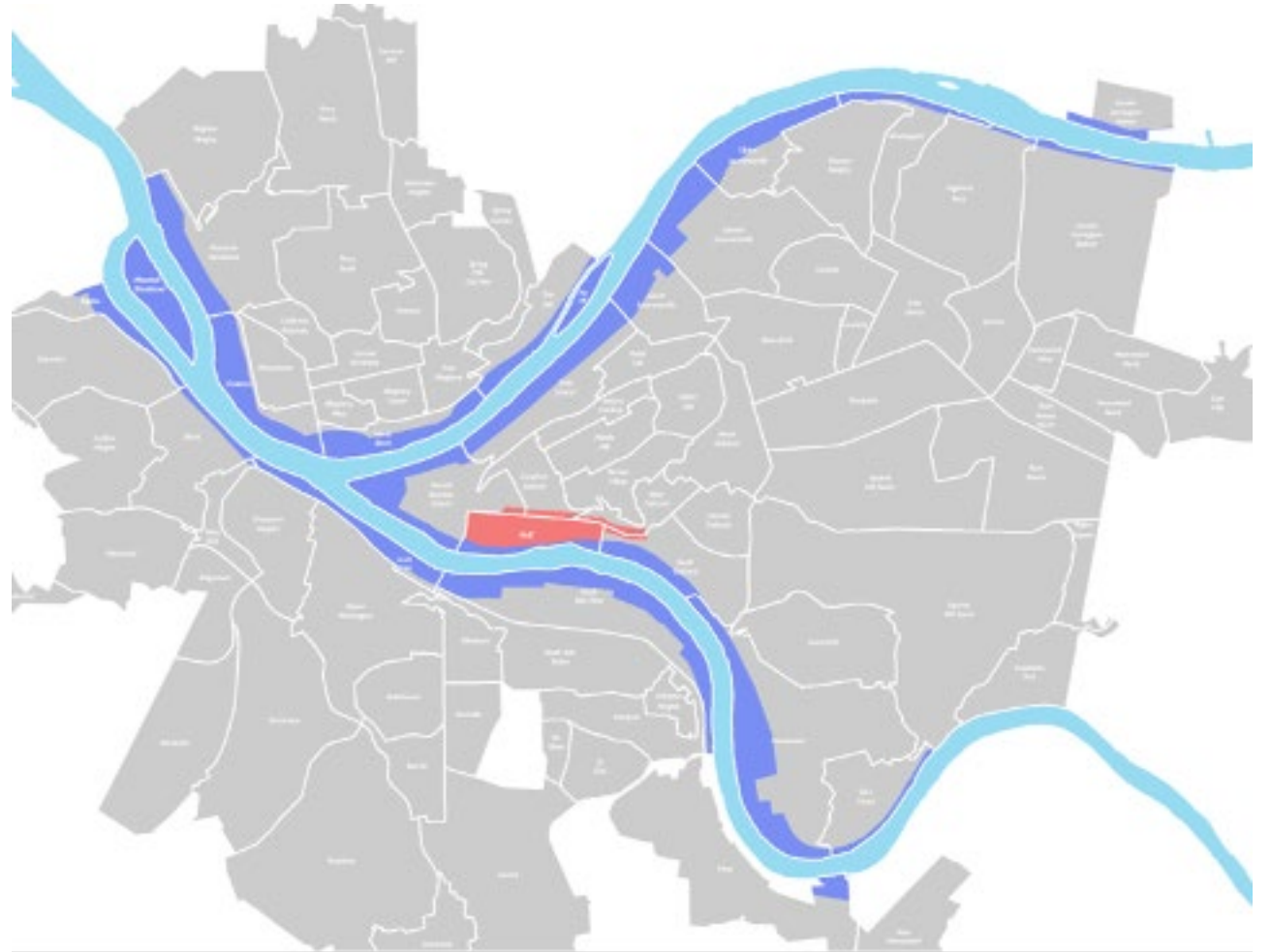
Rate Control Requirements

Watershed Type	Rate Control Requirements
Allegheny County Act 167 Stormwater Management Plan Watershed	For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, twenty-four-hour rainfall events, the post-development peak discharge rates will follow the applicable approved release rate maps and procedures incorporating the use of future climate rainfall projections.
Public Health and Safety Release Rate Watershed	Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour rainfall events using the rainfall estimates and procedures incorporating the use of future climate change rainfall projections.
Not in Public Health and Safety or Act 167 Watersheds	Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour rainfall events using the rainfall estimates and procedures incorporating the use of future climate change rainfall projections.
For Modeling purposes	Existing (pre-development) non-forested pervious areas shall be calculated using permeability coefficients for meadow in good condition and 20% of existing impervious area, when present, shall be calculated using permeability coefficients for meadow in good condition in the model for existing conditions.

See Design Manual section 2.2.b. and Title 13 section 1303.04 for more details.

Rainwater Performance Points

- Exclusively for Riverfront (RIV), Uptown Public Realm District (UPR), and Urban Center Mixed Use UC-MU Zoning Districts
- Allows for a height bonus of 10 feet up to the area's height maximum OR allows for placement 10 feet closer to the river from the distance specified by the Riparian Buffer Zone.



Rainwater Performance Points 915.07

Rainwater

All vegetated Green Infrastructure must use at least 50% Native Plants.		Points
5.a	At least 50% of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or At least 15% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	1
5.b	At least 75% of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or At least 30% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	2
5.c	100% or more of the first two (2) inches of runoff from impervious surfaces is captured and managed using Preferred Stormwater Management Technology installations; or 45% of the first two (2) inches of runoff from impervious surfaces is captured and reused on-site.	3

Q + A

Citations & Links

[Design Manual](#)

[Appendices](#)

[SW Map](#)

[City of Pittsburgh Open Data](#)

<https://pittsburghpa.gov/dcp/stormwater>

Slide 5 images

- Bauder, B. (2019). Trib Live. Couple sues Pittsburgh over landslide that destroyed their home. Retrieved November 28, 2023, from <https://triblive.com/local/pittsburgh-allegheeny/couple-sues-pittsburgh-over-landslide-that-destroyed-their-home/>.
- Cook, R. (2022). This Week in Pittsburgh History: The St. Patrick's Day Flood. Pittsburgh Magazine. Retrieved November 28, 2023, from <https://www.pittsburghmagazine.com/this-week-in-pittsburgh-history-the-st-patricks-day-flood/pic/149889/> <https://triblive.com/local/pittsburgh-allegheeny/couple-sues-pittsburgh-over-landslide-that-destroyed-their-home/> https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.wpxi.com%2Fnews%2Ftop-stories%2Fwest-end-landslide-that-destroyed-home-disrupting-traffic-businesses%2F706981320%2F&psig=AOvVaw2Jv9rq_ZTU6IDr0_vbN6js&ust=1701267803343000&source=images&cd=vfe&opi=89978449&ved=0CBQQjhqxqFwoTCJCaqcry5oIDFQAAAAAdAAAAABZ.
- NY Post. (2011). Two women, kids killed in Pittsburgh flash floods. Retrieved November 28, 2023, from <https://nypost.com/2011/08/20/two-women-kids-killed-in-pittsburgh-flash-floods/>.
- WPXI. (2018). West End landslide that destroyed home disrupting traffic, businesses. Retrieved November 28, 2023, from <https://www.wpxi.com/news/top-stories/west-end-landslide-that-destroyed-home-disrupting-traffic-businesses/706981320/>.

STORMWATER RETROFITS AND MAINTENANCE FOR WATER QUALITY

JIM PILLSBURY, HYDRAULIC ENGINEER, MS, PE

HANK BRADISH, STORMWATER TECHNICIAN

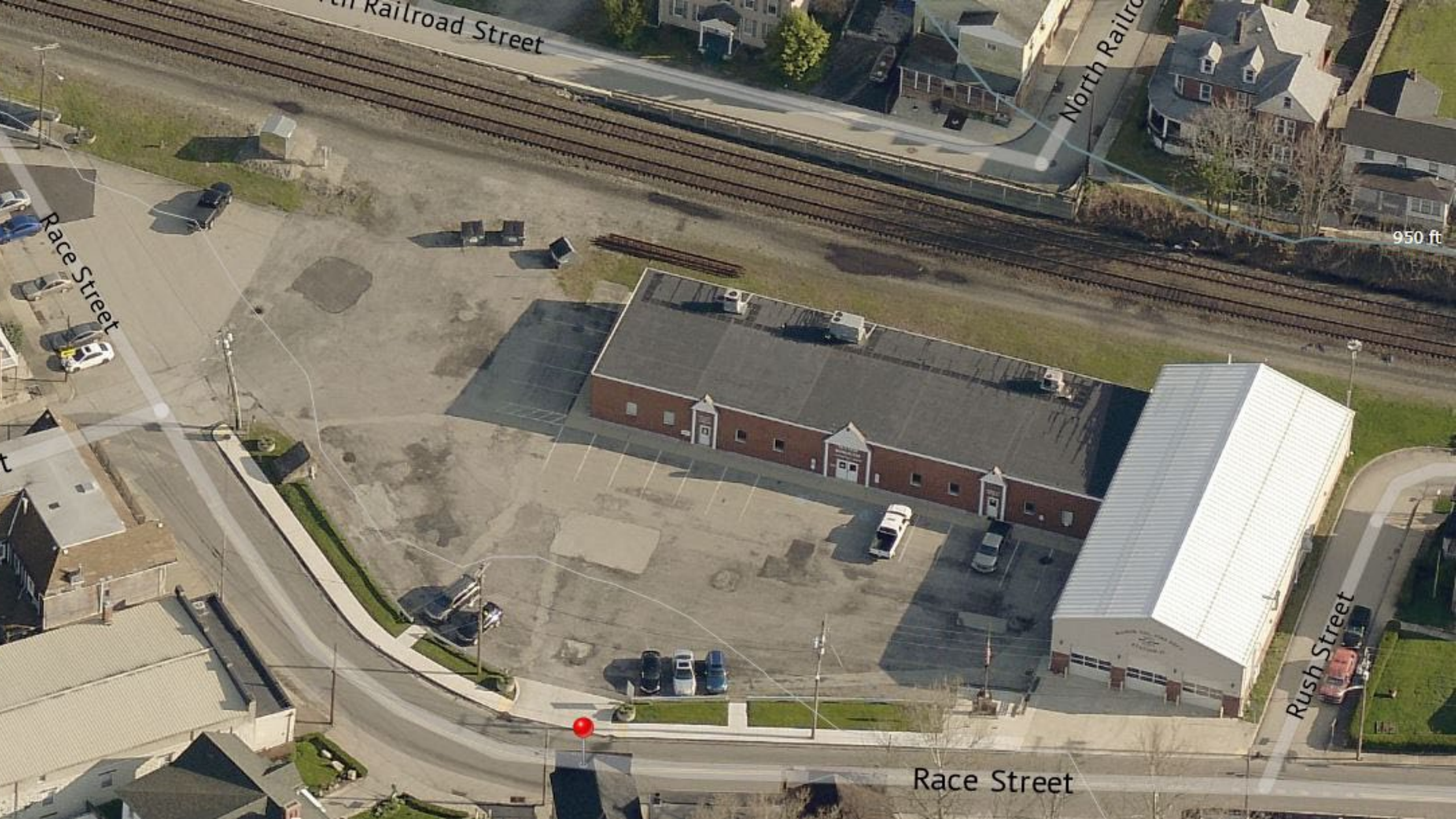
WWW.WESTMORELANDCONSERVATION.ORG

WWW.WESTMORELANDSTORMWATER.ORG



MANOR BOROUGH STORMWATER RETROFITS PROJECT





North Railroad Street

North Railroad

Race Street

950 ft

Rush Street

Race Street



PROJECT HIGHLIGHTS

Permeable Pavers
Unilock: Eco-Optilok



Permeable Pavers
Unilock: Turfstone



Rain Garden with
shrubs, underdrain,
soil mix, curb cuts



08 31 2023



08 31 2023

Expanded Lawn Area
Tree and Shrub Plantings



08 31 2023





EXPECTED MAINTENANCE

RAIN GARDEN: REMOVE SEDIMENT, GARBAGE AND DEBRIS

PERMEABLE PAVERS: REMOVE ANY GARBAGE AND DEBRIS

EXAMINE BMPS TWICE A YEAR AND AFTER EACH MAJOR RAIN EVENT

THE INSTALLATION OF THESE BMPS WILL HELP THE MUNICIPALITY MEET MS4 REQUIREMENTS





MONROEVILLE SENIOR CENTER

- EXISTING DETENTION POND WITH NO MAINTENANCE FOR DECADES
 - STORMWATER WAS ESCAPING WITHOUT BEING TREATED OR DETAINED
- 

THERE'S A DETENTION POND IN HERE SOMEWHERE...



POND OUTLET CAUSING EROSION



PARKING LOT RUNOFF WAS ESCAPING



IT WAS REALLY AN EYESORE!!



WORK DONE BY MUNICIPAL CREW AND CONTRACTOR



REMOVAL OF SEDIMENT...



MAKE SURE RUNOFF GETS TO THE POND!



**CHANGE THE RISER
TO LIMIT OUTFLOW**



PREVENTING EROSION AT PIPE OUTLETS



ATTRACTIVE AND VALUABLE FOR WILDLIFE HABITAT





EXPECTED MAINTENANCE

DETENTION POND: REMOVE ANY TRASH AND DEBRIS

DETENTION POND: REMOVE ANY SEDIMENT AND KEEP VEGETATION TRIMMED

PARKING LOT: MAKE SURE THAT WATER RUNOFF IS REACHING THE POND—CHECK CURBS &
INLETS

EXAMINE BMPS TWICE A YEAR AND AFTER EACH MAJOR RAIN EVENT

THE INSTALLATION OF THESE BMPS WILL HELP THE MUNICIPALITY MEET MS4 REQUIREMENTS



STORMWATER CONTROL MEASURE PENNDOT MAINTENANCE PROGRAMS



RICHARD HEINEMAN NOVEMBER 30 , 2022

TOPICS

Publication 888 Stormwater Control Measure (SCM) Maintenance Manual

SCM Inventory

Maintenance IQ

SCM Inspection

SCM Inspection Results

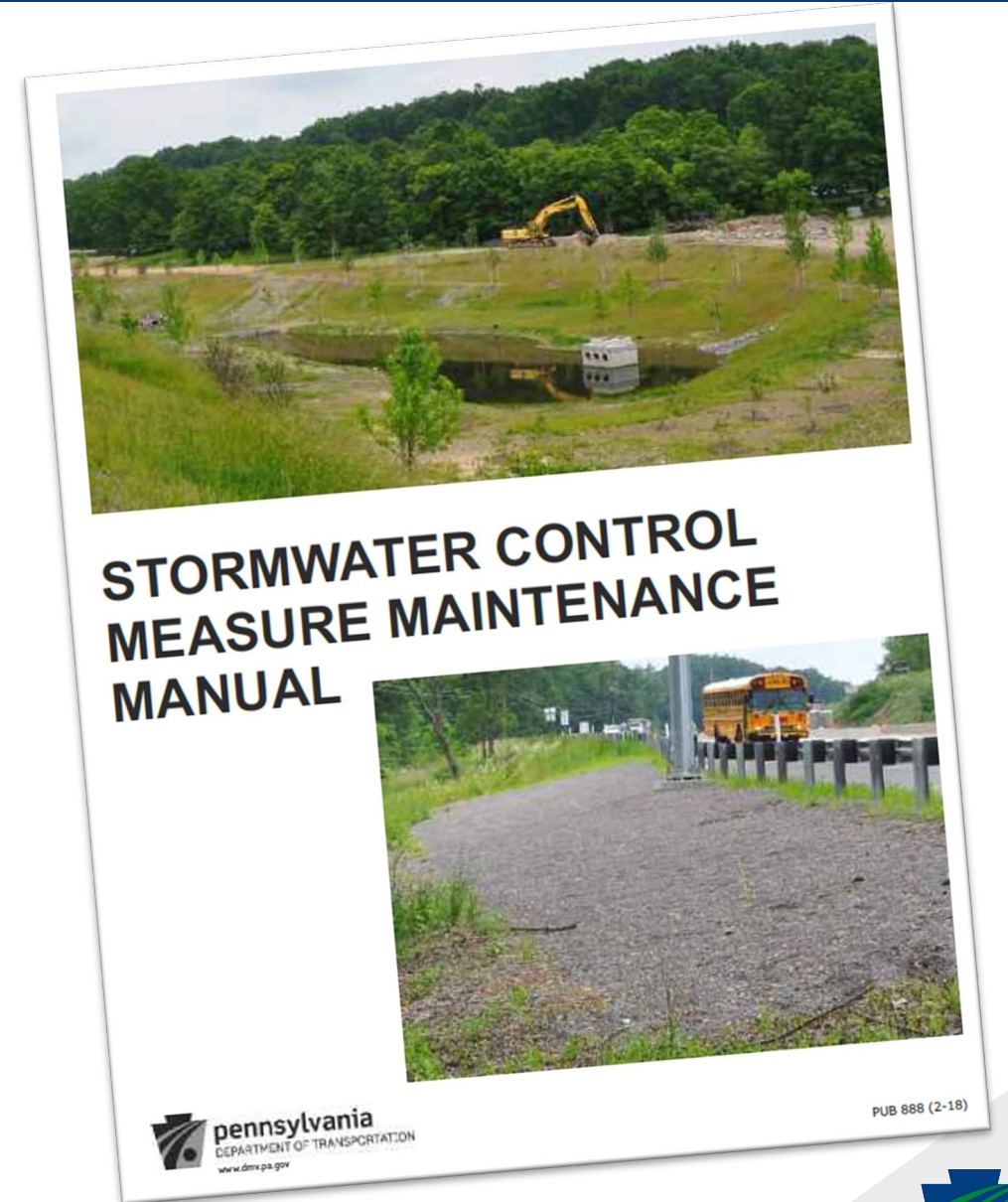
SCM Maintenance Training



PUBLICATION 888

SCM Maintenance Manual

- Inventory procedures
 - IDs, adding/modifying data
- Inspections
 - Types and frequencies
 - Forms, report templates
 - Submitting and viewing results
- Maintenance
 - SCM specific procedures
 - Common SCM components
- Scheduling and charging
 - Assemblies and charge codes
 - Creating work notifications
- <http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20888.pdf>



SCM INVENTORY

- Major effort to inventory SCMs began in 2015
 - No previous centralized database of SCMs
 - 500+ projects reviewed
 - Data manually extracted from paper plans



OPERATION AND MAINTENANCE

GENERAL NOTES

INSTALLATION

LOCATION MAP

Storm Water Control Measures	
Type: Point Result: 1 of 1	
SCM_ID:	0510 BWD 001
SEQUENCE_NUMBER:	001
SCM_TYPE_CODE:	BWD
SCM_TYPE_CODE_DESC:	Basin, Wet Detention
DISTRICT_NO:	05
CTY_CODE:	06
COUNTY_NAME:	Berks
DISTRICT_CTY_CODE:	0510
ST_RT_NO:	0222
SEG_NO:	0233
OFFSET:	31
JURIS:	1
SIDE_IND:	2
ROUTE_DIRECTION:	S
CL_OFFSET:	91
LATITUDE:	40.36222



SCM INVENTORY

**Database of Department-owned
SCMs**

40+ data fields

**Existing SCMs added as
discovered**

**Central Office reviews data and
assigns SCM ID**

**As-Built Plans stored in network
folder**

**Guidance on extracting SCM data from
plans**



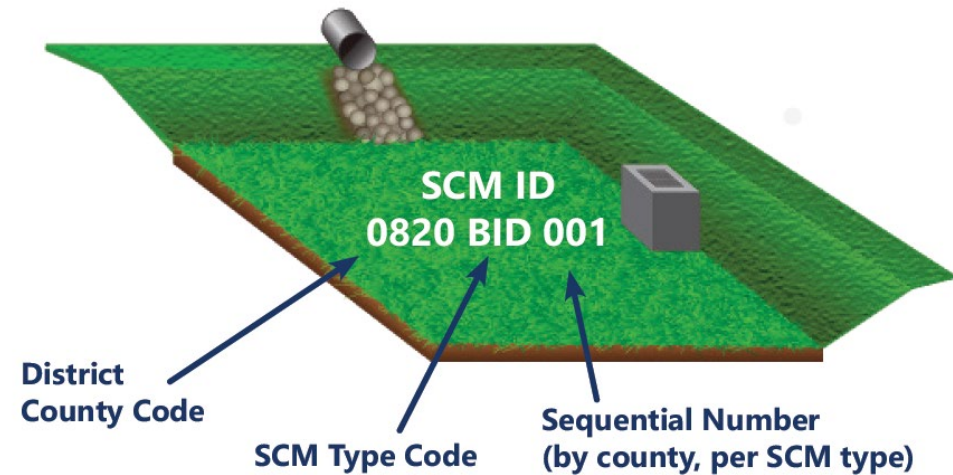
**SCM
Inventory**



SCM INVENTORY

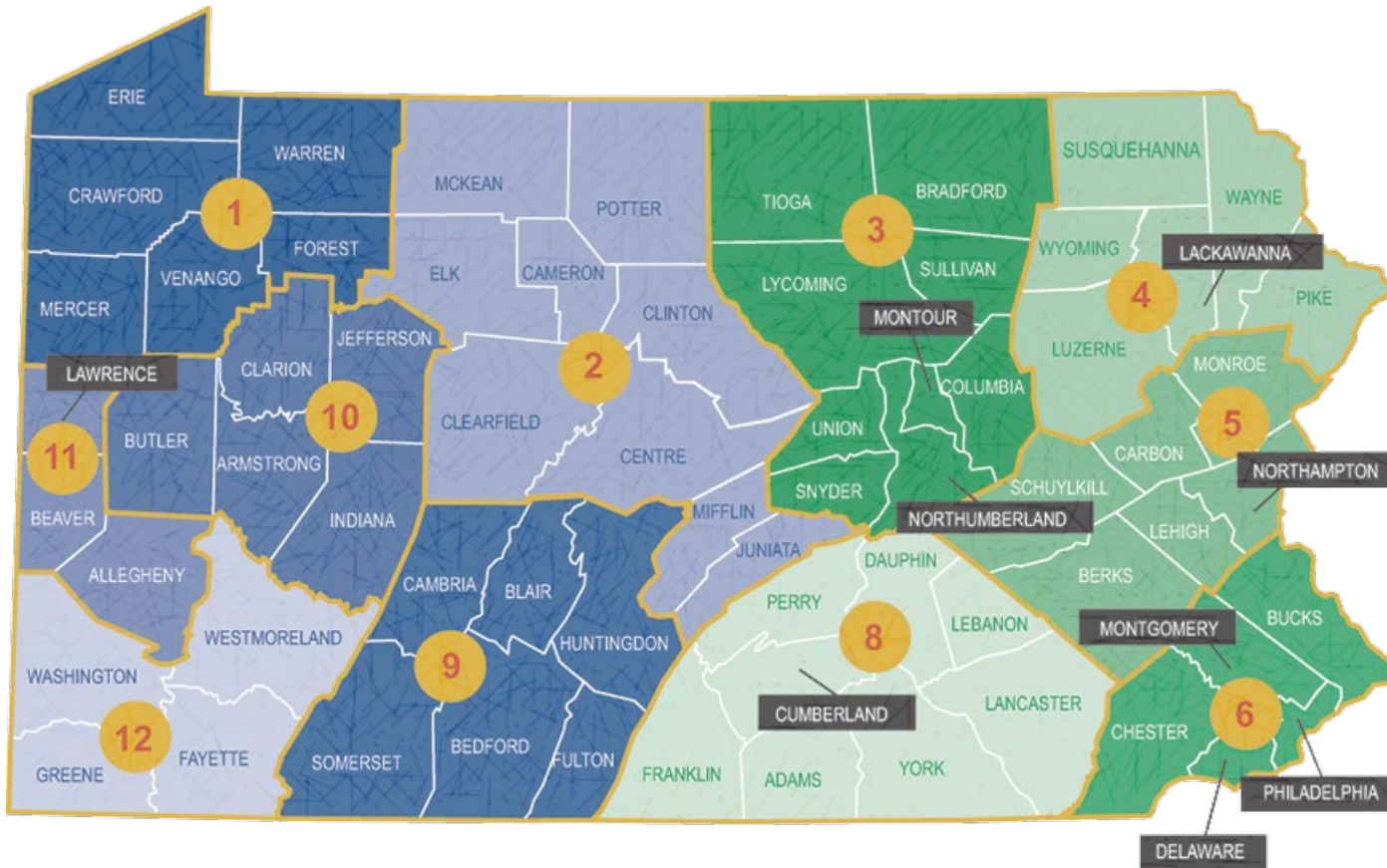
SCM_ID	SCM_TYPE_CODE	LATITUDE	LONGITUDE	DISTRICT_NO	COUNTY_NAME	ST_RT_NO	SECTION
0110 IBE 001	IBE	41.65071	-79.65443	01	Crawford	0089	A02
0110 IBE 002	IBE	41.65116	-79.65465	01	Crawford	0089	A02

- The SCM inventory contains 40+ separate fields: type and location, discharge location, maintenance access, inspection frequencies, etc.
- Unique 10-digit SCM ID assigned by B.O.O.



CURRENT SCM INVENTORY

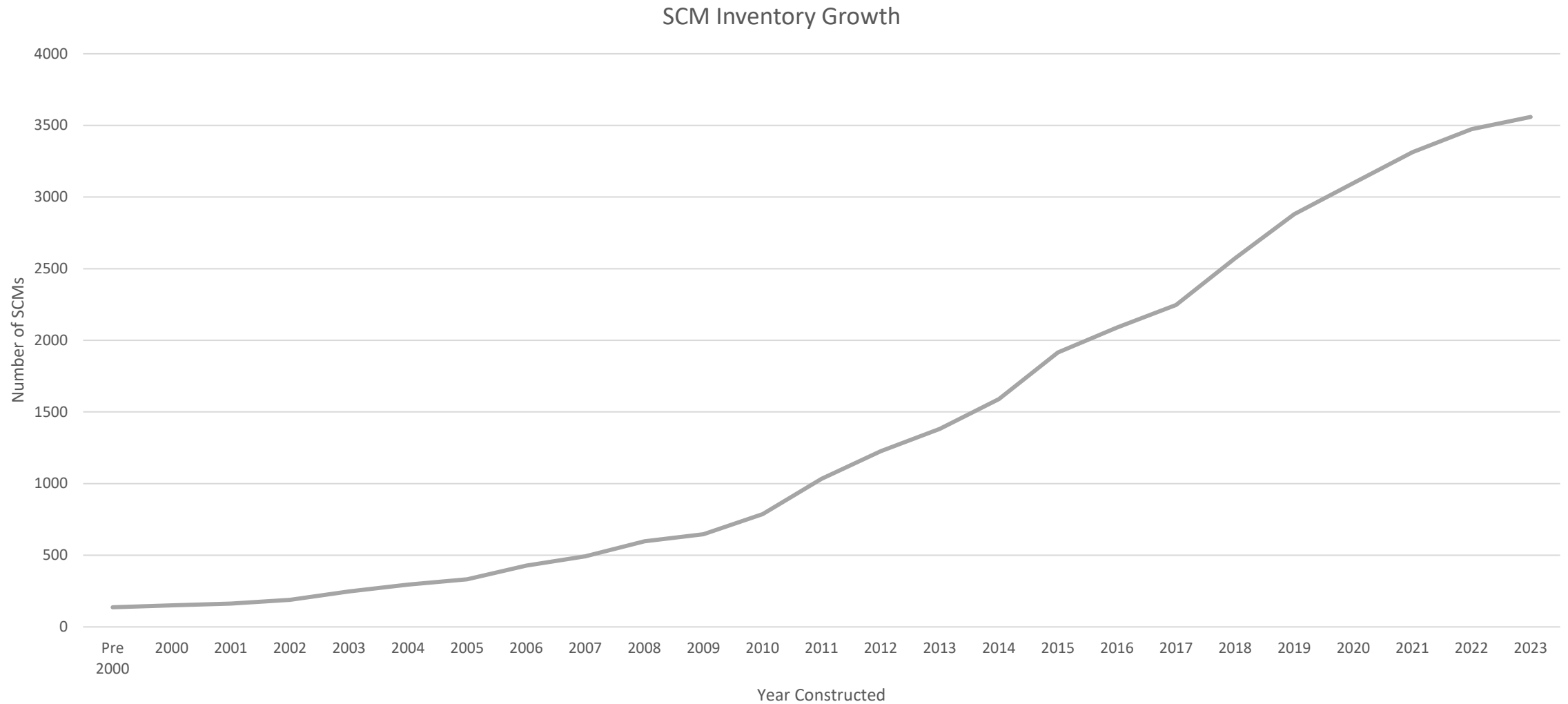
- SCMs in inventory as of November 2023



District	# of SCMs
1	67
2	262
3	178
4	335
5	320
6	782
8	598
9	416
10	159
11	70
12	372
Total	3559

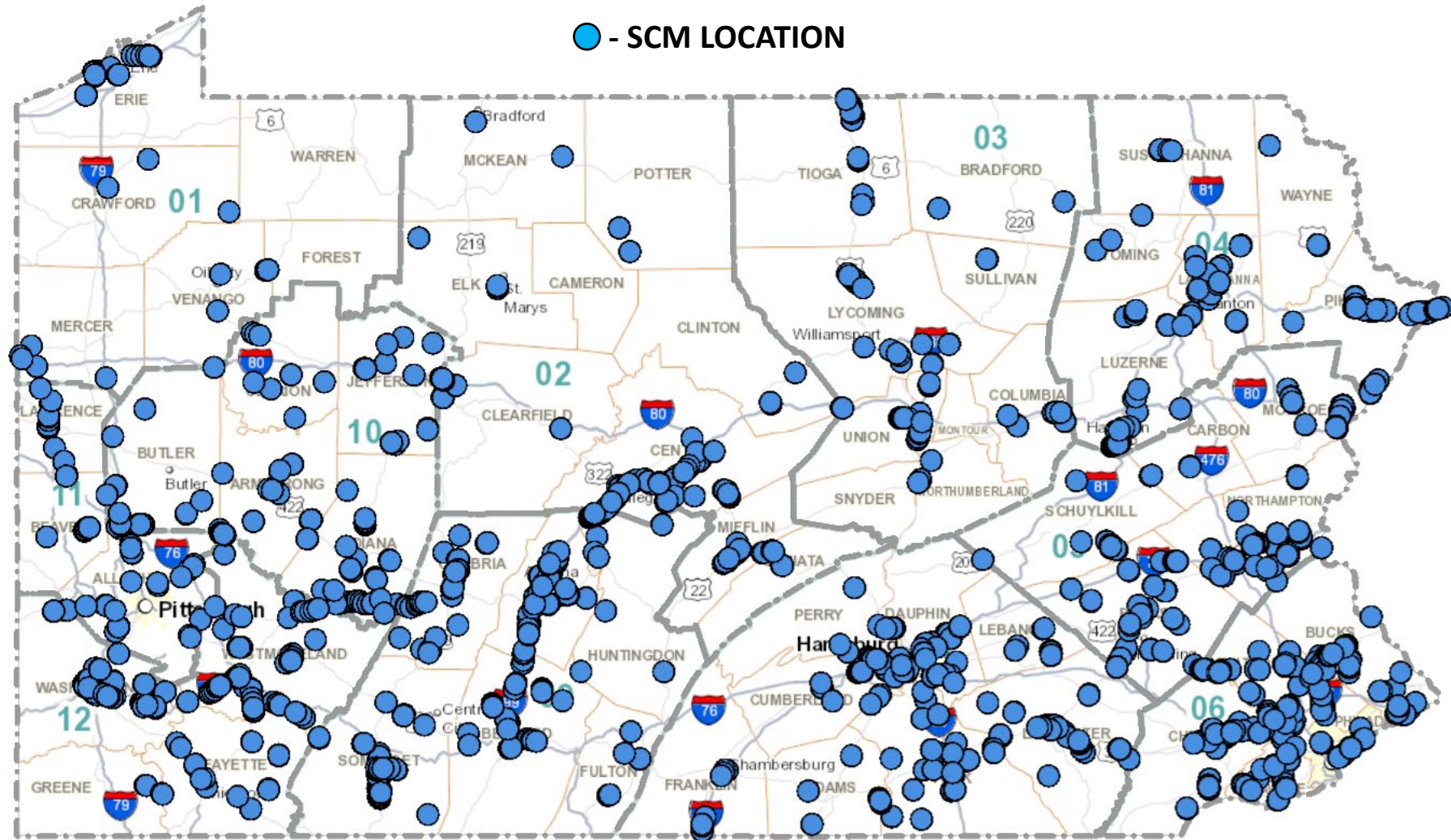


SCM INVENTORY GROWTH



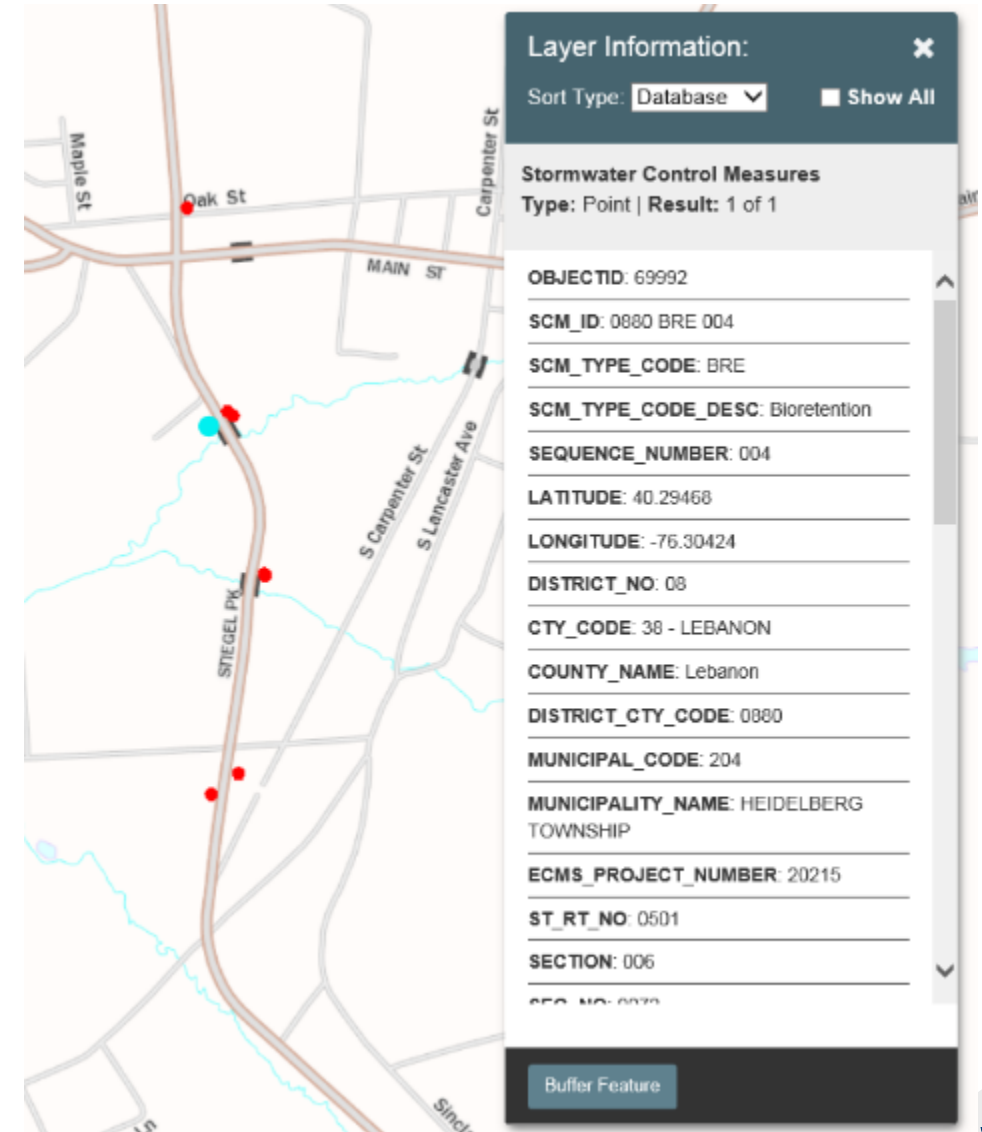
MAINTENANCE-IQ

- Map showing all SCM locations throughout the commonwealth



MAINTENANCE-IQ

- Custom GIS application for PennDOT
- Helpful for planning inspections
- Can view inventory and inspection data



SCM INSPECTIONS-VSI

Routine (1 hour on site)

As-Built Plan is not required

**Documented with Forms M-77 and M-78
(photographs)**

3-year cycle for most SCM types

1½ day training required

3-year cycle for most SCM types



**Visual
Screening
Inspections**



SCM INSPECTIONS-CAI

In-depth (2-4 hours on site)

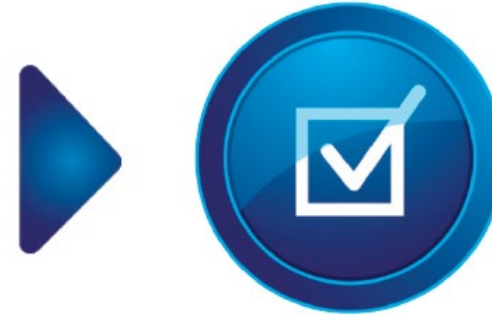
Engineering/environmental professional or apprenticeship required

Confirm accuracy of As-Built Plan

Documented with Forms M-79 and M-78 (photographs)

1 year after construction + every 10 years

1½ day training required (additional to the VSI Training)



**Condition
Assessment
Inspections**



SCM INSPECTIONS

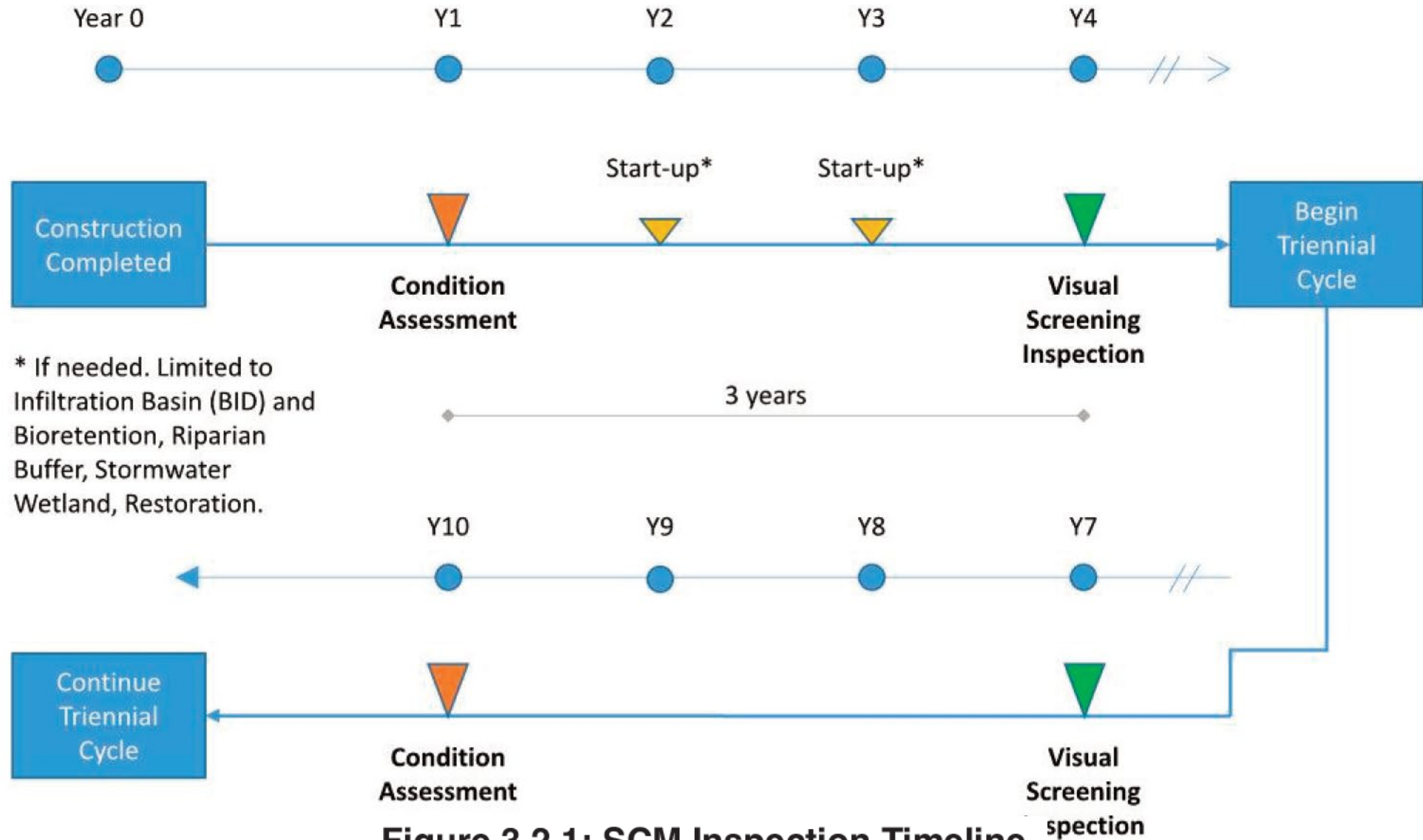
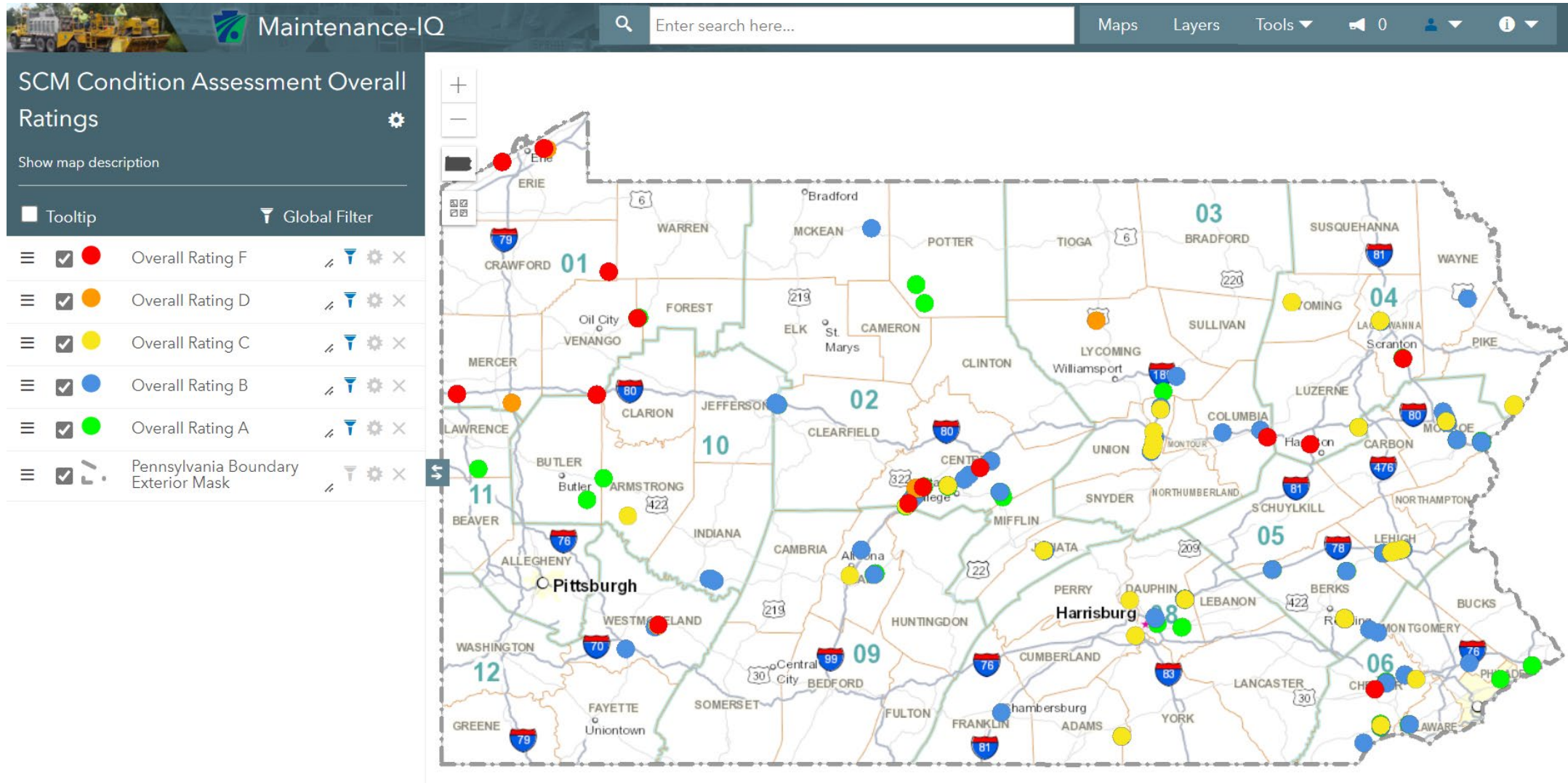


Figure 3.2.1: SCM Inspection Timeline



MAINTENANCE-IQ

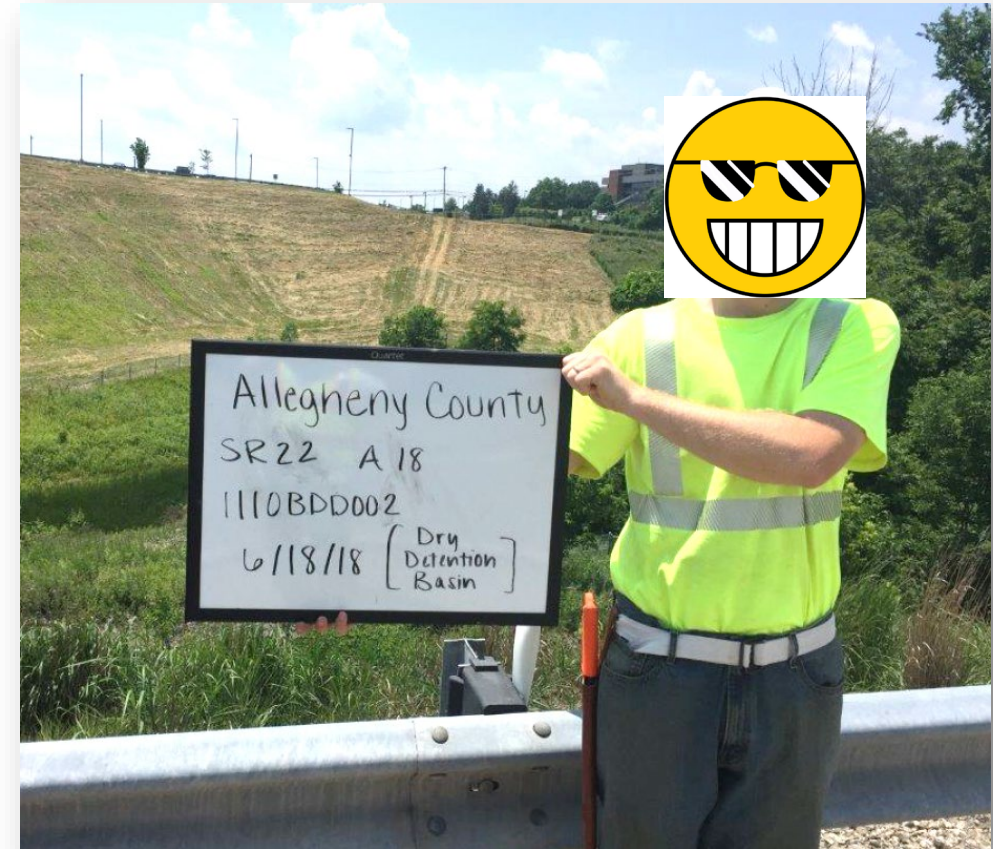
- Map color coded for overall CAI ratings



INSPECTION RESULTS

- Reviewed over 5,600 inspections (VSIs)

General SCM Type	# of SCMs Inspected
Basin	1,693
Bioretention	412
Infiltration	947
Restoration	159
Riparian Buffer	85
Stormwater Wetland	35
Vegetated Filter Strip	50
Vegetated Swale	1,978
Filter	29
Manuf. Treat. Device	152
Other	137



INSPECTION RESULTS

- Inspections have documented almost 18,000 problems
- 44% of problems noted required corrective maintenance or an E/E evaluation

Problem Category	Any Problem	Corrective Maintenance	Engineering Evaluation
	Action Code 0-5*	Action Code 2-4*	Action Code 5*
Debris/Trash	4,615	1,167	22
Erosion	1,533	924	63
Ponding	1,682	2283	652
Vegetation	6,974	2,586	448
Miscellaneous	3,016	1,271	425
Total	17,820	6,231	1,610

*Action Code: 0 = No Action, 1 = Routine Maintenance, 2-4 = Corrective Maintenance, 5 = Engineering Evaluation



INSPECTION RESULTS

- Most common problems

Problem Category	Most Common		Second Most Common	
	Problem Type	Number	Problem Type	Number
Debris/Trash	SCM Floor/Side Slopes	2,156	Inflow Channels	739
Erosion	SCM Bottom Side Slopes	797	Inflow Channels	463
Ponding	Standing Water	1,041	Other Signs of Poor Drainage	537
Vegetation	Wood Vegetation in Embankment	1,818	Hydrophytic Vegetation	1,489
Miscellaneous	Sediment Build-Up	651	Structural Damage	429



INSPECTION RESULTS

Basins

- Every problem category represented
- Most E/E evaluations requests for standing water in dry basins (245)

Bioretention

- Mostly minor problems noted (overgrown vegetation, sediment/debris accumulation)

Infiltration

- Most problems symptomatic of poor infiltration

Swales

- Most problems related to erosion, standing water, excessive vegetation, lack of vegetation, trash & debris



SCM MAINTENANCE TRAINING

- Do we need training?
- Yes, training of field personnel is REQUIRED
- Some activities related to SCM repair require specialized equipment
 - Infiltration Facilities
 - Specialized Vegetative Plantings
 - Review of PCSM Plans
- Each SCM type has different features and requires specialized maintenance schedule
 - Not all equipment should be used on certain SCMs



SCM MAINTENANCE TRAINING

- Do we need training?
- SCMs are not maintained as standard landscape or transportation features
- To ensure proper and efficient maintenance to preserve functionality and extend their operational life
- Training is also an important part of PennDOT's NPDES MS4 permit requirements



SCM MAINTENANCE TRAINING

- Target Audience:
 - Field Maintenance Foreman
 - Mid-Level Managers
- Modularized approach to training material
- Modules are interchangeable and flexible depending on organizational needs
- Also developing an “Awareness” training for all audiences



SCM MAINTENANCE TRAINING

- Training Content

- Module 1: Program Overview
- Module 2: Identification of SCMs
- Module 3: Vegetation Identification
- Module 4: Maintenance Equipment
- Module 5: Routine Maintenance Activities
- Module 6: Corrective Maintenance Activities
- Module 7: Assemblies, Charging, and Roles
- Module 8: Maintenance Review of Design Plans



SCM MAINTENANCE TRAINING

- Field Guides
 - Instructions
 - Best practices
 - Equipment used
 - Always and Never

LGP Equipment and Minimal Compaction Techniques



ALWAYS

- ☑ Check the restrictions on an SCM before planning the execution of work.
- ☑ If possible, perform all work (excluding mowing) with equipment operating from outside of infiltrating or filtrating SCMs.



NEVER

- ☒ **NEVER** enter any SCM when it is not completely dry; even non-infiltrating/ filtrating SCMs can be damaged by rutting when wet.

4.1 Low Ground Pressure (LGP) Procedures

LGP vs. Heavy Equipment

Examples of LGP equipment include:

- Push mowers
- Lighter weight tractors
 - Zero turn mowers and garden tractors (under 1,000 lb.)*
 - Tractors (under 5 tons/axle with 7 psi target, 20 psi max turf tread tires)
- Handhelds:
 - String trimmers
 - Pole saws
 - Loppers
 - Shovels
 - Chain saws
 - Rakes



Images c/o PennDOT

*Typically equipped with LGP tires. Confirm tire tread and psi inflation.

Heavy equipment is **anything** not meeting the LGP requirements. Examples of heavy equipment include:

- Tractors**
- Backhoe
- Excavator
- Loader
- Vacuum Truck
- Dump Truck



**Excluding those under 5 tons/axle with low pressure turf tread tires



Images c/o PennDOT



QUESTIONS ?

Rich Heineman- (717) 787-0459 –

rheineman@pa.gov

Section Chief – Stormwater

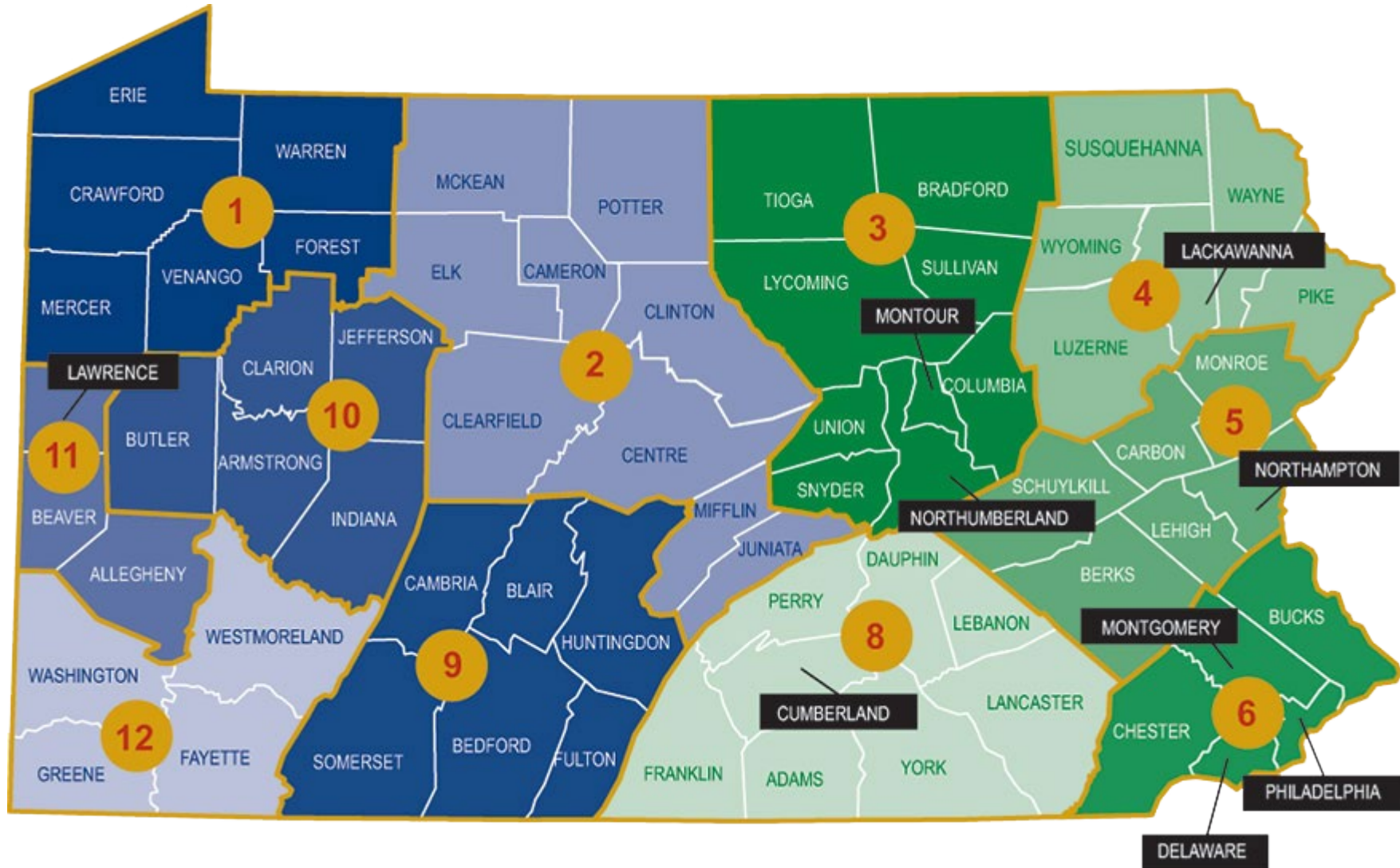


Coordination Across Design, Construction & Maintenance Phases

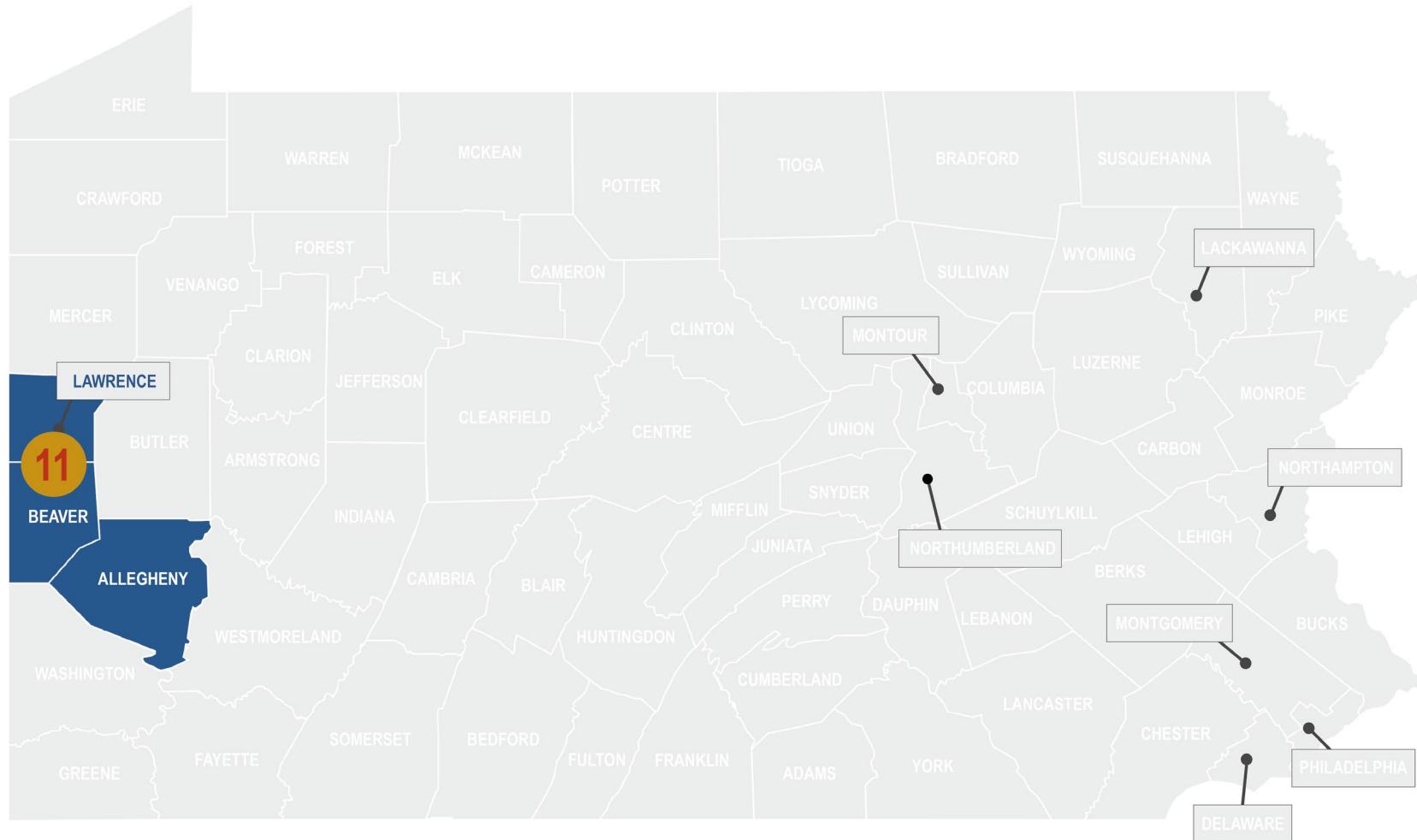
PennDOT Engineering District 11

TYLER MERCER, P.E.
CAITLIN HULLE

PENNDOT REGIONAL OFFICES



PENNDOT DISTRICT 11



STORMWATER MANAGEMENT IN TRANSPORTATION

Ch. 102 Permit Requirements

Municipal Separate Storm Sewer System (MS4)
Requirements

Flooding Mitigation



CH 102 REQUIREMENTS

- National Pollution Discharge Elimination System (NPDES) permit required when >1 acre of earth disturbance
 - Does not include Roadside Maintenance Activities (RMA)
- Post-Construction Stormwater Management (PCSM) facilities are required as a part of the Chapter 102 NPDES permitting process
- Goal to capture and treat any increases in stormwater runoff and improve water quality
- Comparison of pre and post construction volume, rate and quality of runoff



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

PAG-02
AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR DISCHARGES OF
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

NPDES PERMIT NO: (PERMIT ID NO.)

In compliance with the provisions of the Clean Water Act, 33 U.S.C.A. §§ 1251—1387 and Pennsylvania's Clean Streams Law, as amended, 35 P.S. §§ 691.1—691.1001, the Department of Environmental Protection (DEP) authorizes the permittee named below to discharge stormwater associated with construction activities from an earth disturbance activity that involves earth disturbance greater than or equal to one acre, or an earth disturbance on any portion, part, or during any stage of a larger common plan of development or sale that involves earth disturbance greater than or equal to one acre:

Permittee
(Permittee Name(s))
(Permittee Mailing Address)
(Permittee City, State, Zip)

Project Site
(Project Site Name)
(Municipality Name(s)), (County Name(s))

This authorization is subject to DEP's enclosed PAG-02 General Permit (General Permit) which incorporates all effluent limitations, monitoring and reporting requirements, and other terms, conditions, criteria, and special requirements for the discharge of stormwater associated with construction activities to surface waters, including through storm sewers. Authorization to discharge is subject to the implementation of the plans and additional associated information submitted as part of the Notice of Intent (NOI) for general permit coverage.

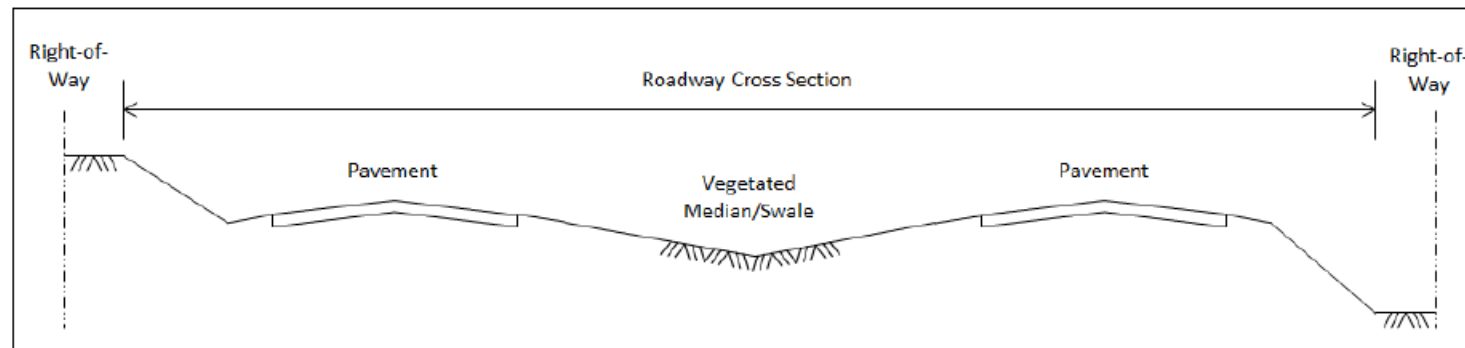
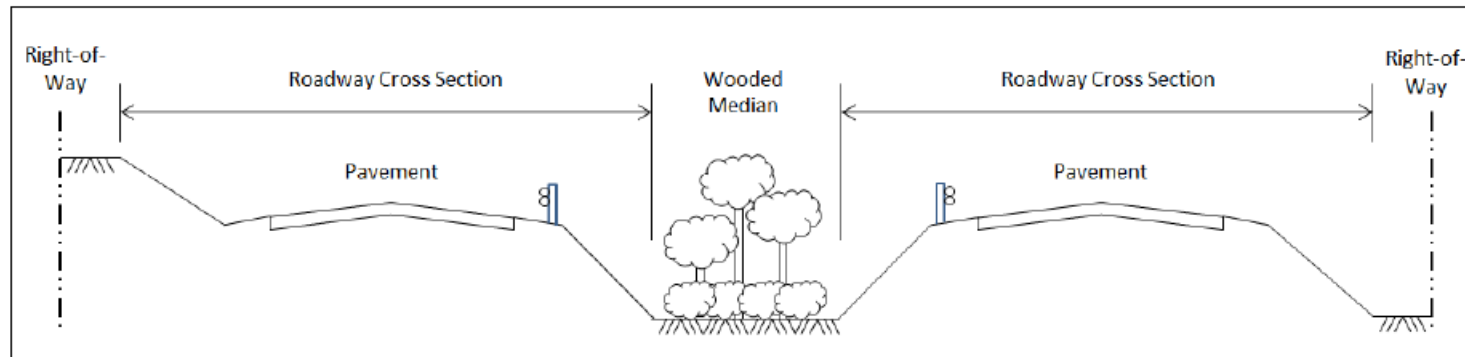
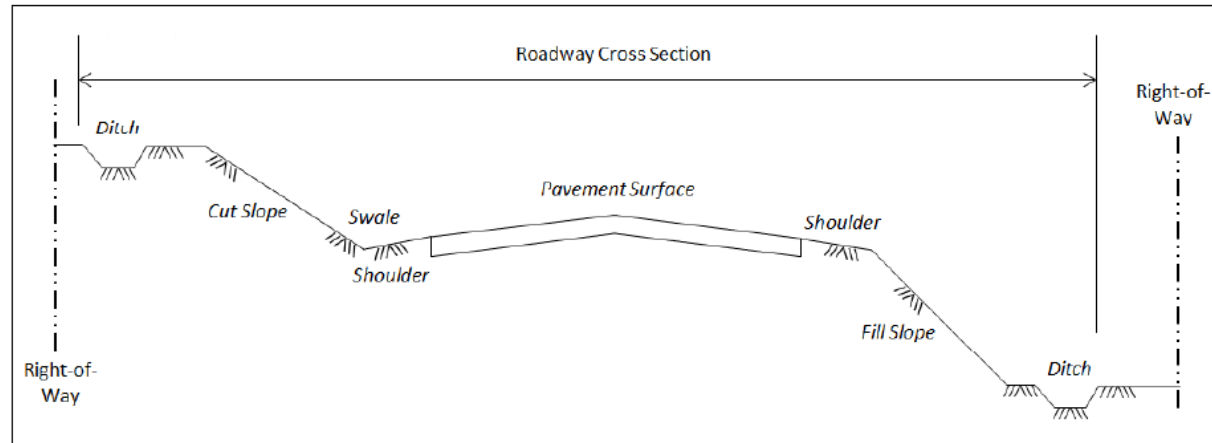
APPROVAL TO DISCHARGE IN ACCORDANCE WITH THE TERMS AND CONDITIONS HEREIN IS AUTHORIZED BEGINNING ON (EFFECTIVE DATE OF COVERAGE) AND WILL EXPIRE ON DECEMBER 7, 2024 WHEN CONDUCTED PURSUANT TO THE TERMS AND CONDITIONS OF THIS GENERAL PERMIT. GENERAL PERMIT COVERAGE MAY BE TERMINATED PRIOR TO THE EXPIRATION DATE UPON RECEIPT AND ACKNOWLEDGEMENT OF A NOTICE OF TERMINATION FORM AND APPROVAL BY DEP OR THE AUTHORIZED CONSERVATION DISTRICT. NO CONDITION OF THIS GENERAL PERMIT SHALL RELEASE THE PERMITTEE OR CO-PERMITTEE(S) FROM ANY RESPONSIBILITY OR REQUIREMENT UNDER STATE OR FEDERAL ENVIRONMENTAL STATUTES, REGULATIONS, OR LOCAL ORDINANCES.

Coverage under the PAG-02 General Permit is authorized by:

(Manager Name)
(Manager Title)
(Name of CCD or DEP Office)



RMA VS CH. 102 EARTH DISTURBANCE



MS4 REQUIREMENTS

- The Municipal Separate Storm Sewer System (MS4) Program regulates nonpoint source stormwater runoff
- PennDOT has a statewide MS4 Permit with a Pollution Reduction Plan (PRP)
- Improve water quality and reduce sediment load in urban areas
- Part of the PRP includes stormwater projects
- Examples of project types:
 - Stream Restoration
 - PCSMs
 - Floodplain Restoration
 - Riparian Restoration



FLOODING MITIGATION

- Ensure the safety of the traveling public by reducing water on roadways when practical
- Increasing infiltration along roadways through swales, native vegetation and check dams
- PCSM facility construction
- Coordination with municipalities and organizations to reduce flooding and improve water quality
 - PennDOT Connects
 - Watershed Groups
 - Non-Profit Groups



PROJECT PHASES

Design

A large, dark blue downward-pointing arrow connects the 'Design' phase to the 'Construction' phase.

Construction

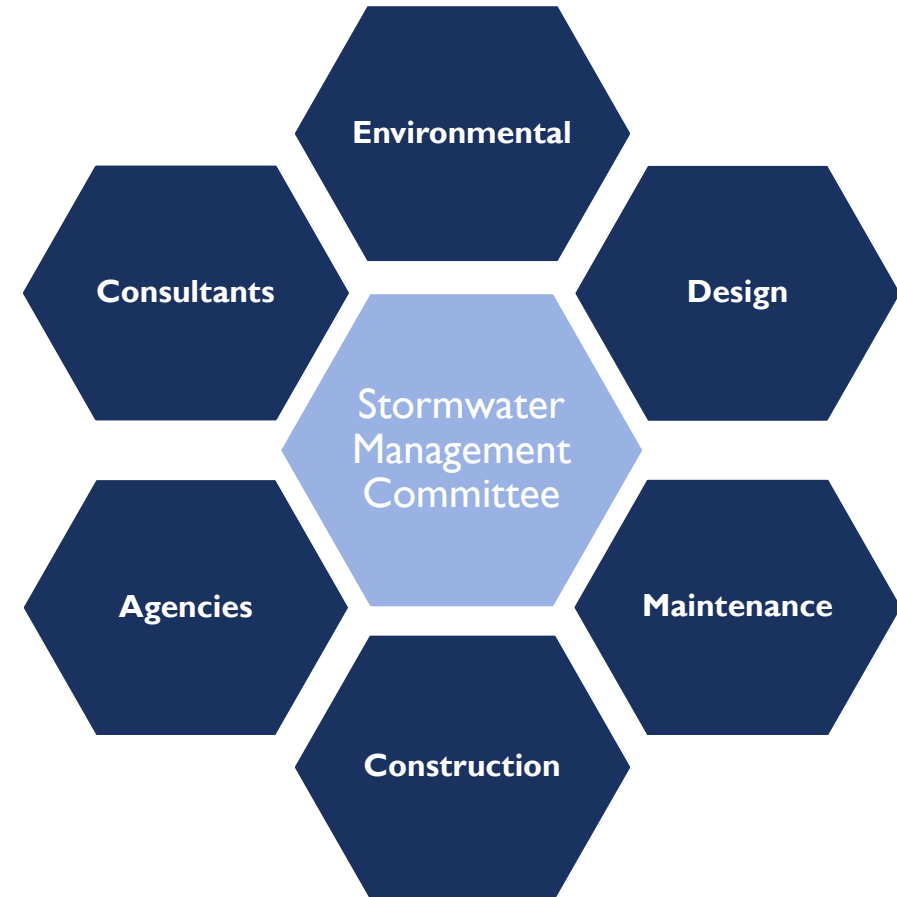
A large, dark blue downward-pointing arrow connects the 'Construction' phase to the 'Maintenance' phase.

Maintenance

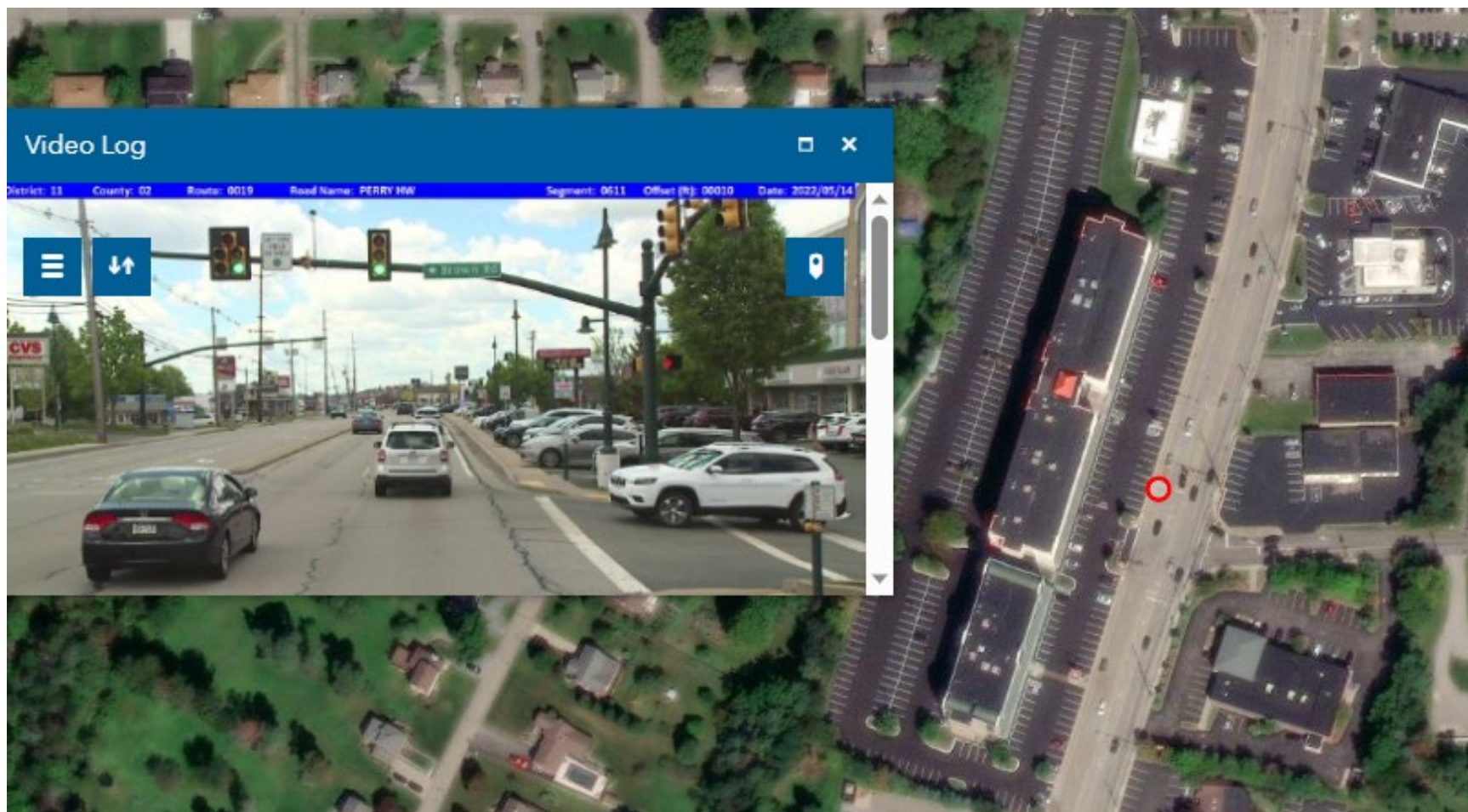


DESIGN - STORMWATER MANAGEMENT COMMITTEE

- Purpose: Multidisciplinary oversight committee to properly design, construct and maintain PCSM facilities for all NPDES permitted projects
- Preliminary Engineering Review- 60%
- Final Design Review – 90%
- Attend pre-construction meeting with permitting agencies
- Regularly attend meetings throughout construction of PCSM facilities



DESIGN CHALLENGES



Challenges of fitting PCSM facilities within tight urban corridors – ROW and topography constraints

Constructing facilities with maintenance in mind that are easily maintained and accessible



CONSTRUCTION- PCSM PHASES

- Environmental Unit coordination at Pre-Construction Meeting
 - Agencies & Contractor 7 days prior to earth disturbance
 - Identify critical stages in PCSM construction
 - Discuss schedule and permitting requirements
- Meeting with Environmental Unit 10 days prior to start of PCSM construction
 - Review plans with contractor, licensed professional and inspection staff
- Meet after PCSM construction complete
 - Verify PCSM constructed according to plans
 - Make corrections to PCSM as needed
 - Mark any deviations in PCSM as built plan



CONSTRUCTION- PCSM PHASES

- Inspect PCSM facilities during Visual Site Inspection Report (VSIR) inspections
 - Project team – weekly and after rainfall events
 - Environmental Unit – QA/QC annually at NPDES permitted sites
- Meet with agencies prior to permit close out
 - Notice of Termination
- PCSM facilities are assigned an ID number and added to the inventory database



MAINTENANCE- PCSM NAME

Facilities have a unique name system- dictated by Pub 888

- 4-digit PennDOT District County Code
 - Allegheny: 1110
 - Beaver: 1120
 - Lawrence: 1140
- 3-letter PCSM Type
 - Basin, Dry Detention: BDD
 - Basin, Infiltration Detention: BID
 - Basin, Wet Detention: BWD
 - Regenerative Step Pool: RSP
 - Infiltration Berm: IBE
 - Subsurface Infiltration Trench: SIT
 - Vegetated Swale w/ Check Dams: VSC
- 3-digit sequentially assigned #
 - Example- 1140-IBE-001



MAINTENANCE - INSPECTION CYCLE



Visual Screening Inspections

- VSI - Routine (1 hour on site)
 - Non-invasive using visual indicators
 - As-Built Plan is not required
 - Documented with Forms M-77 and M-78 (photographs)
 - 3-year cycle for most SCM types



Condition Assessment Inspections

- CAI - In-depth (2-4 hours on site)
 - Minimally invasive
 - Confirm accuracy of As-Built Plan
 - Documented with Forms M-78 and M-79, plus a full or summary report
 - Overall performance rating of A-F
 - 1 year after construction + every 10 years



QA/QC Program

- District Quality Control (QC)
 - Inspection reports
 - Inventory data
 - Inspection cycles
 - Maintenance records
- Central Office Quality Assurance (QA)
 - Blind field inspections

- Inspection requirements dictated in Pub 888 - vary based on PCSM type
- Inspections are complete in PCSM App
- Inspection forms, photos and plans are uploaded to Maintenance IQ
- Corrective maintenance occurs as needed based on inspections



MAINTENANCE - SCHEDULING

- Environmental Unit identifies maintenance needs and assists in coordinating maintenance operations
- Each County handles maintenance differently based on staffing
- January/February meet with Counties to discuss routine maintenance needs
 - Changes yearly based on new facilities being constructed
 - Provide presentation/slides with location maps and pictures to Assistant Maintenance Manager for planning
 - Create work orders for maintenance
- On site support before, during and after work is completed
- Most facilities need biannual mowing
 - First cycle: May-June
 - Second cycle: September-October
- Addition of PCSM maintenance to an extensive maintenance program is challenging with limited resources and staffing



MAINTENANCE – CORRECTIVE & ROUTINE

Corrective

- Field conditions not matching plans
- Repair or replacement
- Water quality issues, lack of infiltration

Routine

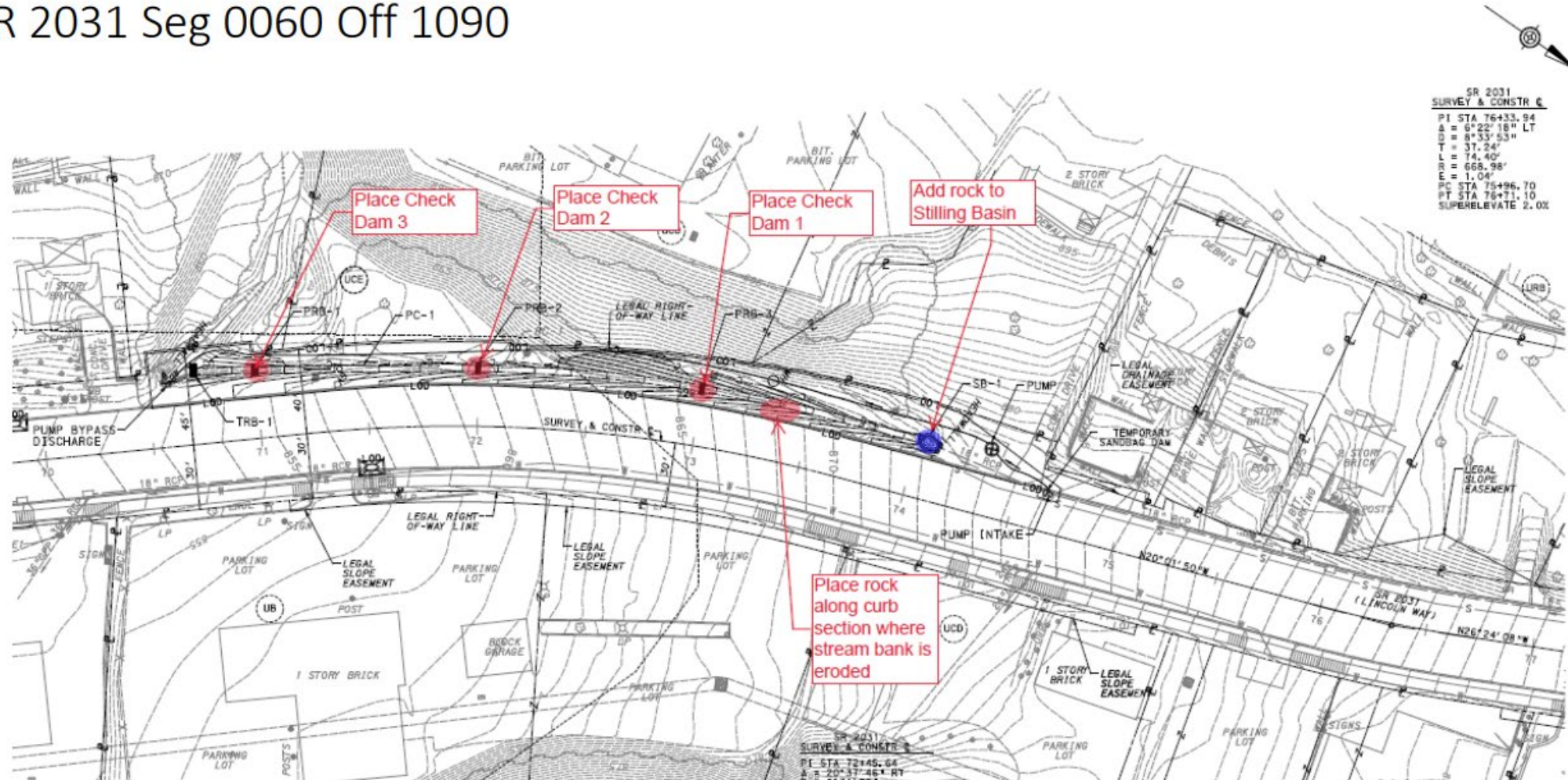
- Vegetation management
- Litter control
- Sediment removal



MAINTENANCE- CORRECTIVE

1110VSC003

SR 2031 Seg 0060 Off 1090



MAINTENANCE - CORRECTIVE



Before



After



MAINTENANCE - CORRECTIVE



MAINTENANCE- CORRECTIVE



Before



Before



MAINTENANCE - CORRECTIVE



Herbicide 2x



Tree removal



Sediment & brush removal



MAINTENANCE- CORRECTIVE



MAINTENANCE - CORRECTIVE



Before



Before



MAINTENANCE- CORRECTIVE



Sediment & vegetation removal



Herbicide

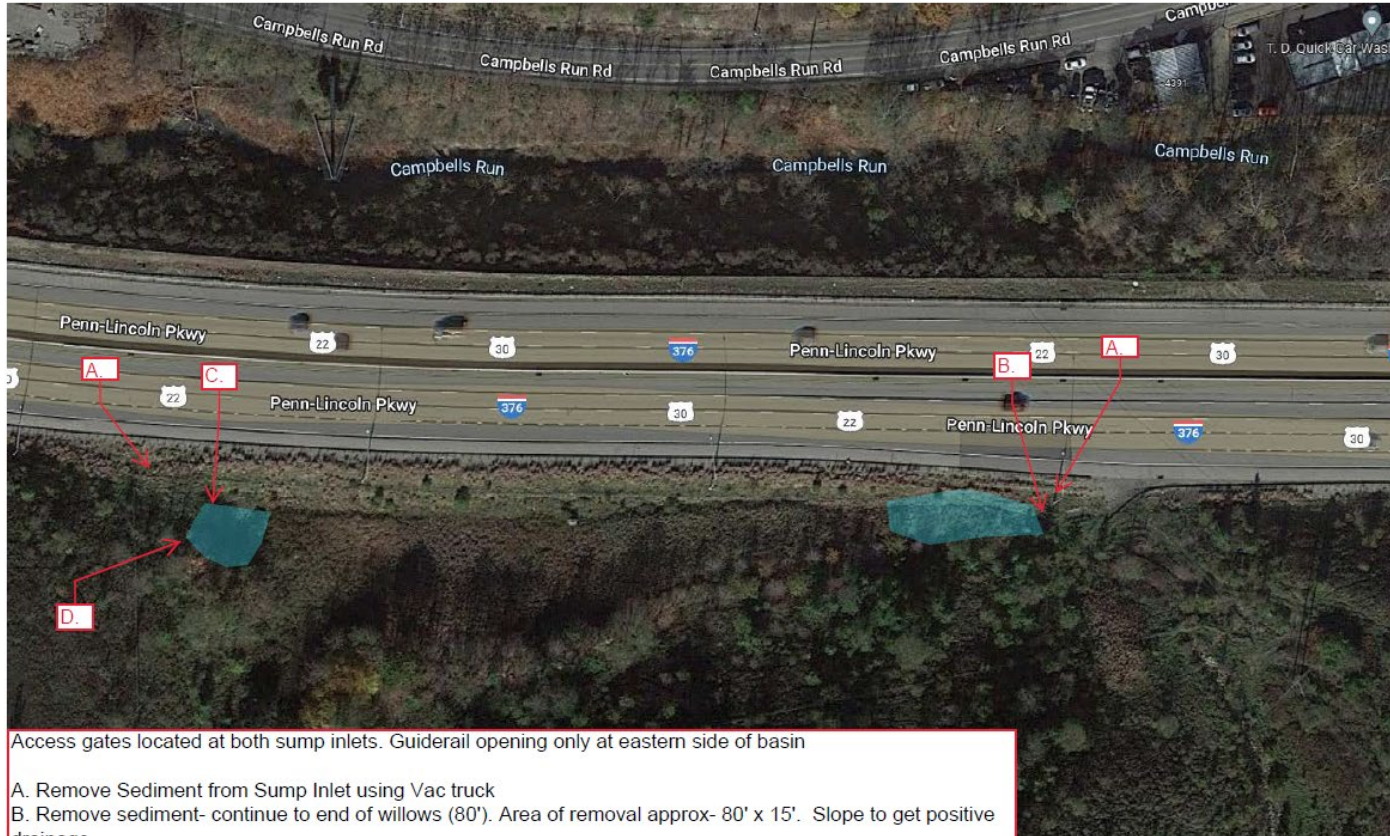


Mowed



MAINTENANCE - CORRECTIVE

1110BWD002
SR 376 Seg 0630 Off 0125
40.42487005201629, -80.11874908784172



Access gates located at both sump inlets. Guiderail opening only at eastern side of basin

- A. Remove Sediment from Sump Inlet using Vac truck
- B. Remove sediment- continue to end of willows (80'). Area of removal approx- 80' x 15'. Slope to get positive drainage.
- C. Remove sediment- continue past cattails (20'). Slope to get positive drainage. Fill in scour hole around headwall with R-4 choked with No 1s.
- D. Sediment that is removed from C can be placed along slope here and seeded/mulched. Place CFS at downslope side- leave until grass is established.



MAINTENANCE - CORRECTIVE



Before



After



MAINTENANCE - ROUTINE



Before



During



After



MAINTENANCE - ROUTINE



Before



During



After



MAINTENANCE - ROUTINE



Before



During



After



QUESTIONS?

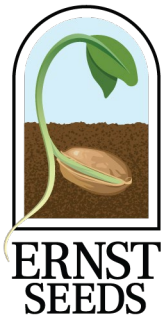
TYLER MERCER, P.E.

**ENVIRONMENTAL SUPERVISOR – PERMITS
PENNDOT ENGINEERING DISTRICT 11-0**

JARMERCER@PA.GOV

Vegetation in Stormwater Control Measures

Mark B. Fiely
Horticulturist
Ernst Conservation Seeds
mark@ernstseed.com

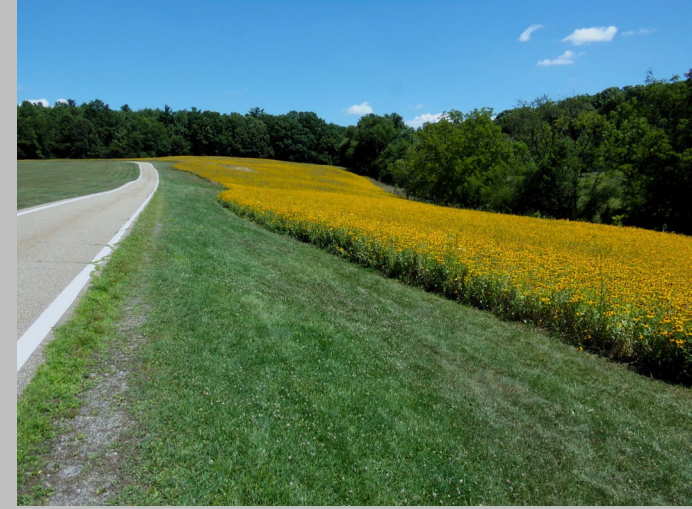




For A Successful Basin Planting, Select Your Seed
Mix Based On Site Hydrology

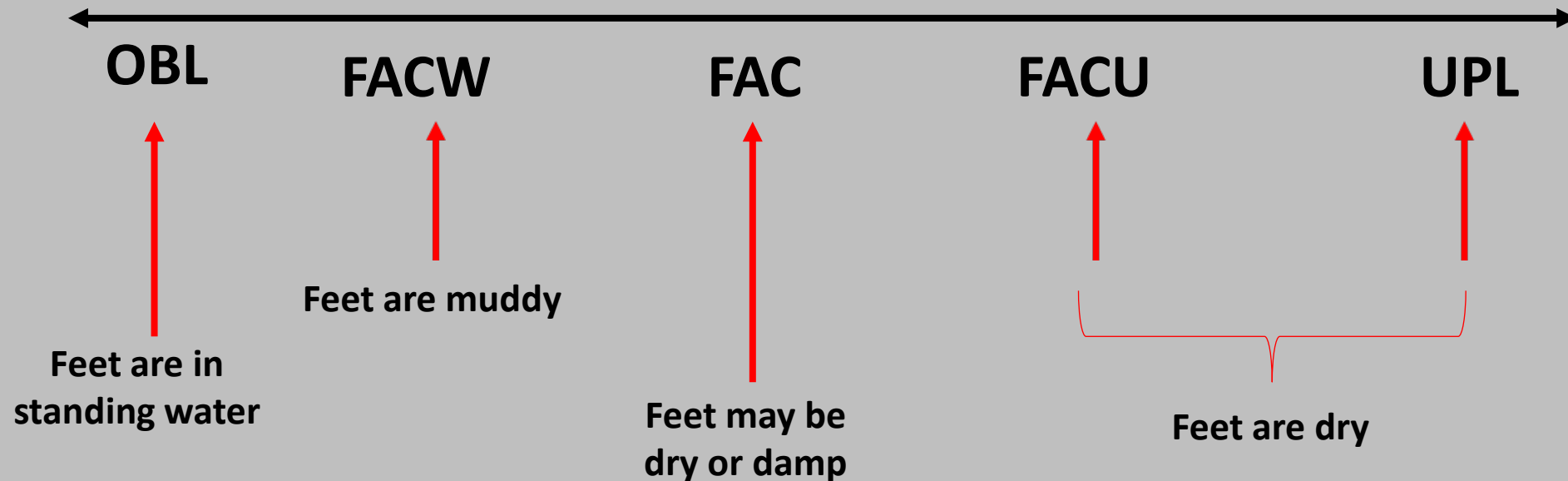
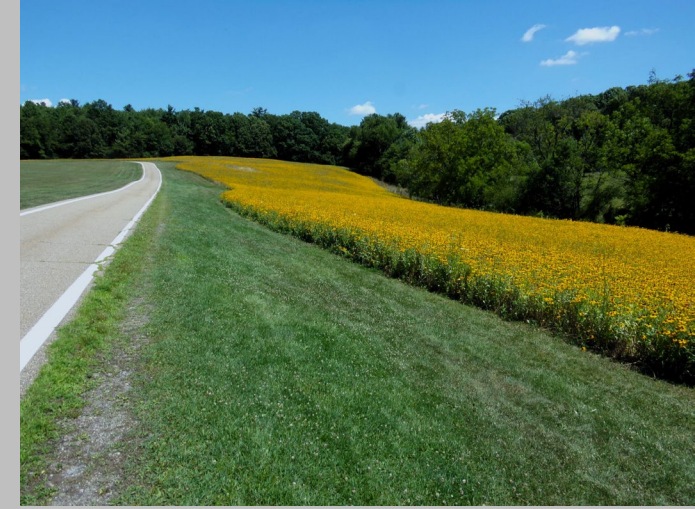


Wetland Indicators





Let's think about the site in terms of walking it in our bare feet. If we walked the site 10 random days in the growing season will our feet be dry, muddy, or in water 7 days?



Should You Choose A Mix With Wildflowers?

- Wildflowers enhance the hydrological elasticity of a seed mix.
- Wildflowers enhance the aesthetics of a basin.
- Wildflowers provide ecological lift by providing food and habitat for pollinators, other insects, and songbirds.



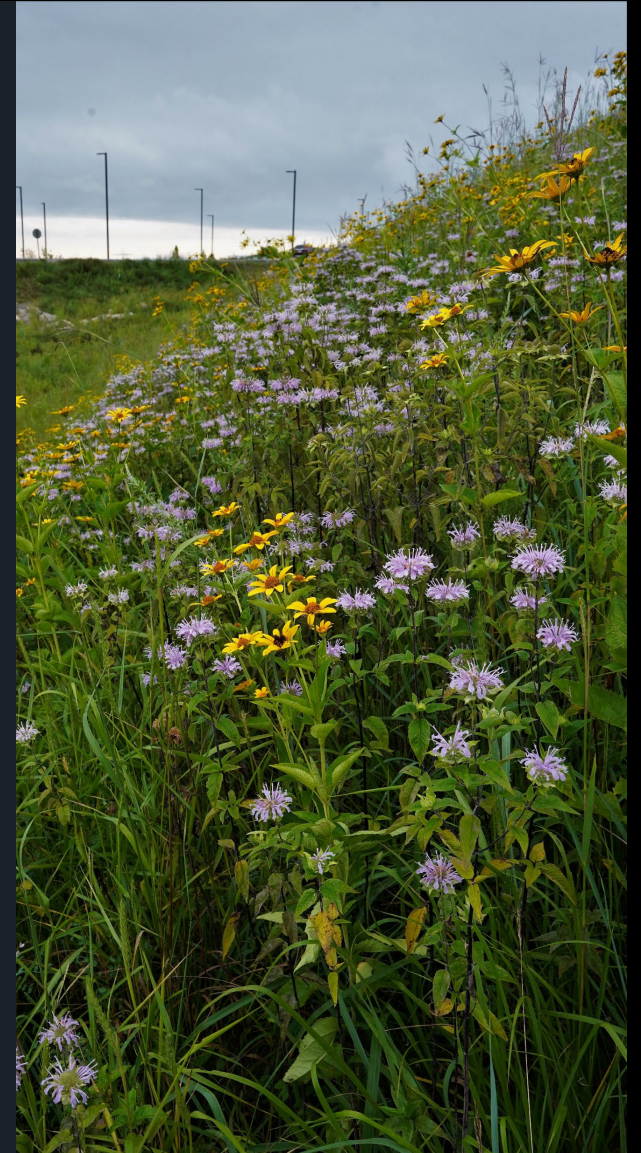


Basin Slope

If slope is less than 3:1, use
ERNMX-153 Showy Northeast
Wildflower and Grass Mix or
ERNMX-105 Mesic to Dry
Native Pollinator Mix.



If slope is 3:1 or steeper, use
ERNMX-181 Native Steep Slope
Mix.





Basin Slopes Tracking

Final tracking **should be**
perpendicular to slope

not parallel to slope.



Basin Slopes Temporary Stabilization (Slope is $\geq 3:1$)

← Bonded Fiber Matrix (e.g.
Flexterra)

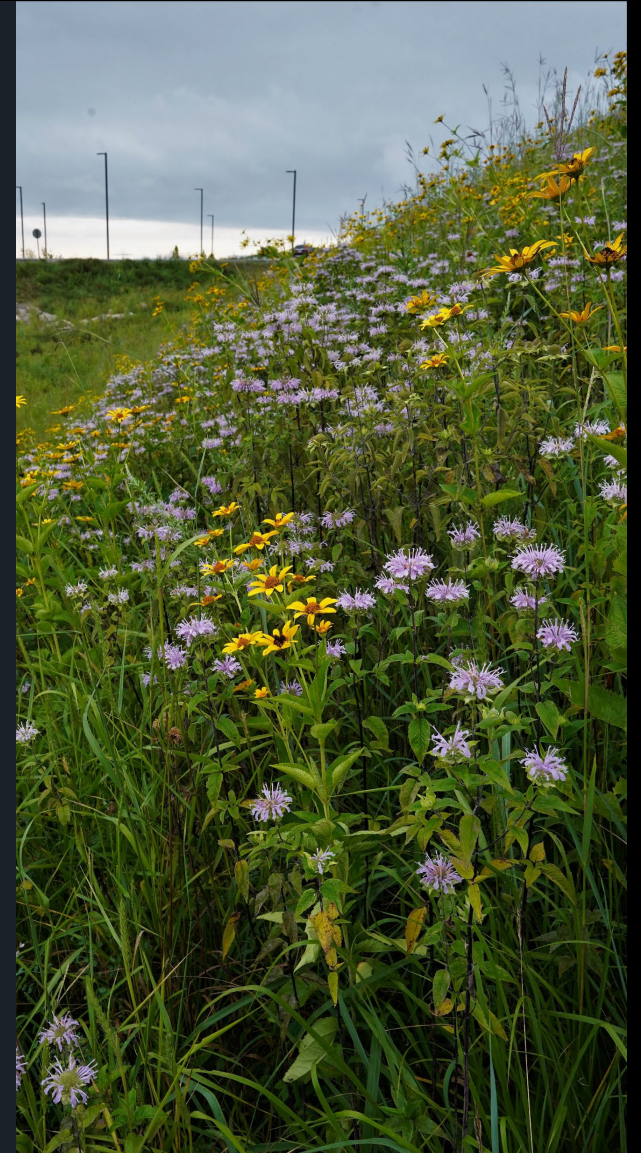
Erosion Control Blanket →





Intersection of Basin Slope and Floor

Overlap slope and basin
mixes.



Basin Floors

Wherever sheet flow of water may occur, apply erosion control blankets.

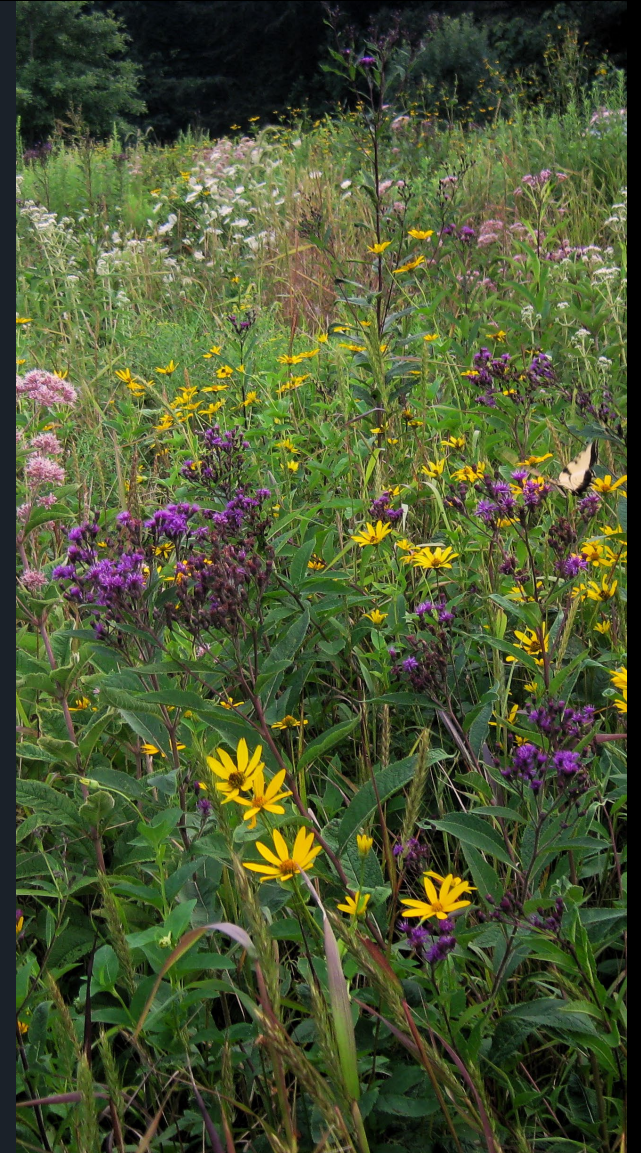


Basin Floor Seed Mixes



If site is inundated less than 12 hours, then rapidly dries out, use ERNMIX-180 Rain Garden Mix.

If the site is inundated less than three days, then dries out, use ERNMIX-178 Riparian Buffer Mix



There may be pockets that remain chronically saturated.



Basin Floor

If you are uncertain whether
the site will be dry or
saturated, choose ERNMX-183
Native Detention Area Mix





Basin Floor Seed Mixes

If the basin floor will be
chronically saturated/
occasionally drying out, use
ERNMX-122 FACW Meadow
Mix

or

ERNMX-126 Retention Basin
Floor Mix

or

ERNMX-127 Retention Basin
Wildlife Mix





Basin Floor Seed Mixes

If the basin floor will be
chronically saturated with
prolonged periods of
inundation use ERNMX-131
Obligate Wetland Mix



Where Ponding Will Be Permanent

1. Most wetland seed will not germinate from depths greater than 3".
 - a) Plant seed prior to inundating the site.
 - b) Maintain site in a saturated state until after germination.
 - c) Allow seedlings to grow 6" tall, then gradually increase water depth.
2. Most wetland seeds float in water.
 - a) If the site is ponded at time of planting, plant ERNMX-131 at the saturated edge of the site.

Native Plant Seedling Gallery

Gallery of Native Plant Seedlings



Photographs courtesy of
Mark Flinn - Environmental
Plant Conservation Society
See our website
or contact us for details.
www.ernstseed.com

www.ernstseed.com

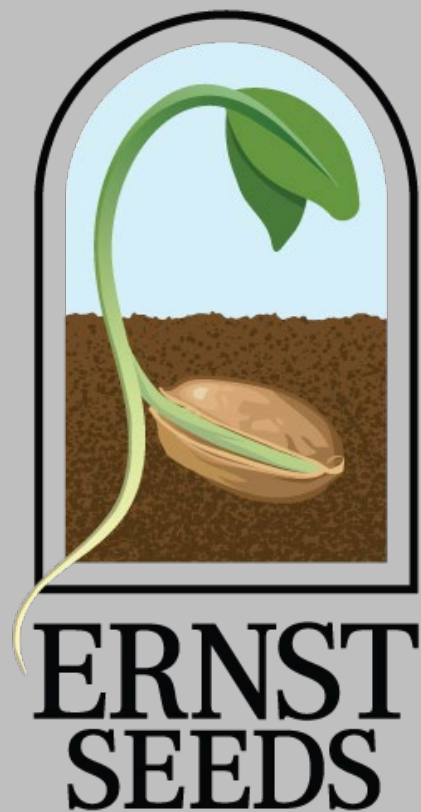
PRINT THIS DOCUMENT

Most eastern US native plant species do not bloom during their establishment year. For most individuals this makes it difficult to determine if any of the desired species in their meadow are growing. To assist those who lack experience with seedling identification, we have produced this seedling gallery.

Our seedling gallery has images of some species commonly used in upland, riparian, and wetland mixes. When reviewing your meadow be sure to have a copy of your seed mix. This will ensure that you are looking for the correct species from this gallery. Do not expect to recognize each species in the field. Instead look for evidence of a few species growing well. If you see these species there is high probability that the other species in the mix are present.



For Help Recognizing Seedlings In Your Basin Plantings See:
<https://www.ernstseed.com/help-guides/native-plant-seedling-gallery/>



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Funding Stormwater Infrastructure



2023 University of Pittsburgh IRISE Stormwater Symposium

11/29/2023

Catherine Tulley, Manager of Environmental Programs



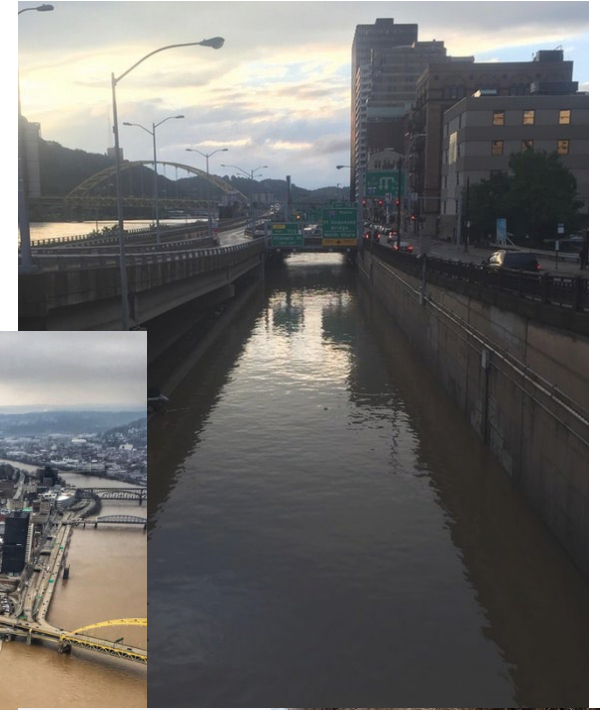
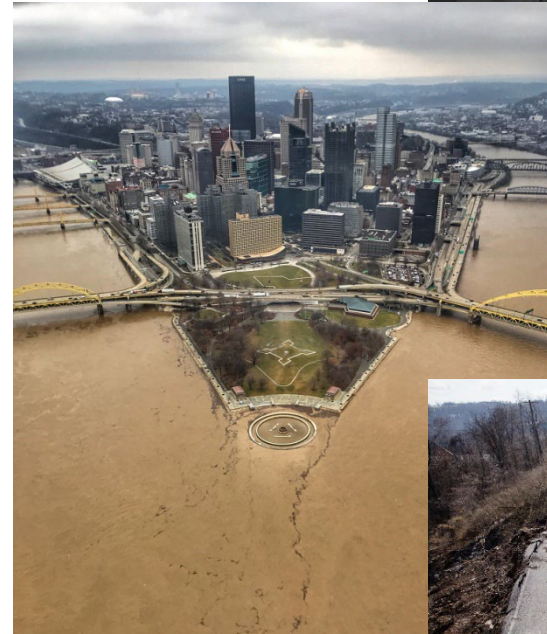
Introduction to SPC

- www.spcregion.org
- The **Southwestern Pennsylvania Commission** is the federally-designated regional Metropolitan Planning Organization (MPO) and Economic Development District (EDD) serving the 10-county Southwestern Pennsylvania region.
- SPC directs the use of state and federal transportation and economic development funds allocated to the region—approximately **\$35 billion through 2045**.
- SPC assists our member counties and local governments to access those state and federal funds through our Long Range Plan, Transportation Improvement Program and other planning & programming initiatives.



Stormwater: WRC's Initial Focus – Here to Stay

💧 Stormwater planning & programming connects to many other related infrastructure issues (localized flooding, aging infrastructure, quality of life & more)



Residential stormwater infrastructure

- 💧 Little to no grant funding is available in Pennsylvania to directly assist homeowners with residential stormwater management, yet...
- 💧 Approximately **950 municipalities in PA** are *required* to have stormwater mgmt. & pollution-reduction plans.
- 💧 Some residential infrastructure costs may be covered through grants or philanthropic sources, for control measures such as rain gardens, rain barrels, downspout planters, municipal green waste recovery programs, or costs may be financed through the assessment of stormwater fees to utility consumers.



Act 167 – Stormwater Mgmt. Act of 1978

- Act 167 required that “within two years following the promulgation of guidelines by DEP, each county must prepare and adopt a watershed stormwater management plan (“Act 167 Plan”) for each watershed located in the county as designated by DEP, in consultation with the municipalities located within each watershed, and must periodically review and revise such plans at least **every five years**.
- For municipalities that have regulated MS4s, compliance with NPDES permits may be achieved by enacting and implementing an ordinance(s) from a current Act 167 Plan.
- Funding:
 - The time period to apply for Act 167 Phase I (Scope of Study) funding closed on June 23, 2023.
 - The application period for Act 167 Phase II (plan development) funding will open approximately one year from the date of the Phase I grant award announcement.
 - Funding decisions for Phase II Act 167 Stormwater Management Plan development or revision requests will not be made until the close of the period to request funding.
 - Counties that are interested in developing or updating Act 167 Plans should contact the appropriate DEP regional office.
 - <https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Pages/Act-167.aspx>

Act 167 - Municipal Reimbursements

- “*When funding is available*, municipalities located in designated watersheds for which watershed stormwater plans have been prepared and adopted by counties and approved by DEP may request annual reimbursement for eligible expenses incurred in the adoption or revision of ordinances or regulations and other actual administrative, enforcement and implementation costs incurred in complying with the Act 167 Plan.
- Submission of a grant application is not necessary for municipalities to obtain reimbursement for eligible expenses. **Starting on January 1, 2024, municipalities may submit applications for reimbursement for the prior calendar year** (subject to the availability of funds) up to March 31st of each year. The [municipal reimbursement form \(3850-FM-BPMPSM0059\)](#) and instructions are available in the DEP eLibrary portal.
- Only municipalities that have enacted a stormwater ordinance that is consistent with a model ordinance contained in a current and approved Act 167 Plan are eligible for reimbursement. The cap for reimbursement of allowable costs by eligible municipalities is \$10,000 per year, subject to the availability of funds.”
- <https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Pages/Act-167.aspx>

Act 167 Stormwater Management Plans Status
4/13/2023



Meso- to macro-scale projects: federal funding

- 💧 EPA has programs such as the Section 319 Nonpoint Source Program, Urban Waters Small Grants Program & WIIN Small or Disadvantaged Communities DW Grants
- 💧 HUD CDBG community development funding can be used to mitigate flooding, reduce blight and improve property values
- 💧 FEMA's Hazard Mitigation Grant Program can provide post-disaster aid to fund flood-mitigation projects or purchase and relocate flood-prone properties
- 💧 US DOT Transportation Alternatives Program to fund non-SOV modalities and GSI components

Loans & financing

- 💧 State Revolving Funds: Clean Water SRF, Drinking Water SRF
- 💧 Loan Financing: Water Infrastructure Finance and Innovation Act (WIFIA)
- 💧 SRFs administered via PENNVEST
- 💧 More info here from EPA:

<https://www.epa.gov/green-infrastructure/green-infrastructure-funding-opportunities>

PA-Specific



DEP



DCNR



DCED



PA Dept of Ag
(DGLVR)



PEMA



USDA-RUS



Permit Fees



Green Bonds



Local Examples: Center & Herron Aves., Hill District

💧 PWSA

💧 <https://www.pgh2o.com/projects-maintenance/search-all-projects/centre-herron-stormwater-project>

💧 This project was partially funded by ALCOSAN's GROW grant program.



Local Examples: Civic Arena Redevelopment (P3)



Local Examples: Mill 19 Redevelopment (P3)



I-579 CAP Plaza

💧 \$30 million

💧 Completed in 2021

💧 \$19 million federal TIGER grant



I-579 Urban Open Space Cap

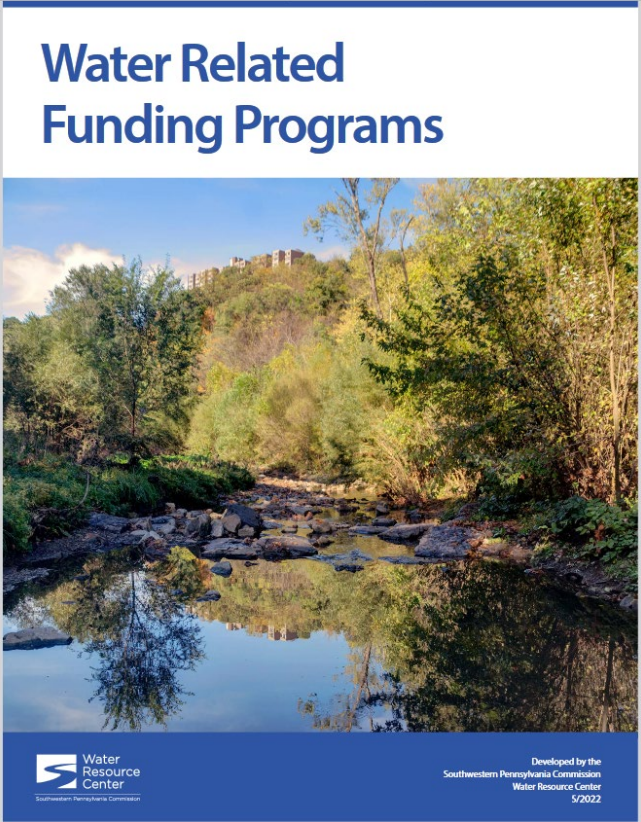
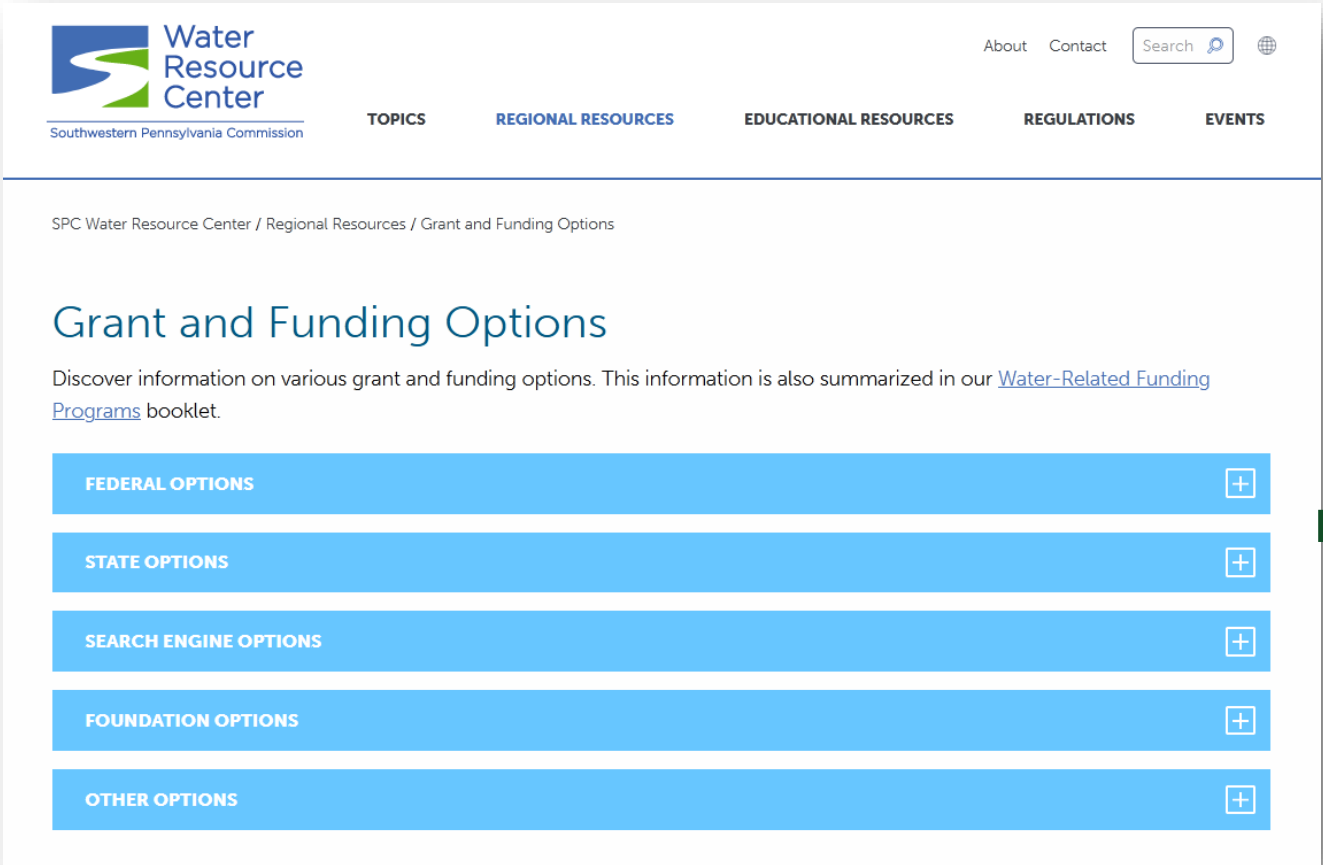
HDR

Takeaways:

- 💧 Think creatively!
- 💧 Work collaboratively
- 💧 Leave no stone unturned when searching for funding
- 💧 Projects may require stacking of multiple funding sources
- 💧 Be patient and stay on top of grant program guidelines, fine print, timelines and deadlines
- 💧 Financing options are generally low-interest and available over long-term periods

Grant & Funding Options: visit the WRC website

💧 <https://spcwater.org/regional-resources/grant-and-funding-options/>



Free PDF booklet (15 pgs.)

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<https://www.spcregion.org>



@spcregion

Thank you!

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Water Related Funding Programs



Water
Resource
Center

Southwestern Pennsylvania Commission

Developed by the
Southwestern Pennsylvania Commission
Water Resource Center

5/2022

SPC's Water Resource Center (WRC) is dedicated to promoting regional collaboration on water topics; facilitating coordination and education; and providing technical assistance to its member governments. WRC provides support to federal, state, regional, and local organizations, counties, cities, and municipalities on various water resource management initiatives.

The information within this document provides local project sponsors with a guide to available funding resources for water-related projects.

This list of funding resources is non-exhaustive. Please check with each funding source for application deadlines, eligibility, priority project types, and further funding details.

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Federal Funding Sources

Environmental Protection Agency (EPA)

Brownfields Grant Funding

Purpose: Funding for brownfields assessment, cleanup, revolving loans, environmental job training, technical assistance, training, and research.

Program Administrator: US Environmental Protection Agency.

Eligibility: Varies by program.

Match/Funding: Varies by program.

Website: <https://www.epa.gov/brownfields/types-epa-brownfield-grant-funding>

Environmental Education Grants

Purpose: Funding to support environmental education projects that promote environmental awareness and stewardship and help provide people with the skills to take responsible actions to protect the environment. Applicants must address at least one of the EPA educational priorities (agricultural education, community projects, or career development) and at least one of the environmental priorities, which changes by funding year.

Program Administrator: US Environmental Protection Agency.

Eligibility: Local education agency; state education or environmental agency; college or university; non profit organization; noncommercial education broadcasting entity; tribal education agency.

Match/Funding: 25% non-federal match required.

Website: <https://www.epa.gov/education/grants>

Greening America's Communities

Purpose: This is a program to help cities and towns develop an implementable vision of environmentally friendly neighborhoods that incorporate innovative green infrastructure and other sustainable design strategies. EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire local and state leaders to expand this work elsewhere.

Program Administrator: US Environmental Protection Agency.

Eligibility: Cities and towns.

Match/Funding: No information.

Website: <https://www.epa.gov/smartgrowth/greening-americas-communities>

Water Infrastructure Finance and Innovation Act (WIFIA)

Purpose: Federal credit program for eligible water and wastewater infrastructure projects. Program

Administrator: US Environmental Protection Agency.

Eligibility: Local, state, tribal, and federal government entities; partnerships and joint ventures; corporations and trusts; Clean Water and Drinking Water State Revolving Fund programs.

Match/Funding: \$5 million minimum for small communities (population 25,000 or less) or \$20 million min for large communities. WIFIA can only fund 49% of project costs. Federal assistance may not exceed 80% of project's costs. Maximum maturity date of 35 years from substantial completion. Interest rate equal to or greater than US Treasury rate of a similar maturity at the date of closing.

Website: <https://www.epa.gov/wifia>

Building Resilient Infrastructure and Communities

Purpose: Funding to support states, local communities, tribes, and territories, as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards. This program replaces the existing Pre-Disaster Mitigation (PDM) program. BRIC guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Program Administrator: Federal Emergency Management Agency.

Eligibility: States, territories, tribal governments as primary applications; local governments, state agencies, and tribal agencies as sub-applicants.

Match/Funding: BRIC is funded by federal post-disaster grant funding. Within this, there is an allocation for each state, territory, and DC, as well as tribal governments. The remainder of the funding will be available competitively for mitigation projects for eligible applicants.

Website: <https://www.fema.gov/bric>

Community Assistance Program - State Support Services Element

Purpose: Funding to states to provide technical assistance to communities in the National Flood Insurance Program (NFIP) and to evaluate community performance in implementing NFIP floodplain management activities.

Program Administrator: Federal Emergency Management Agency.

Eligibility: The Commonwealth.

Match/Funding: 25% non-federal match.

Website: <https://www.fema.gov/community-assistance-program-state-support-services-element>

Flood Mitigation Assistance

Purpose: Funding for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FEMA requires that grantees develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for HMA mitigation projects.

Program Administrator: Federal Emergency Management Agency.

Eligibility: The Commonwealth; local governments, private nonprofits, and state agencies are sub applicants that can sponsor projects for individuals and businesses.

Match/Funding: No information.

Website: <https://www.fema.gov/grants/mitigation/floods>

Hazard Mitigation Grant Program

Purpose: Funding to states, tribes, and local communities after a disaster declaration to protect public or private property through various mitigation measures. Hazard mitigation includes long-term efforts to reduce the impact of future events.

Program Administrator: Federal Emergency Management Agency.

Eligibility: The Commonwealth; local governments, private nonprofits, and state agencies are sub applicants that can sponsor projects for individuals and businesses.

Match/Funding: 75%/25% cost share between FEMA and other sources, respectively.

Website: <https://www.fema.gov/hazard-mitigation-grant-program#>

Public Assistance Grant Program

Purpose: Funding to support communities' recovery from major disasters by providing them with grant assistance for debris removal, life-saving emergency protective measures, and restoring public infrastructure.

Program Administrator: Federal Emergency Management Agency.

Eligibility : Local governments; states; tribes; territories; certain private non-profit organizations.

Match/Funding: No less than 75% of eligible costs are federal; 25% non-federal can be split among sub recipients.

Website: <https://www.fema.gov/assistance/public/program-overview>

Acres for America

Purpose: Funding to conserve lands of national significance, protect critical fish and wildlife habitat, and benefit people and local economies.

Program Administrator: National Fish and Wildlife Service; Walmart.

Eligibility: Non-profit organizations; state government agencies; local governments; municipal governments; Native American tribes; educational institutions.

Match/Funding: 1:1 minimum match, 5:1 match is encouraged. This may include other federal funds.

Website: <https://www.nfwf.org/programs/acres-america>

Bring Back the Natives

Purpose: Funding for conservation activities that restore, protect and enhance native populations of sensitive or listed fish species across the United States, especially in areas on or adjacent to federal agency lands.

Program Administrator: National Fish and Wildlife Service; US Forest Service.

Eligibility: Local government; state government and agencies; federal government and agencies; conservation districts; planning districts; utility districts; non-profit organizations; schools and universities.

Match/Funding: 50% match required; grants generally range from \$50,000 to \$100,000.

Website: <https://www.nfwf.org/programs/bring-back-natives>

Central Appalachia Habitat Stewardship Program

Purpose: Funding to restore and sustain healthy forests, rivers, and streams that provide habitat for diverse native bird and aquatic populations in seven focus areas of the Appalachian region including French Creek, the Upper-Middle Allegheny, the Pennsylvania Wilds, the Laurel Highlands, the Monongahela Forest, the Blue Ridge, and Southwestern Virginia.

Program Administrator: Richard King Mellon Foundation; US Department of Agriculture Natural Resources Conservation Service; US Forest Service; US Fish and Wildlife Service; American Forest Foundation; and Shell Oil Company.

Eligibility: Non-profit organizations; local governments; state government agencies; educational institutions.

Match/Funding: 50% non-federal match; funding amount changes by grant year.

Website: <https://www.nfwf.org/programs/central-appalachia-habitat-stewardship-program>

Five Star and Urban Waters Restoration Program

Purpose: Funding for on-the-ground wetland, riparian, in-stream, and/or coastal habitat restoration; meaningful education and training activities; measurable ecological, educational, and community benefits; and community partnerships.

Program Administrator: National Fish and Wildlife Service; US Forest Service; US Environmental Protection Agency; Shell Oil Company; FedEx; Southern Company.

Eligibility: Non-profit organizations; state government agencies; local governments; educational institutions; geographic focus for project funding changes by year.

Match/Funding: Match requirement changes by funding availability; awards range from \$20,000 to \$50,000, with an average size of \$30,000 and 40-50 grants awarded per year.

Website: <https://www.nfwf.org/programs/five-star-and-urban-waters-restoration-grant-program>

Resilient Communities Program

Purpose: Funding priorities include high-impact resiliency adaptations to help communities prepare for fire in the US West, floods and droughts in the Mid-West, and sea-level rise on the Eastern seaboard; community demonstration and capacity-building projects that help communities understand environmental risks and opportunities and organize and take actions to improve local resiliency by enhancing natural buffers and system functions; scalable, nature-based resilience solutions benefiting affordable housing and/or small businesses in communities vulnerable to impacts from natural disasters.

Program Administrator: National Fish and Wildlife Service; Wells Fargo.

Eligibility: Non-profit organizations; local governments; state government agencies.

Match/Funding: Must meet or exceed a 1:1 match ratio; approximately 9-12 grants of all types are awarded each year; grants range from \$200,000 to \$500,000 in each region for adaptation projects; grants range \$100,000 to \$250,000 per project for community capacity projects; grants range from \$100,000 to \$500,000 per projects for affordable housing/small businesses adaptation.

Website: <https://www.nfwf.org/programs/resilient-communities-program>

Disaster Loan Assistance

Purpose: Low-interest disaster loans to help businesses and homeowners recover from declared disasters.

Program Administrator: Small Business Administration. Eligibility: Varies based on declared disaster.

Website: <https://www.sba.gov/funding-programs/disaster-assistance>

USDA Natural Resources Conservation Services (NRCS)

Agricultural Management Assistance

Purpose: Funding to help agricultural producers manage financial risk through diversification/marketing/natural resource conservation practices.

Program Administrator: US Department of Agriculture, National Resources Conservation Service.

Eligibility: Agricultural producers.

Match/Funding: Up to 75% of costs to install conservation practices, total payments to not exceed \$50,000 per participant for any fiscal year.

Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/ama/?cid=stelprdb1042016>

Conservation Stewardship Program

Purpose: Funding to help agricultural producers maintain and improve existing conservation systems.

Program Administrator: US Department of Agriculture, National Resources Conservation Service

Eligibility: agricultural producers for working lands.

Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/>

Emergency Watershed Protection - Floodplain Easement

Purpose: Purchase of permanent easements in the floodplains to restore land to its natural condition.

Program Administrator: US Department of Agriculture, National Resources Conservation Service.

Eligibility: Available on agricultural, open lands, or lands primary used for residential housing.

Match/Funding: No match - NRCS will pay up to the entire cost of the easement value and up to the entire cost for easement restoration, plus the cost of structures' value if demolished or cost of relocating structure(s) outside of floodplain.

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/landscape/ewpp/?cid=nrcs143_008216

Emergency Watershed Protection-Recovery

Purpose: Address serious and long-lasting damages to infrastructure/the land. NRCS provides financial and technical assistance for the following: debris removal from stream channels, road culverts and bridges; reshape and protect eroded streambanks; correct damaged drainage facilities; establish vegetative cover on critically eroding lands, repair levees and structures; and repair conservation practices.

Program Administrator: US Department of Agriculture, National Resources Conservation Service.

Eligibility: Public and private landowners can apply for assistance for EWP Program – Recovery projects through a local sponsor, or a legal subdivision of state or tribal government. Eligible sponsors include cities, counties, towns, conservation districts, flood and water control districts, or any federally-recognized Native American tribe or tribal organization.

Match/Funding: up to 75% of the cost. Local sponsors must acquire the remaining 25% in cash/ in-kind services.

Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/landscape/ewpp/?cid=nrcseprd1381472>

Environmental Quality Incentives Program

Purpose: Financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, increased soil health and reduced soil erosion and sedimentation, improved or created wildlife habitat, and mitigation against increasing weather volatility.

Program Administrator: US Department of Agriculture, National Resources Conservation Service.

Eligibility: Agricultural producers.

Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1044009>

Regional Conservation Partnership Program

Purpose: Funding for on-the-ground conservation activities including land management, land improvement, restoration practices, land rentals, entity-held easements, US-held easements, public works/watersheds.

Program Administrator: US Department of Agriculture, National Resources Conservation Service.

Eligibility: Agricultural or silvicultural producer; state government; local government; farmer cooperative; water district; municipal water or wastewater treatment entity; organizations that have an established history of working cooperatively with producers on agricultural land.

Match/Funding: Varies by funding year.

Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/>

Emergency Community Water Assistance Grants

Purpose: Funding for eligible communities to prepare or recover from an emergency that threatens the availability of safe, reliable drinking water.

Program Administrator: US Department of Agriculture Rural Development.

Eligibility: State government entities; local governments; nonprofits in eligible areas (populations with 10,000 or less with a median household income less than the state's median household income).

Match/Funding: Partnerships are encouraged but not required; water transmission line grants up to \$150,000, water source grants up to \$500,000.

Website: <https://www.rd.usda.gov/programs-services/emergency-community-water-assistance-grants>

Pre-Development Planning Grants

Purpose: Funding to assist low-income communities with initial planning and development of applications for USDA Rural Development Water and Waste Disposal direct loan/grant and loan guarantee programs.

Program Administrator: US Department of Agriculture Rural Development.

Eligibility: State governmental entities; local governments; private nonprofits in eligible areas (populations with 10,000 or less with a median household income less than the state's median household income).

Match/Funding: 25% match required (not in-kind); maximum of \$30,000 or 75% of the pre-development planning costs.

Website: <https://www.rd.usda.gov/programs-services/water-waste-disposal-predevelopment-planninggrants>

Revolving Funds for Financing Water and Wastewater Projects

Purpose: Funding for qualified nonprofits to create revolving loan funds that can provide financing to extend and improve water and waste disposal systems in rural areas.

Program Administrator: US Department of Agriculture Rural Development.

Eligibility: Non-profits that have legal authority to operate a revolving loan fund and the capacity to comply with state/federal laws and regulations. Must be in eligible areas (populations with 10,000 or less).

Match/Funding: 20% match required (not in-kind); maximum loan per borrower is \$100,000 over a 10-year term.

Website: <https://www.rd.usda.gov/programs-services/water-environmental-programs/revolving-funds-financing-water-and-wastewater-projects>

Technical Assistance and Training Grants

I

Purpose: Funding for qualified private nonprofits to provide technical assistance and training to identify and evaluate solutions to water and waste problems, help applicants prepare applications for water and waste disposal loans/grants, and help associations improve the operation and maintenance of water and waste facilities in eligible rural areas.

Program Administrator: US Department of Agriculture Rural Development.

Eligibility: State governmental entities; local governments; private nonprofits in eligible areas (populations with 10,000 or less).

Match/Funding: No match; project period is one year; this is a reimbursement grant.

Website: <https://www.rd.usda.gov/programs-services/water-waste-disposal-technical-assistance-training-grants>

Water & Waste Disposal Loan and Grant Program

Purpose: Low-interest loans for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and stormwater drainage to households and businesses in eligible rural areas.

Program Administrator: US Department of Agriculture Rural Development.

Eligibility: State governmental entities; local governments; private nonprofits who are not able to obtain commercial credit on reasonable terms. Must be in eligible areas (populations with 10,000 or less).

Match/Funding: Loans with up to 40-year term and fixed interest rate.

Website: <https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program>

Section 14: Emergency Streambank Protection

Purpose: Allows for construction of emergency streambank and shoreline protection to prevent erosion from damaging nonprofit public facilities.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: 65% federal, 35% non-federal cost share for design and implementation; maximum federal share is \$5,000,000.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20Section%2014.pdf>

Section 22: Planning Assistance to States

Purpose: Allows for assistance to states, local governments, and other non-federal entities with broad comprehensive water resource planning, including flood damage reduction, water supply, water conservation, environmental restoration, erosion, etc. Program is for planning studies only.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.). **Match/Funding:** 50% cost-share between USACE and study partner. In-kind services accepted.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20PAS.pdf>

Section 205: Flood Damage Reduction

Purpose: Allows for construction of projects (structural or nonstructural) to reduce damages caused by flooding and focuses on solving local flood problems in urban areas, towns and villages.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: 65% federal, 35% non-federal for design and implementation costs. Maximum federal share for planning, design and construction is \$10,000,000.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20Section%20205.pdf>

Section 206: Floodplain Management Services

Purpose: Provides technical services and planning guidance to state, regional, and local governments to support effective floodplain management.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: None, 100% federal.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20FPMS.pdf>

Section 206: Aquatic Ecosystem Restoration

Purpose: Allows for USACE to partner with a non-federal sponsor to develop aquatic ecosystem restoration and protection projects to improve the quality of the environment, provided that the project is not used to meet mitigation or remediation requirements.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: Maximum of \$10 million per project including feasibility, design, and construction costs. Feasibility study up to \$100,000, costs exceeding this are cost-shared 50/50 with non-federal sponsor; design and construction costs are cost-shared 65% federal, 35% non-federal.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20Section%20206.pdf>

Section 208: Snagging and Clearing for Flood Control

Purpose: Allows for USACE to partner with a non-federal sponsor to plan for and provide removal of accumulated snags and other debris from waterways and to clear stream channels in the interest of flood control.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: Maximum federal expenditure per project of \$500,000 including feasibility, design, and construction costs. Sponsor's cost-share is limited to a maximum of 50% of total project costs, unless the project exceeds the maximum expenditure.

Website: <https://www.lrp.usace.army.mil/Portals/72/Updated%20Fact%20Sheet%20-%20Section%20208.pdf>

Section 219: Environmental Infrastructure

Purpose: Provides assistance to non-federal interests in carrying out water-related environmental infrastructure and resource protection and development projects.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor in one of the authorized locations within the Pittsburgh USACE District: Beaver Creek Reservoir, Clarion County in Beaver and Salem Township, PA; Allegheny County, PA; and various counties in West Virginia.

Match/Funding: 25% non-federal sponsor match required.

Website: <https://www.lrp.usace.army.mil/Missions/Planning-Programs-Project-Management/Project%C2%AD%20Authorities/>

Silver Jackets Program

Purpose: Allows USACE involvement in state-led interagency teams that work to reduce flood risk at the state level. Facilitates strategic flood risk reduction through collaborative solutions.

Program Administrator: US Army Corps of Engineers.

Eligibility: Non-federal sponsor (i.e. the Commonwealth; local governments, private nonprofits, etc.).

Match/Funding: Varies by project.

Website: <https://silverjackets.nfrmp.us/State-Teams/Pennsylvania>

State Funding Sources

PA Association of Conservation Districts (PACD)

Dirt, Gravel, and Low Volume Road Maintenance Program

Purpose: Funding to eliminate stream pollution caused by runoff and sediment from the state's comprehensive network of unpaved and low volume public roads.

Program Administrator: County conservation districts (as granted by the State Conservation Commission).

Eligibility: Public road-owning entities (municipalities). Match/ Funding: None.

Website: <https://www.dirtandgravel.psu.edu/pa-program-resources>

PACD Grants for Conservation Districts

Purpose: Various funding options for PA county conservation districts including the CREP mini-grant program, multi-functional riparian buffer sub-grant, nonpoint source pollution educational mini-grant, manure management and Chapter 102 Compliance workshop mini-grant.

Program Administrator: Pennsylvania Association of Conservation Districts.

Eligibility: County conservation districts.

Match/Funding: Dependent on program.

Website: https://pacd.org/?page_id=69

PA Department of Agriculture (PDA)

Agricultural Conservation Easement Purchase Program

Purpose: Funding for state and county governments to purchase conservation easements from farmers.

Program Administrator: PA Department of Agriculture.

Eligibility: Farm owners apply to the county for funds. Criteria vary by county. Match/Funding: Payment to farmer.

Website: https://www.agriculture.pa.gov/Plants_Land_Water/farmland/Pages/default.aspx

PA Department of Community and Economic Development (DCED)

Abandoned Mine Drainage Abatement and Treatment Program

Purpose: Funding for abandoned mine drainage, abatement, and treatment.

Program Administrator: Commonwealth Financing Authority.

Eligibility: Municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations; for-profit businesses.

Match/Funding: 15% match; maximum project cost of \$1,000,000.

Website: <https://dced.pa.gov/programs/abandoned-mine-drainage-abatement-treatment-program-amdatp/>

Baseline Water Quality Data Program

Purpose: Funding for projects that involve practices for water sample collection and analysis to document existing groundwater quality conditions on private water supplies.

Program Administrator: Commonwealth Financing Authority.

Eligibility: For-profit businesses; municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations.

Match/Funding: 15% match required; grants shall not exceed \$250,000 for any project.

Website: <https://dced.pa.gov/programs/baseline-water-quality-data-program/>

Community Development Block Grant

Purpose: Funding to expand economic opportunities for low- and moderate-income individuals and to improve infrastructure critical to community health and welfare.

Program Administrator: PA Department of Community and Economic Development.

Eligibility: Eligible municipalities.

Match/Funding: Minimum request of \$100,000, no ceiling limit.

Website: <https://dced.pa.gov/housing-and-development/community-development-block-grant/>

Flood Mitigation Program

Purpose: Funding for projects authorized by a flood protection authority, the Department of Environmental Protection, the US Army Corps of Engineers, or the US Department of Agriculture's Natural Resources Conservation Service, or identified by a local government. Min total project cost of \$50,000.

Program Administrator: Commonwealth Financing Authority.

Eligibility: Municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations; for-profit businesses.

Match/Funding: 15% match of the total project cost; grants shall not exceed \$500,000.

Website: <https://dced.pa.gov/programs/flood-mitigation-program-fmp/>

Greenways, Trails, and Recreation Program

Purpose: Funding for planning, acquisition, development, rehabilitation and repair of greenways, recreational trails, open space, parks and beautification projects.

Program Administrator: Commonwealth Financing Authority.

Eligibility: For-profit businesses; municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations.

Match/Funding: 15% match required; grants shall not exceed \$250,000 for any project.

Website: <https://dced.pa.gov/programs/greenways-trails-and-recreation-program-gtrp/>

H20 PA - Flood Control Projects

Purpose: Funding for projects that involve construction, improvement, repair, or rehabilitation of all or part of a flood control system.

Program Administrator: PA Department of Community and Economic Development.

Eligibility: The Commonwealth; independent agencies; municipalities or municipal authorities.

Match/Funding: Minimum of \$500,000 or more, and a maximum amount of \$20 million for any project.

Website: <https://dced.pa.gov/programs/h20-pa-flood-control-projects/>

H20 PA - High Hazard Unsafe Dam Projects

Purpose: Funding for projects that involve the repair, rehabilitation, or removal of all or a part of a high hazard unsafe dam.

Program Administrator: PA Department of Community and Economic Development.

Eligibility: Independent agencies; municipalities; municipal authorities; the Commonwealth.

Match/Funding: Minimum of \$500,000 or more, and a maximum amount of \$20 million for any project.

Website: <https://dced.pa.gov/programs/h20-pa-high-hazard-unsafe-dam-projects/>

H20 PA-Water Supply, Sanitary Sewer and Stormwater Projects

Purpose: Funding for activities to assist with the construction of drinking water, sanitary sewer, and storm sewer projects.

Program Administrator: PA Department of Community and Economic Development.

Eligibility : Independent agencies; municipalities; municipal authorities; the Commonwealth.

Match/Funding: Minimum of \$500,000 or more, and a maximum amount of \$20 million for any project.

Website: <https://dced.pa.gov/programs/h20-pa-water-supply-sanitary-sewer-storm-water-projects/>

Industrial Sites Reuse Program

Purpose: Grants and low-interest loans to perform environmental site assessment and remediation work at former industrial sites.

Program Administrator: PA Department of Community and Economic Development.

Eligibility : Public entities; private nonprofit economic development entities; companies involved in reuse of former industrial land; entities that did not cause or contribute to environmental contribution.

Match/Funding: 25% match; up to \$200,000 in funding for environmental assessments; up to \$1,000,000 in funding for remediation; interest rates of 2%.

Website: <https://dced.pa.gov/programs/industrial-sites-reuse-program-isrp/>

Municipal Assistance Program

Purpose: Funding to assist local governments to plan for and efficiently implement a variety of services and improvements. Funding is available for three groups of activities: shared services, community planning, and floodplain management. Related to the floodplain management activities, funding may be used for reimbursement of costs of preparation, enactment, administration, and enforcement of floodplain management regulations pursuant to the Flood Plain Management Act.

Program Administrator: PA Department of Community and Economic Development.

Eligibility: Counties; municipalities; some projects open to councils of governments.

Match/Funding: Grants of up to 50% of eligible costs.

Website: <https://dced.pa.gov/programs/municipal-assistance-program-map/>

Watershed Restoration and Protection Program

Purpose: Funding for watershed restoration and protection projects that involve the construction, improvement, expansion, repair, maintenance, or rehabilitation of new or existing watershed protection Best Management Practices (BMPs).

Program Administrator: Commonwealth Financing Authority.

Eligibility: Municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations; for-profit businesses.

Match/Funding: 15% match; maximum of \$300,000 for any project.

Website: <https://dced.pa.gov/programs/watershed-restoration-protection-program-wrpp/>

PA Department of Conservation and Natural Resources (DCNR)

Community Conservation Partnerships Program Grants

Purpose: Funding for projects related to parks, recreation, and conservation. Grants can fund: planning, acquisition, and development of public parks; recreation areas; motorized and non-motorized trails; river conservation and access; and conservation of open space.

Program Administrator: PA Department of Conservation and Natural Resources.

Eligibility: Counties; municipalities; municipal agencies; nonprofit organizations; state heritage areas; prequalified land trusts; for-profit enterprises.

Match/Funding: 50% match.

Website: <https://www.dcnr.pa.gov/Communities/Grants/Pages/default.aspx>

Wild Resources Conservation Program

Purpose: Funding for survey, research, management, and conservation of wild resources.

Program Administrator: PA Department of Conservation and Natural Resources.

Eligibility: For-profit businesses; municipalities; councils of governments; authorized organizations; institutions of higher education; watershed organizations; conservation districts; municipal authorities.

Match/Funding: 25% match required; average award size is \$30,000 per project.

Website: <https://www.dcnr.pa.gov/Conservation/Biodiversity/WildResourceConservationProgram/Pages/default.aspx>

PA Department of Environmental Protection (DEP)

Environmental Education Grants

Purpose: Funding for education projects that foster an understanding of natural world functions and cultivate critical thinking and actions that promote environmental protection and sustainable resource management. Program priorities include education relating to climate change, water, or environmental justice.

Program Administrator: PA Department of Environmental Protection.

Eligibility: Public schools and school districts; incorporated private schools; incorporated conservation and education organizations and institutions; universities and colleges; county conservation districts; incorporated non-profit organizations; businesses.

Match/Funding: Mini-grants- match not required but encouraged; funding up to \$3000 / General grants- 20% match required; Level I funding up to \$20,000, Level II funding up to \$85,000.

Website: <https://www.dep.pa.gov/Citizens/EnvironmentalEducation/Grants/Pages/default.aspx>

Flood Protection Program

Purpose: Technical assistance to investigate flood problems within Pennsylvania and determine the feasibility of providing solutions to these flood problems. Flood protection projects include but are not limited to: concrete channels, concrete floodwalls, compacted earthen levees, channel improvements, or a combination of a number of these. The main objective of the program is to minimize property damage and the possibility of loss of life.

Program Administrator: Department of Environmental Protection - Office of Waterways, Engineering, and Wetlands.

Eligibility: Requests from municipalities; states and federal legislators; county and state government officials; private residents.

Match/Funding: No information.

Website: <https://www.dep.pa.gov/Business/Water/Waterways/Flood-Protection/Pages/default.aspx>

Growing Greener Plus Program

Purpose: Funding for watershed protection and restoration projects including planning activities; education and outreach; design and/or construction, operation, maintenance, and repair/replacement; technical assistance; evaluation, assessment, and monitoring tools for watershed management; watershed group organization/support; or the Healthy Waters Initiative.

Program Administrator: PA Department of Environmental Protection.

Eligibility: Incorporated watershed associations; counties; municipalities; county conservation districts; councils of governments; non-profit organizations; educational institutions; municipal authorities.

Match/Funding: 15% match required, which cannot include other DEP funding sources or in-kind services.

Website: <https://www.dep.pa.gov/Citizens/GrantsLoansRebates/Growing-Greener/Pages/default.aspx>

Section 319 Nonpoint Source Management Grants

Purpose: Funding for nonpoint source management plans and activities identified in Pennsylvania watersheds with approved Watershed Implementation Plans (WIPs).

Program Administrator: PA Department of Environmental Protection.

Eligibility : Incorporated watershed associations; counties; municipalities; county conservation districts; councils of governments; non-profit organizations; educational institutions; municipal authorities.

Match/Funding: Match not required but encouraged.

Website: <https://www.dep.pa.gov/Business/Water/PlanningConservation/NonpointSource/Pages/default.aspx>

Stream Improvement Program

Purpose: Technical assistance to design and construct small projects to restore stream channels damaged by high water or flooding events and to stabilize streambanks affected by erosion at sites where there are imminent threats to the structural integrity of homes, businesses, and industries.

Program Administrator: Department of Environmental Protection - Office of Waterways, Engineering, and Wetlands.

Eligibility : Requests from municipalities; states and federal legislators; county and state government officials; private residents.

Match/Funding : No information.

Website: <https://www.dep.pa.gov/Business/Water/Waterways/Flood-Protection/Pages/StreamImprovements.aspx>

PA Emergency Management Agency (PEMA)

Building Resilient Infrastructure and Communities (BRIC)

Purpose: Reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal funding in future disasters.

Program Administrator: PA Emergency Management Agency (granted by the Federal Emergency Management Agency).

Eligibility: Local governments or eligible organizations; individuals cannot apply directly for the program.

Match/Funding: federal cost share for a PDM project is 75%. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. Some funding is available for planning.

Website: <https://www.pema.pa.gov/Grants/BRIC/Pages/default.aspx>

Emergency Management Performance Grant

Purpose: Funding for the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the state and by county government.

Program Administrator: PA Emergency Management Agency (granted by the Federal Emergency Management Agency).

Eligibility: Counties.

Match/Funding: 50% match.

Website: <https://www.pema.pa.gov/Grants/EMPG/Pages/default.aspx>

Hazard Mitigation Grant Program

Purpose: Funding for communities to implement hazard mitigation measures following a Presidential Major Disaster Declaration. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters.

Program Administrator: PA Emergency Management Agency (granted by the Federal Emergency Management Agency).

Eligibility: The Commonwealth is the applicant - municipalities which have adopted the county's Hazard Mitigation Plan are sub-applicants.

Match/Funding: 75% federal share, 25% non-federal share (usually covered by the Commonwealth).

Website: <https://www.pema.pa.gov/Grants/HMGP/Pages/default.aspx>

PA Fish and Boat Commission (PFBC)

State Wildlife Grant Program

Purpose: Funding to keep species from becoming federally listed as threatened or endangered. Priority projects change by year but usually must meet conservation needs identified in the current State Wildlife Action Plan.

Program Administrator: PA Fish and Boat Commission (as granted by US Fish and Wildlife Service).

Eligibility: Varies by grant year.

Match/Funding: Up to 75% federal vs. 25% non-federal for planning projects; up to 65% federal vs. 35% non-federal for implementation of projects.

Website: <https://www.fishandboat.com/Resource/StateWildlifeGrantProgram/Pages/default.aspx>

PA Infrastructure Investment Authority (PENNVEST)

Clean Water State Revolving Fund

Purpose: Low-interest loans for wastewater and certain other projects for the construction, improvement, extension, expansion, repair, or rehabilitation of wastewater collection, treatment, or disposal facilities, stormwater management, nonpoint source pollution controls including but not limited to agricultural best management practices and watershed and estuary management.

Program Administrator: PENNVEST (as granted by US Environmental Protection Agency).

Eligibility: Varies by project type.

Match/Funding: Loan.

Website: <https://www.pennvest.pa.gov/Information/Funding-Programs/Pages/Clean-Water-State-Revolving-Fund.aspx>

Drinking Water State Revolving Fund

Purpose: Low-interest loans for expansion and maintenance of drinking water facilities (treatment plants, distribution mains, storage facilities), and improvements and upgrades to water quality systems.

Program Administrator: PENNVEST (as granted by US Environmental Protection Agency).

Eligibility: Varies by project type.

Match/Funding: Loan.

Website: <https://www.pennvest.pa.gov/Information/Funding-Programs/Pages/Clean-Water-State-Revolving-Fund.aspx>

PA Small Water and Sewer

Purpose: Low-interest loans for expansion and maintenance of drinking water facilities (treatment plants, distribution mains, storage facilities), and improvements and upgrades to water quality systems.

Program Administrator: PENNVEST (as granted by US Environmental Protection Agency).

Eligibility: Varies by project type.

Match/Funding: Loan.

Website: <https://www.pennvest.pa.gov/Information/Funding-Programs/Pages/Drinking-Water-StateRevolving-Fund.aspx>

PA Department of Transportation (PennDOT)

Municipal Liquid Fuels Program

Purpose: Funding for construction, reconstruction, maintenance, and repair of public roads or streets.

Program Administrator: PA Department of Transportation.

Eligibility: Municipalities; must submit annual reports and make payments in compliance with Act 655.

Match/Funding: Allocation is based on a municipality's population and miles of roads on their approved Liquid Fuels inventory.

Website: <https://www.penndot.pa.gov/Doing-Business/LocalGovernment/LiquidFuels/MunicipalLiquidFuelsProgram/Pages/default.aspx>

Regional Foundation Funding Sources

Captain Planet Foundation Grants

Purpose: Funding for high-quality, solution-based programs that embrace STEM learning and empower youth to become local and global environmental change-makers. Three grant programs: ecoSolution, ecoTech, and ecoSTEM.

Eligibility: Educators (K-12 classroom and informal).

Match/Funding: Funding range \$500-\$2,500 for ecoSolution grants, \$2,500 for ecoTech, resource kits for ecoSTEM.

Website: <https://captainplanetfoundation.org/resources/grants/>

Colcom Foundation Grants

Purpose: Grant priority areas include environmental sustainability, natural resource preservation, land and water conservation, and expanding green spaces.

Eligibility: No information.

Match/Funding: No information.

Website: <http://colcomfdn.org>

Foundation for Pennsylvania Watersheds Grants

Purpose: Funding for non-profit citizen groups to support watershed projects.

Program Administrator: Foundation for Pennsylvania Watersheds.

Eligibility: Citizen groups with 501c3 nonprofit status. Primary service area is from the Ohio boarder to the Susquehanna River's main stem.

Match/Funding: Maximum grant amount of \$2,000.

Website: <http://pennsylvaniawatersheds.org/apply-for-a-grant/>

Heinz Endowment Grants

Purpose: Funding priority areas include creativity, learning, and sustainability.

Eligibility: Non-profit organizations in the Commonwealth.

Match/Funding: Varies.

Website: <http://www.heinz.org/grants/apply-for-a-grant>

Hillman Family Foundation Grants

Purpose: Search through the 18 foundations for various grants, based on focus area and location.

Eligibility : Non-profit organizations; other organizations or government entities that are tax-exempt.

Match/Funding: Varies.

Website: <https://hillmanfamilyfoundations.org>

Laurel Foundation Grants

Purpose: Funding priorities include arts and culture, education, environment, and public/society benefit projects in Southwestern Pennsylvania.

Eligibility: Non-profit organizations in the Greater Pittsburgh area.

Match/Funding : No information.

Website: <http://laurelfdn.org/grants-program/>

Richard King Mellon Foundation

Purpose: Funding priorities include conservation, education, human services, and regional economic development.

Eligibility: Non-profit organization or government entity in Pennsylvania.

Match/Funding: Varies.

Website: <https://www.rkmf.org/grants>

Additional Funding Sources

ARC Project Grants - Physical Infrastructure

Purpose: Funding for infrastructure including water/sewer facilities to enhance economic development or address health issues.

Program Administrator: Southwestern Pennsylvania Commission (as granted by the Appalachian Regional Commission).

Eligibility: Varies by project.

Match/Funding: 50% match required - may be decreased if in a distressed or at-risk county.

Website: <https://www.arc.gov/funding/ARCProjectGrants.asp>

Coldwater Conservation Planning and Implementation Grants

Purpose: Funding for the creation of a Coldwater Conservation Plan that will ultimately conserve and protect the coldwater streams of Pennsylvania.

Program Administrator: Coldwater Heritage Partnerships.

Eligibility: Non-profit organizations such as watershed associations, land trusts, Trout Unlimited chapters, conservancies, sportsmen's groups, educational institutions and conservation organizations. Municipalities, municipal authorities, counties, and conservation districts may also apply.

Match/Funding: 50% match encouraged; approximately \$5,000 awarded for planning and \$8,000 for implementation projects.

Website: <https://coldwaterheritage.org/index.php/grant-application-guidelines/>

Dominion Energy Watershed Mini Grant Program

Purpose: Funding to provide assistance to the region's grassroots watershed groups and organizations. Grants can be used to cover expenses in three areas: water quality monitoring (\$3,000 limit), restoration projects (\$3,000 limit), or organizational promotion and outreach (\$2,000 limit).

Program Administrator: Western Pennsylvania Conservancy.

Eligibility: Watershed organizations in the following counties: Allegheny, Armstrong, Beaver, Blair, Butler, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Crawford, Elk, Fayette, Franklin, Greene, Indiana, Jefferson, Juniata, Lawrence, Mercer, McKean, Potter, Tioga, Venango, Washington and Westmoreland.

Match/Funding: No information.

Website: <https://waterlandlife.org/watershed-mini-grant-program/>

Pennsylvania American Water Environmental Grant Program

Purpose: Funding for community-based environmental projects that improve, restore, or protect the watersheds, surface water, and groundwater supplies in our local communities. The two grant categories include Watershed Protection and Project Source Water Protection.

Eligibility: Projects must be located within an American Water service area and must be carried out by a formal or informal partnership between two or more organizations; typical applications include municipalities, non-profit organizations, or schools.

Match/Funding: Match not required but encouraged; maximum grant amount is \$10,000.

Website: <https://amwater.com/paaw/news-community/environmental-grant-program>

Stormwater Fees

Purpose: Funding for municipal stormwater projects can be leveraged through a fee, which is based on each parcel's amount of impervious surface.

Eligibility: Municipal authorities (stormwater or drinking water); home rule communities; second-class townships.

Match/Funding: There are several ways to calculate a fee, the most common being the Equivalent Residential Unit (ERU) where parcels are charged based on their impervious surfaces.

Website: https://www.pennfuture.org/Files/Admin/PennFuture_StormwaterManual_web_3.20.17.pdf

Additional Resources

Grant Tips

- Look for a foundation's 990 forms – these list who they gave money to previously.
- Purchase a foundation search subscription.
- When searching for foundation grants, try searching a business' name + "foundation" + "corporate giving" or "corporate responsibility" (ex. Walmart Foundation corporate giving).
- Use foundation grants to match federal or state grants.

Funding Search Engines

Catalog of Federal Funding Sources

Description: Searchable database of financial assistance sources available to fund a variety of projects.

Organization: US Environmental Protection Agency.

Website: <https://www.grants.gov/web/grants/search-grants.html>

Funding Integration Tool for Source Water

Description: FITS is a one-stop-shop tool that explains how users can integrate various federal funding sources to support activities that protect sources of drinking water.

Organization: Environmental Protection Agency

Website: <https://www.epa.gov/sourcewaterprotection/fits>

Pennsylvania Water and Wastewater Funding Sources

Description: Funding sources for water and wastewater in Pennsylvania.

Organization: Environmental Finance Center Network.

Website: <https://efcnetwork.org/wp-content/uploads/2019/05/PA-Water-Wastewater-Funds-2019.pdf>

US Federal Catalog of Grants

Description: Search all federal agency funding opportunities.

Organization: US Department of Health and Human Services Office of Management and Budget.

Website: <https://www.grants.gov/>

Water Infrastructure and Resiliency Finance Center

Description: Financing information to help local decision-makers make informed decisions for drinking water, wastewater, and stormwater infrastructure to protect human health and the environment.

Organization: US Environmental Protection Agency.

Website: <https://www.epa.gov/waterfinancecenter>

USDA Rural Development Funding Appropriations Search

Description: Rural Development funding opportunities, Notices of Solicitation of Applications (NOSAs) or Notices of Funding Availability in the Federal Register.

Organization: USDA Rural Development

Website: <https://www.rd.usda.gov/newsroom/federal-funding-opportunities>



**For more information
please contact:**

Water Resource Center
(412) 391-5590
WRC@spcregion.org
www.spcwater.org

Cross-Jurisdictional Coordination

County-level Participation in Municipal Stormwater Management

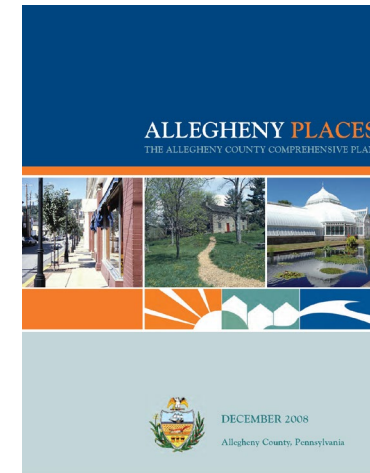
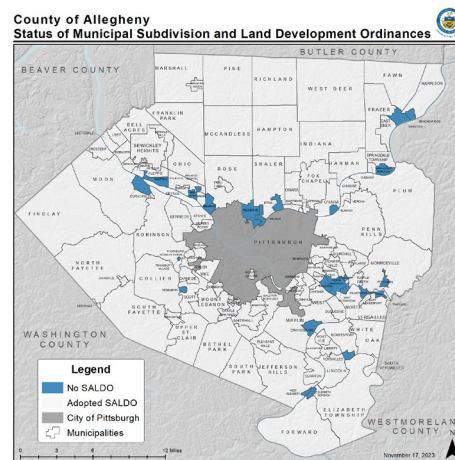
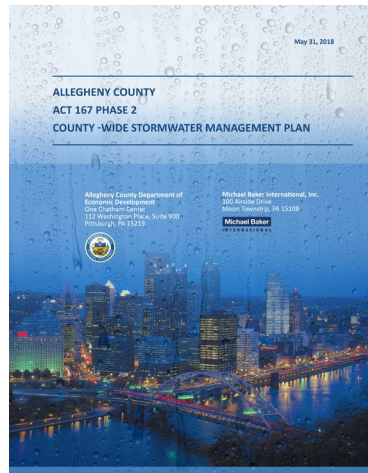


November 30, 2023
2023 IRISE Stormwater Symposium

Matt Trepal, AICP
Manager, Planning Division, ACED

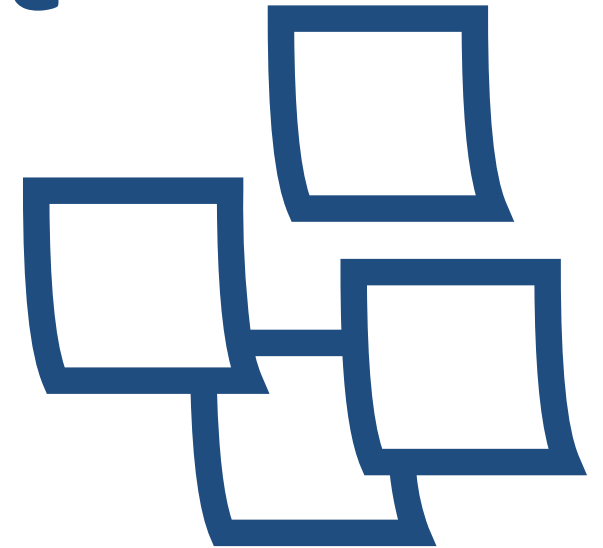
County's Three Roles

- Act 167 Countywide Stormwater Management Plan
- Land Development Review
- County Comprehensive Plan



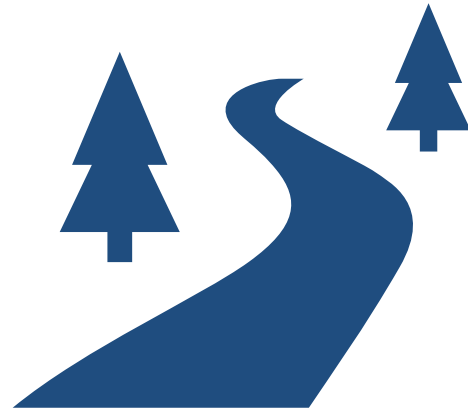
Act 167 SWM Plan

- **Required by Act 167 of 1978, the Stormwater Management Act**
 - Requires counties to adopt a plan
 - Requires municipalities to adopt ordinances or regulations consistent with the county plan

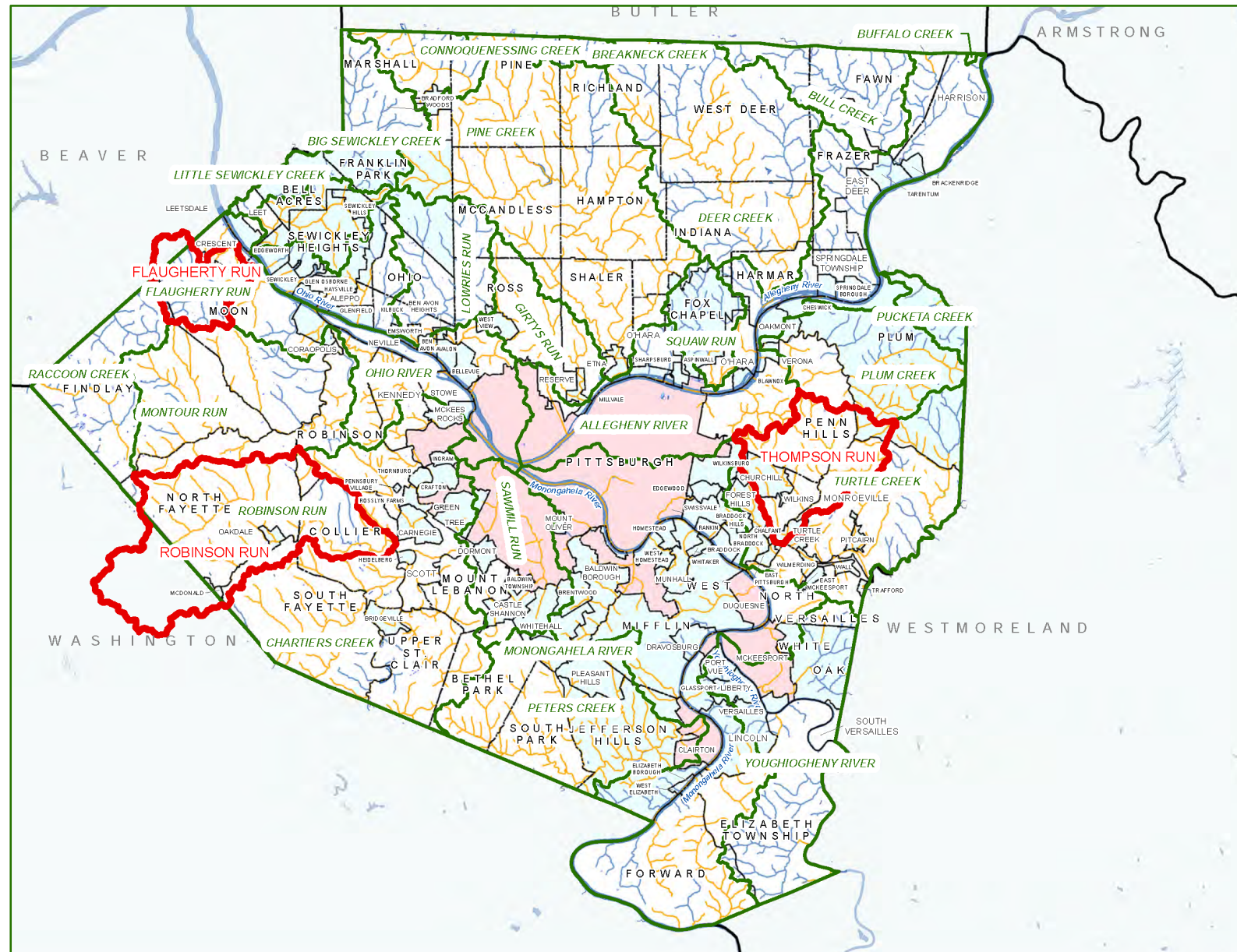


Act 167 SWM Plan

- **Allegheny County Act 167 Plan**
 - Adopted in 2018
 - Includes 25 watersheds, 11 of which were modeled or updated in this plan



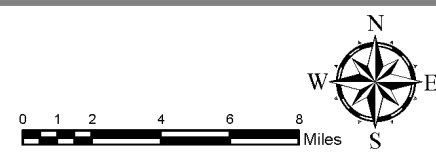
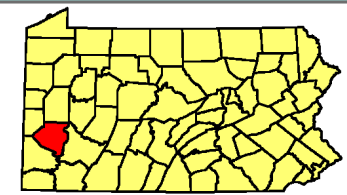
Map 2 - Act 167 Designated Watersheds



LEGEND

- Watershed Study Area
- Act 167 Watersheds Boundaries
- Municipal Boundaries
- Bordering Counties
- Impaired Streams
- Streams
- Rivers, Lakes, and Ponds
- Reservoirs
- City
- Borough

LOCATION MAP



DATA SOURCES

Allegheny County
Pennsylvania Department of Transportation
Pennsylvania Turnpike Commission
National Hydrography Dataset
Pennsylvania Department of Environmental Protection

Act 167 SWM Plan

- **Allegheny County Act 167 Plan**
 - Includes 5 goals
 - Develop SWM plan and model SWM ordinance
 - Encourage BMPs to improve water quality
 - Preserve natural courses and capacities
 - Encourage green solutions
 - Provide guidance for SWM through identified problem areas



Model Ordinance

- **Model Municipal SWM Ordinance**
 - Allow municipalities to adopt an ordinance consistent with Act 167
 - Consistent with neighboring municipalities
 - Consistent standards lead to consistent implementation



Model Ordinance

- **Municipal Adoption Grant Program**
 - Offered funding to municipalities to assist in adopting the model ordinance
 - Of 130 municipalities in Allegheny County, 79 participated in the grant program
 - At least 95 have adopted the ordinance



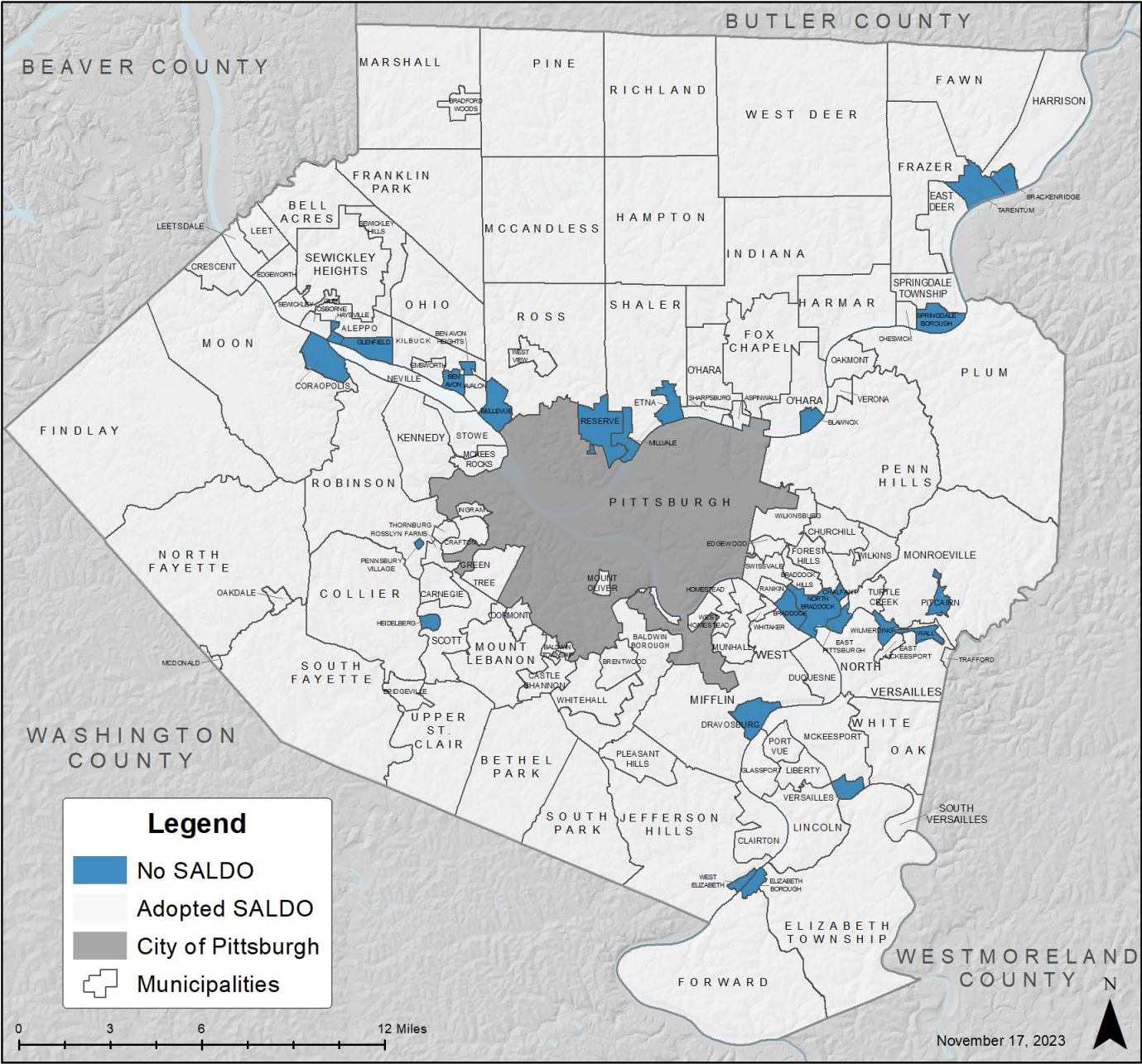
Land Development Review

- **County Advisory Review**
 - 103 municipalities
 - Adopted municipal SALDO
- **County Approval**
 - 26 municipalities
 - No municipal SALDO, fall under county SALDO



County of Allegheny

Status of Municipal Subdivision and Land Development Ordinances



Land Development Review

- **County Advisory Review**
 - Review with municipal zoning and subdivision ordinances
 - Stormwater review and approval is sole responsibility of municipality
 - Do not receive stormwater plans



Land Development Review

- **County Approval**
 - Review with municipal zoning ordinance and county SALDO
 - Stormwater plan is reviewed by county engineering consultant for comment to municipality
 - Ultimate approval is responsibility of municipality



County Comprehensive Plan

- Adopted in 2008
- Update beginning in 2024
 - Topic-oriented to Issues-oriented
 - Two-pronged approach to recommendations
 - What can the county do directly?
 - What can the county do to assist municipalities and other partners?



County Comprehensive Plan

- **Issues Identification**
 - Aging Infrastructure
 - Climate Change, Resiliency, and Adaptation
 - Collaboration
 - Stormwater



County Comprehensive Plan

- **Potential Recommendations**
 - Best Practices Clearinghouse
 - Information
 - Technical Assistance
 - Coordination and Collaboration



Thank You

Matt Trepal, AICP

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412-350-1030



WE ALL LIVE DOWNSTREAM STORMWATER MANAGEMENT ETNA BOROUGH

2023 University of Pittsburgh IRISE Stormwater Symposium

November 30, 2023

Mary Ellen Ramage, Manager

PINE CREEK WATERSHED, OUR STORY

- ▶ Pine Creek is a 22.8 mile long stream in Allegheny County that begins in Pine Township and empties into the Allegheny River in the Borough of Etna. It's watershed is 67.3 square miles (43,072 acres) and covers parts of 14 Municipalities. There are 128 stream miles in the watershed.
- ▶ Etna's TOTAL area in square miles is 0.80
- ▶ Etna's watershed area in square miles is 0.67 (of the 67.3 sq. miles)
- ▶ 83.75% of Etna is in the watershed area
- ▶ Etna makes up 1% of the total watershed area

ETNA BOROUGH IS THIS PART OF THE FUNNEL.....





Note high water mark

ETNA MUNICIPAL BUILDING
SEPTEMBER 17, 2004

AFTERMATH OF HURRICANE IVAN



IVAN,
SEPTEMBER
2004



NORTH HILLS COMMUNITIES CALL TO ACTION AFTER IVAN, September 17, 2004

- ▶ There was an immediate response to communities most affected by the flooding of Hurricane Ivan, including Etna, in 2004. Without the [help of our upstream neighbors](#), many of whom were flooded themselves, and [many other government and quasi government agencies](#), Etna could not have recovered so quickly
- ▶ Discussions began at the [North Hills Council of Governments](#) on how collectively we can act together to ensure we are doing “all we can” to prevent such catastrophic loss again
- ▶ The [North Hills Council of Governments](#) formed the [N.H.C.O.G. Stormwater Management Committee](#)
- ▶ First action item was the adoption of an updated, ACT 167, multi-municipal Stormwater Management Ordinance, collectively and enthusiastically worked on by many member communities, on a volunteer basis. Upstream meets downstream! This was made possible by funding for Act 167 updates from the [Pa. Dept. of Environmental Protection](#). [Eighteen communities](#) in the COG adopted the ordinance, 2008

NORTH HILLS COUNCIL OF GOVERNMENTS, SWM

- ▶ After the adoption of the Stormwater Management Ordinance/ Act 167 update, the [SWM Committee](#) began working on the Pine Creek Watershed Implementation Plan. The goal of this Plan was to determine how best to reduce the nonpoint pollutant loads in the Watershed through projects throughout the watershed. The all-volunteer committee worked for over a year on the Plan document. Funding was provided by the [PA Dept. of Environmental Protection](#) through Section 319 of the Federal Clean Water Act, administered by the [U.S. Environmental Protection Agency](#). The plan was completed in October of 2009 and later approved by the DEP. [Art Gazdik](#), at the time Engineer for [Ross Township](#), led this project as well as the Ordinance update and was instrumental in their completion.
- ▶ The [SWM Committee](#) established a Stormwater Management Fund for technical assistance for all communities in the C.O.G; and later a fund specific for Pine Creek in addressing TMDL issues within the watershed.

NORTH HILLS COUNCIL OF GOVERNMENTS, SWM

- ▶ In 2019, the [SWM Committee](#) began working on an update to the Pine Creek Watershed Implementation Plan in conjunction with EPA/DEP and an update occurring with the Allegheny County Hazard Mitigation Plan in 2020. The goal of this effort was to include the updated WIP into the County Hazard Mitigation Plan to address localized flooding and water quality improvements at the same time which then could potentially provide funding opportunities through both Plans for projects included in the WIP. The all-volunteer committee worked for over a year on these Plan documents. Funding was provided by the [PA Dept. of Environmental Protection](#) through Section 319 of the Federal Clean Water Act, administered by the [U.S. Environmental Protection Agency and PEMA](#). The Updated WIP was finalized and adopted in January of 2021.

NORTH HILLS COUNCIL OF GOVERNMENTS, SWM

- ▶ The [SWM Committee](#) has developed a list of watershed projects to reduce quantity of flow and improve water quality that has been shared with the Army Corps of Engineers to help assess priorities within the Watershed. Goals have been discussed for next steps for the committee for 2024 along the lines of shared maintenance responsibilities within the watershed for these and built projects.
- ▶ The Committee continues to meet quarterly and provide guidance and information to members of Council of Governments on funding opportunities, educational materials and regulatory requirements.

What makes Etna Sustainable?

- ▶ **Wetna** -Stormwater Management
- ▶ Green Master Plan/Green Streetscape
- ▶ Incentivized Ordinances
- ▶ High visibility projects for education
- ▶ Good Governance
- ▶ Collaboration
- ▶ Stormwater as a lens for all projects undertaken

Etna's Commitment to Stormwater Management continues

- ▶ Through a grant administered by the [Pennsylvania Environmental Council](#) and with [3 Rivers Wet Weather](#), the Borough of Etna undertook a study to assess the feasibility of reducing/eliminating proposed grey infrastructure alternatives by managing the 90% of the Typical Year 2003 runoff through the implementation of green solutions, through our combined sewer community. The Etna Green Master Plan was adopted in June of 2014 and identified 23 sites within Etna that, if implemented, would manage a total of 16.1 million gallons of stormwater annually at an estimated cost of \$6.1 million, which translates to \$0.38/gallon. Five of those projects are part of a Green Streetscape in the commercial business district. This Master Plan was done by [Donald Newman, P. E.](#), [Buchart Horn, Inc.](#) and [Matt Graham, Landbase Systems](#).
- ▶ In 2014, through funding from the [DEP Growing Greener, Section 319](#), Etna completed the first phase of this streetscape (listed specifically in the Pine Creek Watershed Implementation Plan, 2009). Through the assistance of [3 Rivers Wet Weather Program](#) and [RK Mellon](#) funds with a local share, an additional project was completed in 2014, the School Street Public Parking lot. Phase II, also funded through [Growing Greener](#) funds, was completed in 2017. Both projects were designed and engineered by [Buchart Horn, Inc.](#)

Etna's Commitment to Stormwater Management continues

- ▶ In 2019, Phase III of Green Streets, Streetscape was completed through funding from the [ALCOSAN GROW](#) (Greening of our Waterways) program. Etna also submitted and was successful in acquiring 319 Funding for the design of Green Streets, Streetscape V. Design was completed in 2020. The Design includes the disconnection of huge storm drains from a block long warehouse that formerly housed a section of an old steel mill.
- ▶ The four projects completed to date from the [Green Master Plan](#) are estimated to remove over three million gallons of stormwater from our combined sewer system, which aid in lessening basement backup flooding, roadway flooding from inundated sewers (combined) as well as reducing overflows to Pine Creek, all sources of localized flooding. The School Street lot includes a monitor. Two other rain gardens add an estimated additional one hundred and fifty thousand gallons of removal annually.

Etna's Commitment to Stormwater Management continues

- In 2017, the Borough of Etna and a group of committed residents, entered into a two year [Eco District](#) Education and Planning Program, through funding received through the newly formed [TriBoro EcoDistrict](#) with our partners in Millvale and Sharpsburg from the [Henry L. Hillman Foundation](#). Through this process, Etna became the **First Certified EcoDistrict in the World** with Sharpsburg and Millvale following as the second and third to receive this distinction. During the community planning process, goals for the community were identified by residents that aimed towards a better, healthier environment, both socially and physically for all. One project identified was the Etna EcoPark. This park would provide much needed green space to a sector of our community. Through our partnership with ECO, we provided the space for the park to become a reality. An abandoned property from the flood of 2004, was torn down and then ownership acquired by the Borough which we earmarked perpetual greenspace and for stormwater management. Together with ECO, the Park became a reality. The Borough paid for the installation of a large rain garden and installed the pervious walkway through the Park. Community members built all the other wonderful features including raised gardening beds, educational signage, artwork and fencing. This Park is estimated to remove 80,000 gallons of stormwater from our combined system annually. This property sits in the Special Flood Hazard Area and now is perpetual greenspace for residents to enjoy. This Park was completed in 2021. Eco friendly educational programming occurs there throughout the spring, summer and fall.

Etna's Commitment to Stormwater Management continues

- ▶ Etna began installing [filter basins](#) as a pilot in the very first Green Streets Streetscape Project. We discovered in our densely populated, valley community, they did an excellent job of removing sediment from our combined system. Sediment overflows into our streams and rivers, harming wildlife and their habitat, while at the same time, eating up capacity in an already overloaded combined system. Since that first installation in 2014, Etna has installed a total of [34 filter basins](#) throughout the community. During the last cleaning of these by our Public Works employees, [2,529 pounds of sediment were collected](#) from basins over a nine month period this year. This sediment was prevented from overflowing into Pine Creek and from eating up capacity in our combined system, aiding roadway flooding and basement backups. This also helped reduce our costs when hiring a sewer vector company (twice a year) to clean out our basins. These also aid in Etna meeting their nine minimum controls (debris removal) for [CSO compliance](#) as well as meeting [MS4 requirements](#).

Etna's Commitment to Stormwater Management continues

- ▶ In 2022, Etna received funding (\$500,000) for the construction of [Phase IV Green Streets](#), another block of our commercial business district through [Community Development Block Grant Funding and Allegheny County](#). We are currently waiting for our contract and then bids will be out for the project.
- ▶ In 2023, Etna received funding (\$562,000) for one half of Green Streets, [Streetscape 5 from 319 Growing Greener](#) funding. We anticipate going out to bid for this project sometime after the new year.
- ▶ Also in 2023, developers in Etna, incorporated our Green Streets, Streetscape program into the redevelopment of an historic old mill, almost a block long, that incorporates our [Green Streets, Streetscape 5A](#). They are currently under construction of this project.

Etna's Commitment to Stormwater Management continues

- Many of our programs came with an additional and unforeseen benefit. Our residents began to take notice and ask questions. Living in a community that has historically been flood prone, they wanted to learn more and make a difference themselves in their daily lives. Etna purchased a quantity of the [Hydra Rain Barrels](#), which holds one hundred and sixteen gallons of stormwater. We sell them at reduced rates to our residents in a sliding scale, including residents making less than \$35,000.00 can get them [FREE](#). They normally cost over \$300.00. They must acquire a [disconnect permit](#) at a cost of \$10.00 and after our public works performs a perc test, if they pass, our crew will install their barrel for them. Approved rain barrels receive a \$5.00 credit on their environmental sewer surcharge on their sewer bill. Each home receives a sign for their yard which reads [“This home protects Pine Creek and the Allegheny River”](#). We have thirty approved rain barrels installed to date.

BOROUGH OF ETNA
ENVIRONMENTAL SERVICES
DOWNSPOUT DISCONNECT PROGRAM
 437 BUTLER STREET
 PITTSBURGH, PA. 15223

Office: 412-781-0569
 Fax: 412-781-5302
 Email: etna@etna-borough.org

RESIDENTIAL DOWNSPOUT DISCONNECTION PERMIT APPLICATION
 Permit Expires One Year from the Date Issued

SITE INFORMATION

BUILDING ADDRESS: _____ DATE: _____

OCCUPANT/OWNER NAME: _____ ZIP CODE: _____

If different than Owner/Occupant name, CONTACT NAME: _____

If different than site address, CONTACT ADDRESS: _____

CITY: _____

TYPE OF EXISTING CONNECTION

☐ Number of downspouts you plan to disconnect _____

☐ Number of downspouts you plan to retain _____

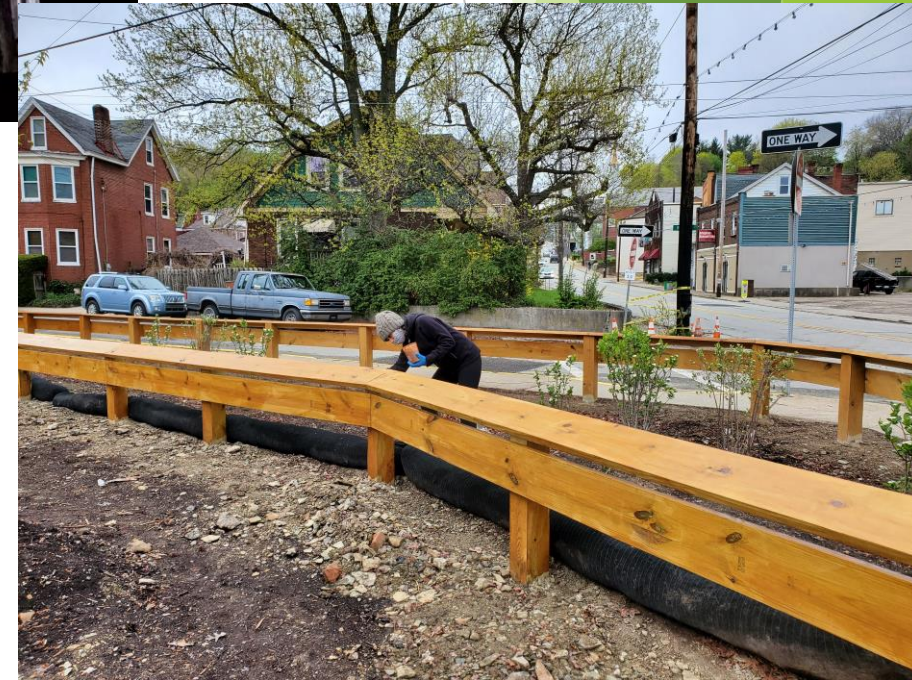
DESCRIPTION OF WORK

Date Fee Paid: _____

Homeowners may perform the work. Please call 412-781-0569 for more information. All work must be completed by the date of the permit expiration.

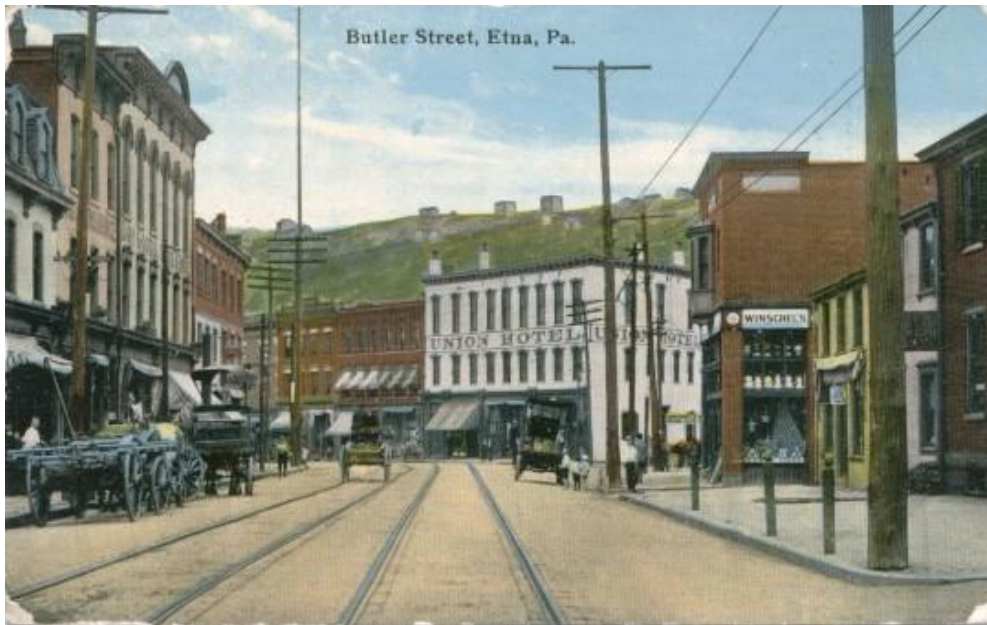






Green Projects Completed

Etna circa 1909



Areas Managed

- ▶ 3.162 Acres
- ▶ Annually
 - ▶ 3.2 million gallons removed
 - ▶ 427 lbs. sediment removed

Impervious Surface Area 29%

ETNA STREETScape

Roof Drain Collection

The Butler Street, Freeport Street, and Union Alley facilities collect roof runoff via channels and pipes and direct it to below-ground facilities.

Pervious Pavers

Parking pads on the Union Alley side of the block use permeable pavers with subsurface gravel storage/infiltration beds.

Bump-outs

Bump-outs improve pedestrian safety by reducing the distance and time that pedestrians are exposed to vehicular traffic. Bump-outs also calm traffic as drivers perceive a need to slow down to negotiate the narrow lanes.

Tree Grate

ADA-compliant tree grates maximize pedestrian space in the commercial district and allow oxygen and water to reach the tree roots.

Curvilinear Trench Drain

Emulates water flow in a natural pattern, a nod to Etna's ties to the nearby Allegheny River and to its ironworks history. It also allowed the system to be built around the myriad of existing utility valves in the sidewalk.

Street Trees

Studies show street trees reduce traffic speeds, create safer walking environments, improve business income streams, absorb 30% of precipitation from normal storm events, provide heat protection, add value to real estate, and screen overhead utilities.

Green Inlets

Treatment inserts in catch basins remove pollutants associated with sediment-laden road runoff.

Impervious pavement

Runoff from the sidewalk within 5 feet of the existing building structures flows to the trench drain, protecting the buildings from water damage.

Decorative Trench Grate

Impervious Pavement

Modular Plastic Storage Units
Installed Under Sidewalk

Impervious Liner
Protects Adjacent Buildings

Underdrain Protects
Nearby Basements

Rainfall



Modular Stormwater Storage System

Infiltration System: Diverts stormwater from the combined sewer system and regional sewage treatment plant, saving money, and reducing environmental impact.



River Bend

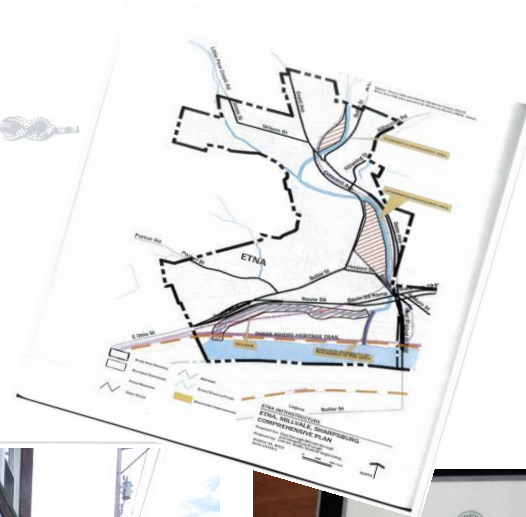
A Comprehensive Plan for Etta, Milne and Sharpburg

On a river bend, the strongest, safest and one of the most enduring methods of joining things together is using a Figure 8 knot.

Etta, Milne and Sharpburg, located on a bend in the Kingsbury River, are poised to join together to undertake a series of 8 key regionally oriented and community specific goals.

Anticipate the communities aim to pursue accompany each goal and, thus, through strength in objectivity and quality ideas, the communities will thoughtfully join together to collectively realize their vision.

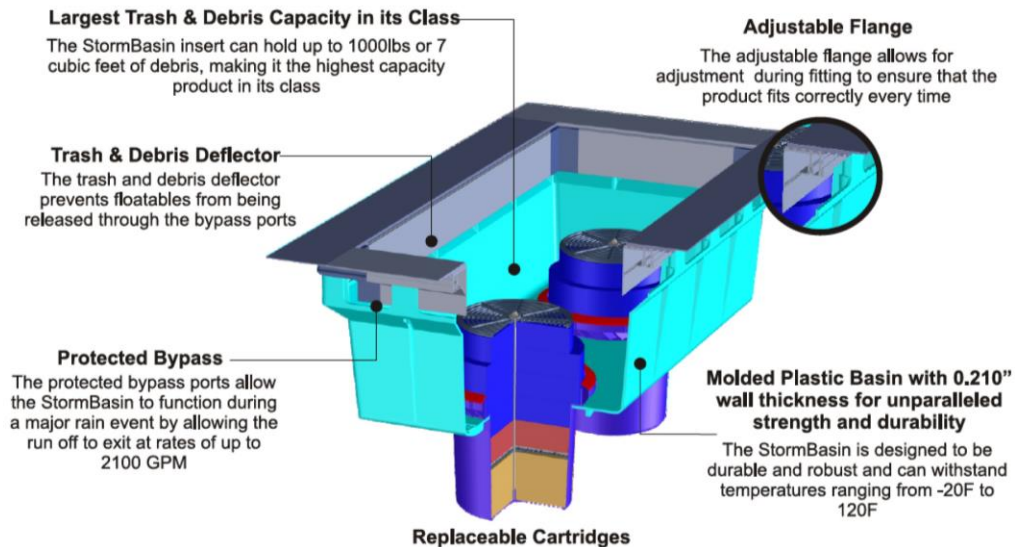
"We strive to thrive as urban communities valued and cared for by local government, civic organisations, businesses and citizens."





STORMBASIN

BY FABCO INDUSTRIES



Thirty-four catch basins have either been installed or retrofitted with these filter basins in the last four years. In a six month period, we are averaging 1,374 pounds of sediment collected and removed from the combined system via these basins .

Etna Doing Their Part

- ▶ Etna does a yearly cleaning of all catch basins within the community, and also periodically at trouble areas throughout the year after heavy rain events. As a combined sewer community, debris picked up in rain and running into the catch basins is an issue we have learned to address as finances allow, but it is a priority. It is done at the discretion and judgement of our Public Works Director.
- ▶ In 2012, Etna adopted a [residential downspout disconnect ordinance](#), realizing and addressing how our combined sewer community adds to the problem. While we are installing larger stormwater infiltration projects (streetscape, etc.), we wanted to educate and make our residents conscious of how our sewer system is designed and operates and problems that contribute significantly to localized flooding and make them stakeholders in solutions as well. While downspout connection is permitted in Etna, we knew it added to our issues. To encourage residents to disconnect, included in the Ordinance is an incentive to *properly* disconnect. A permit is required to ensure it is feasible at the location. A [\\$5.00 bimonthly credit](#) is provided on the Sewer Environmental Service Fee for three years (6 times a year). We send our Public Works out to do a perk test (trained in) and install the rain barrels at NO ADDITIONAL COST at appropriate, approved locations. To further encourage disconnection, Etna purchased a quantity of Hydro Rain Barrels which hold 116 gallons, and we offer them to residents at a reduced cost, based on income. We recognize and consider green infrastructure - our rain barrels, rain gardens, rain park, a part of our sewer infrastructure and treat it as such. EVERY DROP COUNTS!
- ▶ Etna received a [\\$50,000 air pollution prevention grant from the Allegheny County Health Department](#) in 2019, for tree plantings! While this will significantly help improve our air quality as we are bordered by rail and highway corridors, these trees will also greatly assist in stormwater management in our community.

We are offering a reduced pricing program, on a first come/first serve basis, based on income levels. There are a limited number of rain barrels. The rain barrels, if purchased individually, are normally \$365.00 but residents making \$35,000.00 or less can receive one free; income between \$36,000.00 and \$50,000.00, the cost would be \$50.00; \$50,000.00 to \$100,000.00, the cost is \$100.00; and \$100,000.00 and above, the cost is \$150.00.



In Summary.....

- ▶ Etna has learned that during the planning process, stormwater management has to be our first priority and the first lens that we look through when viewing our projects and plans. We have learned that by [working collaboratively with neighbors, specifically upstream neighbors \(through the North Hills Council of Governments\), with other informed agencies such as the Allegheny County Conservation District, Three Rivers Wet Weather Program, Sustainable Pittsburgh, the Allegheny County Sanitary Authority, the Dept. of Environmental Protection, the Pennsylvania Emergency Management Agency, the Pennsylvania Environmental Council, Tree Pittsburgh and our neighbors in Millvale and Sharpsburg Boroughs and our EcoDistrict work, we can accomplish much](#). These efforts have helped to improve the quality of life for our residents, which is our number one priority. We are grateful for the partnerships and relationships which have developed through this process.



Influence of Industrialization/ Commercialization on Transportation Stormwater Management

SARAH CORDEK, FHWA



FROM THE SURVEY

“MOST DOTS... ARE NOT TERRIBLY IN-TUNED
WITH STORMWATER ISSUES, EXCEPT TO KEEP
WATER OFF THE ROAD...”

Industrialization and Commercialization – Where does it happen?



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PennDOT will no longer allow private property owners to directly connect into an underground PennDOT system without also including the municipality as a permittee.

- Forcing stormwater management on-site and adherence to municipal guidelines

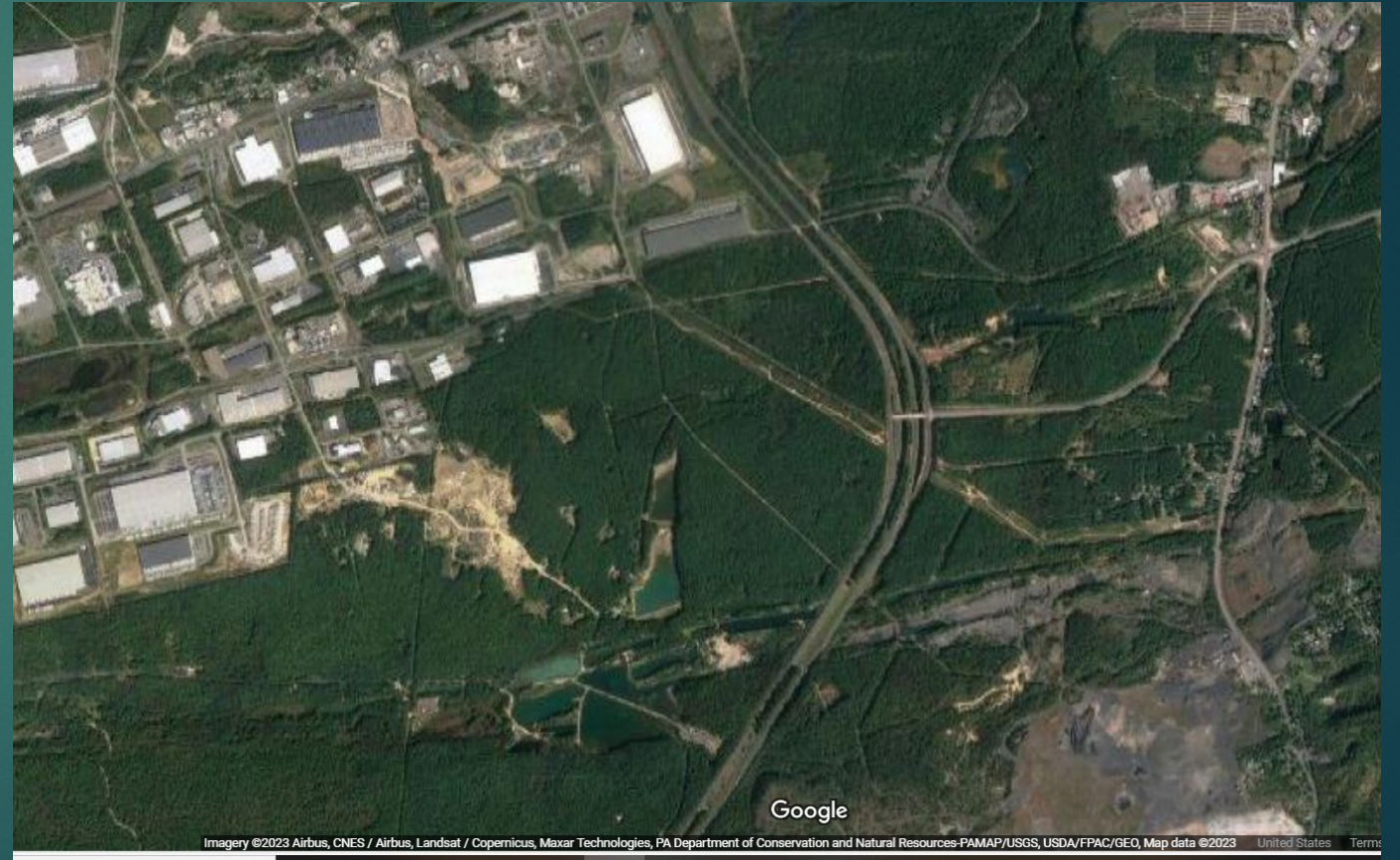


Other Considerations

- Additional stress on municipalities.
- Some of these developments are large scale and mostly impervious area. What if they become abandoned?
- Social and political pressures to approve developments



Current Development in Northeast PA



What can we do?

- ▶ Asset management
 - ▶ Databases which reliably track ownership
- ▶ Resilient design
 - ▶ Storm frequency/intensity is changing
- ▶ How do we integrate stormwater management into the land development process and what can transportation and planning agencies do?
- ▶ Collaboration/ communication between agencies and jurisdictions

What can I do at the Federal level?

sarah.cordek@dot.gov

Aerial photos from Penn Pilot and Google Maps.