2022 Business Development Series

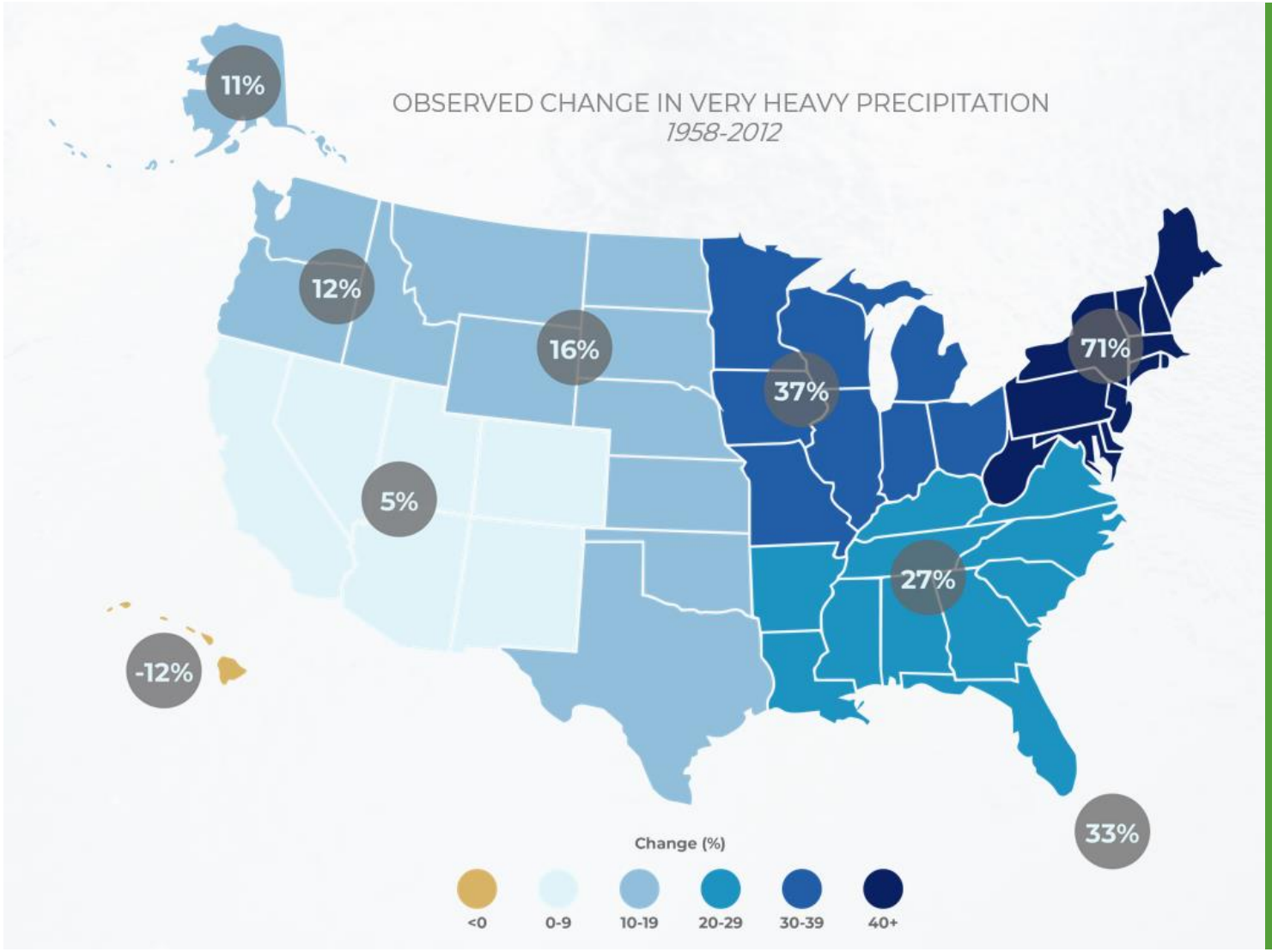
Stormwater Management

James J. Stitt | Sustainability Manager

May 11, 2022

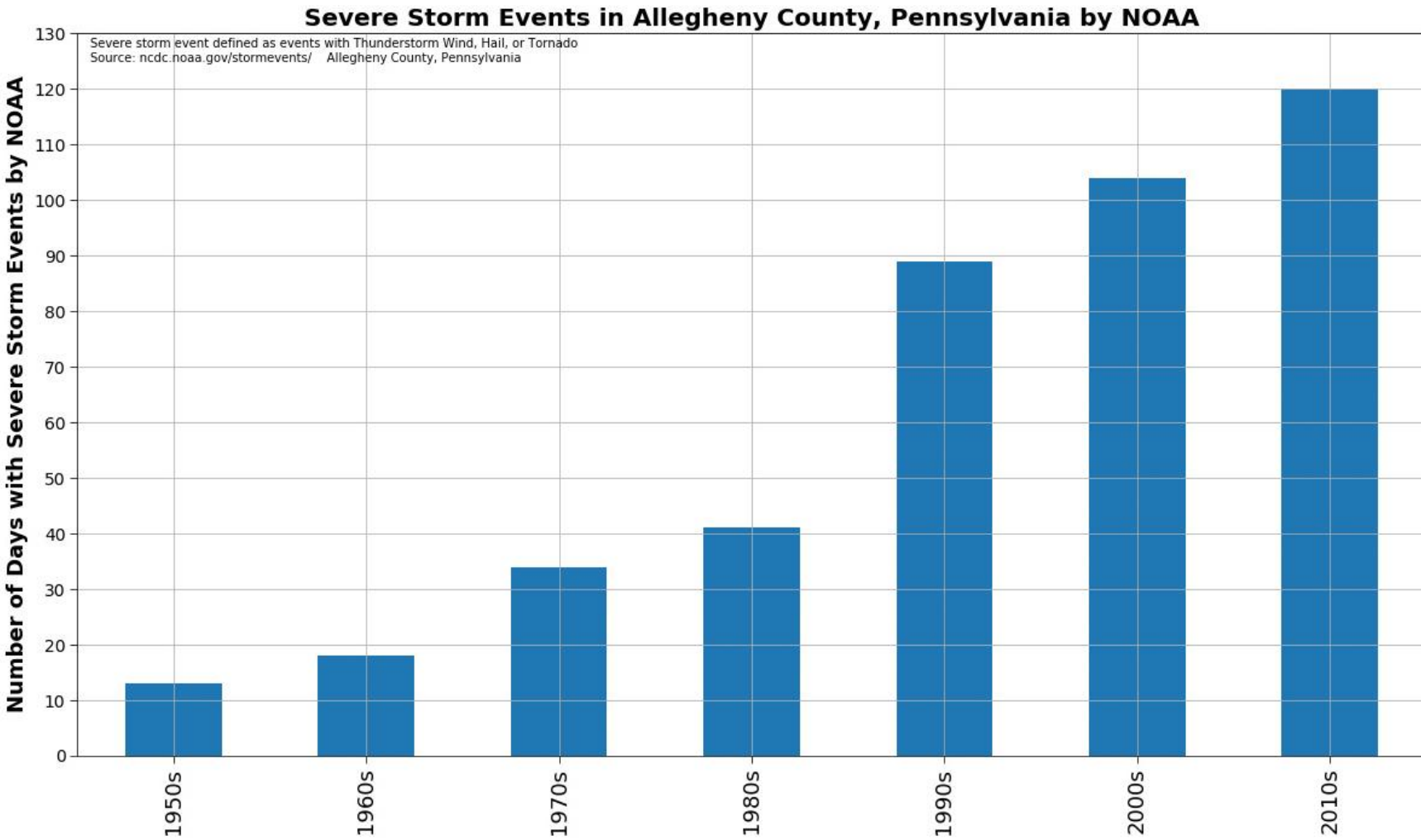
PWSA and Stormwater

- Why Stormwater Matters
- PWSA's Strategic Plan
- Stormwater Fee and Credit Program
- Updated Stormwater Code



The Northeast U.S. and Pittsburgh are getting much more heavy rainfall than in the past.

Occurrences of severe storms have increased dramatically in Allegheny County.



So…We Gotta Talk About Stormwater

- Today, Pittsburgh averages 38 inches of rain a year.
- Severe, highly-localized storms frequently overrun the sewer system and exceed treatment capacity.
- Too much stormwater + sewer water = pollution in our rivers.

Our system was not built for this volume of stormwater

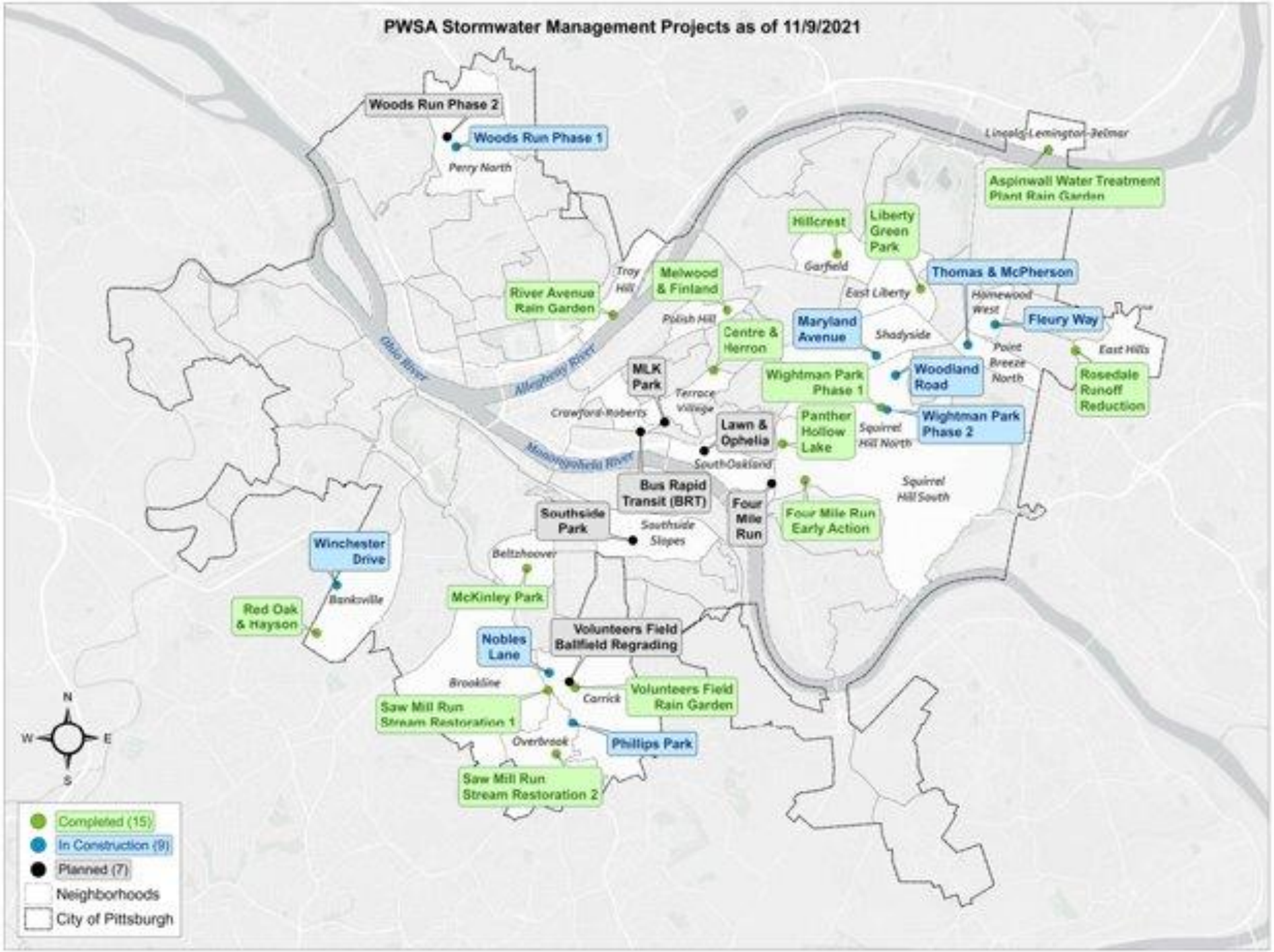
- We have more pavement and hard surfaces than we did 100 years ago
- We have more rain, and localized severe storms, than the system is built to handle
- Previously, Pittsburgh has not had a unified stormwater strategy

PWSA is stepping up

To tackle our stormwater challenges, PWSA is building an innovative stormwater management system, designed to absorb or redirect as much rainwater as possible *before* it enters our overburdened sewer system.

PWSA Strategic Plan for Stormwater

- 12 month process – final plan due in June
- Outline priorities for investment in stormwater management focusing on 4 lenses:
  - Water quality – CSO, MS4
  - Flooding – localized, basement backup, riverine
  - Equity – investment in distressed communities
  - Opportunity – targeting existing green space, vacant property
- Look for ways to leverage PWSA's investment through partnerships, external funding etc.
- Connect stormwater to other infrastructure investments – energy, transportation etc.

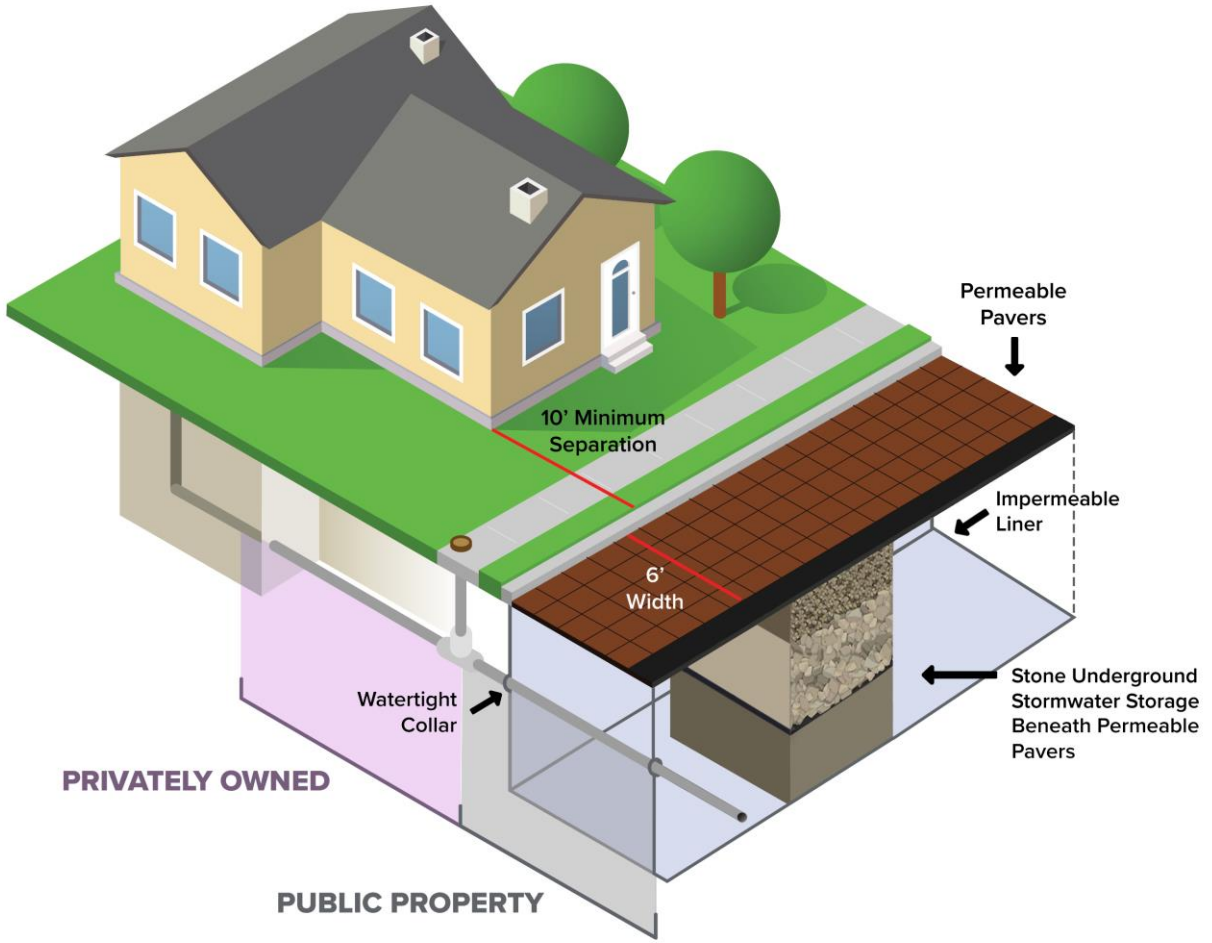

PWSA Stormwater Management Projects as of 11/9/2021
Woods Run Phase 2
Woods Run Phase 1
Perry North
Aspinwall Water Treatment Plant Rain Garden
Hillcrest
Liberty Green Park
Garfield
Thomas & McPherson
East Liberty
Homewood West
Fleury Way
River Avenue Rain Garden
Troy Hill
Melwood & Finland
Polish Hill
Centre & Herron
Maryland Avenue
Shadyside
Point Breeze North
East Hills
Rosedale Runoff Reduction
MLK Park
Terrace Village
Wightman Park Phase 1
Woodland Road
Crawford-Roberts
Lawn & Ophelia
Panther Hollow Lake
Squirrel Hill North
Wightman Park Phase 2
South Oakland
Bus Rapid Transit (BRT)
Four Mile Run
Four Mile Run Early Action
Squirrel Hill South
Southside Park
Southside Slopes
Winchester Drive
Beltzhoover
Bankville
McKinley Park
Red Oak & Hayson
Nobles Lane
Volunteers Field Ballfield Regrading
Brookline
Carrick
Volunteers Field Rain Garden
Saw Mill Run Stream Restoration 1
Overbrook
Phillips Park
Saw Mill Run Stream Restoration 2
Ohio River
Allegheny River
Monongahela River
N
W
E
S
Completed (15)
In Construction (9)
Planned (7)
Neighborhoods
City of Pittsburgh

Projects like Centre and Herron will transform stormwater management

- Designed to capture and hold excess runoff before it runs into a river
- Also beautifies a neighborhood

Maryland Avenue Stormwater Improvement Project

- Shadyside Neighborhood
  - Howe St and Kentucky Avenue
  - Permeable pavers and underground stone storage area for stormwater in the parking lane between S. Negley Ave and College Street
  - Reduce combined sewer overflows in the A-22 sewershed
  - Reduce basement sewage backups and neighborhood flooding
  - Est completion – Spring 2022.



PWSA's Stormwater Strategic Planning

- Pittsburgh's blueprint to address local stormwater challenges
- Visionary team led by PennPraxis and the Water Center at Penn. Final plan June 2022.
- Public engagement of a diverse group of residents, ratepayers and stakeholders via focus groups and a community ambassador program to convey the community issues and needs
- Special attention to those most impacted by stormwater issues such as flooding and basement backups, and environmental Justice areas.

- **For more information review our FAQ**
  www.pgh2o.com/stormwater-master-plan-faq

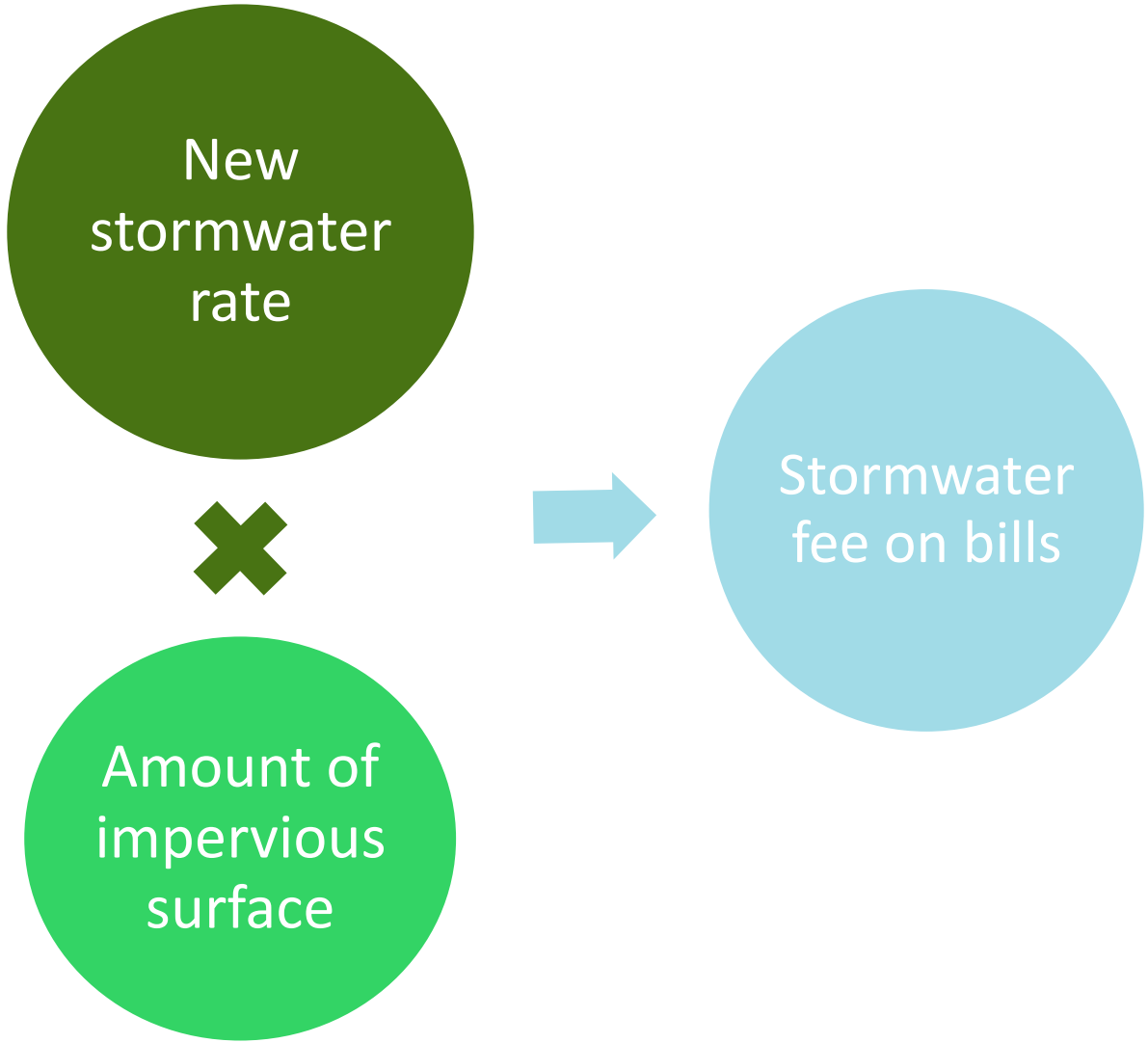
Development of Stormwater Fee

To change how we manage stormwater, we also changed how we bill for stormwater

Until January, PWSA charged every customer based on how much drinking water they use. That meter reading determines drinking and wastewater rates

As of January 2022, stormwater is billed differently

- Every parcel in Pittsburgh has been mapped
- Even if a parcel has no water meter, it will be obliged to pay a stormwater fee
- This is fairer and more equitable than billing by meter usage



Understanding Stormwater & Impervious Area

- Impervious surfaces are hard surfaces that rain cannot pass through
- Examples:
  - Roofs
  - Driveways and parking lots
  - Sidewalks
- Impervious area mapping of Geographic Information System (GIS) data is generated to determine unique impervious area for each customer
- PWSA will have a process for property owners to appeal or correct impervious surface area calculation
- PWSA Stormwater Fee Finder

Rates will be based on an “ERU”

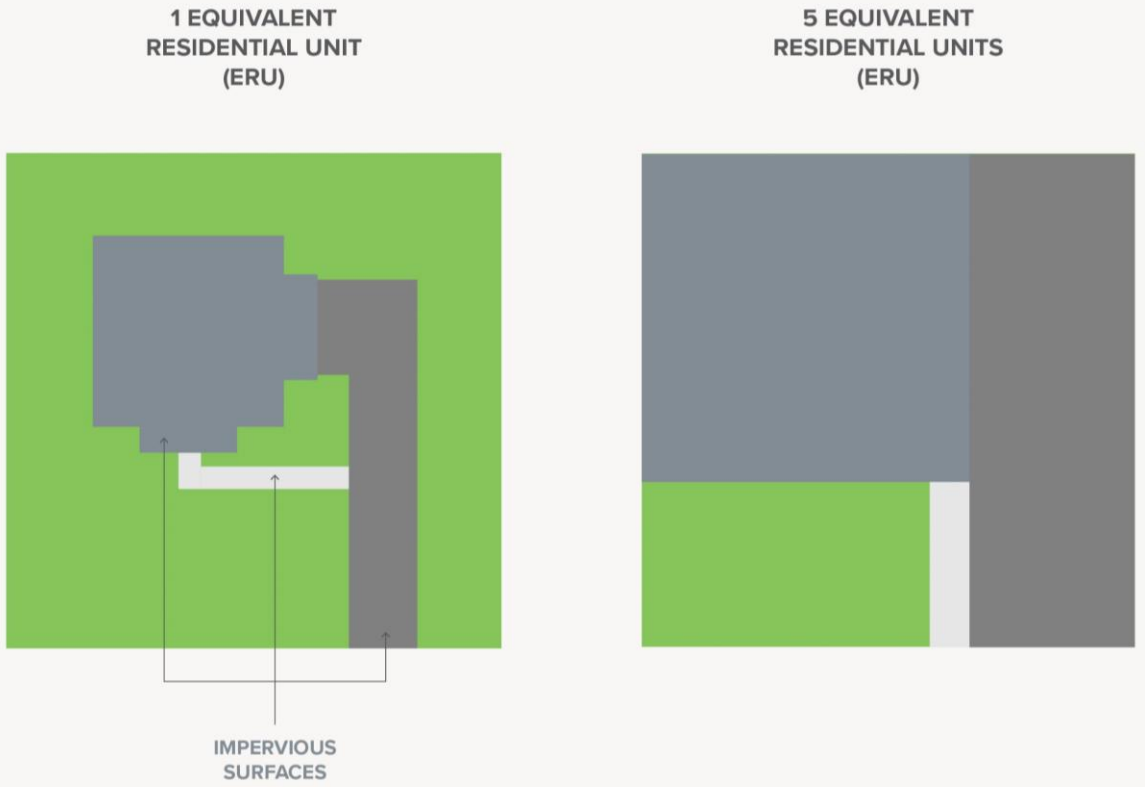
PWSA determined three tiers for all residential properties in Pittsburgh:

- Tier 1 = 400 sq ft – 1,015 sq ft
- Tier 2 = 1,015 sq ft – 2,710 sq ft

Over 70% of PGH residential properties will be Tier 2. This size is our base rate, or Equivalent Residential Unit “ERU”

- Tier 3 = 2,710 sq ft+

All non-residential units will be based on 1650 sq. ft. ERU. If a parking lot is 8250 sq. ft. = 5 ERUs, the parking lot’s stormwater bill will be 5x the approved ERU rate.



Stormwater Rates

Stormwater Customer Categories	ERUs	Monthly Rate 2022	Monthly Rate 2023
Residential Tier I (>=400 sf. to <1,015 sf.)	.5	$2.98	$3.98
Residential Tier II (>=1,015 sf. to 2,710 sf.)	1	$5.96	$7.95
Residential Tier III (>=2,710 sf.)	2	$11.92	$15.90
Non-residential	Per ERU	$5.96	$7.95

The stormwater fee will fund

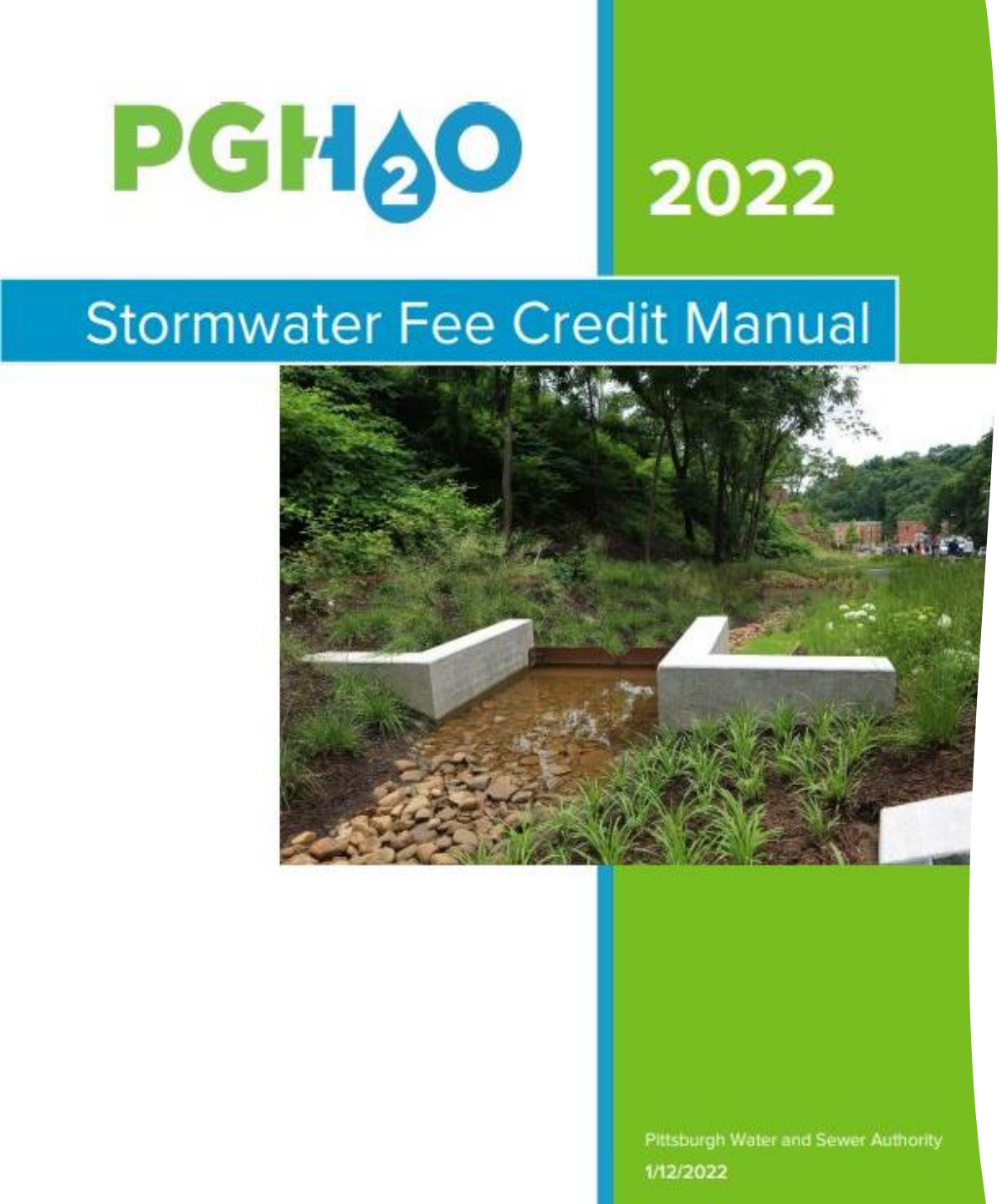
- **Capital Costs**: design and construction of stormwater projects identified in PWSA's Capital Program _____
- **Direct Costs**: Day-to-day maintenance
  - Cleaning catch basins
  - Weeding and maintenance of PWSA raingardens and stormwater infrastructure
  - Meeting state water quality requirements
- **Indirect Costs**: Shared functions that support stormwater, water, and wastewater services

Stormwater Fee Credits

- Incentivizes property owners to help reduce the impact of stormwater runoff from a property on PWSA's stormwater management system and our rivers and streams by managing runoff or eliminating impervious areas.

- **Residential customers** –
  - Disconnect downspouts and redirect property drainage to street planters in targeted areas
  - Control at least ¾-inch of runoff from all impervious surfaces using solutions such as raingardens

- **Non-residential customers** – must meet the City of Pittsburgh's 2019 or 2016 stormwater code standards
  - **2019 Standard**: On-site capture/detention of first 1" of rainfall from impervious surfaces to receive 60% credit for that tributary impervious area
  - **2016 Standard:** On-site capture/detention of first ¾" of rainfall from impervious surfaces to receive 45% credit for that tributary impervious area



Applying for a Credit

PWSA's Stormwater Fee Credit Manual and Application are available on our web site.

- **Complete the Application –** Ensure the application is filled out in full before submitting.
- **Provide Details –** Include as much supporting documentation as possible; BMP design details, permit approvals, site plan drawings, inspection reports, geo-tech data, O & M plans, etc.
- **BMP Verification –** PWSA may require an on-site inspection prior to credit approval, or at anytime while credit is in effect
- **Code Compliance ≠ Credit Approval –** Credits must be applied for and are evaluated separately from other regulatory requirements
- **3 Year Term –** Credits are valid for three years, then owner must submit a renewal request.
- **Credit Termination –** May be terminated at any time if BMP is improperly maintained and/or not adequately functioning

City of Pittsburgh
2022 Stormwater Code

Pittsburgh
Water & Sewer
Authority

Agenda

- Code Update Process
- New Code vs. Old Code
- New Regulations
- New Application + Review Process
- Design Manual + New Resources

Objectives

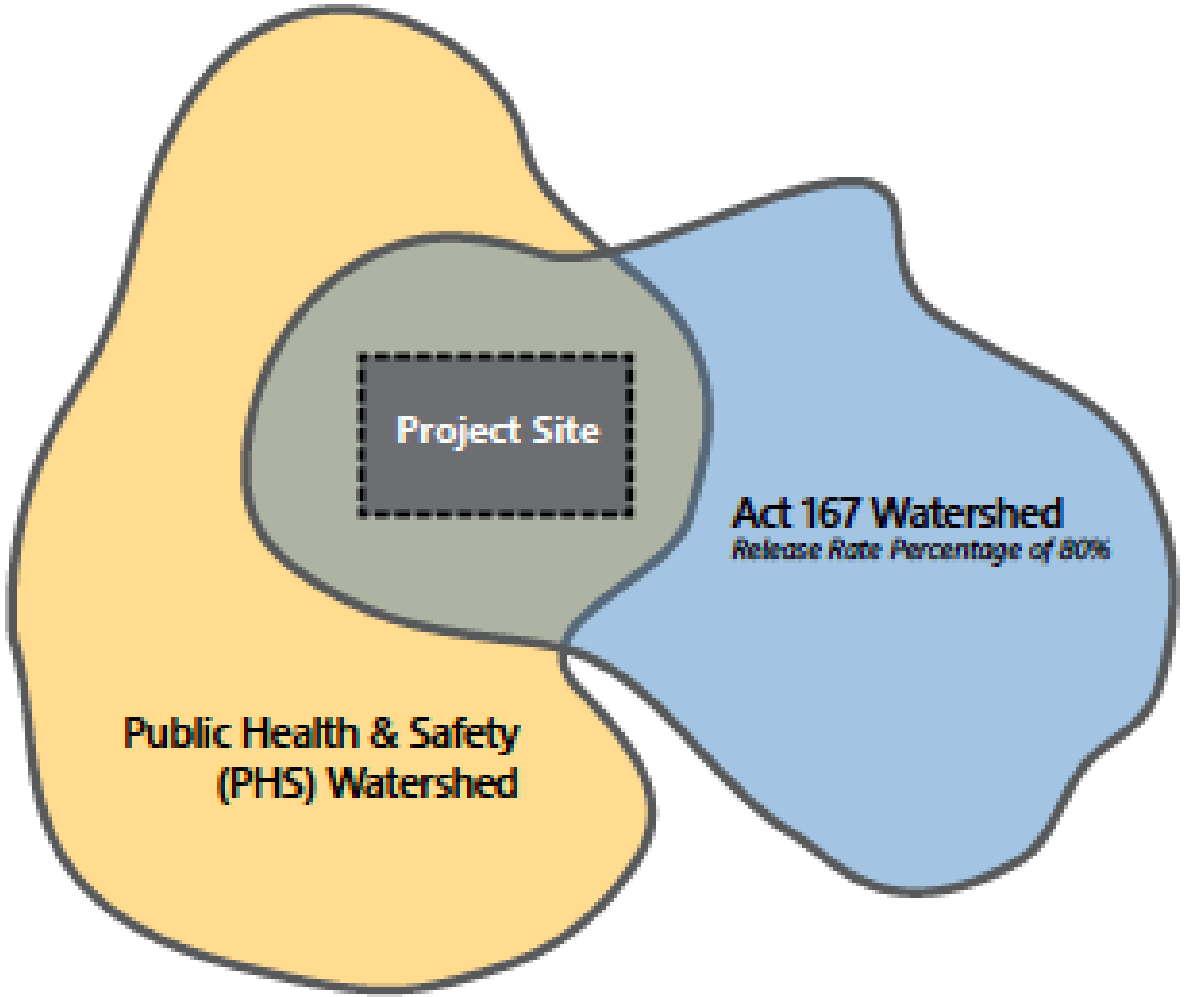
- Highlight key code changes
- Introduce new application and review processes
- Dive into new regulations
- Present Design Manual and other new resources

Well…How Did We Get Here?

2+ Year Public Engagement & Legislative Process

- Agency Working Group
- Stakeholder Group
- Resident Notification

- Planning Commission Hearing
- City Council Hearing
- Approved by City Council on October 5, 2021 went into effect on March 31, 2022



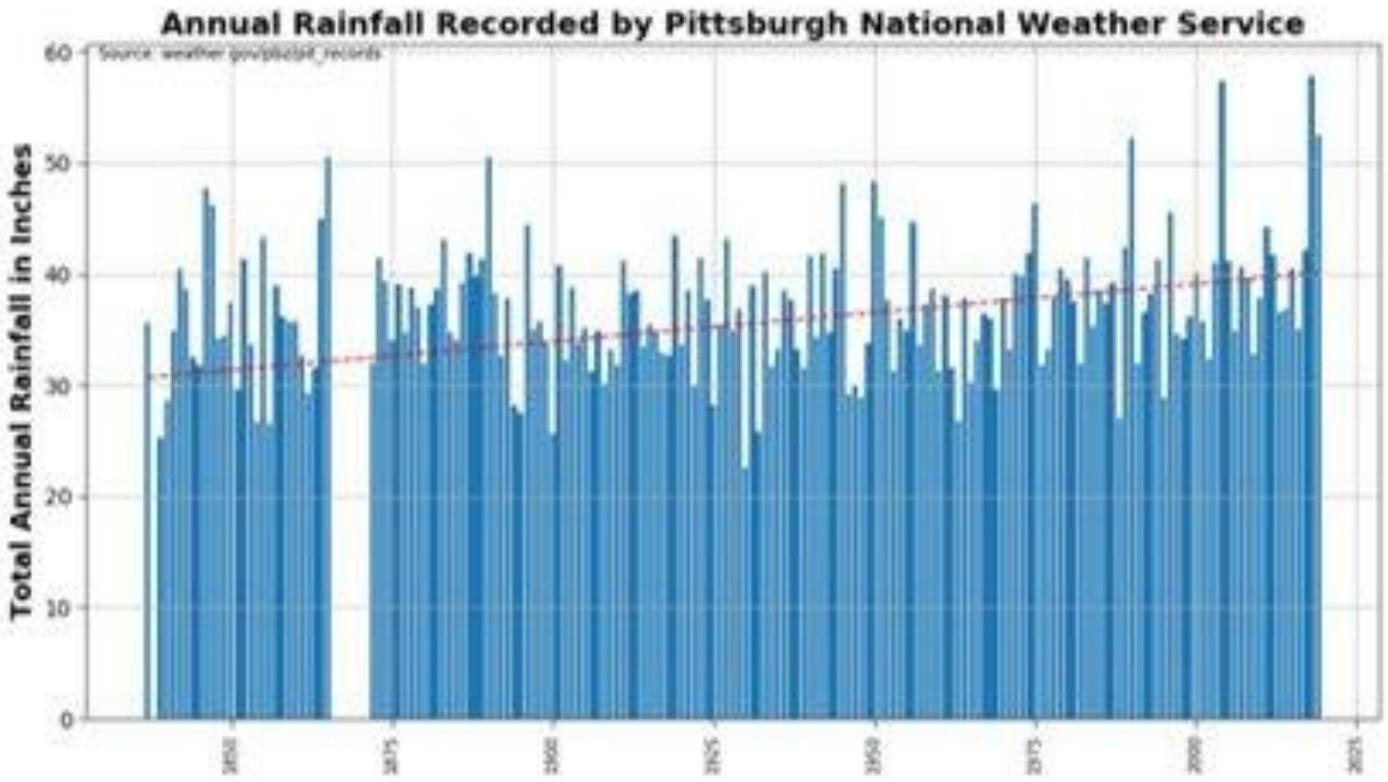
New Code
v
Old Code

Highlight of Code Changes

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

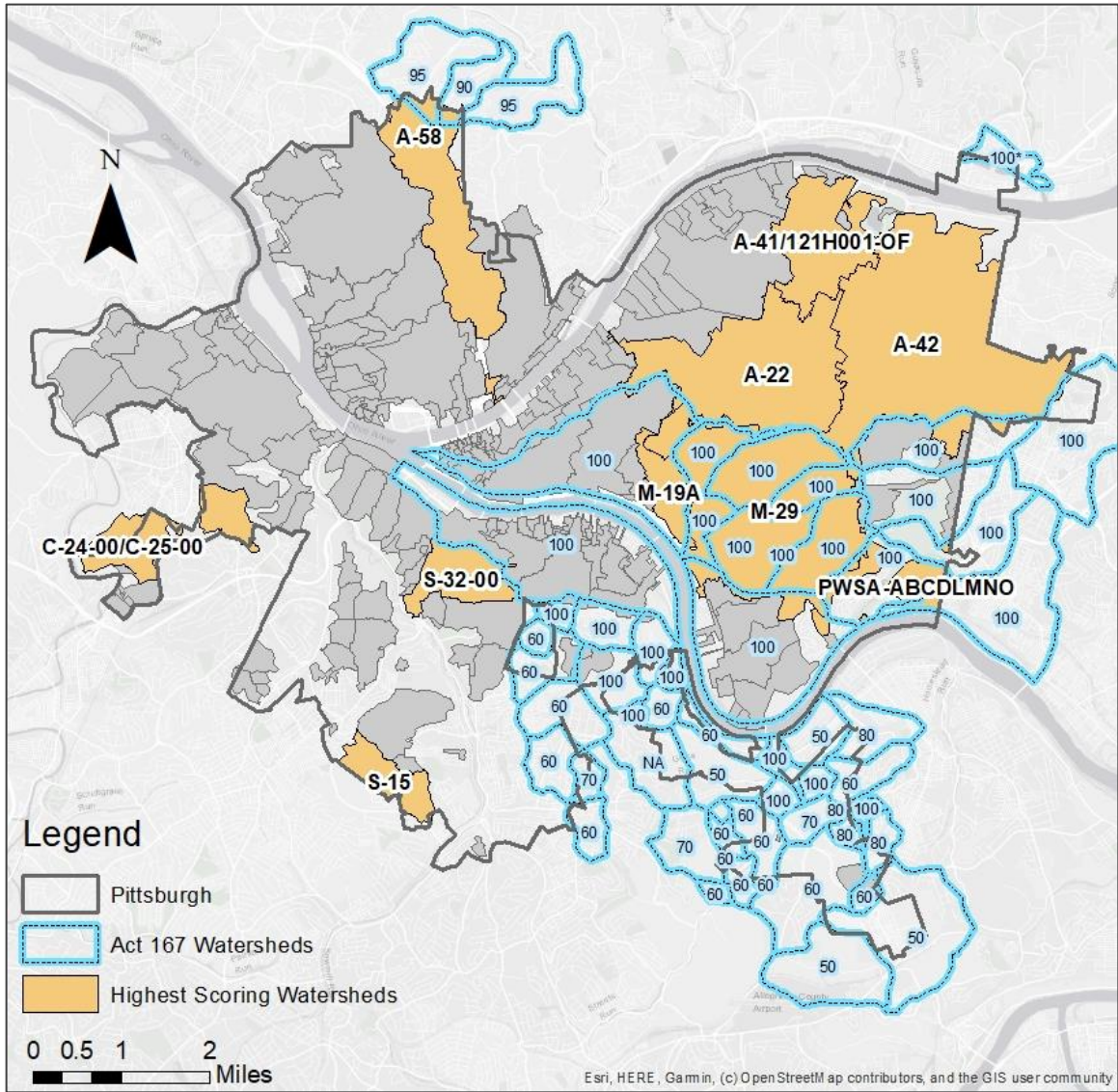
Details of Key Code Changes

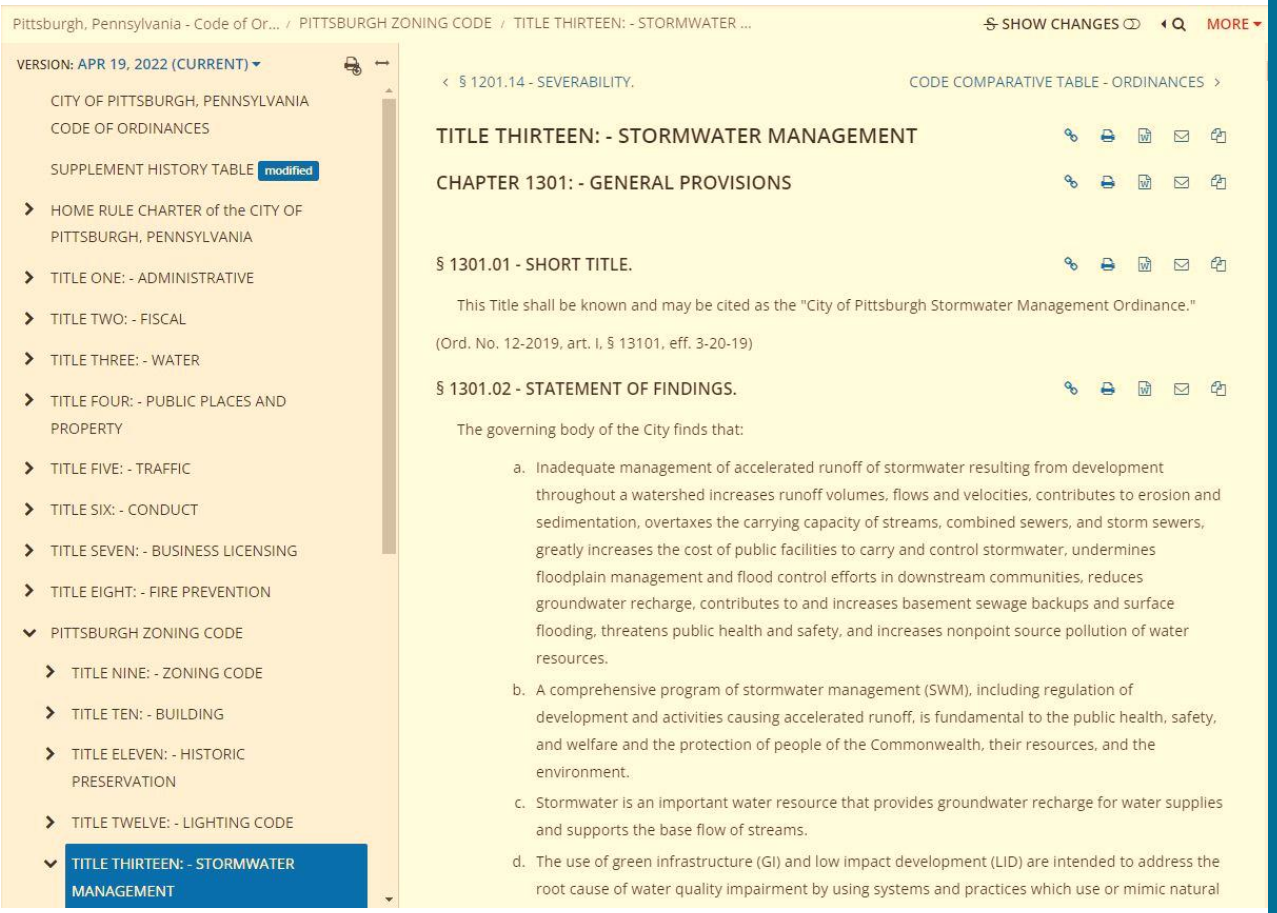
- Carnegie Mellon projection model specific for Pittsburgh
  - 8% to 23% increase in rainfall depth, depending on storm frequency
  - 13% increase of 95th percentile rainfall



Public Health and Safety Release Rates

- Ranked combined sewer watersheds with flood susceptibility using:
  - PWSA flood complaint data
  - Existing hydraulic model capacity analysis
- Highest scoring watersheds are subject to Public Health and Safety Release Rate requirements
  - Approx. 25% of the City
- Overlap with Act 167 watersheds





New Regulations

New Rainfall Standards

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.

See Design Manual section 2.2.a.i. and Title 13 section 1303.03 for more details.

Climate Change Requirements Policies

Volume Controls:

Require the 95th percentile with year 2100 future climate change projection for all regulated activities.

Purpose:
Water Quality Improvement

Rate Controls:

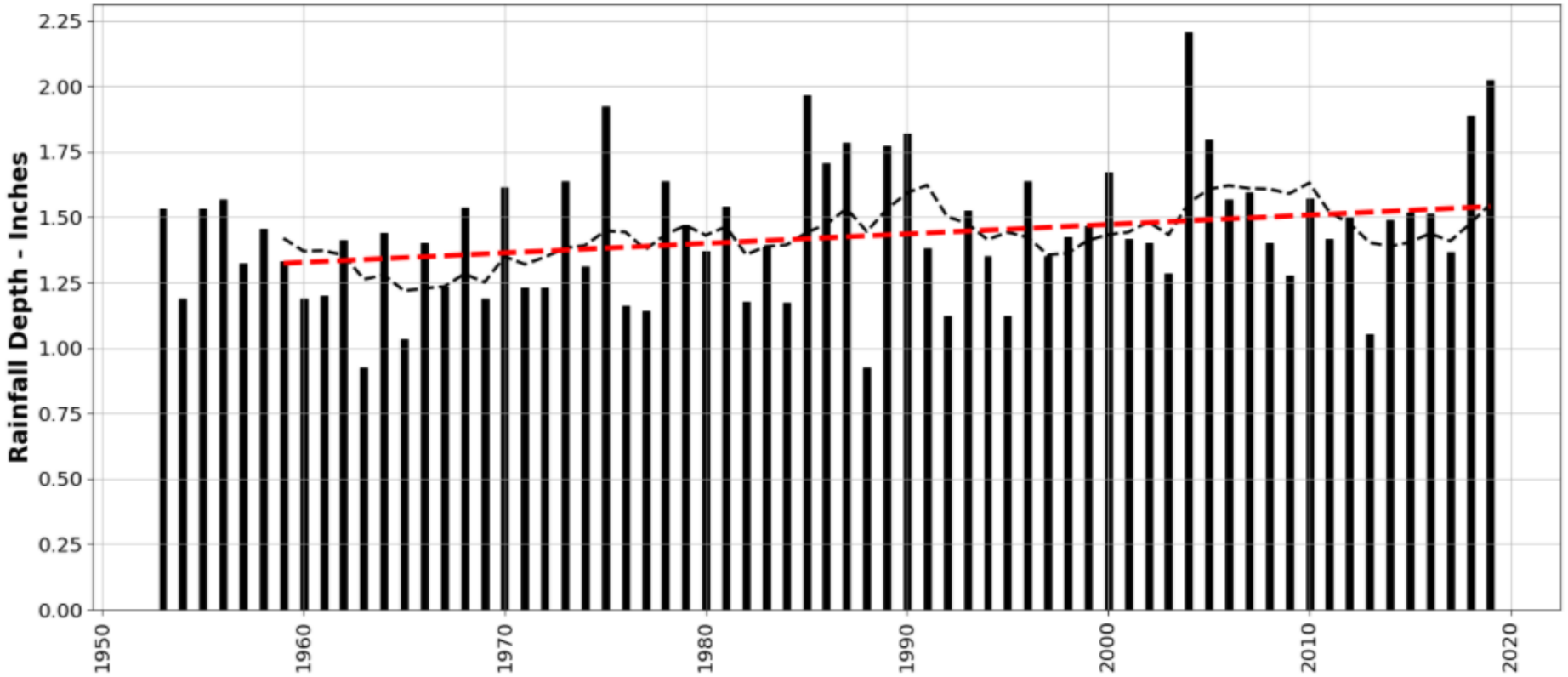
Peak flow rate for the post development using 2100 future climate change rainfall projection shall not exceed peak flow rate for the pre-development using NOAA Atlas 14 for the 1 through 100-year, 24 hour rainfall events.

Purpose:
Public Health and Safety

Stormwater Management Requirements

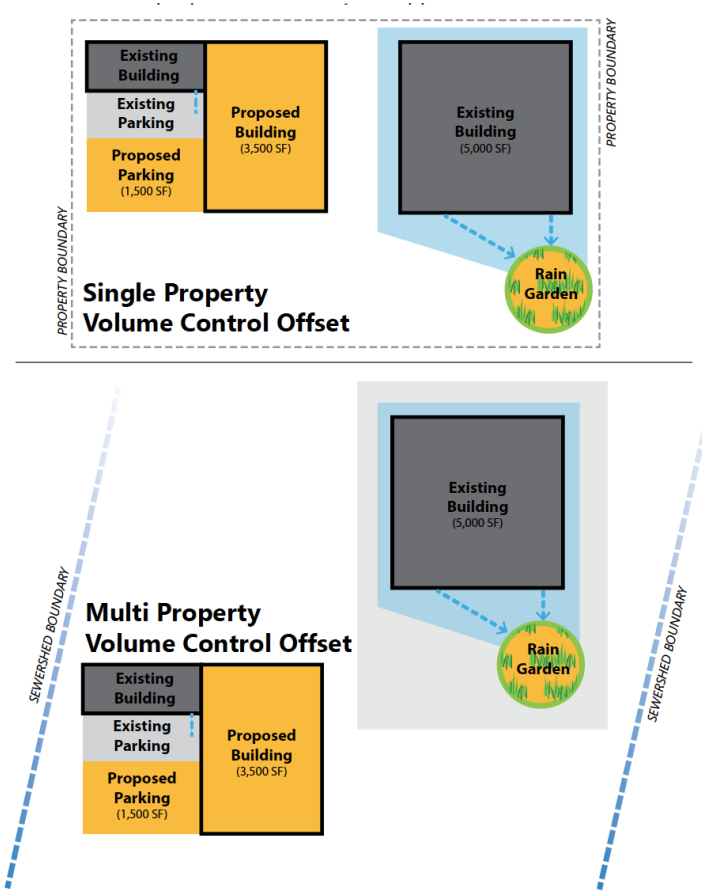
Design storm sizing requirements

Volume Control – 95th Percentile 2100 Future Projection 1.66-inches



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.



See Design Manual section 2.2.a.iv. and Title 13 section 1303.03(c)3 for more details.

Infiltration Testing + BMP Siting Guidance

- Infiltration is prohibited in the following locations without technical justification from a qualified professional:
  - Landslide Prone Overlay District
  - BMP placements with steep slopes greater than 15% or within 100 feet of steep slopes greater than 25% or within 200 feet of steep slopes greater than 50%.
  - Development sites 200 feet upgradient from a documented historic landslide.
  - Undermined Area Overlay District

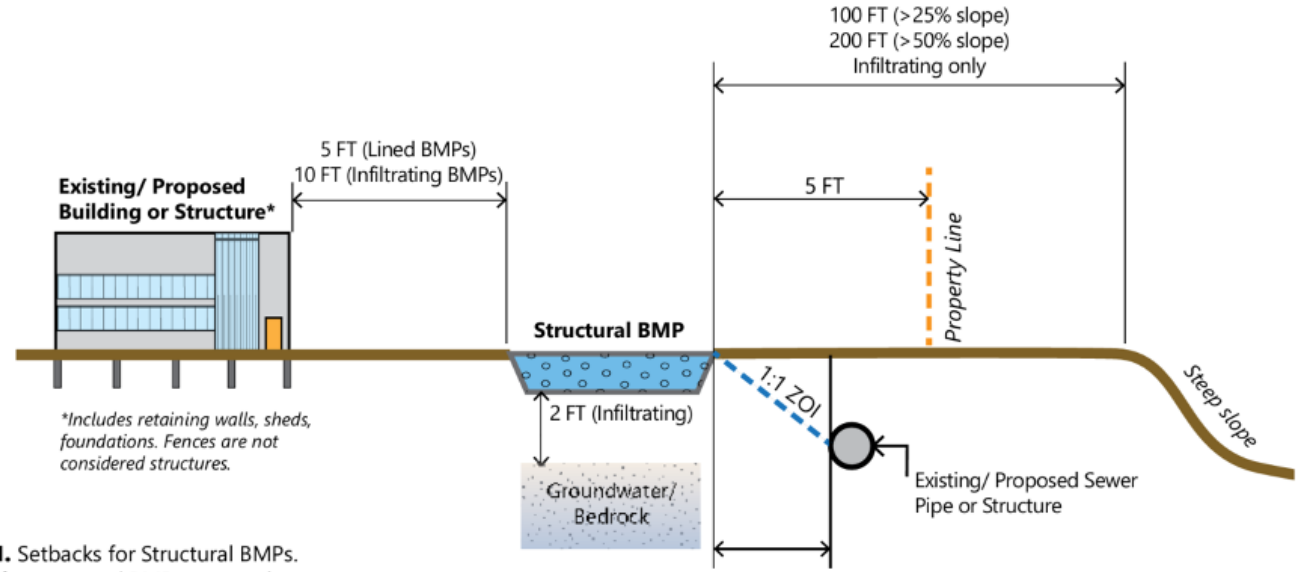


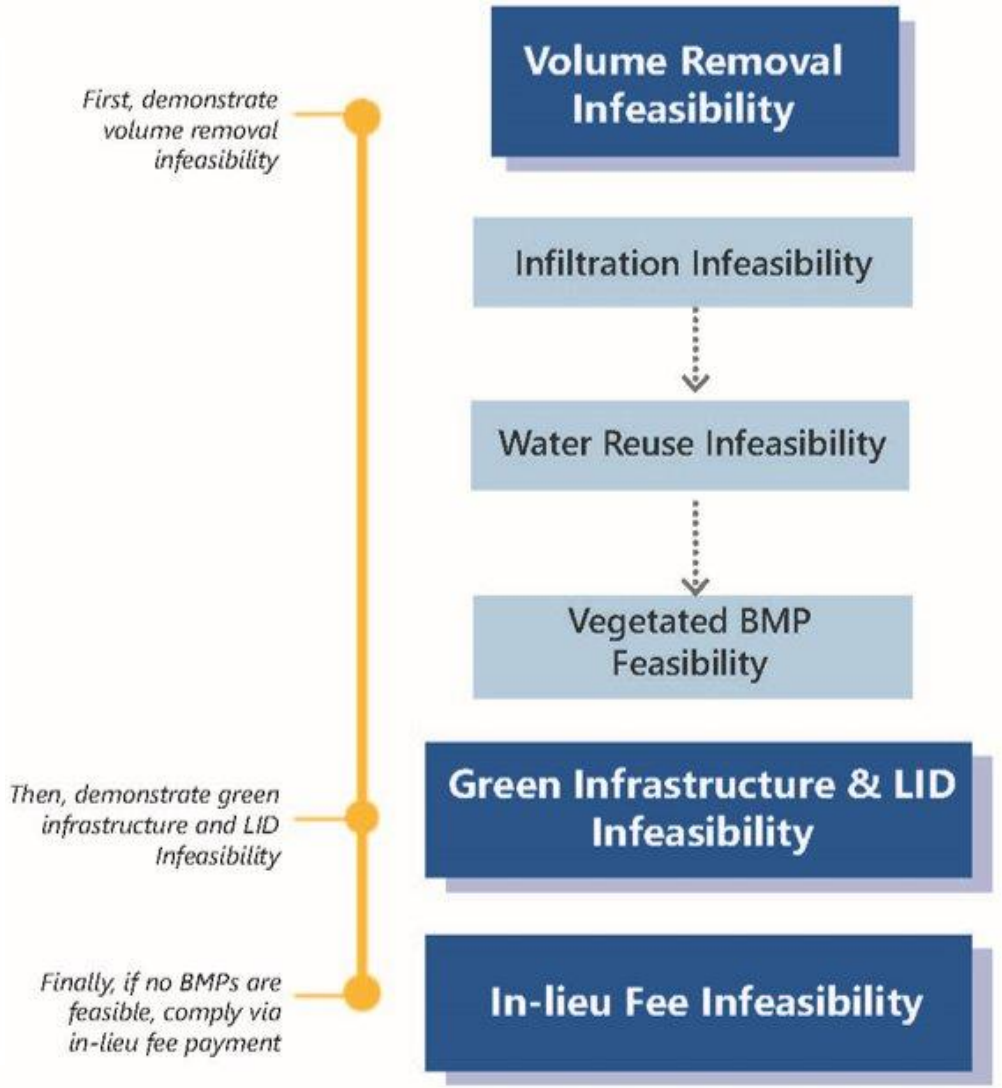
Figure 4.1. Setbacks for Structural BMPs. Setbacks for structural BMPs ensure that BMPs are placed in locations where they can perform optimally and pose the least risk to existing infrastructure.

See Design Manual section 3.4 and Appendix B or more details.

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.



See Design Manual section 3.6 for more details.

New Application and Review Process

Administrative and Process Changes

- Two-step stormwater management plan approval process
- Expedited five-day review for projects using preferred practices
- New Stormwater Permit requirement
- PLI's inspection and enforcement program

Application Process

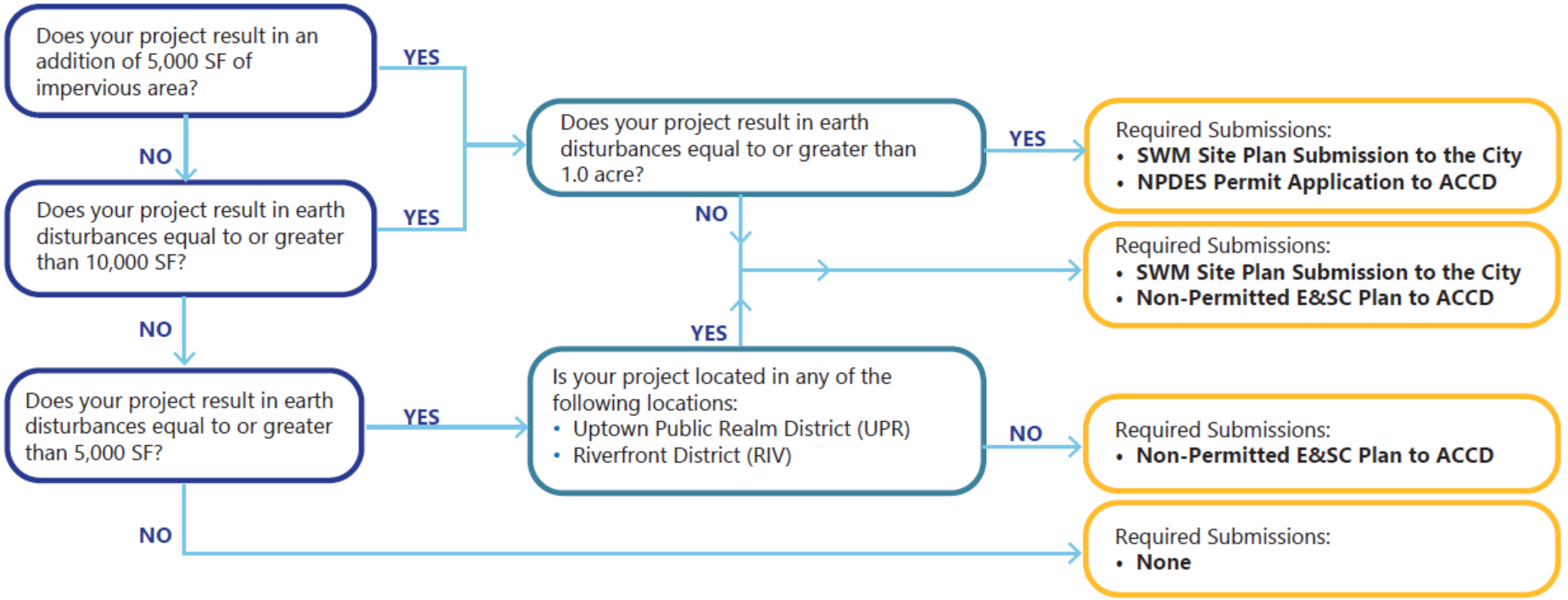


Figure 2.1. Regulated Activities and Required Submissions Flow Chart

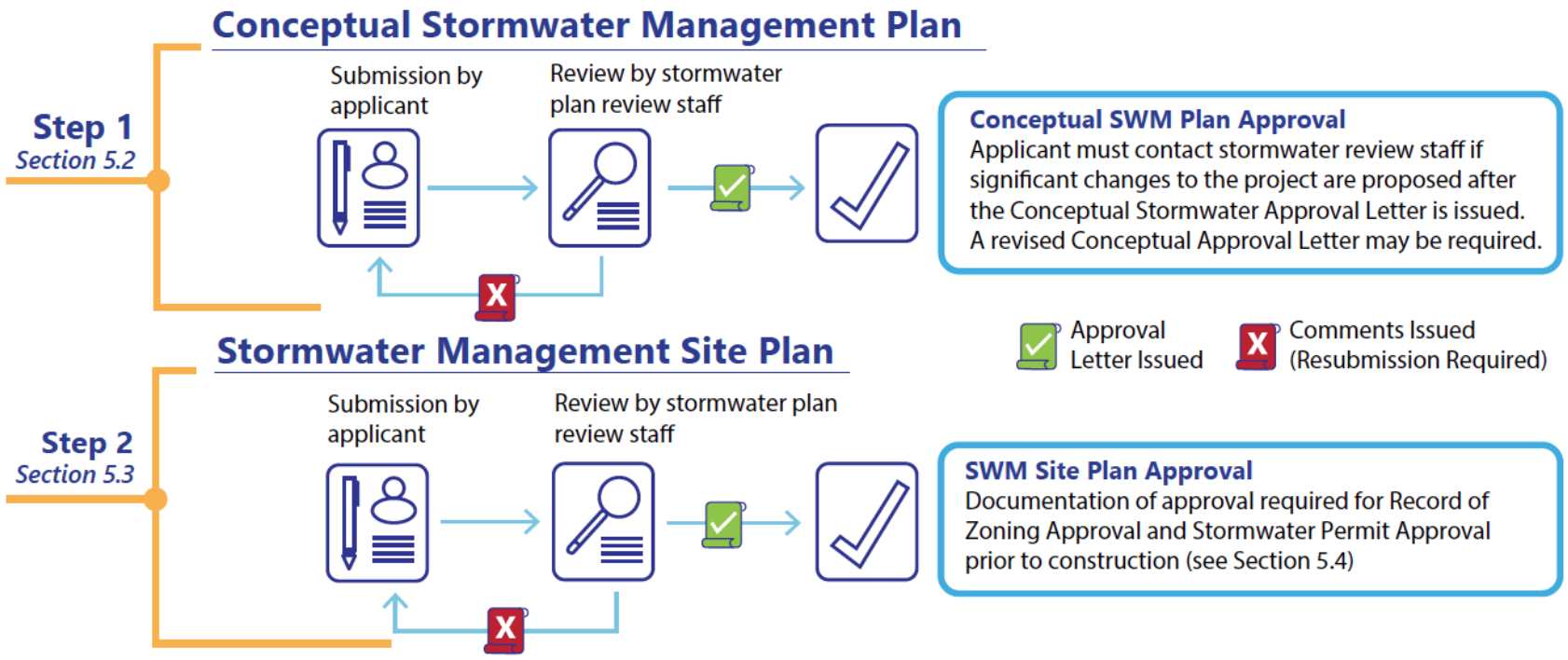
See Design Manual section 2 and 5 and Title 13 section 1304.01 for more details.

New PLI Stormwater Permit

- Apply through OneStopPGH
  - Concurrent with first ZDR submission
  - After Zoning pre-app is complete and preliminary/conceptual plans are complete
  - After meeting with PWSA for a pre-development meeting
- Fee based on cost of BMP construction
  - This can be edited at time of construction
  - PLI Fee calculator
- Valid for 5 years after issuance

See Design Manual section 5.4 and Title 13 section 1304.08 for more details.

SWM Plan Application Process



See Design Manual section 5 and Title 13 section 1304.01 for more details.

Application/Review Process

Phase I: conceptual review - $500 review fee

- First step is to submit a stormwater permit application through OneStopPGH
- The first submission will be for conceptual review
- 15-day review period
- Iterative process
  - Plan Review Summary from OneStopPGH will provide comments/revisions required
- Work with DCP staff to gain approval – this will all live in OneStopPGH.
  - Also sent over email. (Plan Review Summary will say Approved with Conditions)
- Once approved DCP will provide details for site plan/technical submission.
- Cannot approve until ZDR passes Initial Review.

See Design Manual section 5.2 and Title 13 section 1304.02 for more details.

Application/Review Process

Phase II: site plan review – fee based on cost of BMP construction

- Submit required docs through OneStopPGH
- 45-day review period
- Iterative process
  - Plan Review Summary from OneStopPGH will provide comments/revisions required
- Work will PLI staff to gain approval – this will all live in OneStopPGH
  - Also sent over email. (Plan Review Summary will say Approved)
- Once approved a SW permit will be granted.

See Design Manual section 5.3 and Title 13 section 1304.03 for more details.

Appeals

- Conceptual review appeals can be made to the Zoning Board of Adjustment.
  - Includes a $500 fee
  - The applicant should work with their DCP environmental plan reviewer to schedule this hearing.
  - Requires a ZDR to be submitted.
- Applicants can seek a variance from the Board of Appeals for decisions related to the site plan review process.
  - The PLI appeals process can be found here.

See Title 13 section 1308.05 for more details.

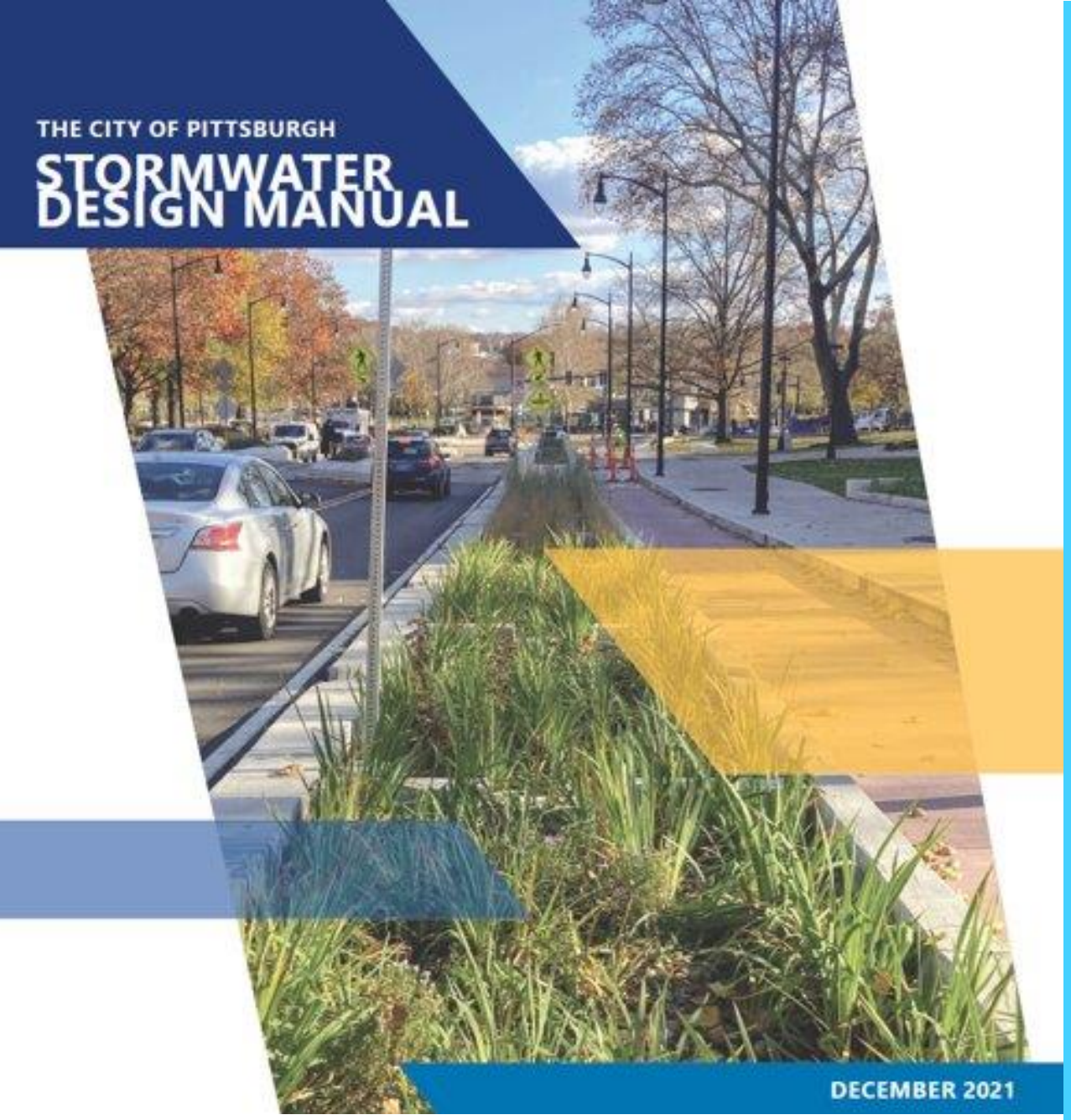
Inspections

PLI Stormwater Inspectors will perform three inspections of BMPs:

1. Pre-construction
   - review scope of work, construction sequencing, and inspection schedule
2. Underground
   - after trenches or ditches are excavated and bedded, piping installed, and before any backfill is put in place
3. Final
   - after the stormwater management system is complete and is ready for service

All inspections must be requested by the Permit Holder.

See Design Manual section 6.6 and Title 13 section 1304.10 for more details.



Design Manual and New Resources

Design Manual

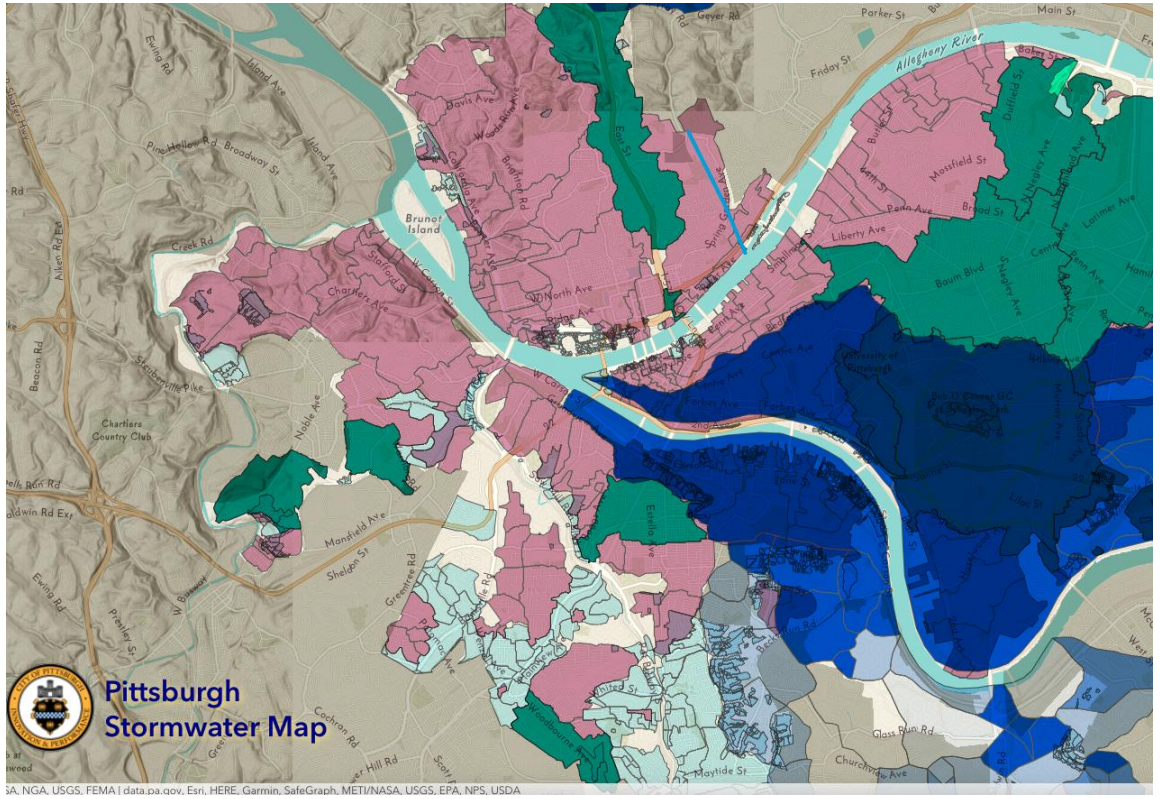
- Technical supplement to City Code
  - Can be amended based on feedback from stakeholders
- Primary audience:
  - Engineers
  - Design professionals

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 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/

Stormwater Map

Layer	Source	Open Data or Other Link
Riverfront Uptown Public Realm Zoning	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/zoning/explore?location=40.430846%2C-79.979819%2C12.76
Steep Slopes	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/25-or-greater-slope/explore?location=40.431325%2C-79.980725%2C12.74
Landslide Prone	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/194cdce70d084b7e893653dece2de0bd_0/explore?location=40.437813%2C-79.986794%2C12.89
Undermined Areas	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/428f48cd3ba540339ab3d2afc94d65a9_0/explore?location=40.429490%2C-79.968416%2C12.80
Watersheds	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/pgh-watersheds/explore?location=40.431284%2C-79.980796%2C12.89
City Limits	City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/a99f25fffb7b41c8a4adf9ea676a3a0b_0/explore?location=40.430838%2C-79.979816%2C12.76
Floodplain	FEMA/City	https://pghgishub-pittsburghpa.opendata.arcgis.com/datasets/2014-fema-flood-zones/explore?location=40.425406%2C-79.988203%2C12.86 ; https://www.fema.gov/flood-maps/national-flood-hazard-layer
Tree Canopy	County	https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1235
Combined Sewer Areas	PWSA	Combined Sewershed - Datasets - WPRDC
PADEP Impaired Waters	PADEP	https://newdata-padep-1.opendata.arcgis.com/documents/2022-integrated-report-restoration-priorities-data/about
MS4 Areas	PADEP	https://gis.dep.pa.gov/ms4/index.html

References & Resources

Cook, L.M., McGinnis, S. & Samaras, C. The effect of modeling choices on updating intensity-duration-frequency curves and stormwater infrastructure designs for climate change. Climatic Change 159, 289–308 (2020). https://doi.org/10.1007/s10584-019-02649-6

Jordan R. Fischbach, Michael T. Wilson, Craig A. Bond, Ajay K. Kochhar, David Catt, Devin Tierney Managing Heavy Rainfall with Green Infrastructure: An Evaluation in Pittsburgh's Negley Run Watershed, Santa Monica, Calif.: RAND Corporation, RR-A564-1, 2020. As of December 05, 2020: https://www.rand.org/pubs/research_reports/RRA564-1.html

City Stormwater Code & Ordinance Review and Update information page:
https://engage.pittsburghpa.gov/stormwater-code

PWSA Stormwater information:
https://www.pgh2o.com/your-water/stormwater
https://www.pgh2o.com/your-water/stormwater/stormwater-fee
https://www.pgh2o.com/your-water/stormwater/stormwater-fee/stormwater-credit-program
https://www.pgh2o.com/your-water/stormwater/stormwater-fee/stormwater-fee-finder
https://pwsa.maps.arcgis.com/apps/webappviewer/index.html?id=df39e93b5a0e403f8a29889a42125edc

Reporting Basement Backups and Flooding

- *Call PWSA's 24/7 Emergency Dispatch (412) 255-2423*
- *Dispatch uses intake form to collect information from caller*
- *Send crews to investigate*
- *Use data to inform future projects*

James J. Stitt
Sustainability Manager
jstitt@pgh2o.com

For more information, please visit www.pgh2ostormwater.com