



Pittsburgh Water & Sewer Authority
Green First Plan

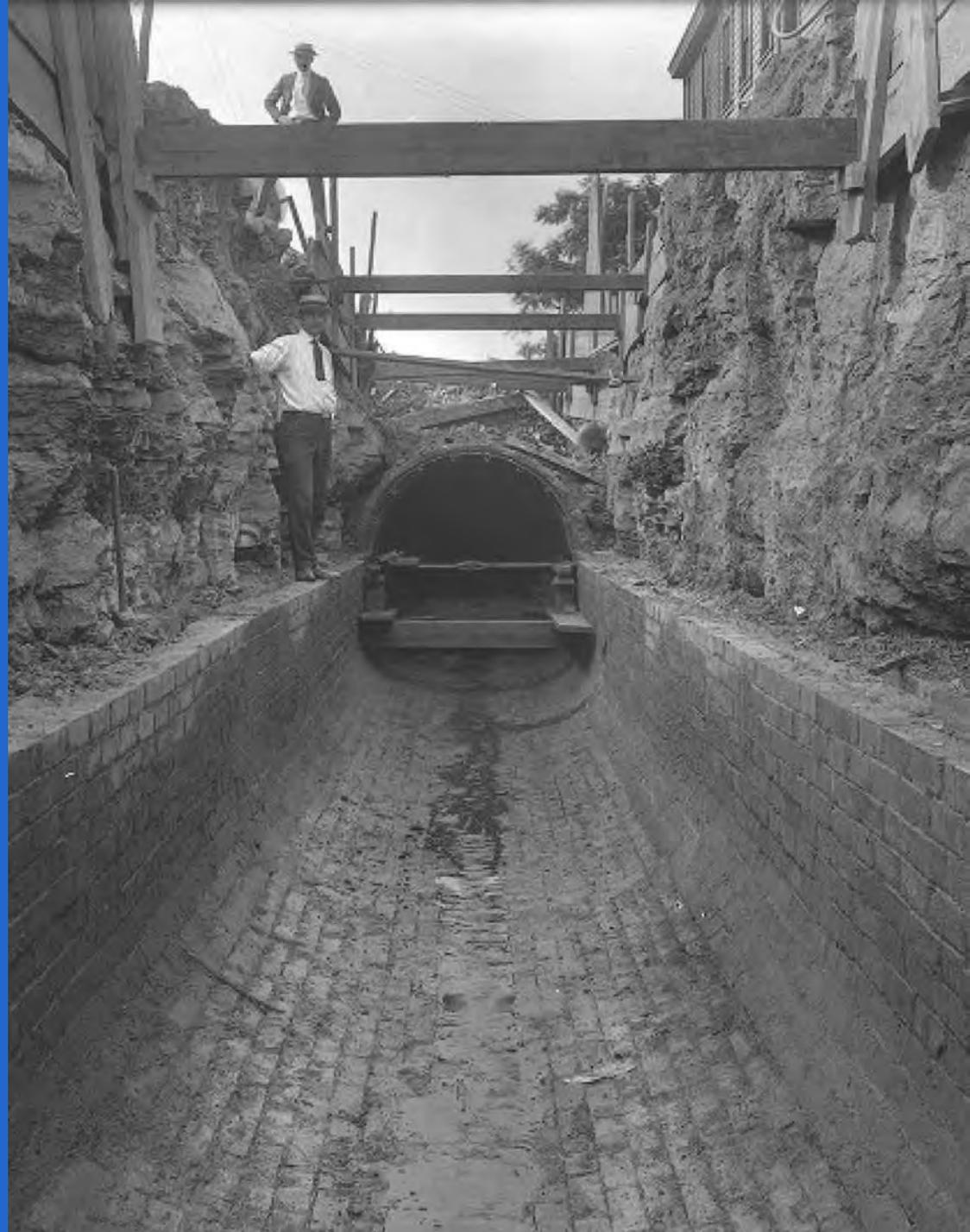
July 2018

Christine Mondor , evolveEA

Megan Zeigler , PWSA



At the turn of the 20th century, Pittsburgh embarked on its biggest infrastructure improvement campaign, building sewers, water lines, roads, power lines that created the city we know today.



We used to think...
Move the water away quickly



We solved our stormwater and waste issues with a single system.



The system functions differently in dry weather than when it rains.

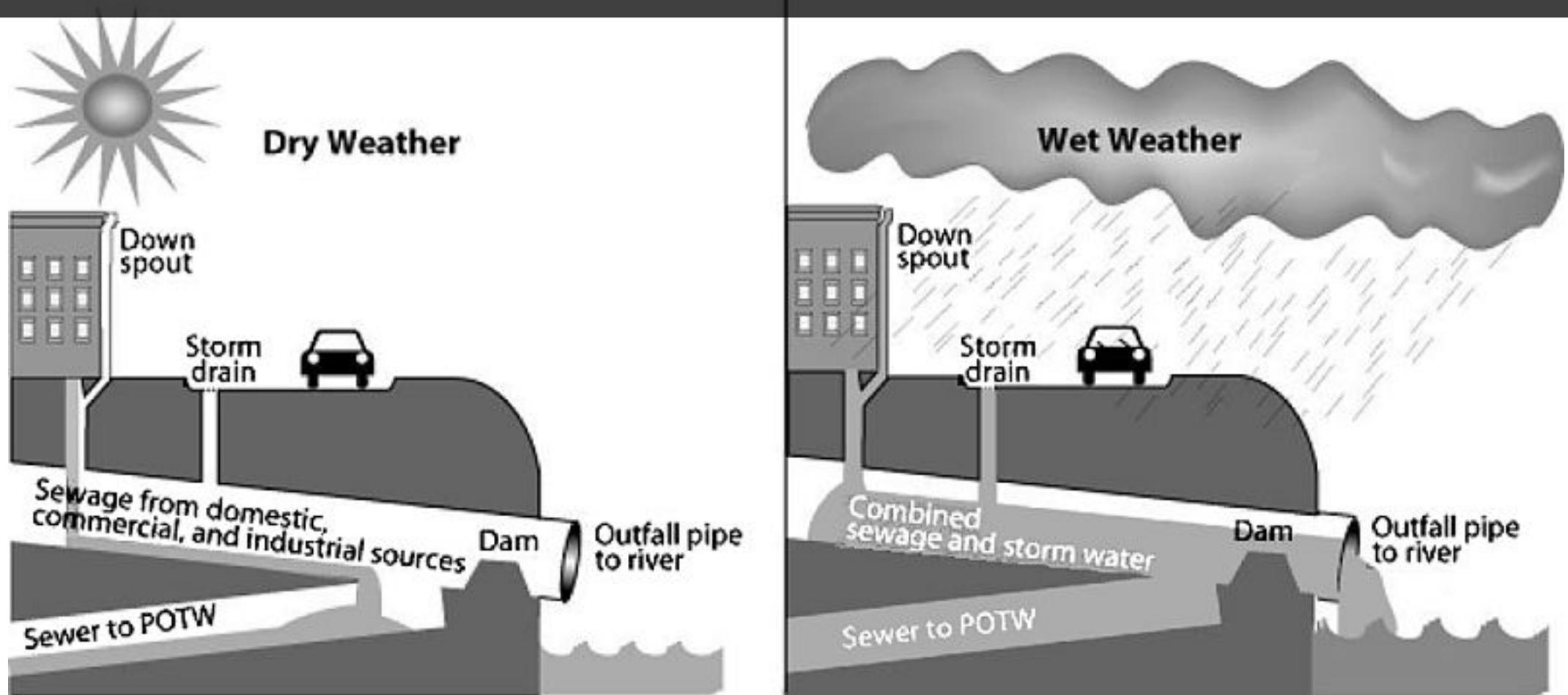


Image: US Environmental Protection Agency

The Clean Water Act requires us
to address our overflows.



Image: 3 Rivers Wet Weather

We need to create
next century
green infrastructure.



Pittsburgh's stormwater story

1 CITY

3 RIVERS

365 DAYS

PW SA's Clean & Green Plan

PGH₂O



The Clean & Green Infrastructure Assessment is the map to our future vision.

The purpose of the City -Wide Assessment is to create a “Green First” approach to regulatory compliance that

PEOPLE increases resiliency and minimizes hazards

PLANET improves our rainwater system functioning

PLACE enhances urban environments

PERFORMANCE stimulates economic growth



We began our
planning in areas
where green
infrastructure can
be most effective.



We evaluated the system capacity evaluations found that green is a key part of a broader solution.



We are attentive
to a number of
related stormwater
issues.

Image: Stream Inflow in Allegheny Cemetery,

evolveE A

PGH₂O



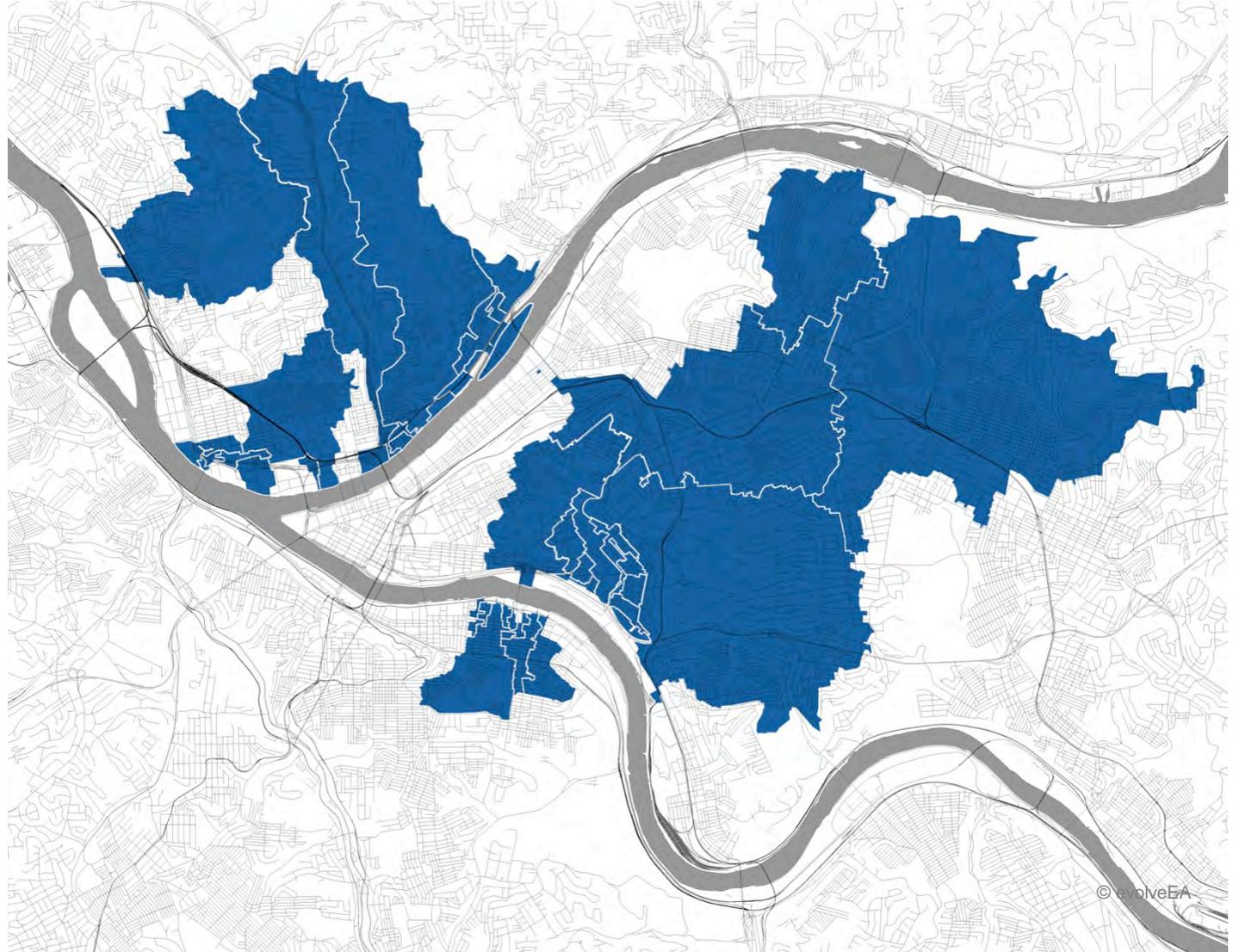
We looked for the most effective projects and systems that would provide community benefit in each shed.



The Clean & Green plan is **ENGINEERED**

We need to keep rainwater out of the system. We can be most effective by focusing efforts on the sheds that contribute the most to the system.

We identified the **top 30 sheds**

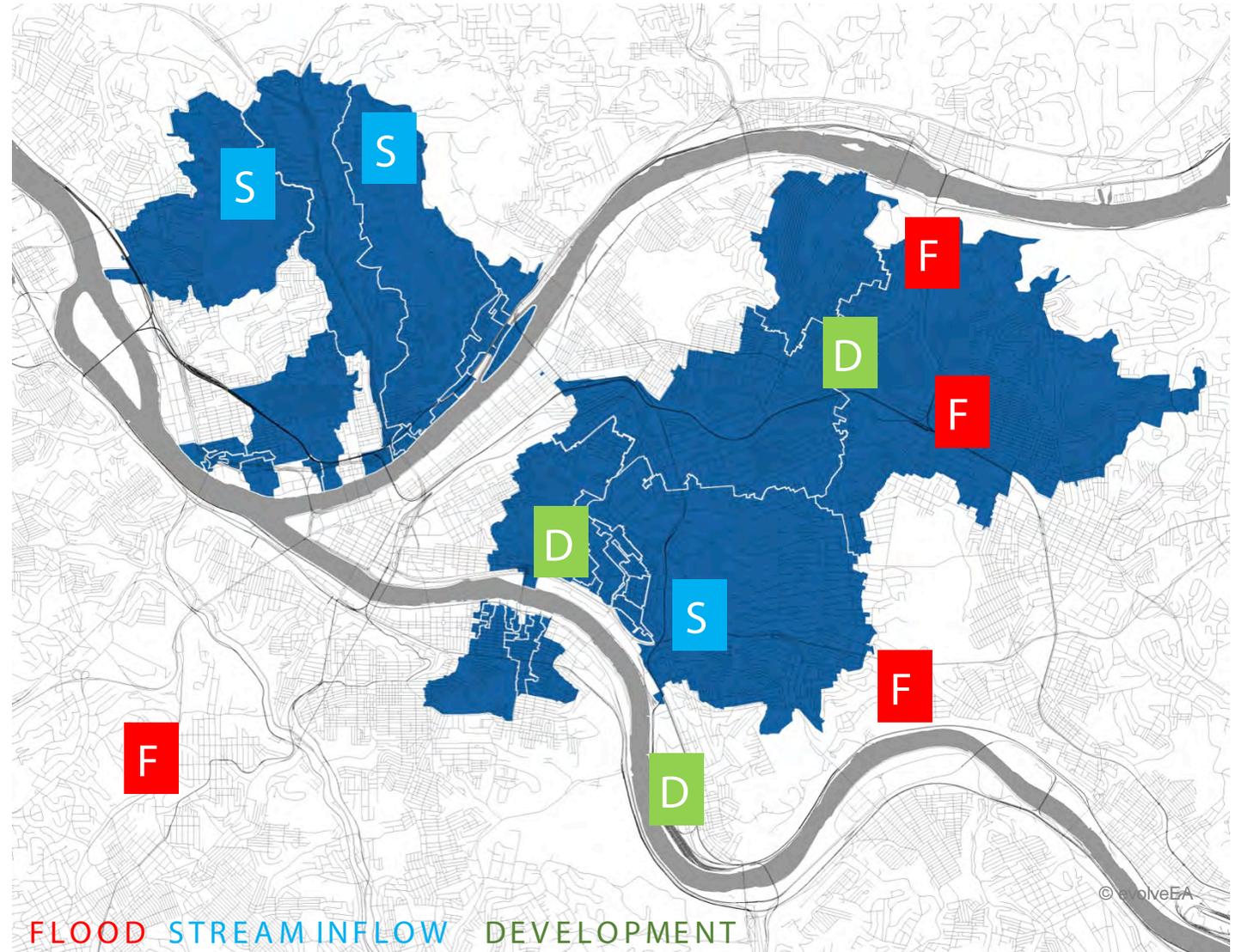


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We need to keep rainwater out of the system. We can be most effective by focusing efforts on the sheds that contribute the most to the system.

We identified the **top 30 sheds** and overlaid other criteria:

RISK	LOWER RISK
OPPORTUNITY	EASY TO IMPLEMENT
DEVELOPMENT	HIGH ACTIVITY
SYNERGIES	MULTIPLE BENEFITS



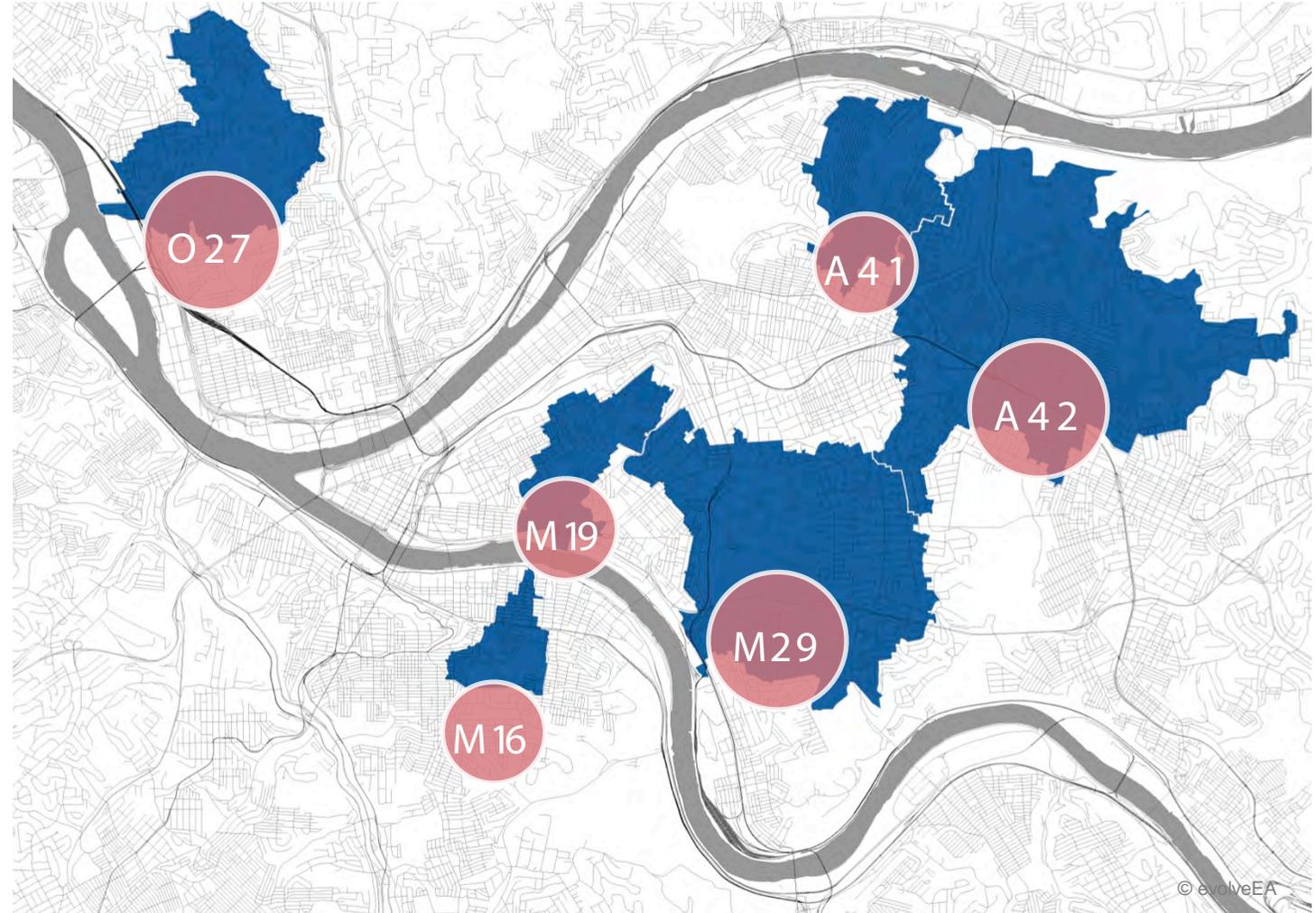
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and chose **6 priority sheds**

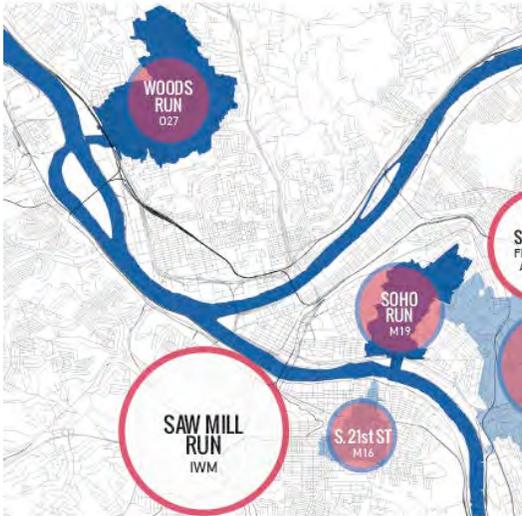


We are using a methodology that can be used across the city and the region.



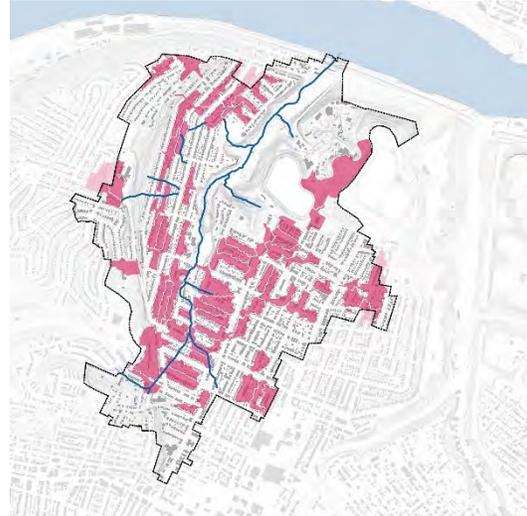
The Clean & Green plan WORKS AT DIFFERENT SCALES .

At the
**CITY-WIDE
SCALE** we are



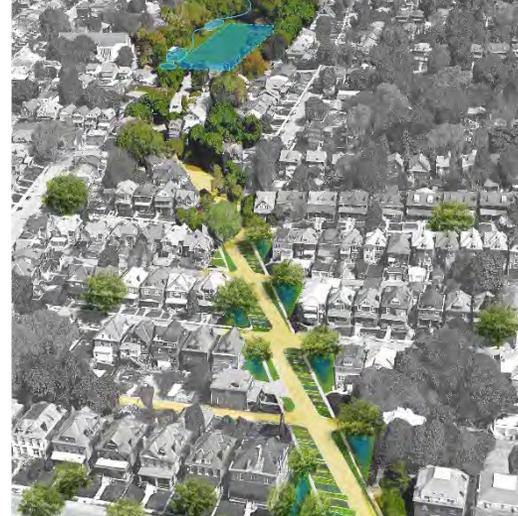
CREATING A CITY
WIDE MODEL,
POLICY, AND
FUNDING
STRATEGY

At the
**SEWERSHED
SCALE** we are



DEVELOPING
COMMUNITY
INFORMED
SEWERSHED
MASTERPLANS

At the
**PROJECT
SCALE** we are



IMPLEMENTING
PRIORITY
PROJECTS &
CONNECTED
NETWORKS

We need to embed
green infrastructure
in our communities.



Water has always determined
the identity of our neighborhoods.

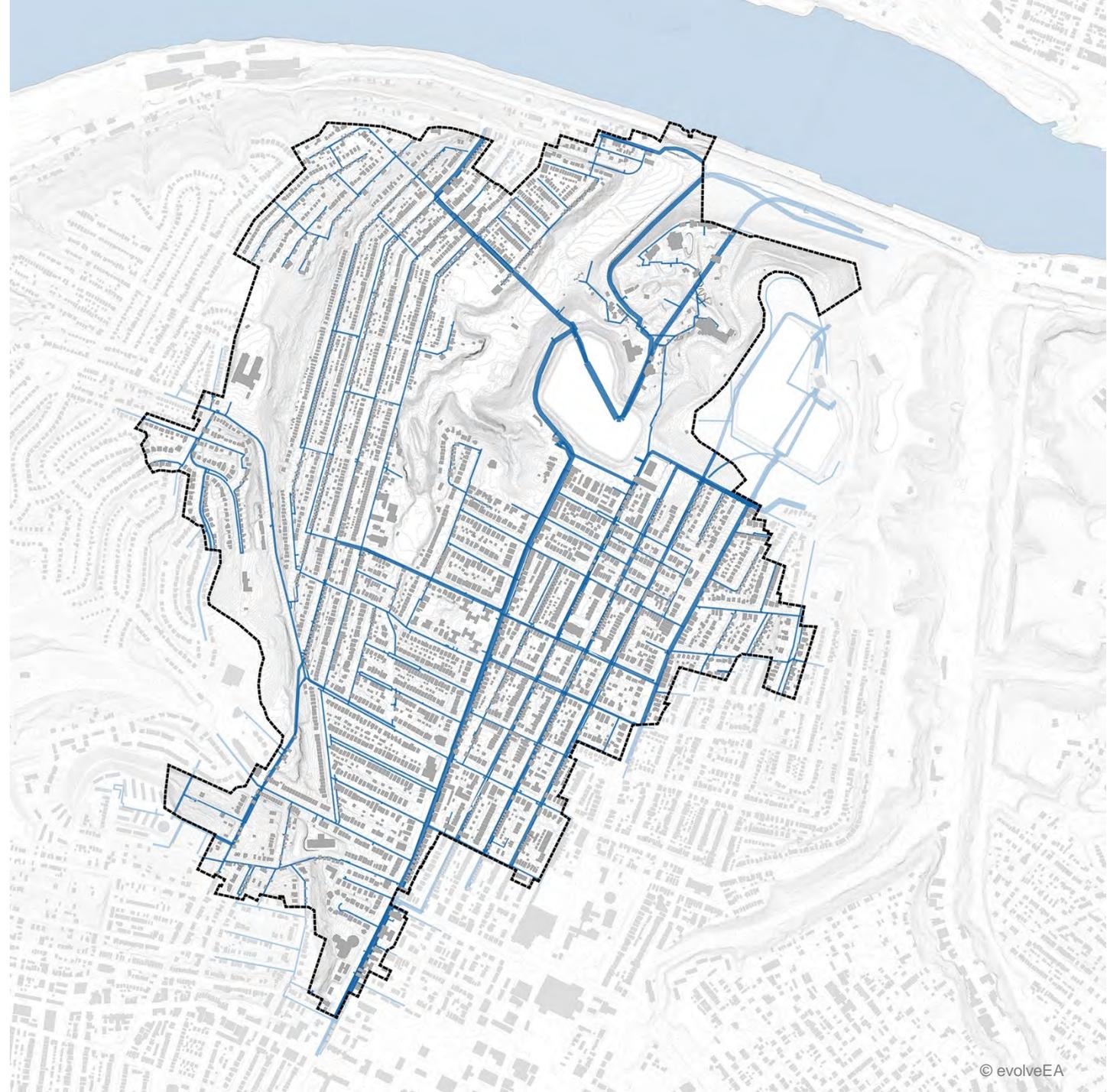


A41 HETH'S RUN SHED CAPTURE ANALYSIS

We investigated development patterns for each shed.

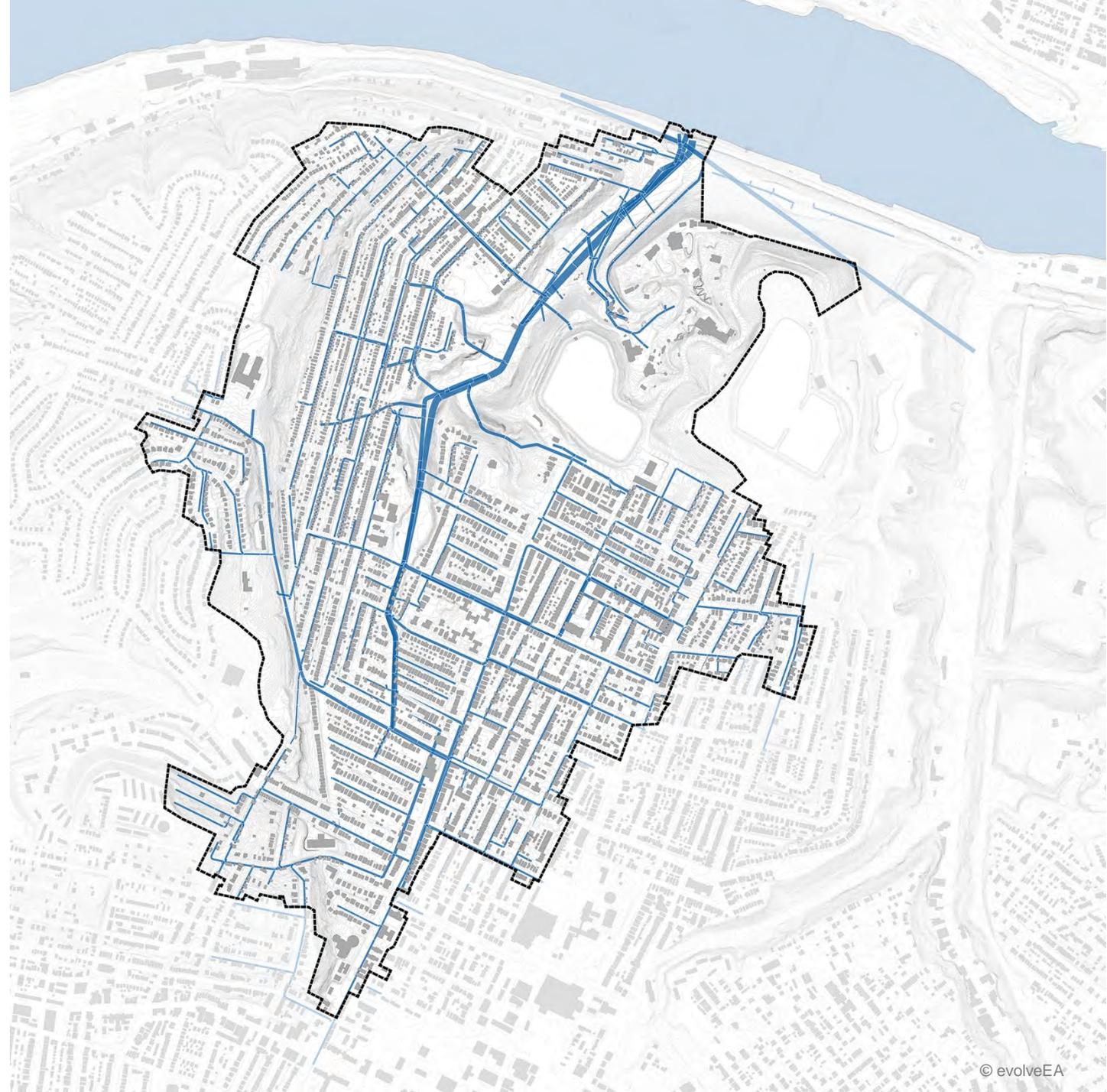


A41 HETH'S RUN SHED CAPTURE ANALYSIS



Water Lines

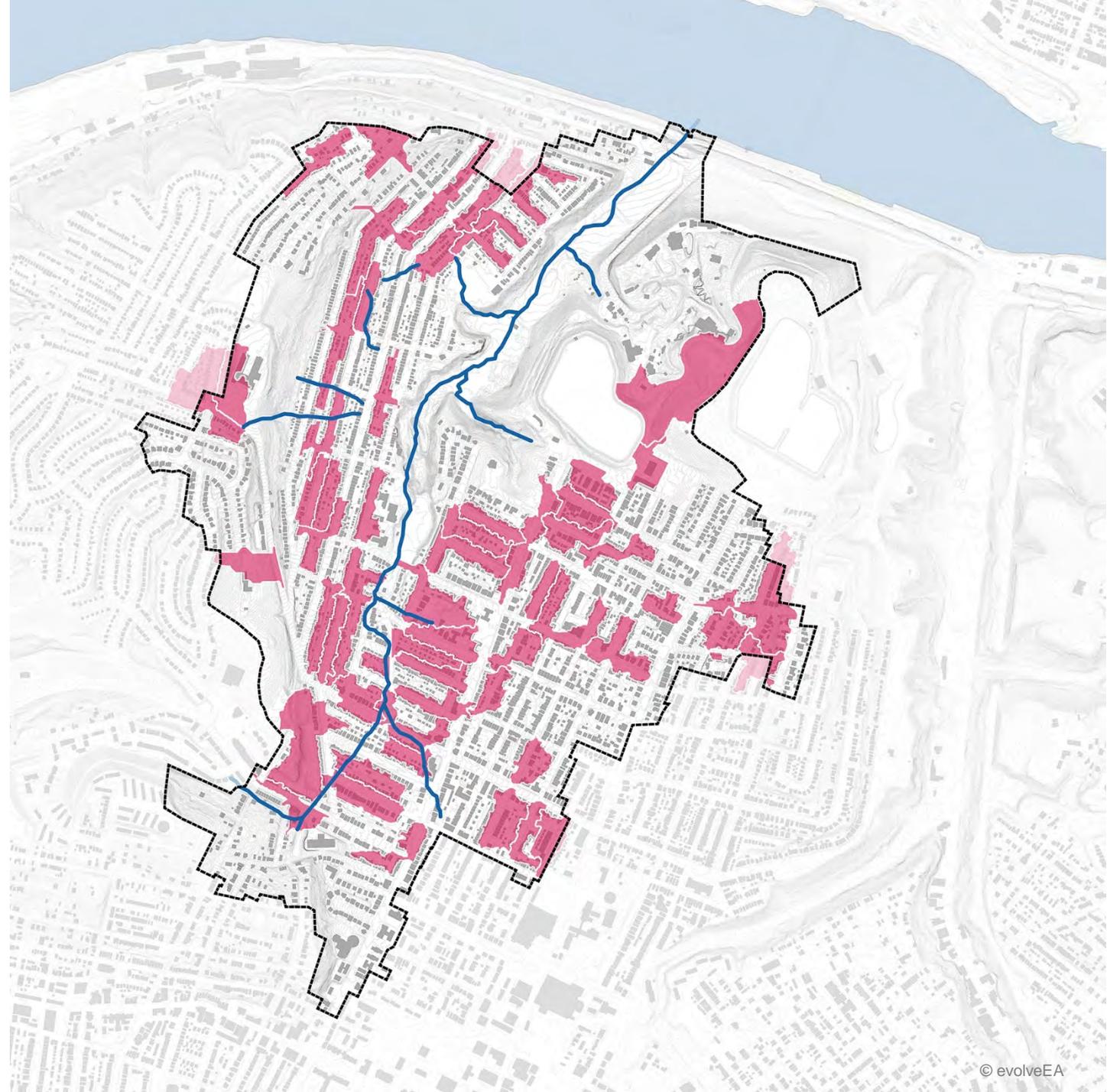
A41 HETH'S RUN SHED CAPTURE ANALYSIS



Sewer Lines

A41 HETH'S RUN SHED CAPTURE ANALYSIS

High capture areas were identified.



Historic Streams and Target Areas

A41 HETH'S RUN SHED CAPTURE ANALYSIS

High capture areas were identified.

Most sheds share a similar kit of parts:

STORAGE



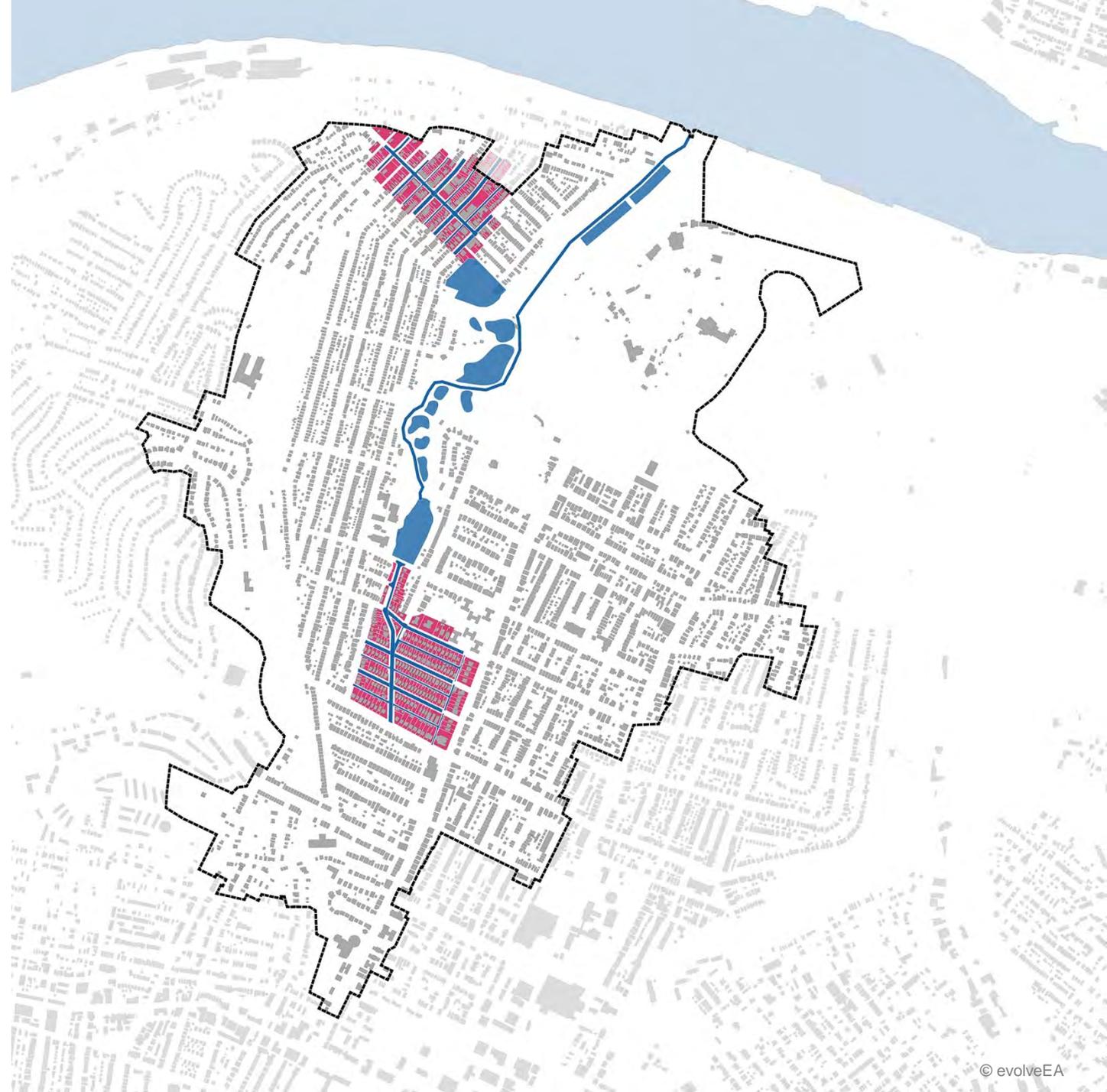
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STORAGE

CONVEY



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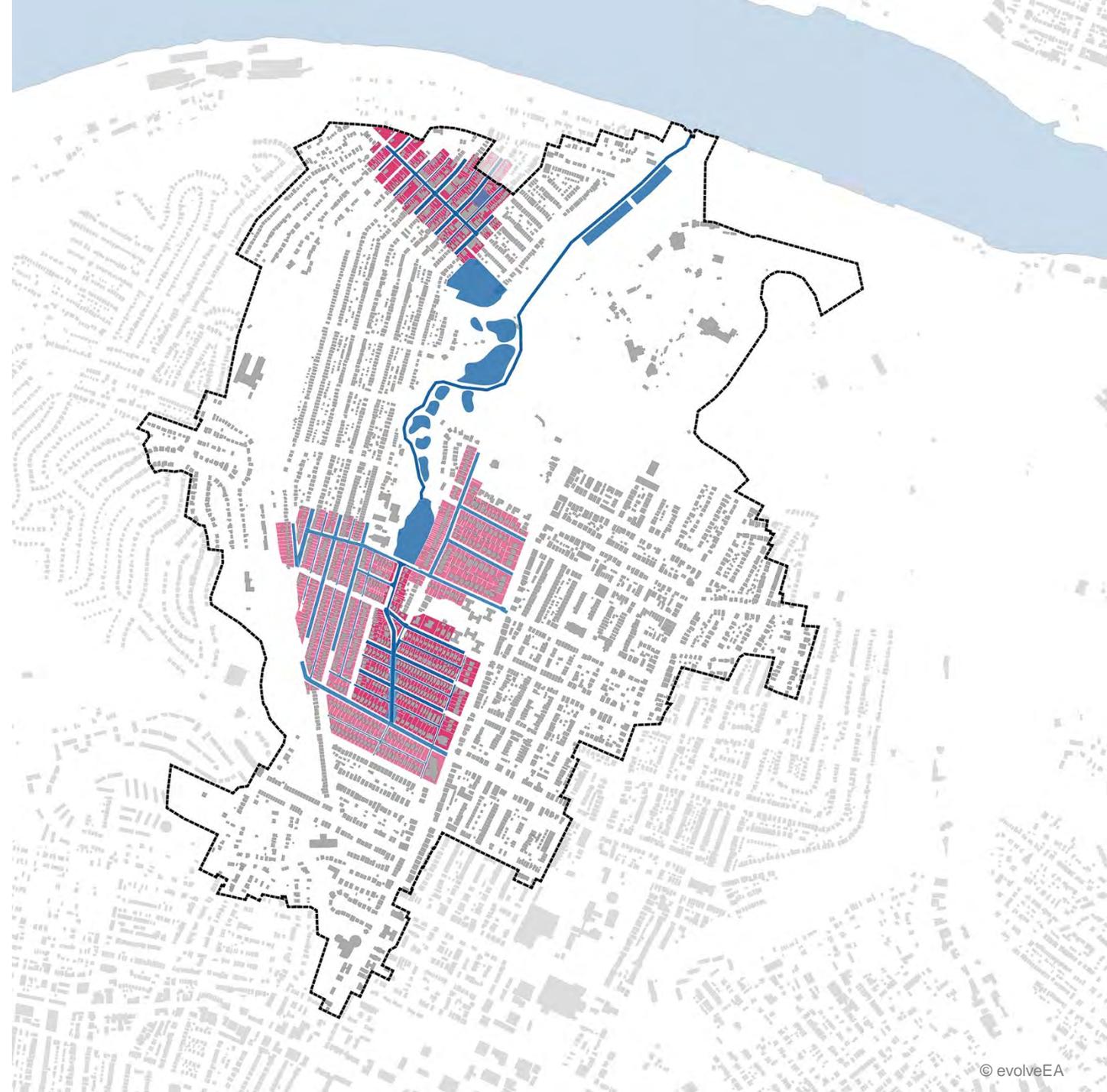
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CONVEY

CAPTURE



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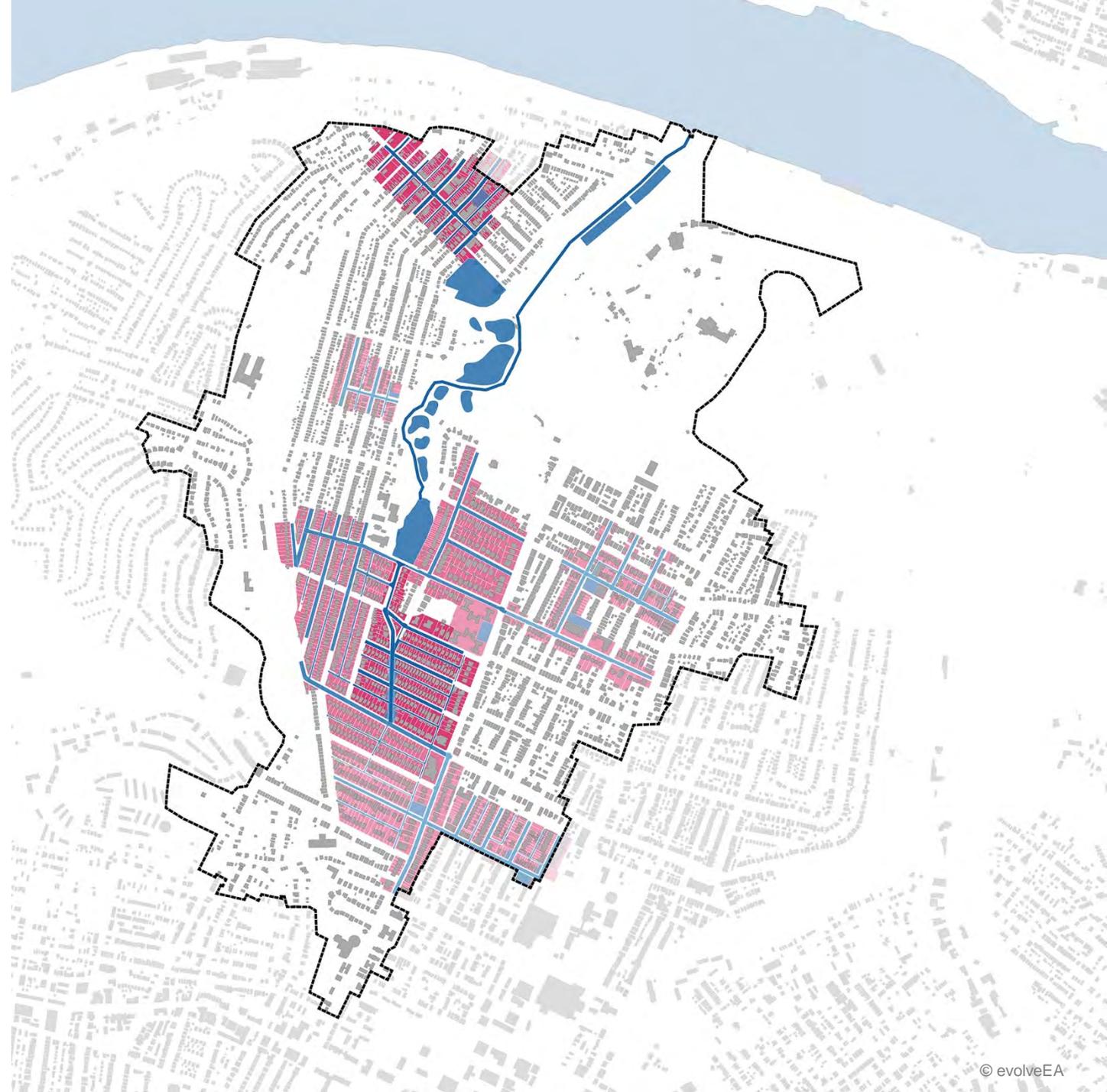
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working as a system.



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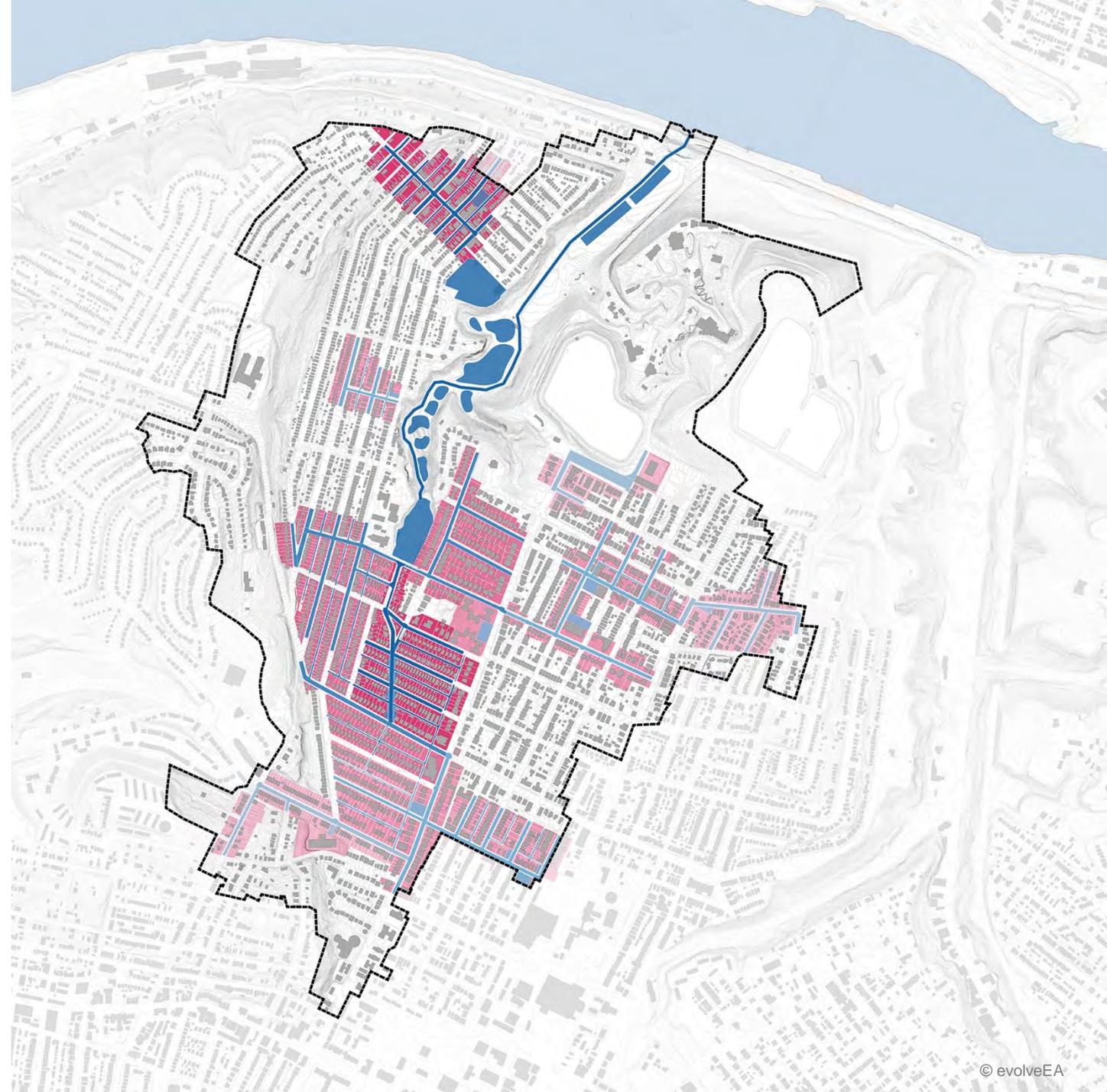
STORAGE

CONVEY

CAPTURE

working as a system.

These solutions can provide economic opportunity, increase safety and lower risk, and can dramatically [improve the places in our communities](#) .



This yields a series of STRATEGIES.

They align with larger city initiatives.



COMPLETE STREETS





COMPLETE STREETS



They can offer economic opportunity.



BIOSWALES

They can be part of ongoing maintenance.



GREEN ALLEYS



COMPLETE STREETS



BIOSWALES



They require interagency cooperation.



GREEN ALLEYS



IMPROVED STREETS



COMPLETE STREETS



BIOSWALES



SUBSURFACE STORAGE

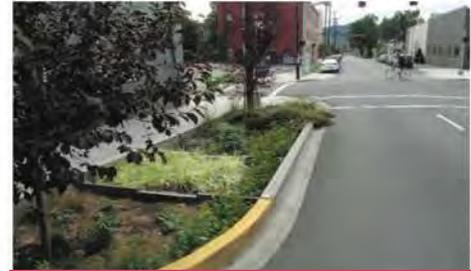


GREEN ALLEYS



COMPLETE STREETS

They create memorable civic spaces.



IMPROVED STREETS



BIOSWALES



SUBSURFACE STORAGE



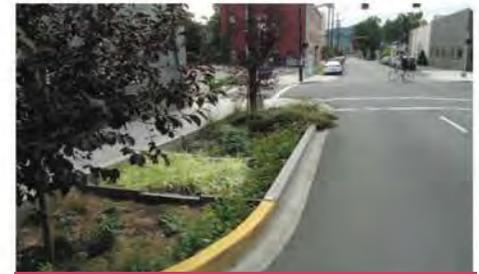
GREEN ALLEYS



COMPLETE STREETS



CONSTRUCTED WETLAND



IMPROVED STREETS



BIOSWALES

Created with public private partnerships.

Organizational
structure needs
to follow ...

Administration Model



GUIDING DOCUMENTS

CITY-WIDE PLAN

vision & goals
priority sheds

URBAN SHED PLANS

30,000*

shed performance targets & goals
urban design system schematic project typologies
design district designation
project identification

PROJECTS ON THE GROUND

resources and protocols needed for teams to implement include:

- project typologies
- development standards
- ordinances and codes
- GI "kit-of-parts"
- mou's and standardized agreements
- maintenance protocol
- training & workforce development programs and resources

STAKEHOLDERS

PWSA STORMWATER AUTHORITY

CITY-WIDE MANAGER & ENGINEERING

Manages city-wide model, regulatory reporting, and all sewershed managers. Technical expert driven.

PARTNERS

implement at all scales, including:

- short term & demonstration projects
- long term implementation projects
- education and training
- project monitoring
- project maintenance & stewardship



GUIDING DOCUMENTS

CITY-WIDE PLAN

vision & goals
priority sheds

URBAN SHED PLANS

30,000'

shed performance targets & goals
urban design system schematic project typologies
design district designation
project identification

IMPLEMENTATION PLAN

10,000'

standardized documentation of sewershed plans, including additional development of:

- ground truthing & inventory
- project prioritization
- economic modeling
- jurisdiction and existing plans
- partnership identification & community engagement
- conceptual design of major projects

PROJECTS ON THE GROUND

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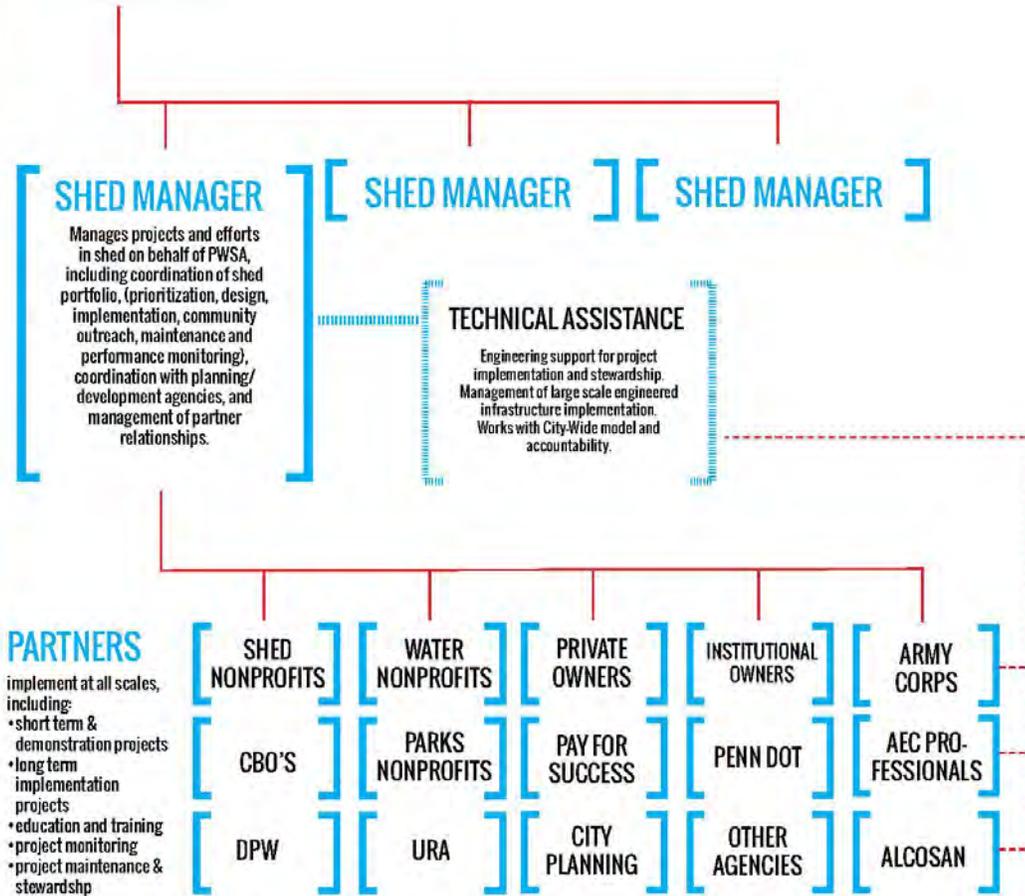
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How do we
integrate it into
other planning
processes?

M19 Soho Run



FIND THE NETWORK [4/4]



Runoff Parcels ■
Detention Sites + Conveyance Network ■

M19
SOHO RUN



OPPORTUNITIES FOR DISTRIBUTED DETENTION SITES

These sites are open spaces that exist throughout the M19 sewershed. By distributing the infrastructure for detention, the demand for conveyance infrastructure is reduced allowing for more daylight surface flows.

Detention Sites 
Detention Sites + Conveyance Network 

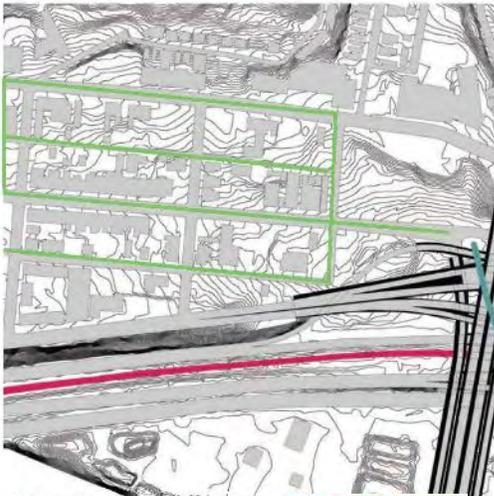
M19
SOHO RUN



GREEN CONVEYANCE CORRIDORS



Street side rain garden in State College, PA
Source: Borough of State College



M19
SOHO RUN

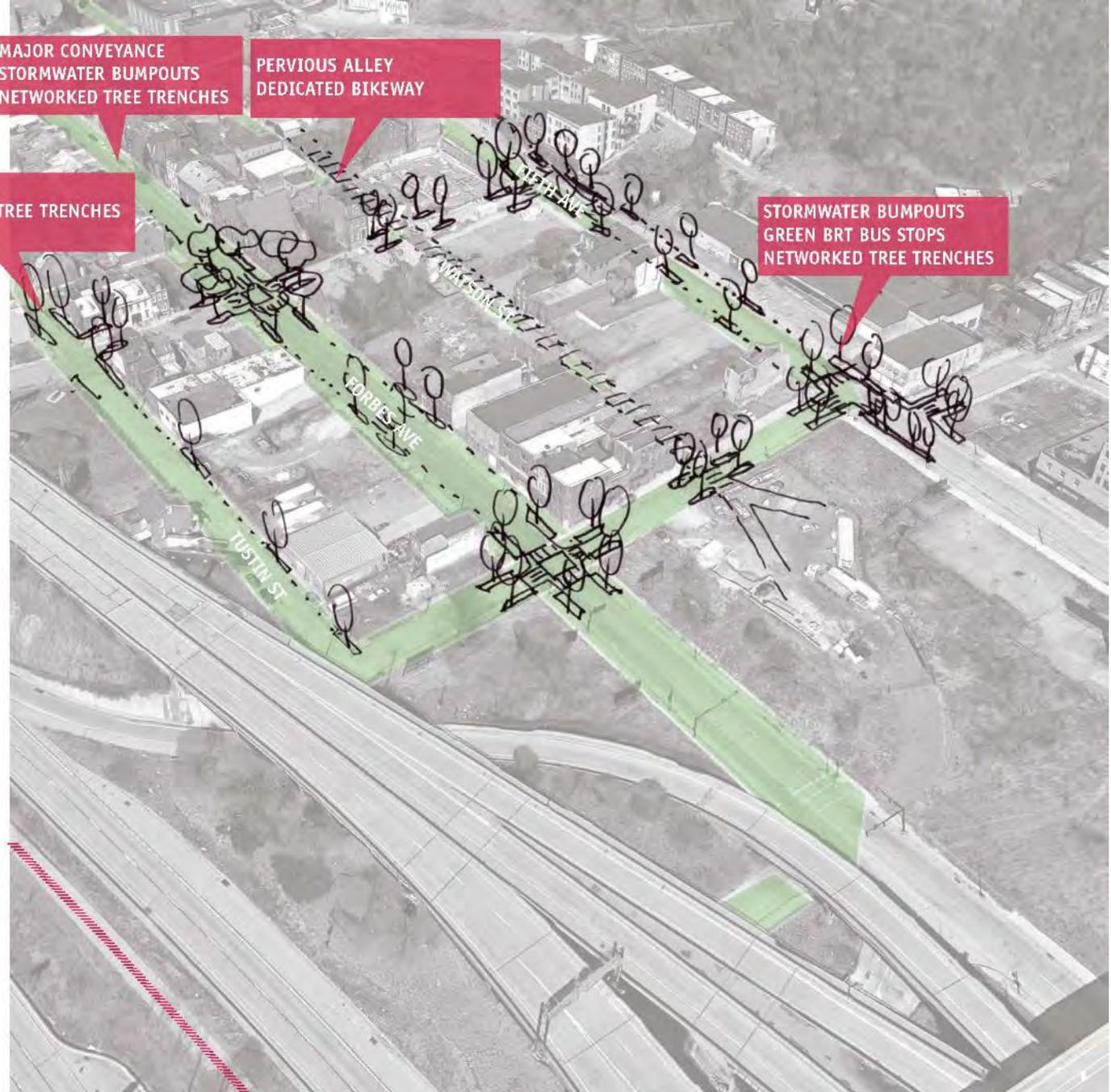


NETWORKED TREE TRENCHES

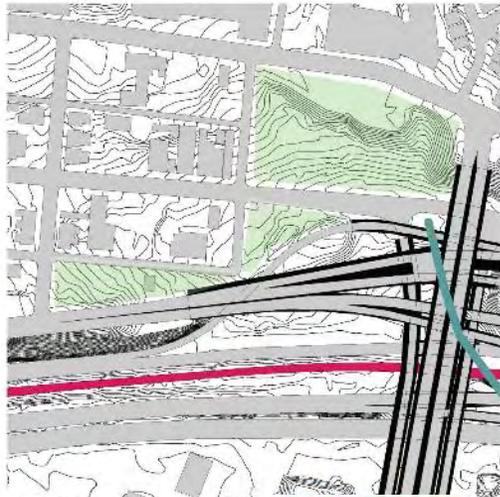
MAJOR CONVEYANCE
STORMWATER BUMPOUTS
NETWORKED TREE TRENCHES

PERVIOUS ALLEY
DEDICATED BIKEWAY

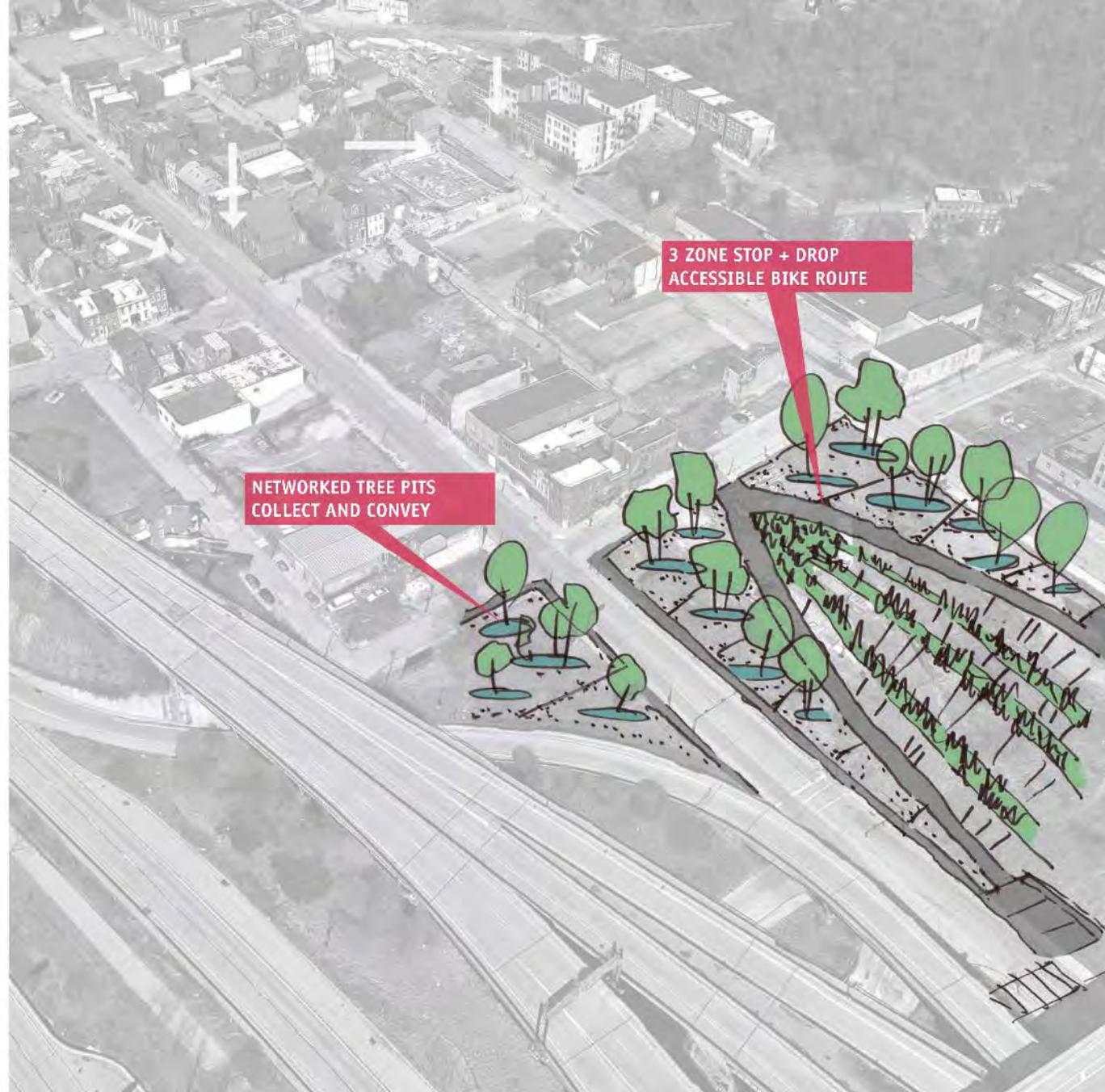
STORMWATER BUMPOUTS
GREEN BRT BUS STOPS
NETWORKED TREE TRENCHES



UPTOWN PORTAL PARK



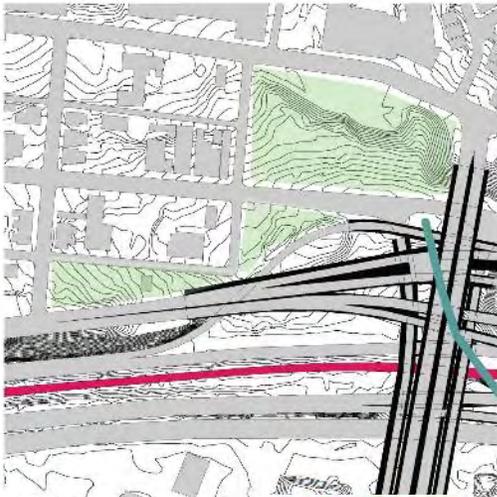
M19
SOHO RUN



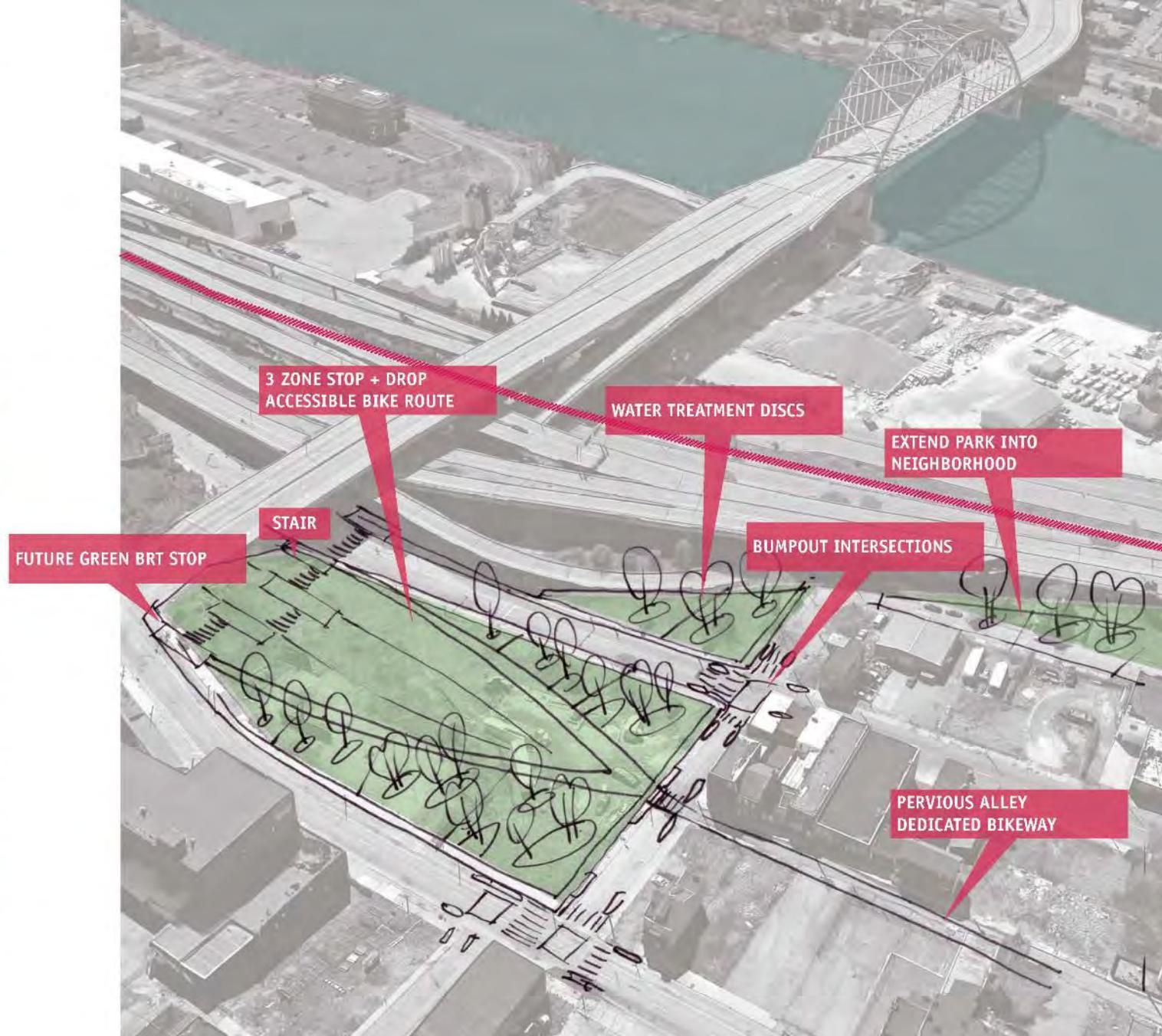
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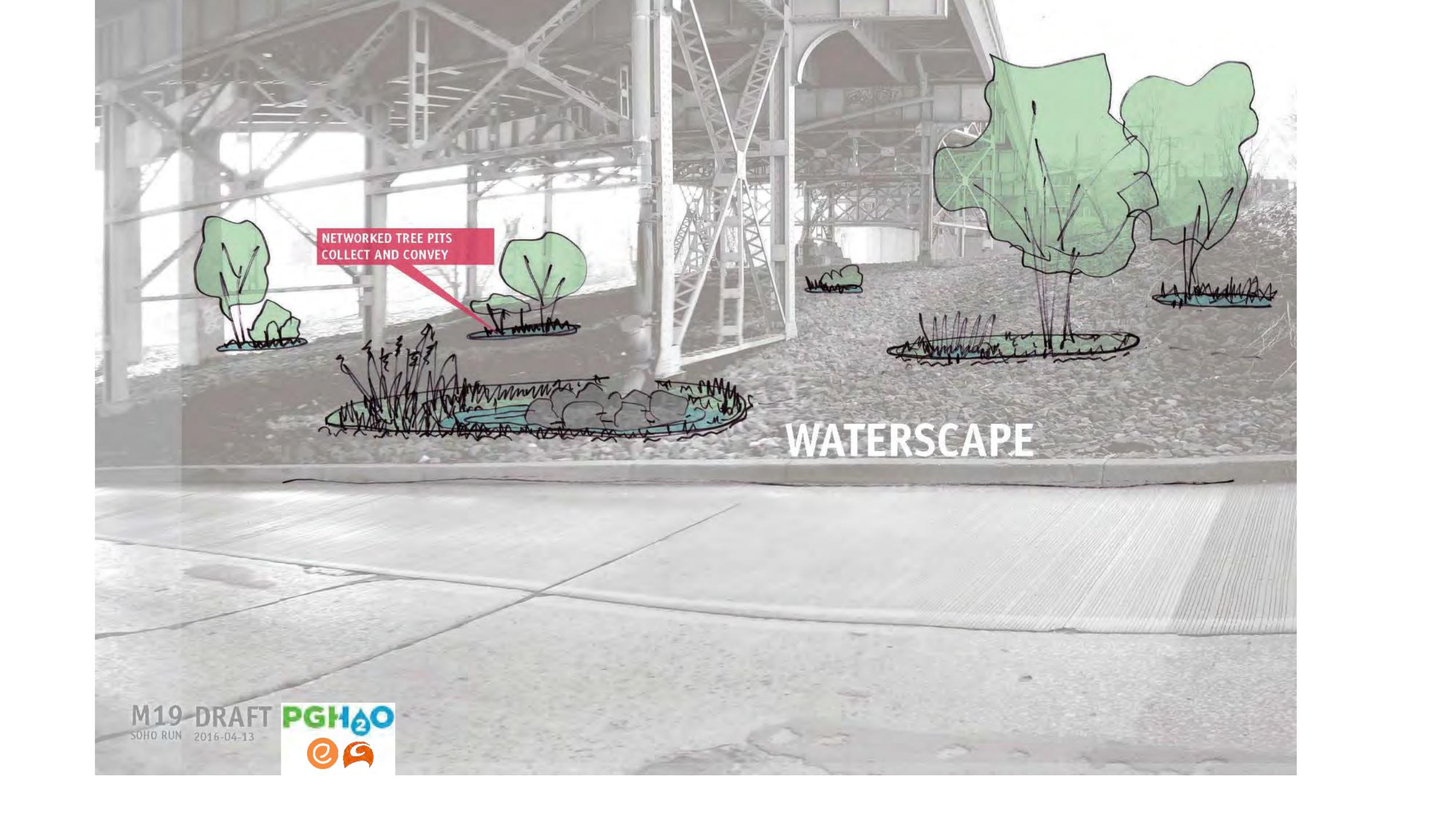


Seattle Olympic Sculpture Park
Source: deasy/penner & partners



M19
SOHO RUN





NETWORKED TREE PITS
COLLECT AND CONVEY

WATERSCAPE

M19 DRAFT
SOHO RUN 2016-04-13

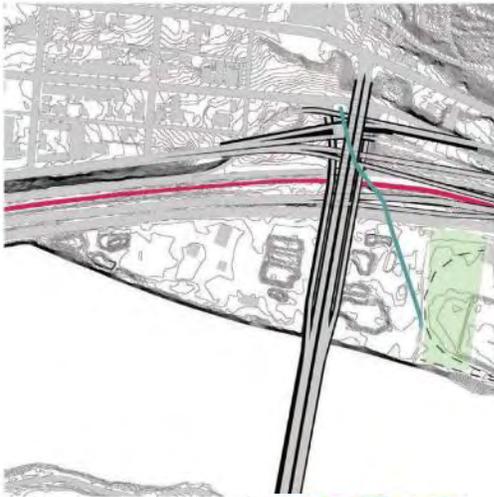




DAYLIT SOHO RUN OUTFALL PHASE 1: 10 YEARS



Lower Codorinces Creek Restoration, Albany, NY
Source: Restoration Design Group



M19
SOHO RUN

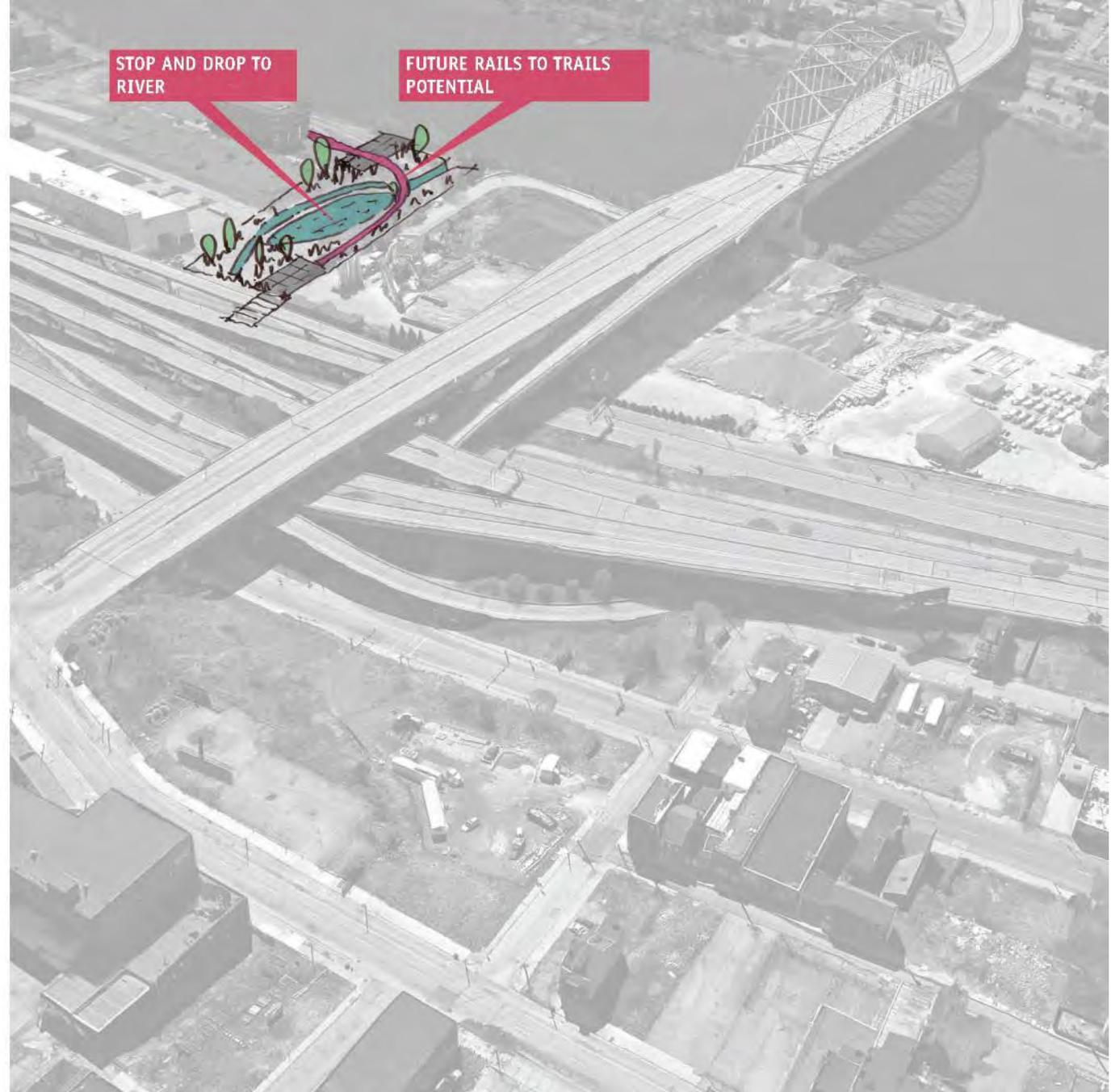
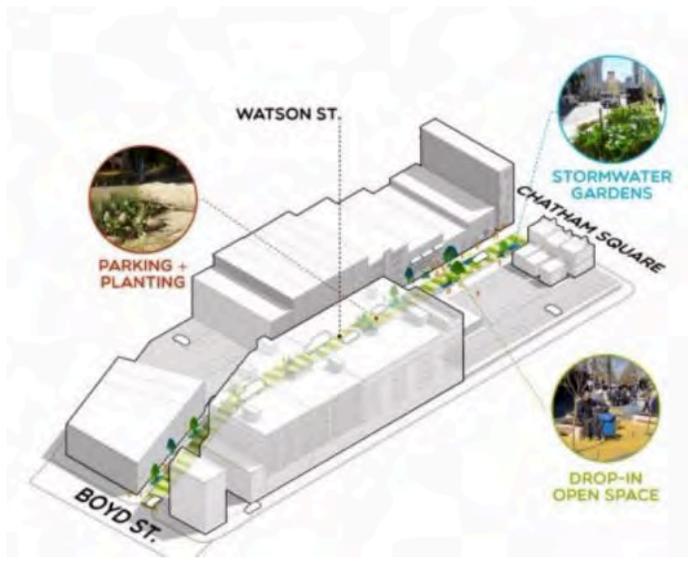
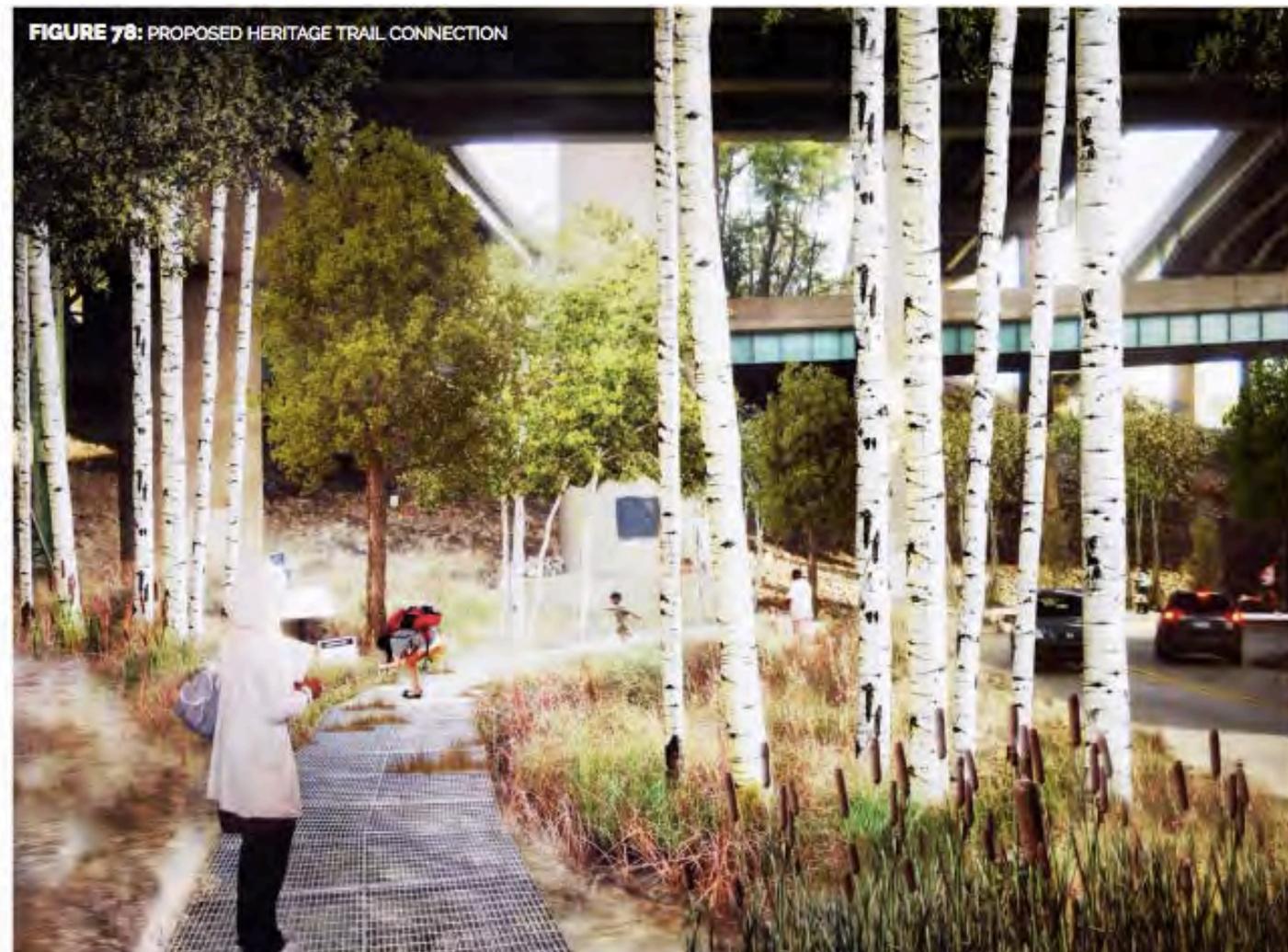


FIGURE 78: PROPOSED HERITAGE TRAIL CONNECTION



HIRMINTHAM BRIDGE



INTEGRATED INTO PLANNING
 EcoInnovation District Masterplan
 Department of City Planning, Stoss, Interface



INTEGRATED INTO PLANNING
Centre Avenue Plan
Hill Community Development Corp, evolveEA



PROJECT
Herron and Centre Avenues
Grand Opening: June 20 18
PWSA



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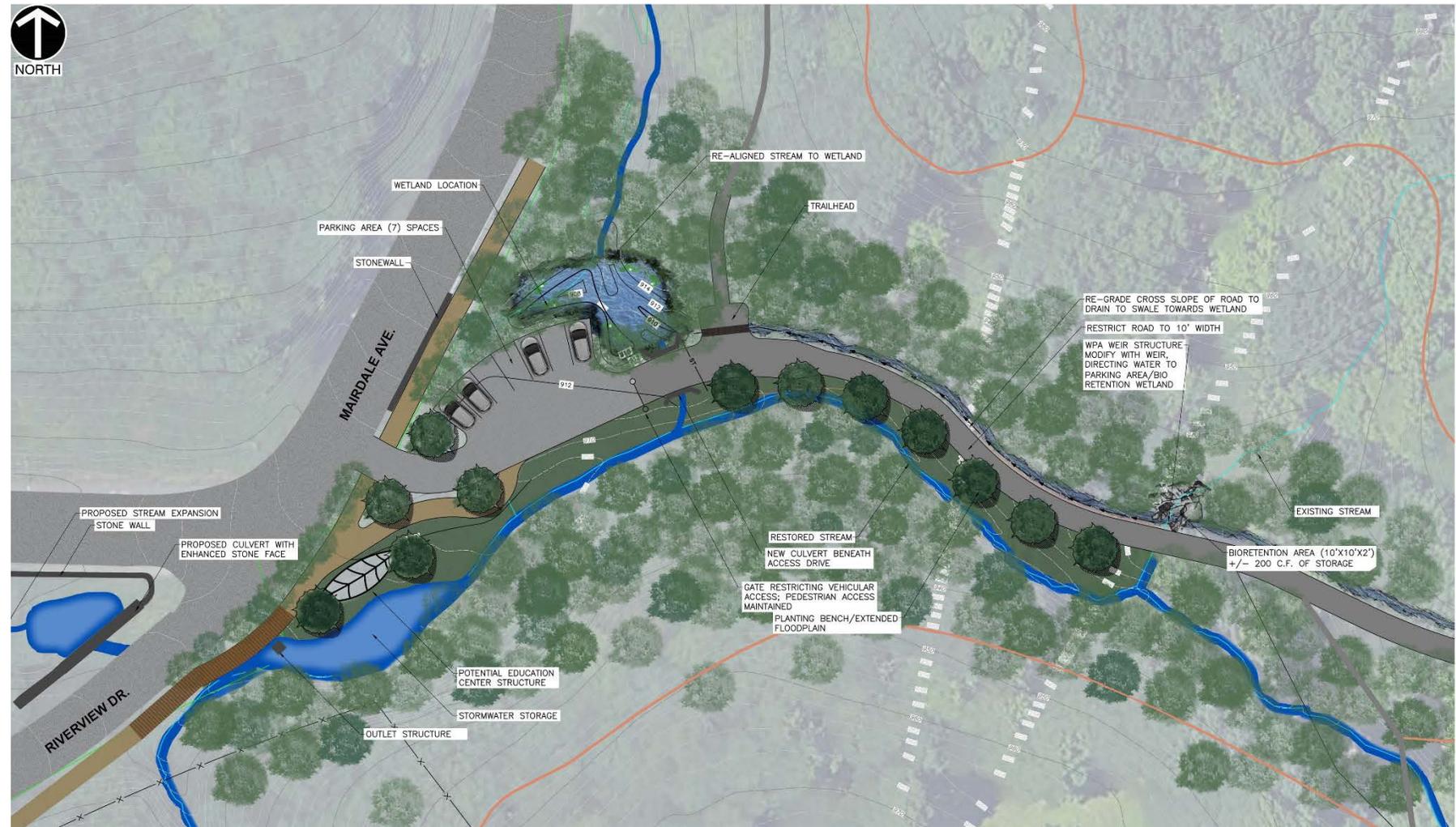
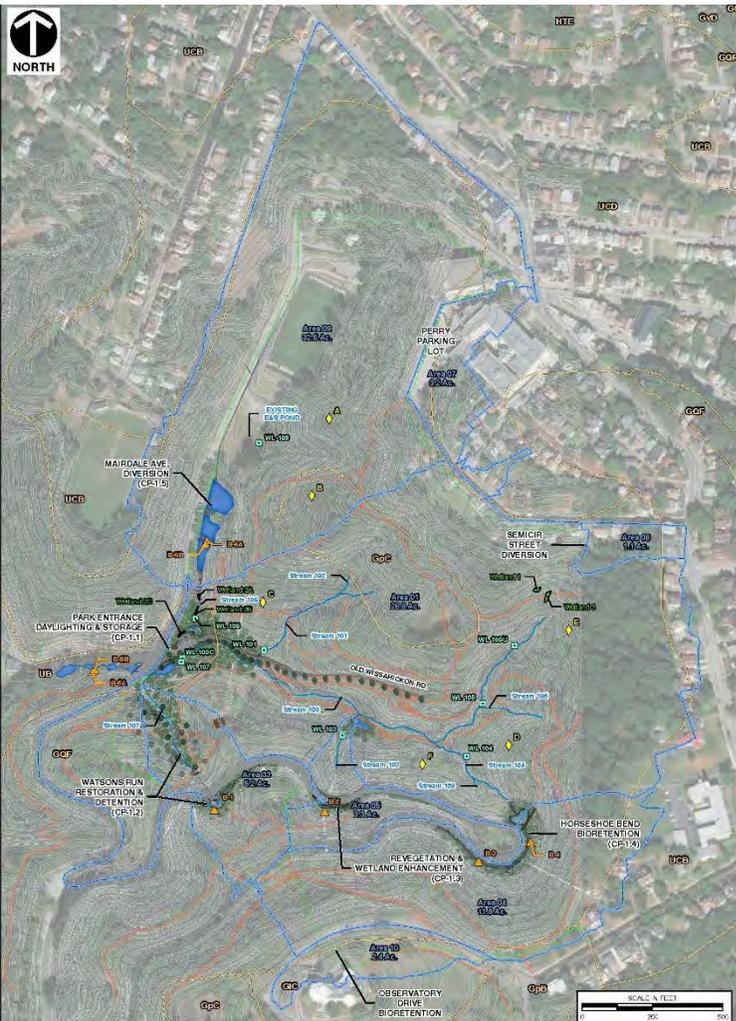


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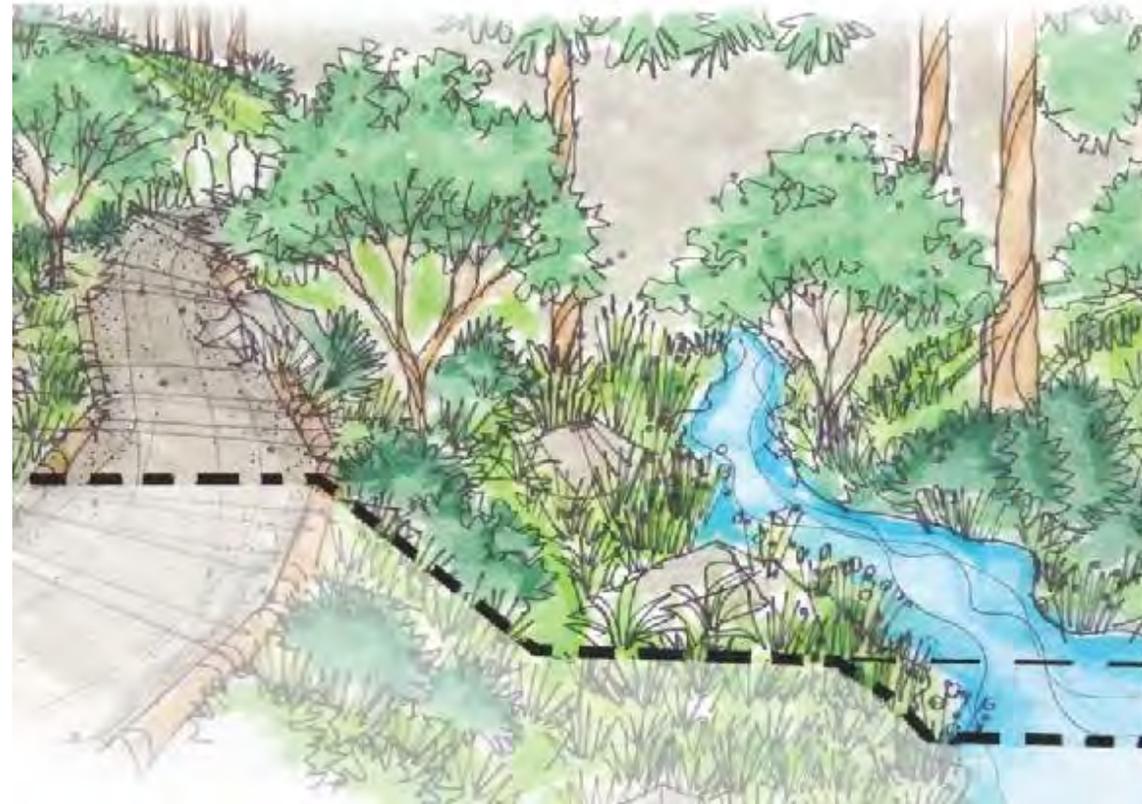
Works in progress



O27: WOODS RUN | RIVERVIEW PARK



O27: WOODS RUN | RIVERVIEW PARK



A 42: WASHINGTON BLVD | NEGLEY RUN



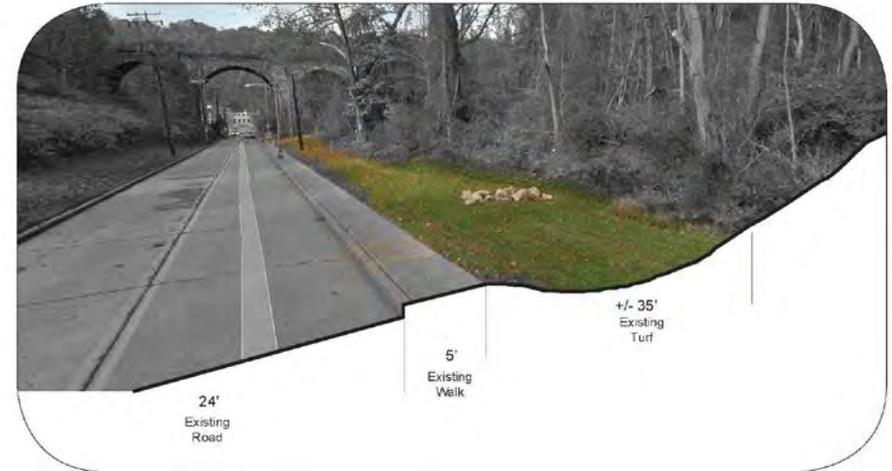
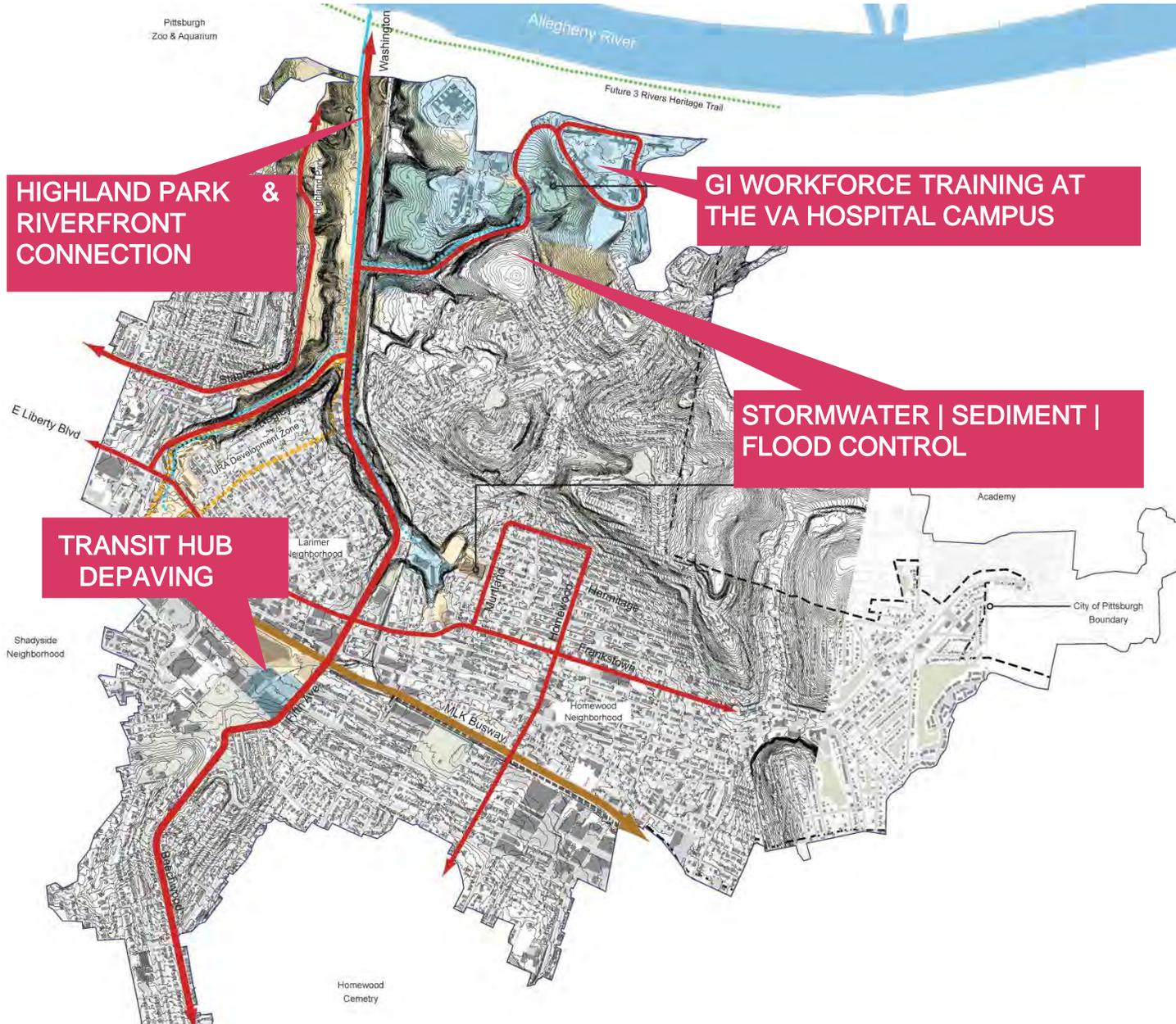
-  PVIOUS PAVEMENTS
-  BIOSWALES & RAIN GARDENS
-  RETENTION/DETENTION

Image Landsat

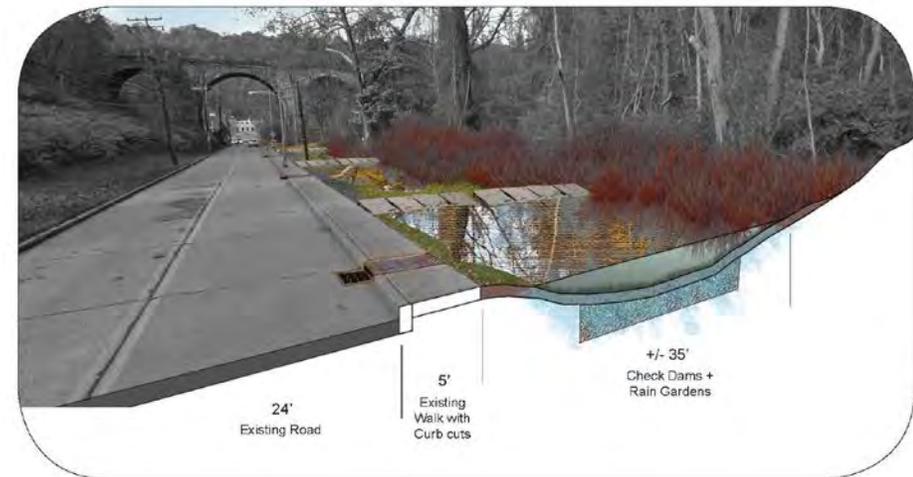
Google e

MELLON PARK
40°27'48.34" N 79°54'32.64" W elev 915 ft eye alt 5

A42: WASHINGTON BLVD | NEGLEY RUN



Leech Farm Road - Before



Leech Farm Road - After

A42: WASHINGTON BLVD | NEGLEY RUN

Little Negley Run

is a daylighting project that disconnects new development via an open air sewer separation project.

Community vetted project as part of the Choice Neighborhood Planning grant.

Secured **\$ 1.2 Million** in design funds in a partnership with Army Corps.



M29: FOUR MILE RUN | JUNCTION HOLLOW



SCHENLEY DRIVE

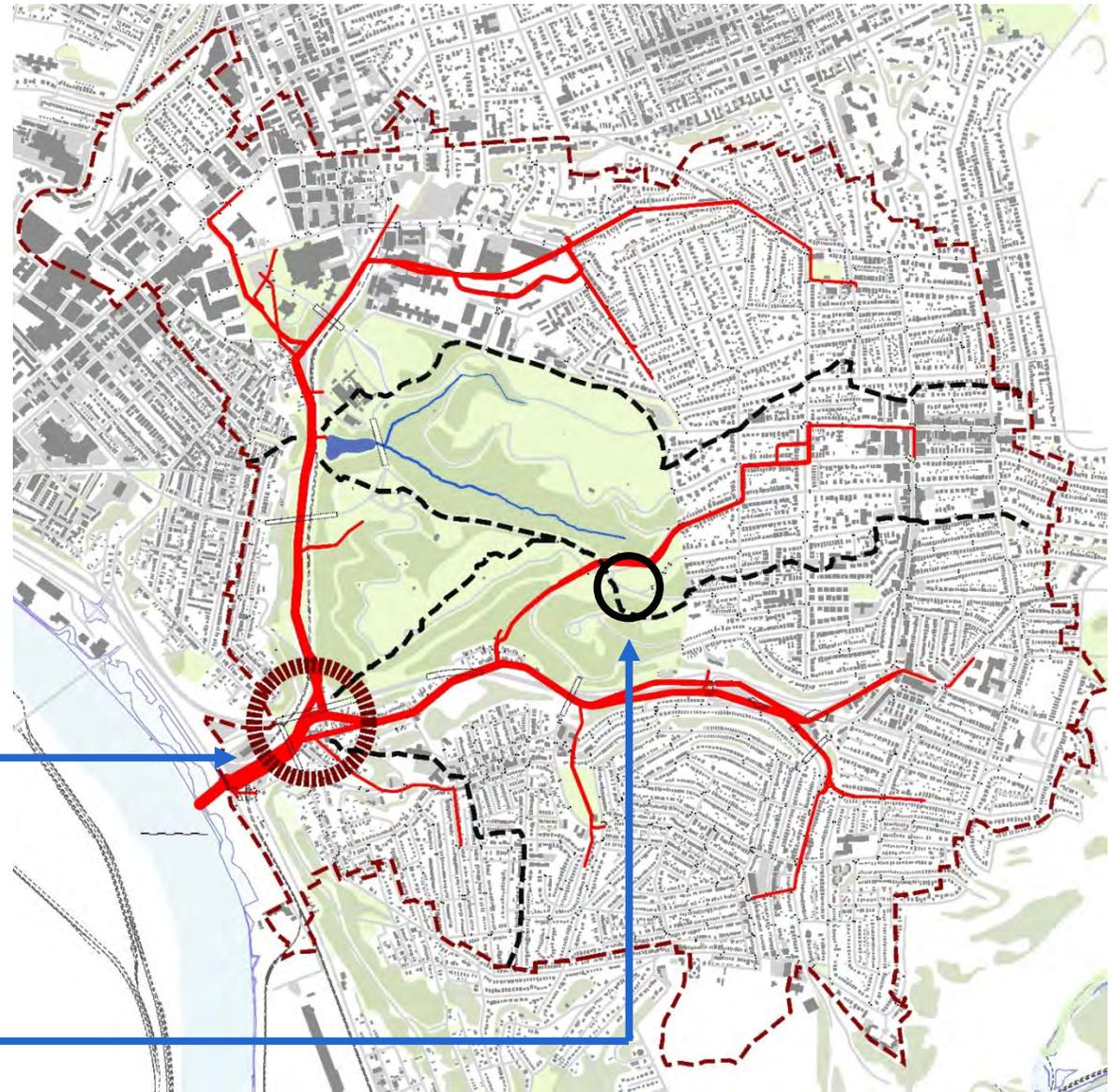
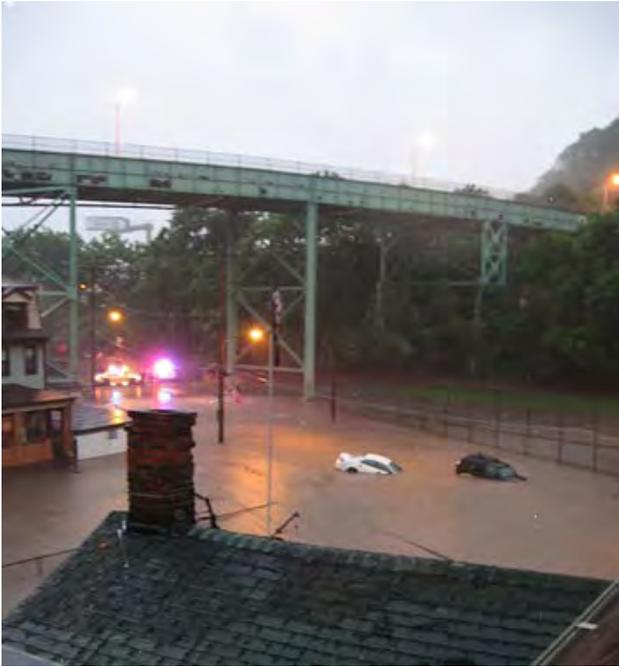
PANTHER HOLLOW LAKE

JUNCTION HOLLOW STREAM DAYLIGHTING

ALMONO SITE

- PERVIOUS PAVEMENTS
- BIOSWALES & RAIN GARDENS
- RETENTION/DETENTION

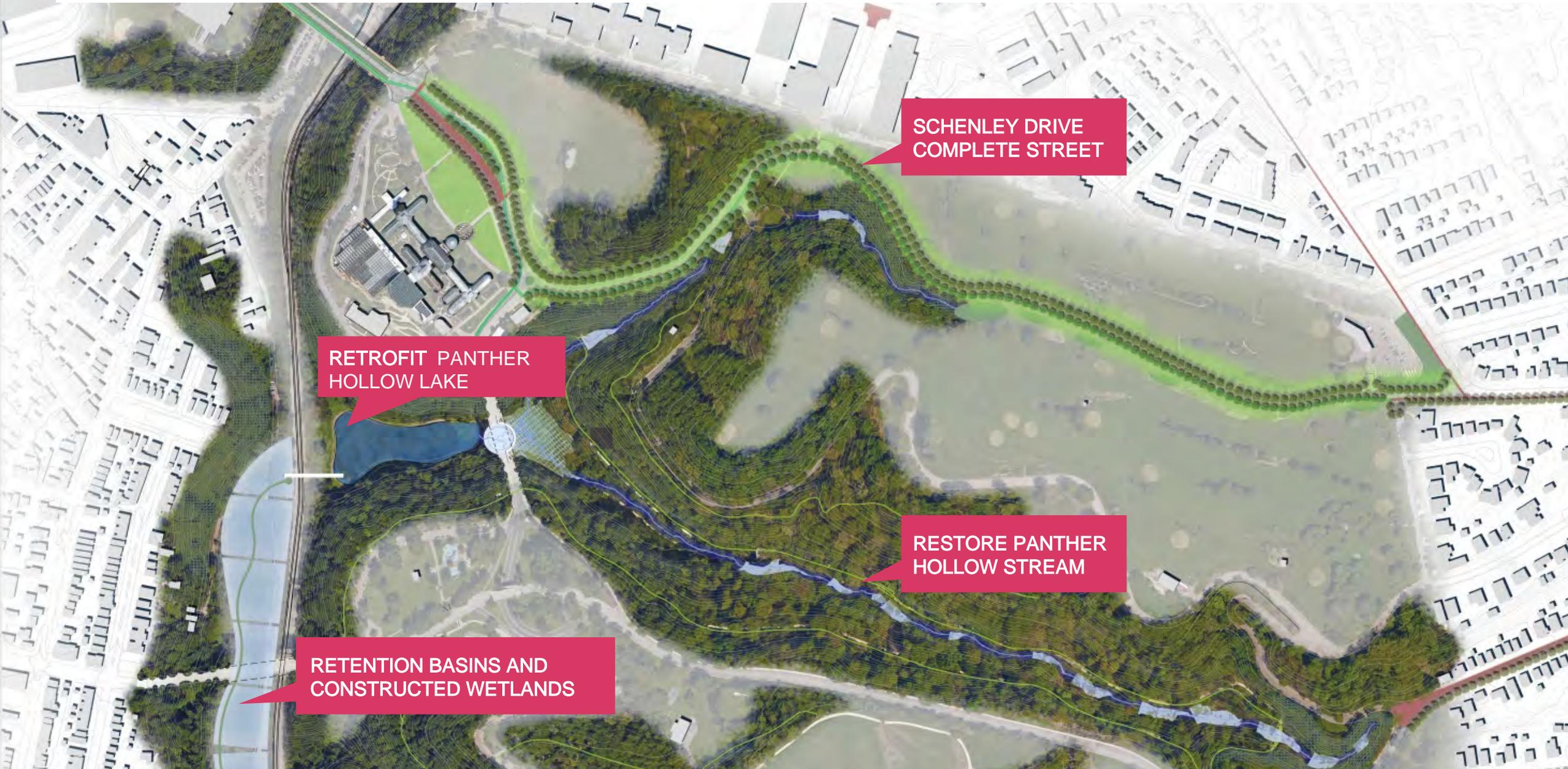
M29: FOUR MILE RUN | JUNCTION HOLLOW



This plan **addresses flooding** at the bottom of the 4 Mile Run watershed that impacts nearby residents and businesses.

Stormwater runoff from **Squirrel Hill** is reestablished in the historic Panther Hollow stream channel.

M29: FOUR MILE RUN | JUNCTION HOLLOW



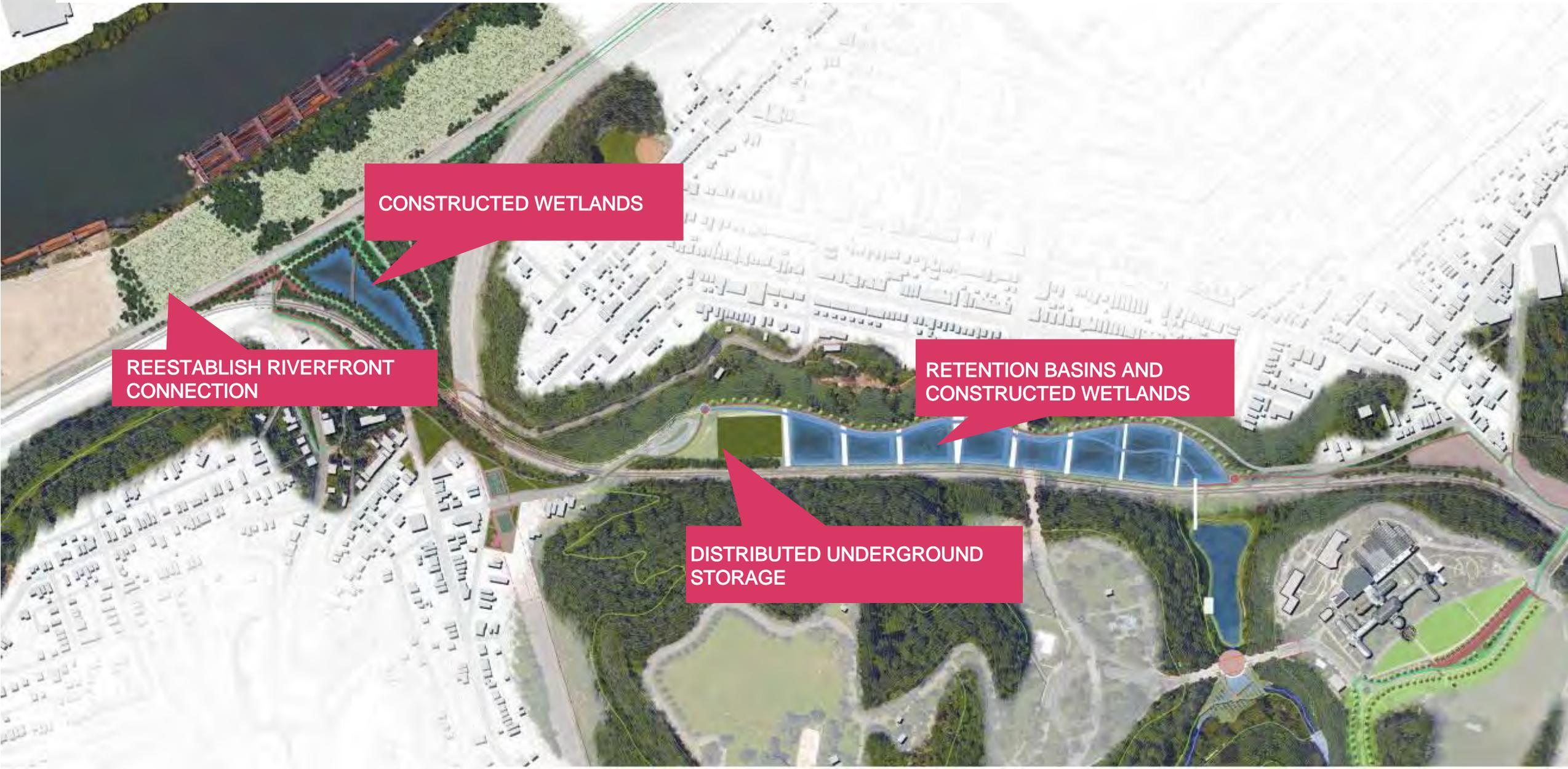
SCHENLEY DRIVE
COMPLETE STREET

RETROFIT PANTHER
HOLLOW LAKE

RESTORE PANTHER
HOLLOW STREAM

RETENTION BASINS AND
CONSTRUCTED WETLANDS

M29: FOUR MILE RUN | JUNCTION HOLLOW



CONSTRUCTED WETLANDS

REESTABLISH RIVERFRONT CONNECTION

RETENTION BASINS AND CONSTRUCTED WETLANDS

DISTRIBUTED UNDERGROUND STORAGE

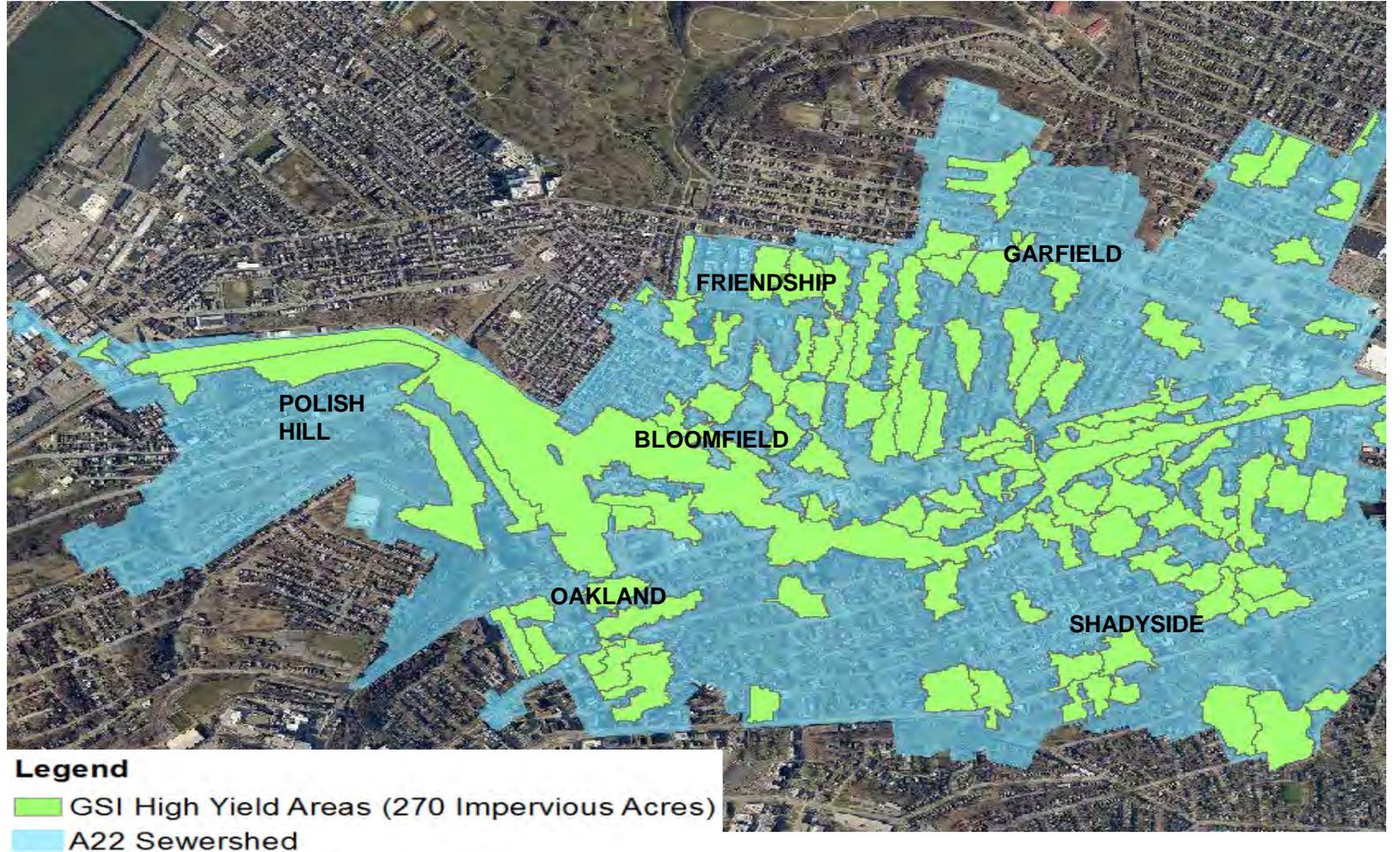
M29: WIGHTMAN PARK



A22 SEWERSHED | EAST END FLOODING



August 31, 2014 Rain Event:
1.05" in 15 Minutes



ISSUES:

Surface Flooding, 11 Basement Sewage Flooding (Backups) Reported

2015 Homeowner Survey Revealed Chronic 136 Basement Backups

A22 SEWERSHED: HILLCREST PROJECT



① flex lawn & berm



② d/g flex space



③ weir



④ bioretention plantings



⑤ curb cut



⑥ gravel bottom retention area

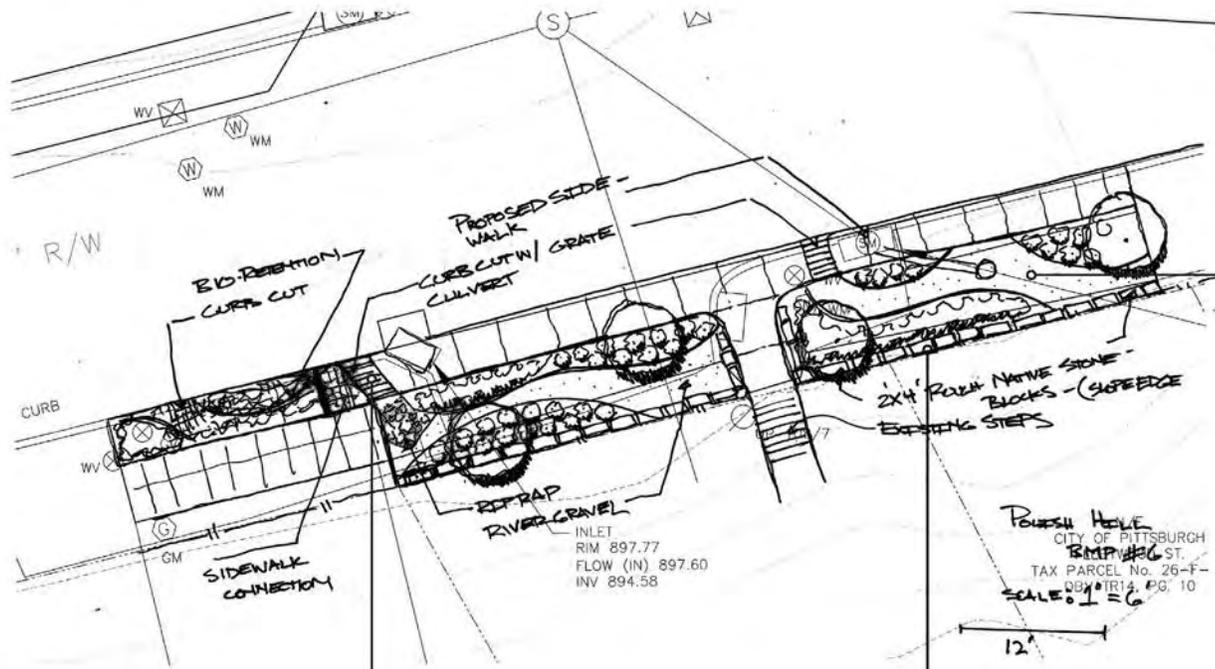
A22 SEWERSHED: HILLCREST PROJECT



A22 SEWERSHED: HILLCREST PROJECT



A22 SEWERSHED: MELWOOD PROJECT



GRAVEL BED OF BIORETENTION



SIDEWALK GRATE



LIMESTONE BLOCK 1 COURSE HIGH TO TERMINATE SLOPE

A22 SEWERSHED: SHADYSIDE PROJECT



PLANTS FILTER AND TRANSPIRE WATER WHILE ENHANCING THE STREETSCAPE

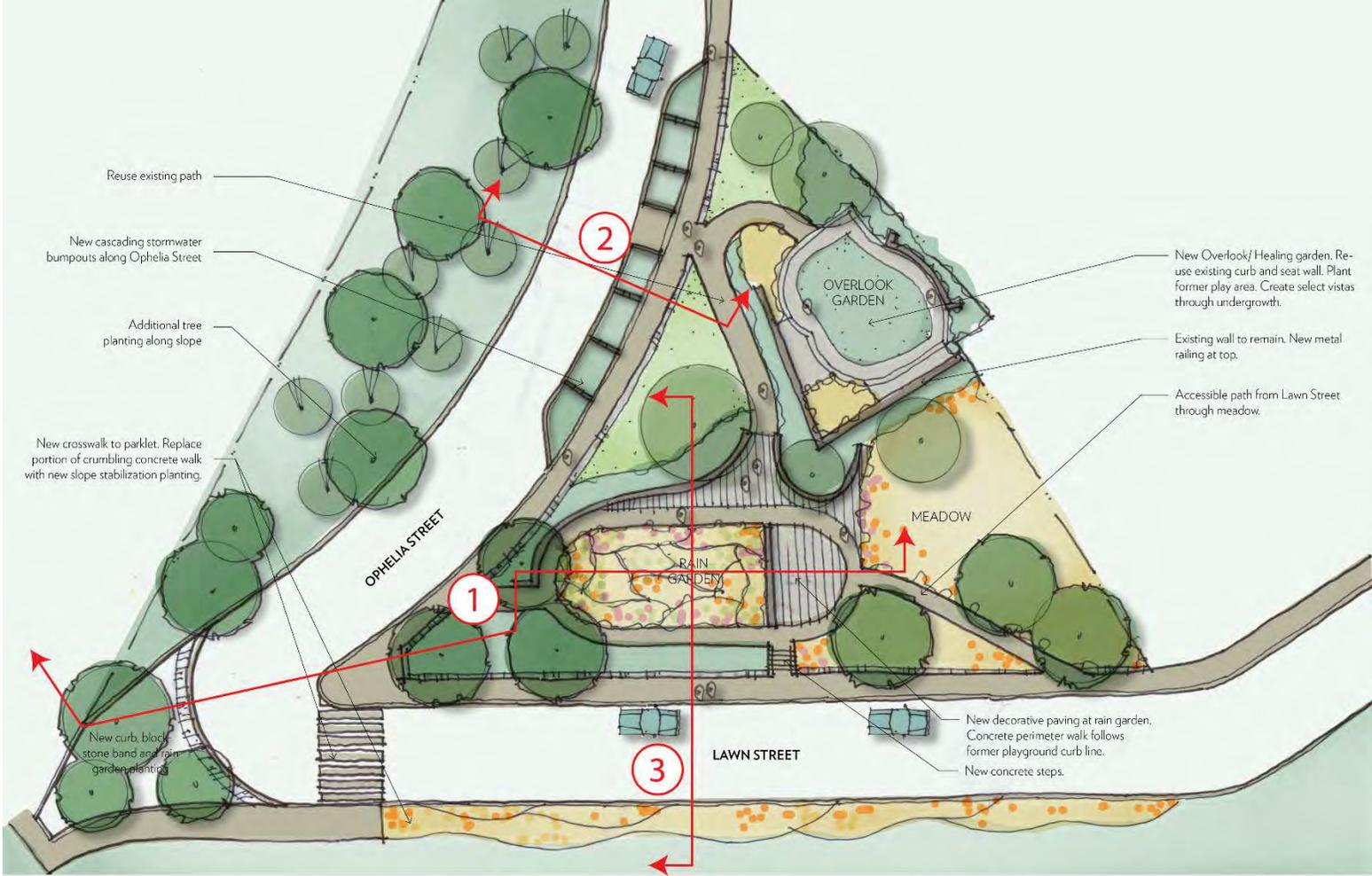




A22 SEWERSHED: CHATHAM UNIVERSITY



M19B: LAWN AND OPHELIA PARKLET



Christine Mondor

evolve environment::architecture

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Megan Zeigler

Pittsburgh Water and Sewer Authority

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