



Pittsburgh Water & Sewer Authority Green First Plan

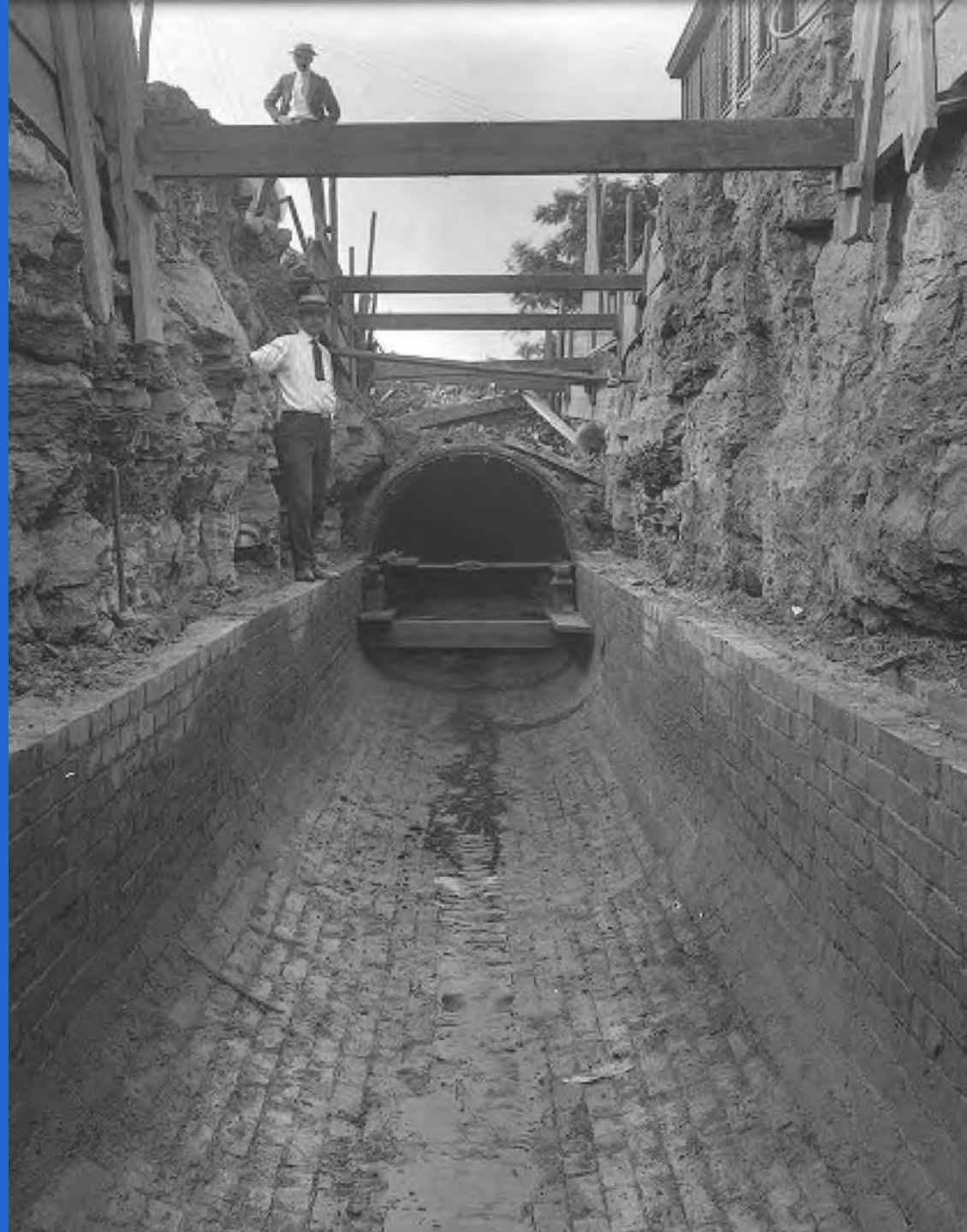
July 2018

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.



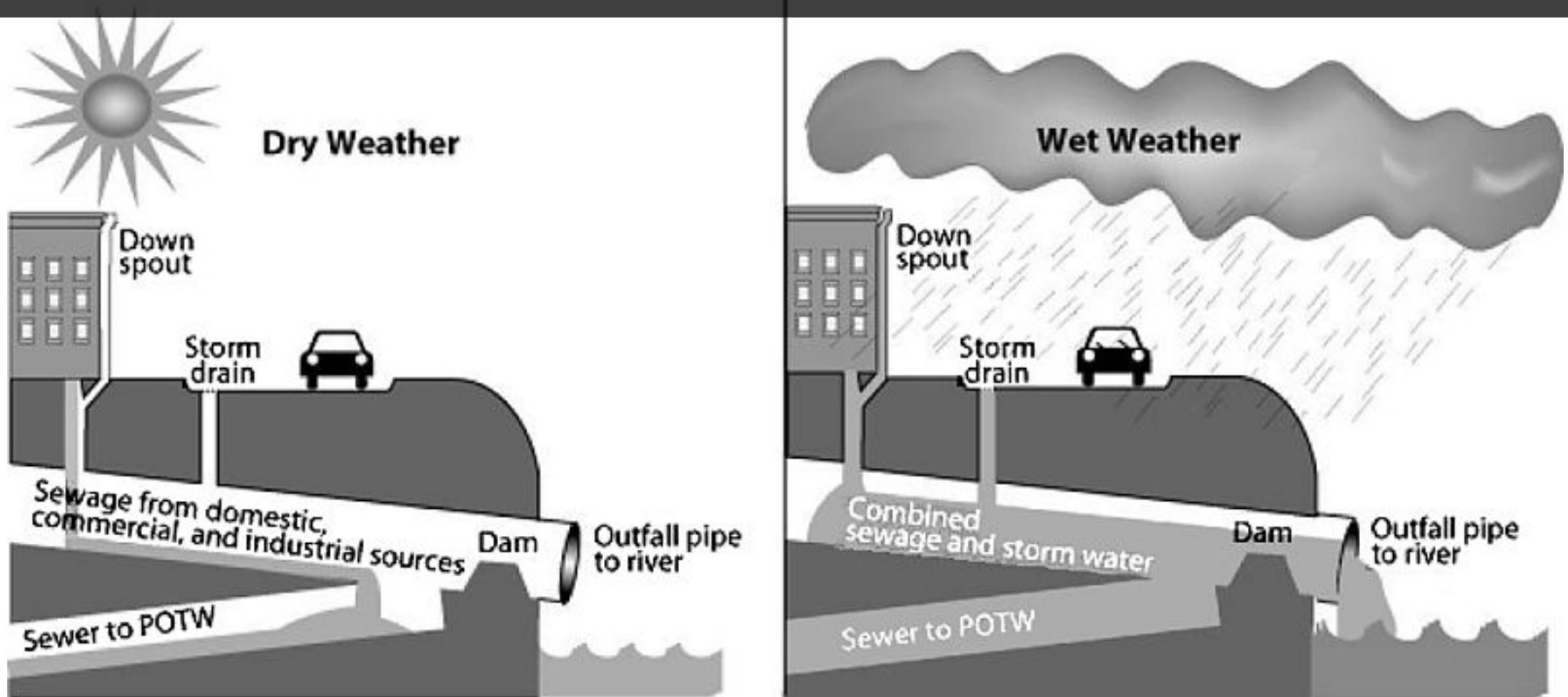
We used to think...
Move the water away quickly



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



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



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



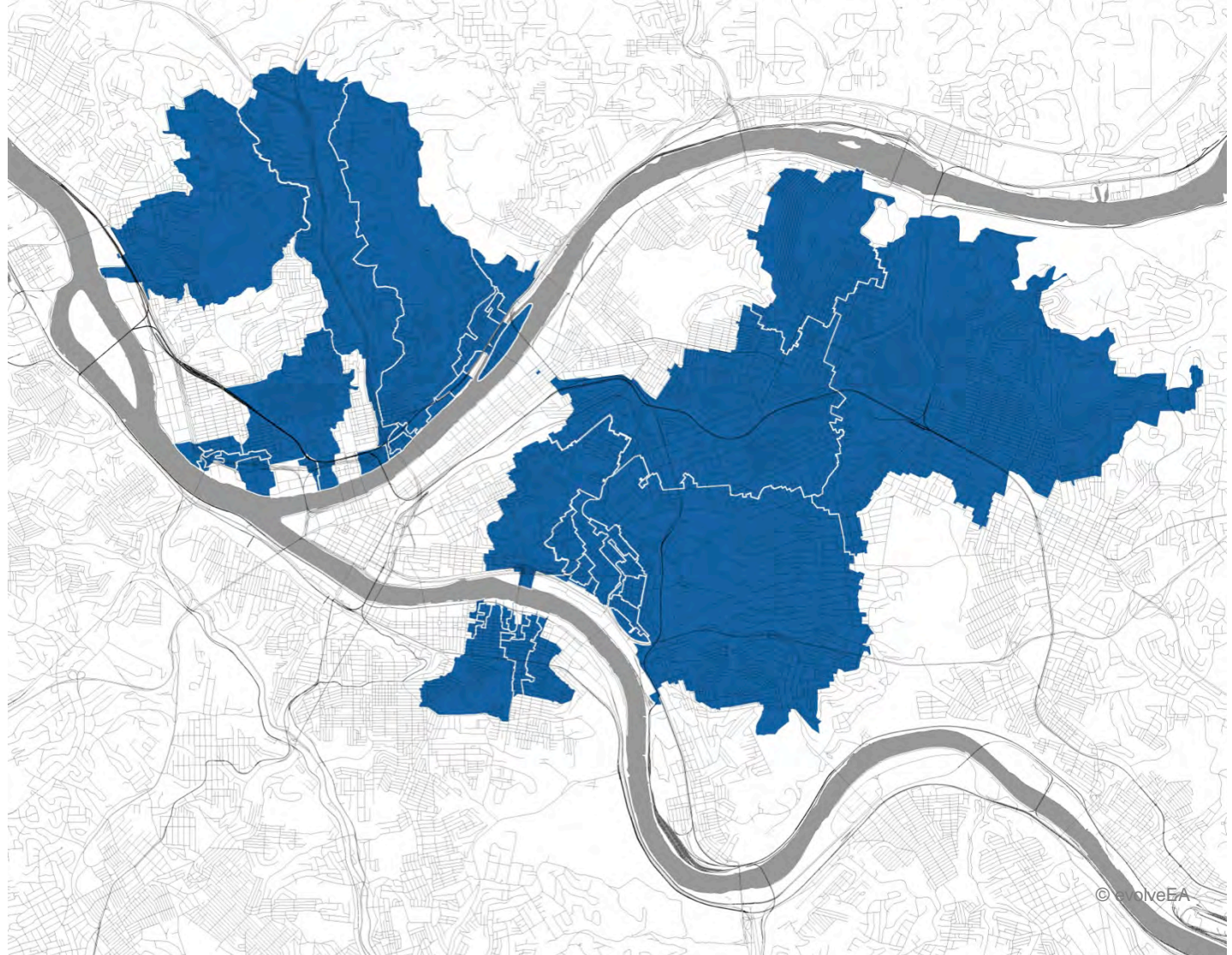
We looked for the most effective projects and systems that would provide community benefit in each shed.



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**

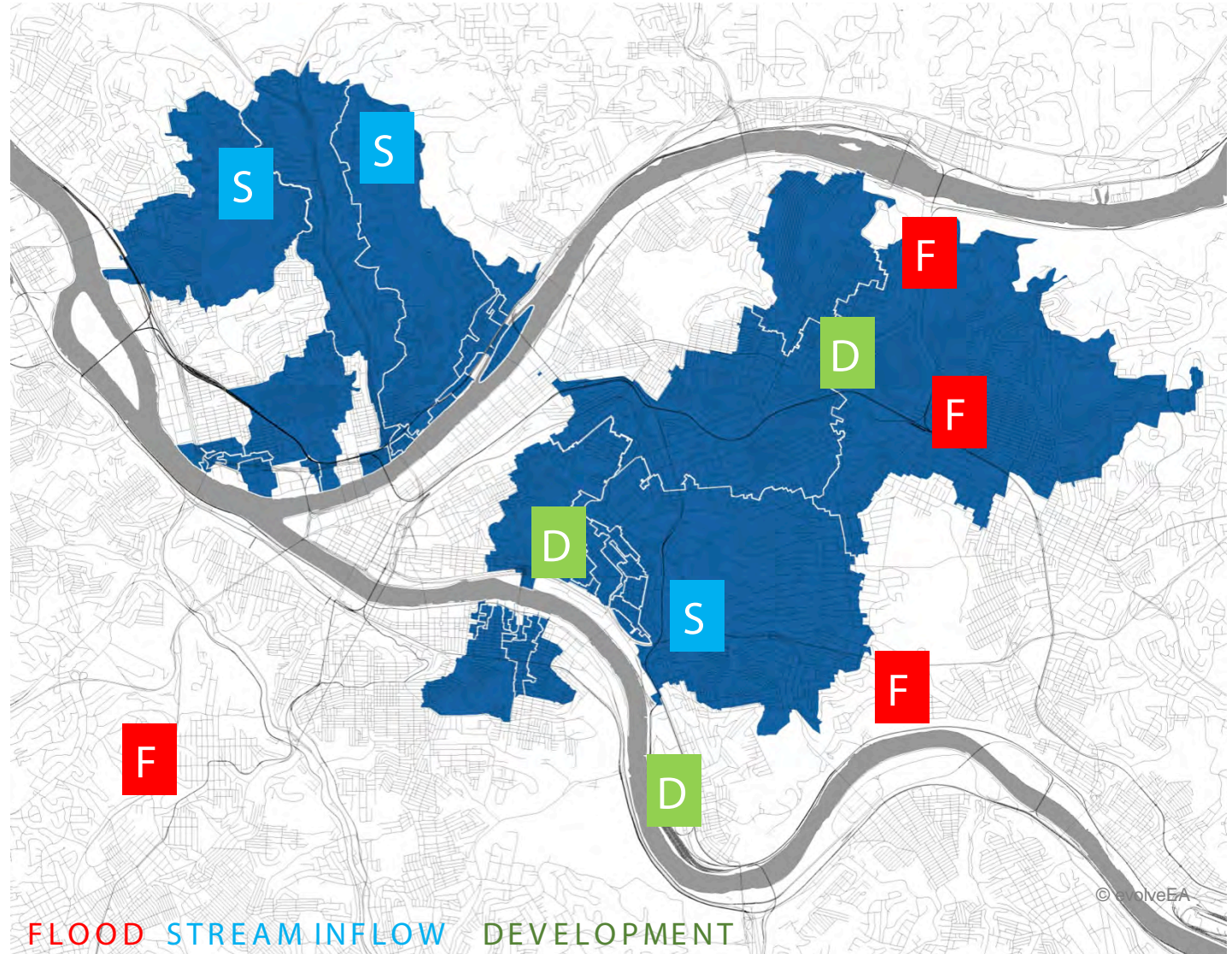


The Clean & Green plan is **ENGINEERED**

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** and overlaid other criteria:

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



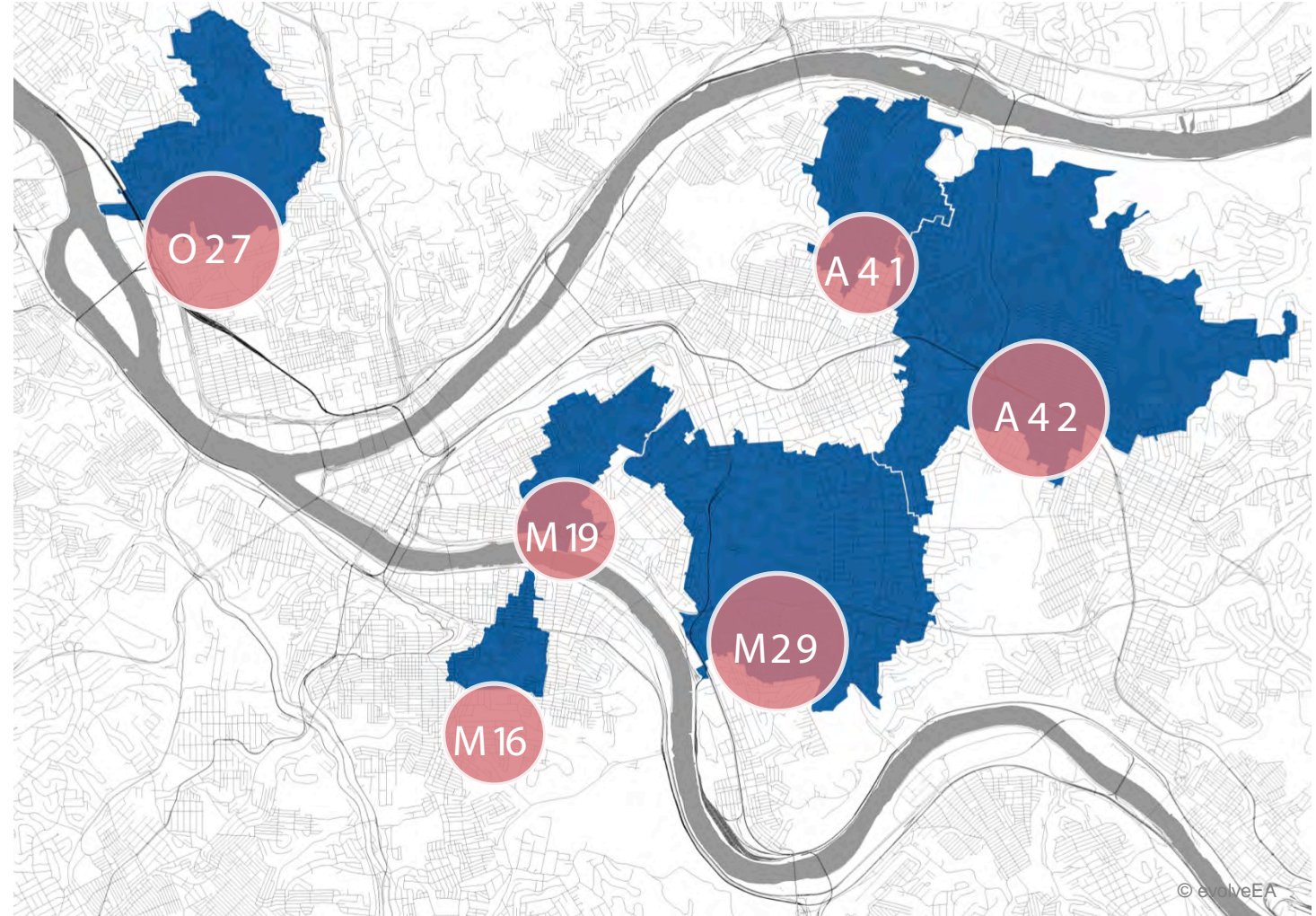
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and chose **6 priority sheds**



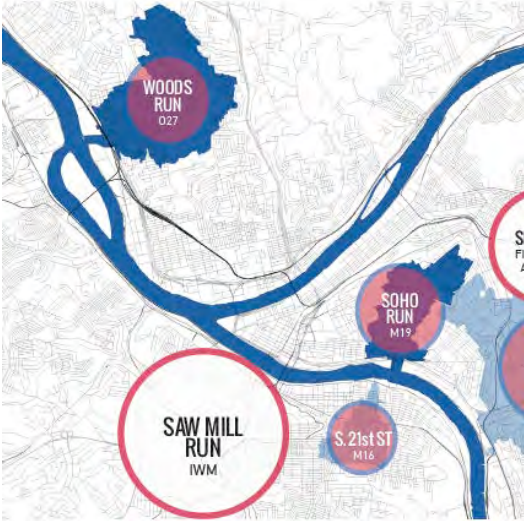
We are using a methodology that can be used across the city and the region.



The Clean & Green plan

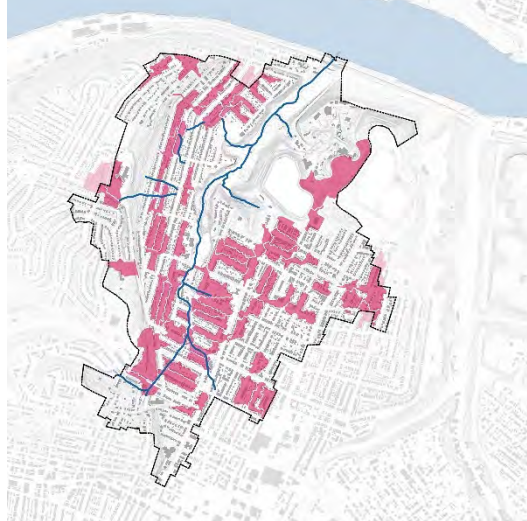
WORKS AT DIFFERENT SCALES .

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.

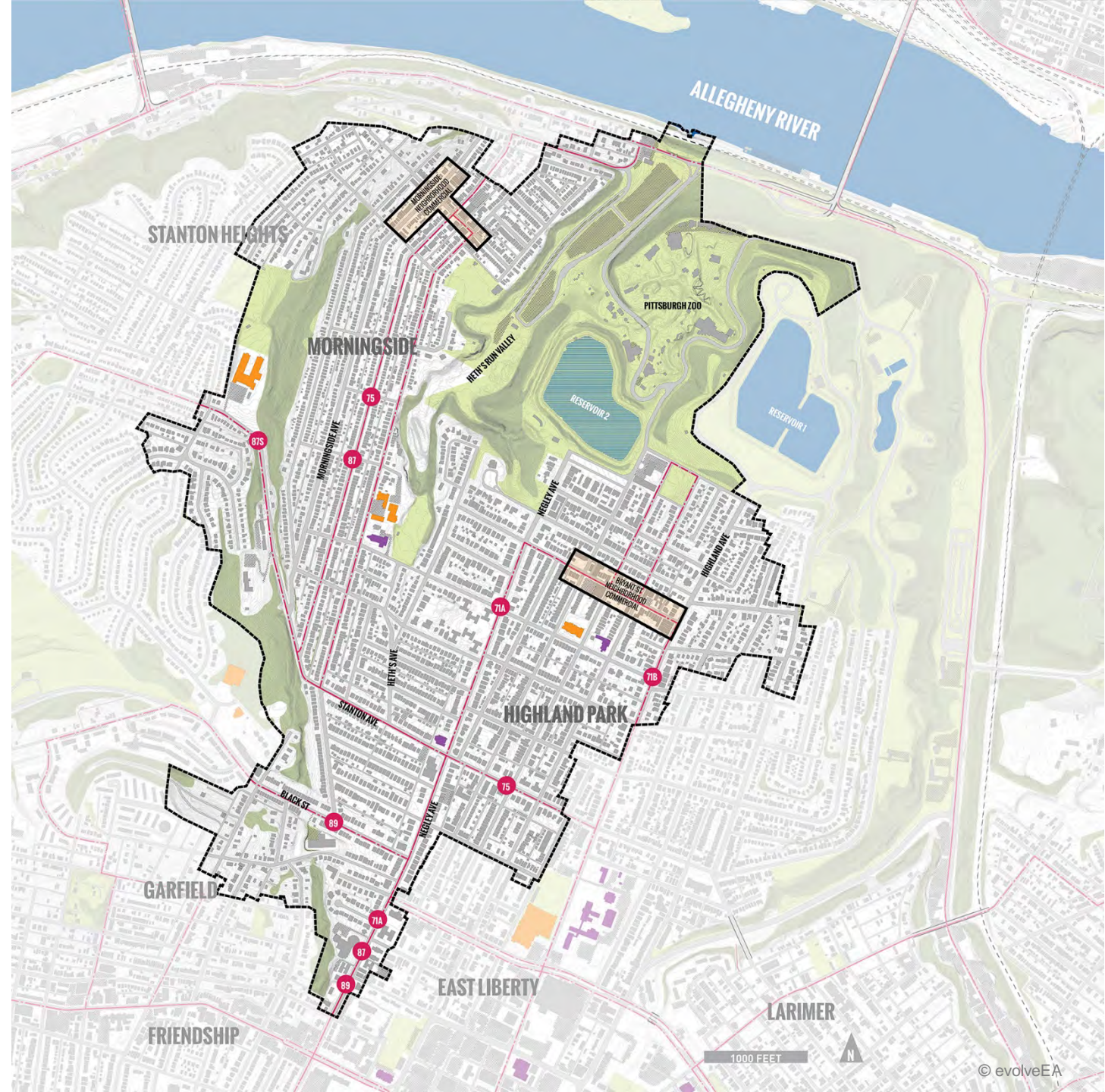


Water has always determined
the identity of our neighborhoods.



A41 HETH'S RUN SHED CAPTURE ANALYSIS

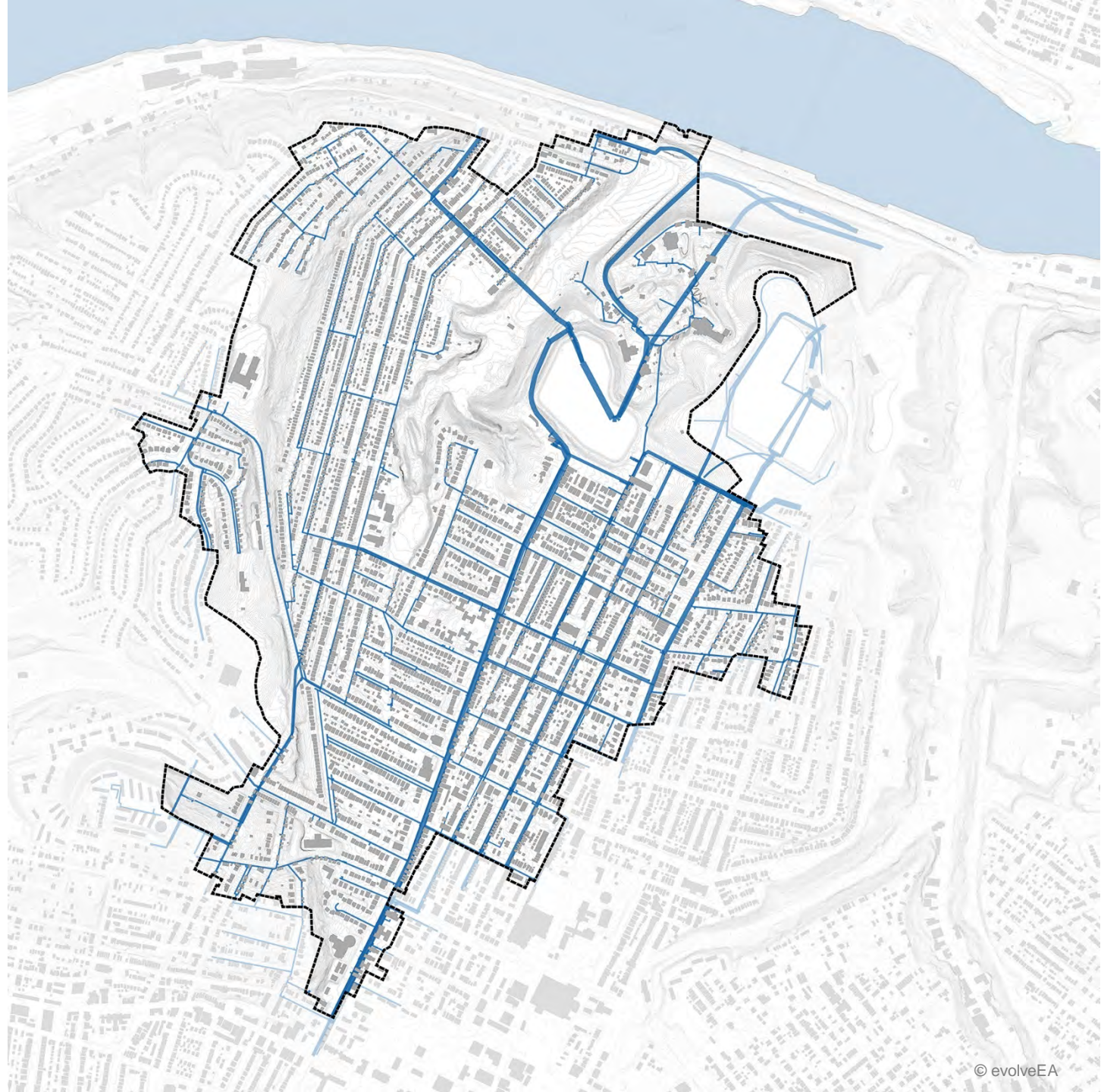
We investigated development patterns
for each shed.



A41 HETH'S RUN

SHED CAPTURE ANALYSIS

Water Lines



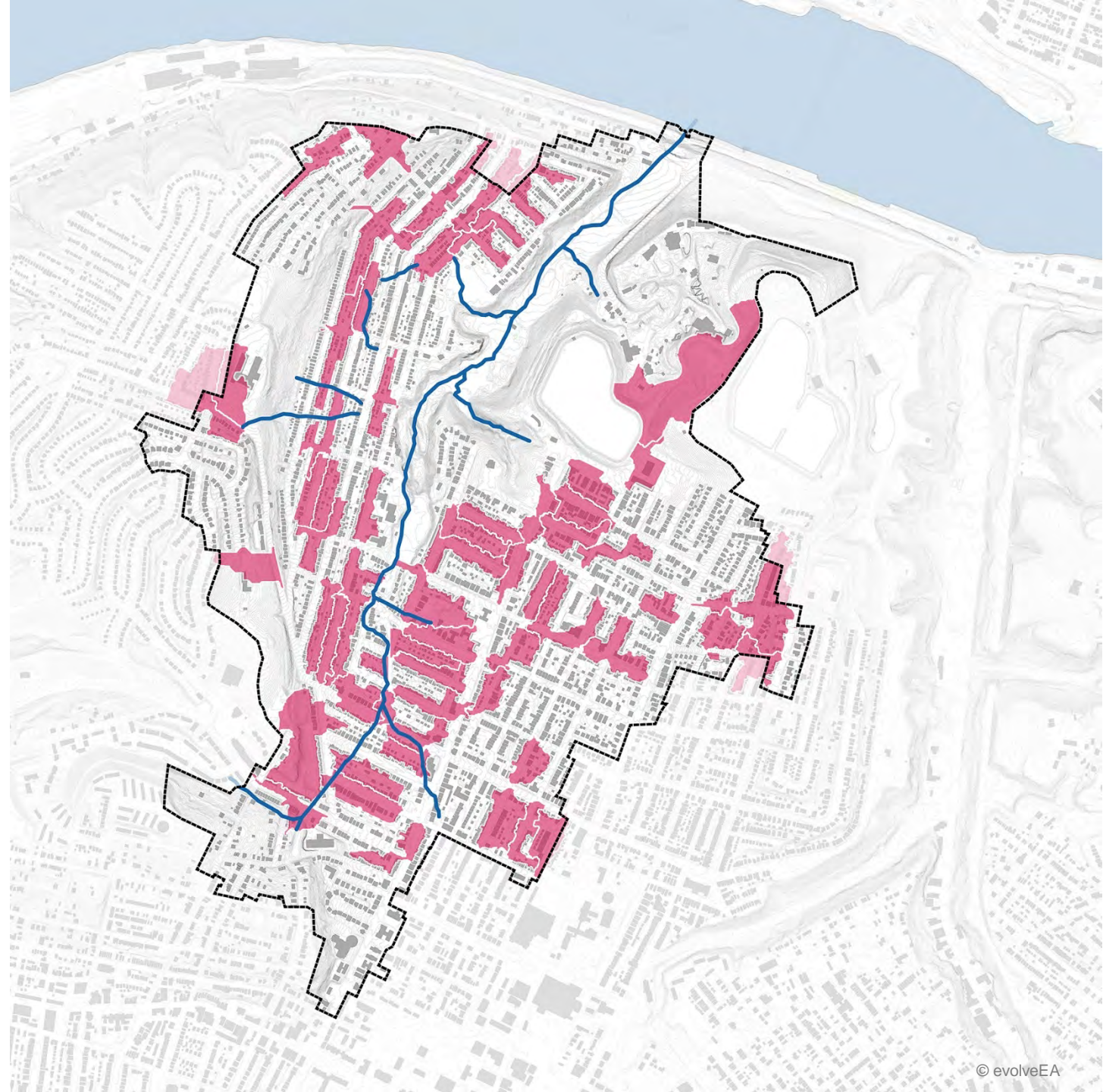
A41 HETH'S RUN SHED CAPTURE ANALYSIS

Sewer Lines



A41 HETH'S RUN SHED CAPTURE ANALYSIS

High capture areas were identified.



Historic Streams and Target Areas



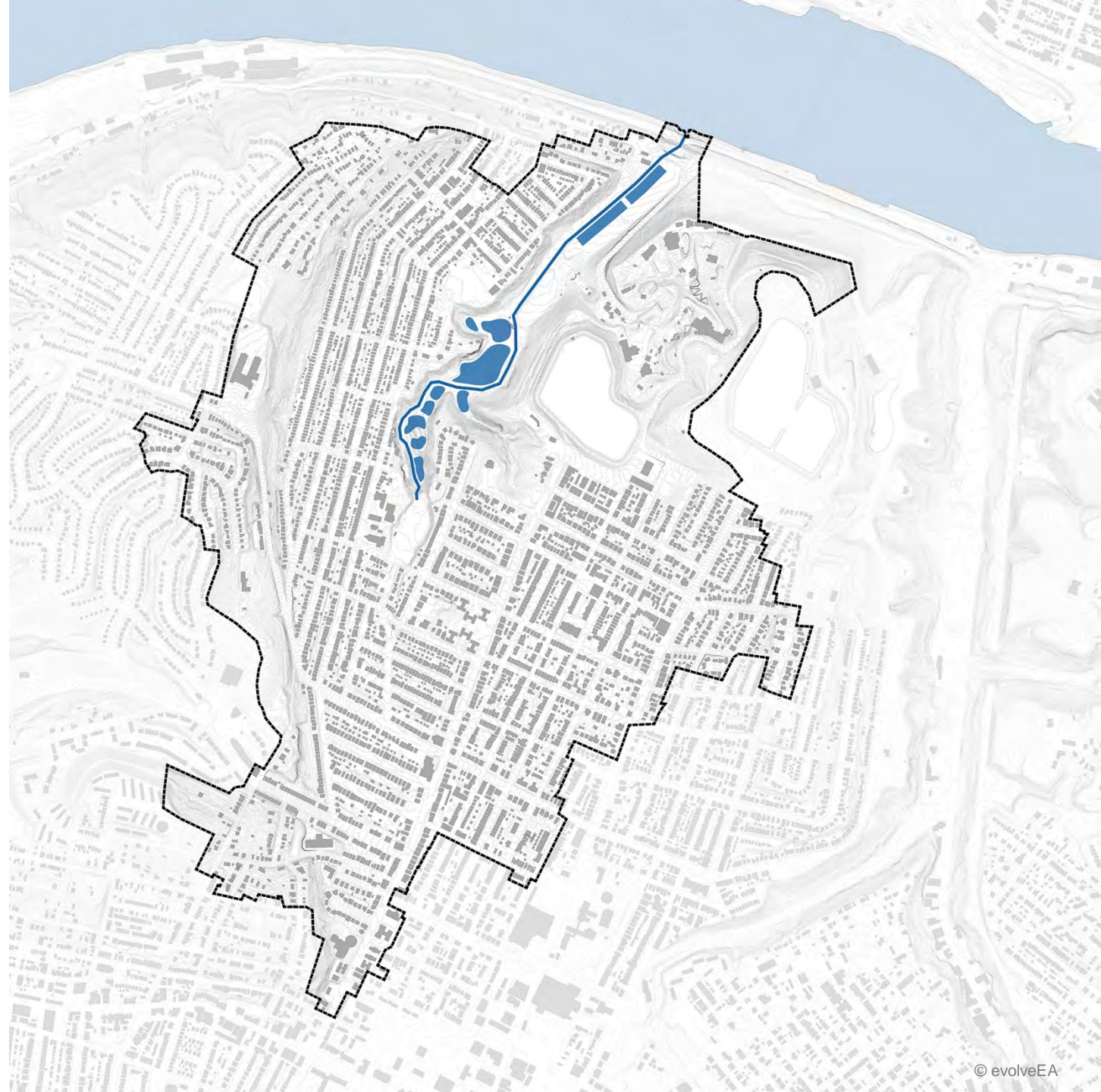
A41 HETH'S RUN

SHED CAPTURE ANALYSIS

High capture areas were identified.

Most sheds share a similar kit of parts:

STORAGE





A41 HETH'S RUN

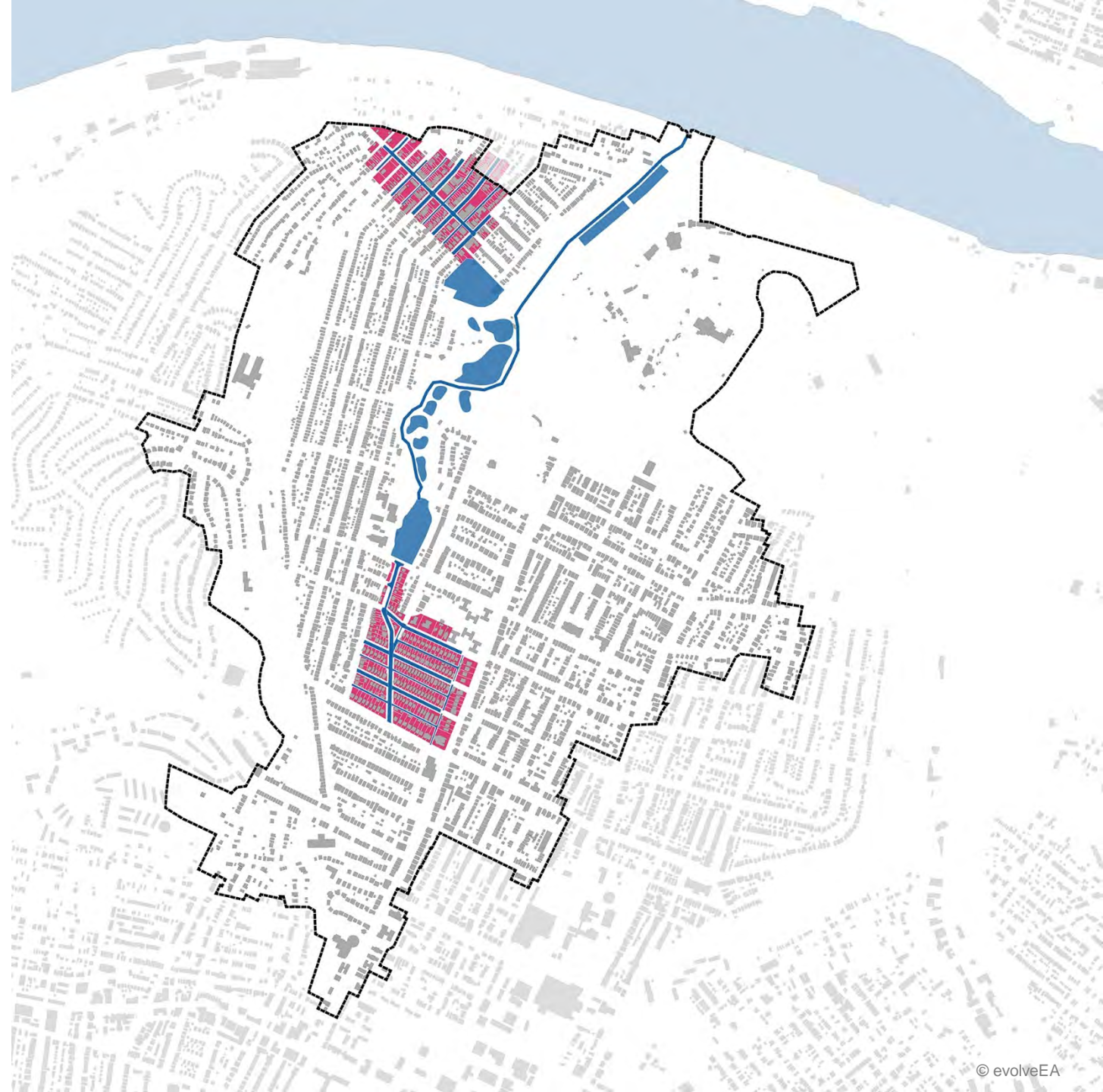
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STORAGE

CONVEY





A41 HETH'S RUN

SHED CAPTURE ANALYSIS

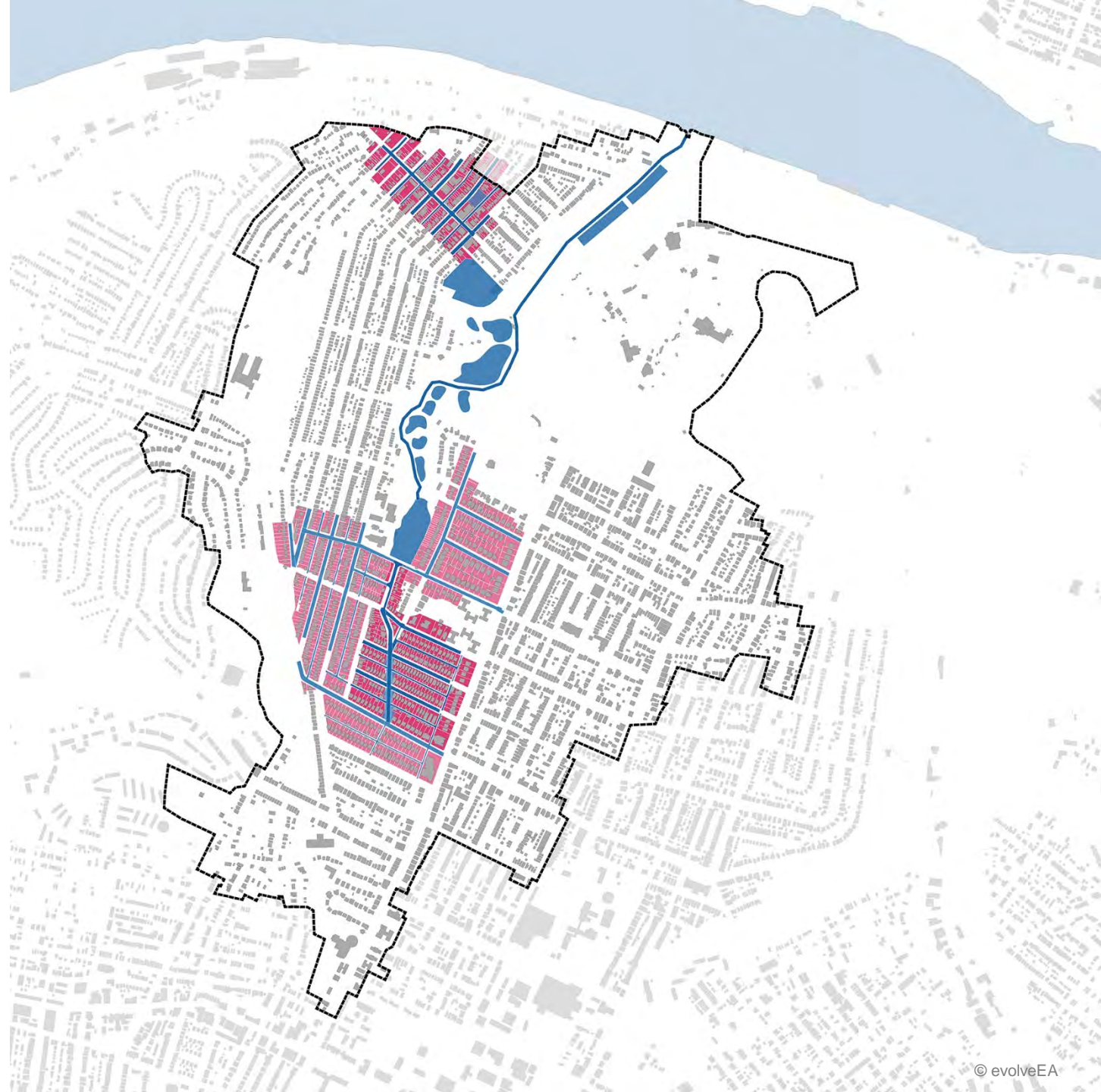
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STORAGE

CONVEY

CAPTURE





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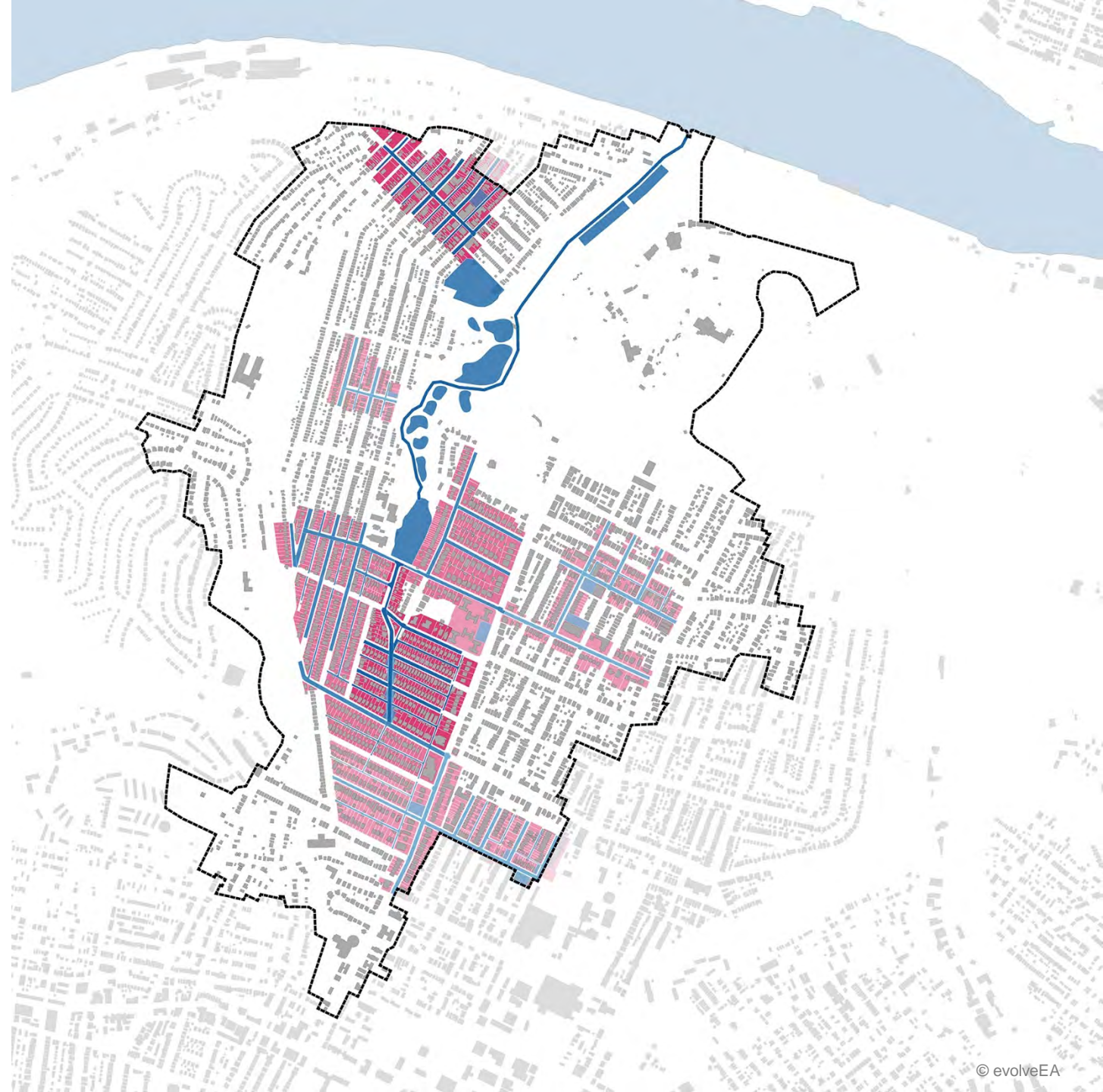
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STORAGE

CONVEY

CAPTURE

working as a system.





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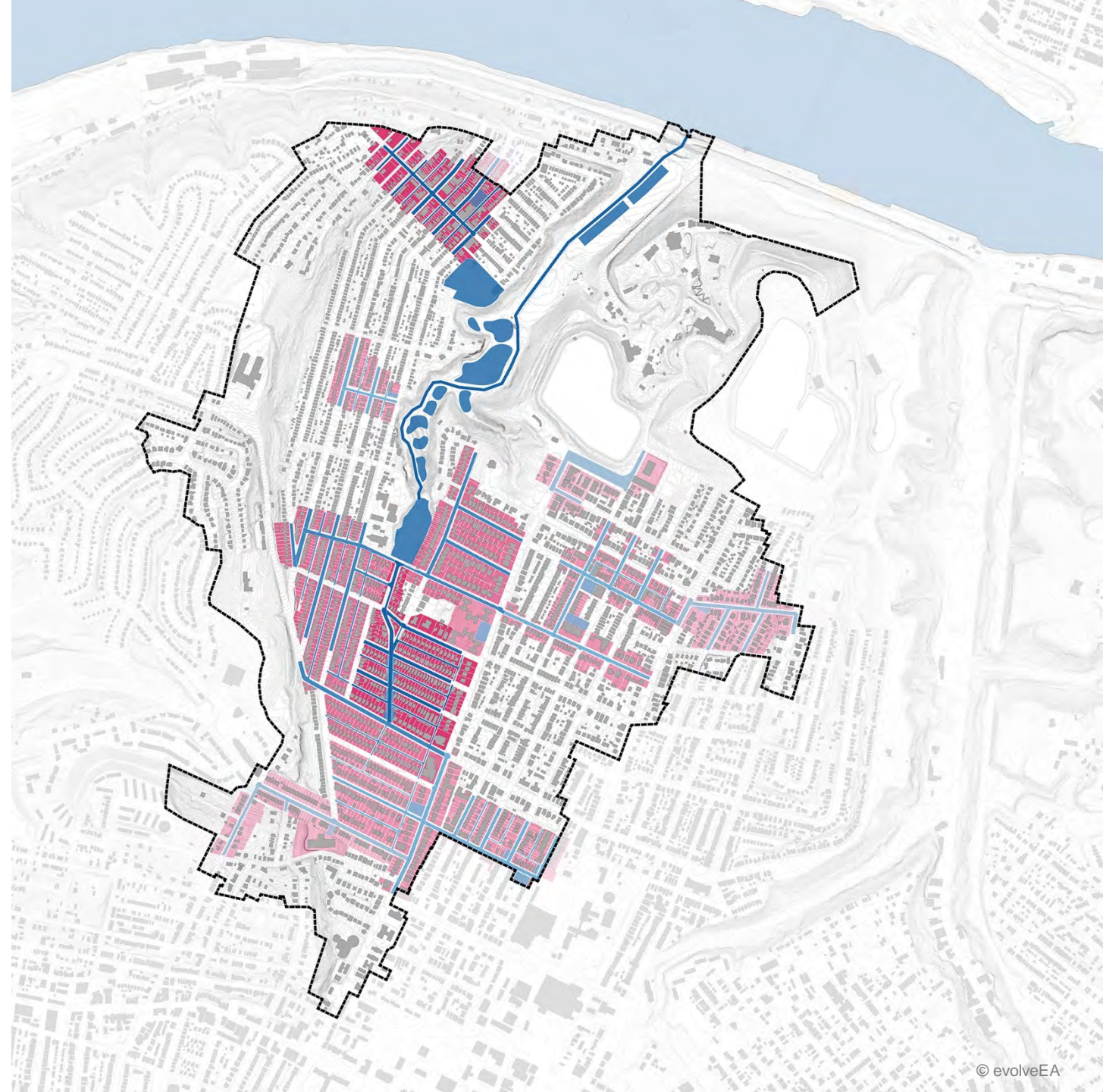
STORAGE

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



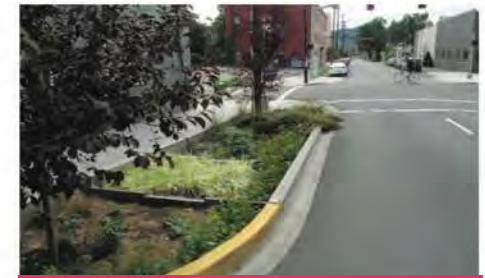
GREEN ALLEYS



COMPLETE STREETS



They require interagency cooperation.



IMPROVED STREETS



NATURALIZED BIOSWALES

BIOSWALES



SUBSURFACE STORAGE

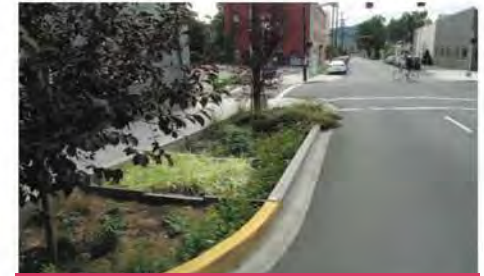


GREEN ALLEYS



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

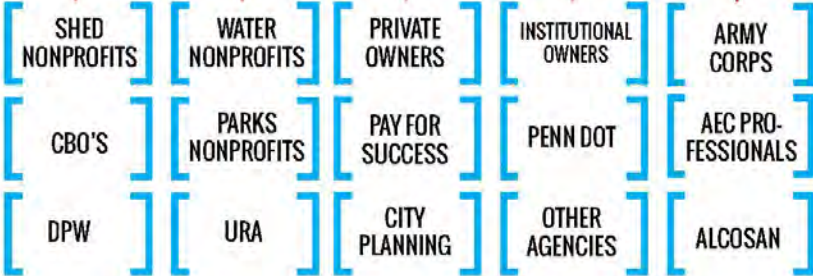
PWSA STORMWATER AUTHORITY

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

resources and protocols needed for teams to implement include:

- project typologies
- development standards
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- 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.

SHED MANAGER

Manages projects and efforts in shed on behalf of PWSA, including coordination of shed portfolio, (prioritization, design, implementation, community outreach, maintenance and performance monitoring), coordination with planning/development agencies, and management of partner relationships.

SHED MANAGER

SHED MANAGER

TECHNICAL ASSISTANCE

Engineering support for project implementation and stewardship. Management of large scale engineered infrastructure implementation. Works with City-Wide model and accountability.

PARTNERS

implement at all scales, including:

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

SHED NONPROFITS

CBO'S

DPW

WATER NONPROFITS

PARKS
NONPROFITS

URA

PRIVATE OWNERS

PAY FOR
SUCCESS

CITY
PLANNING

INSTITUTIONAL OWNERS

PENN DOT

OTHER
AGENCIES

ARMY CORPS

AEC PRO-
FESSIONALS

ALCOSAN

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 daylit surface flows.

Detention Sites 
Detention Sites + Conveyance Network 

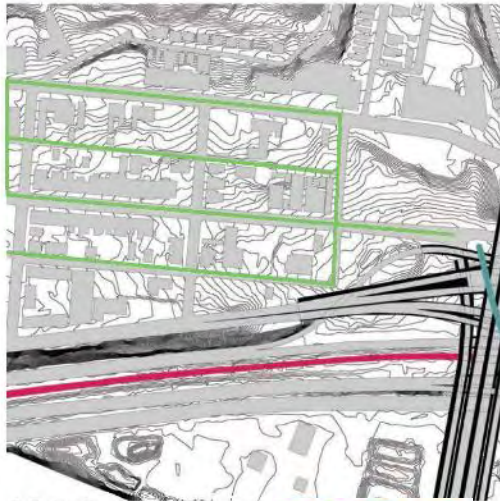
M19
SOHO RUN



GREEN CONVEYANCE CORRIDORS



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



M19
SOHO RUN

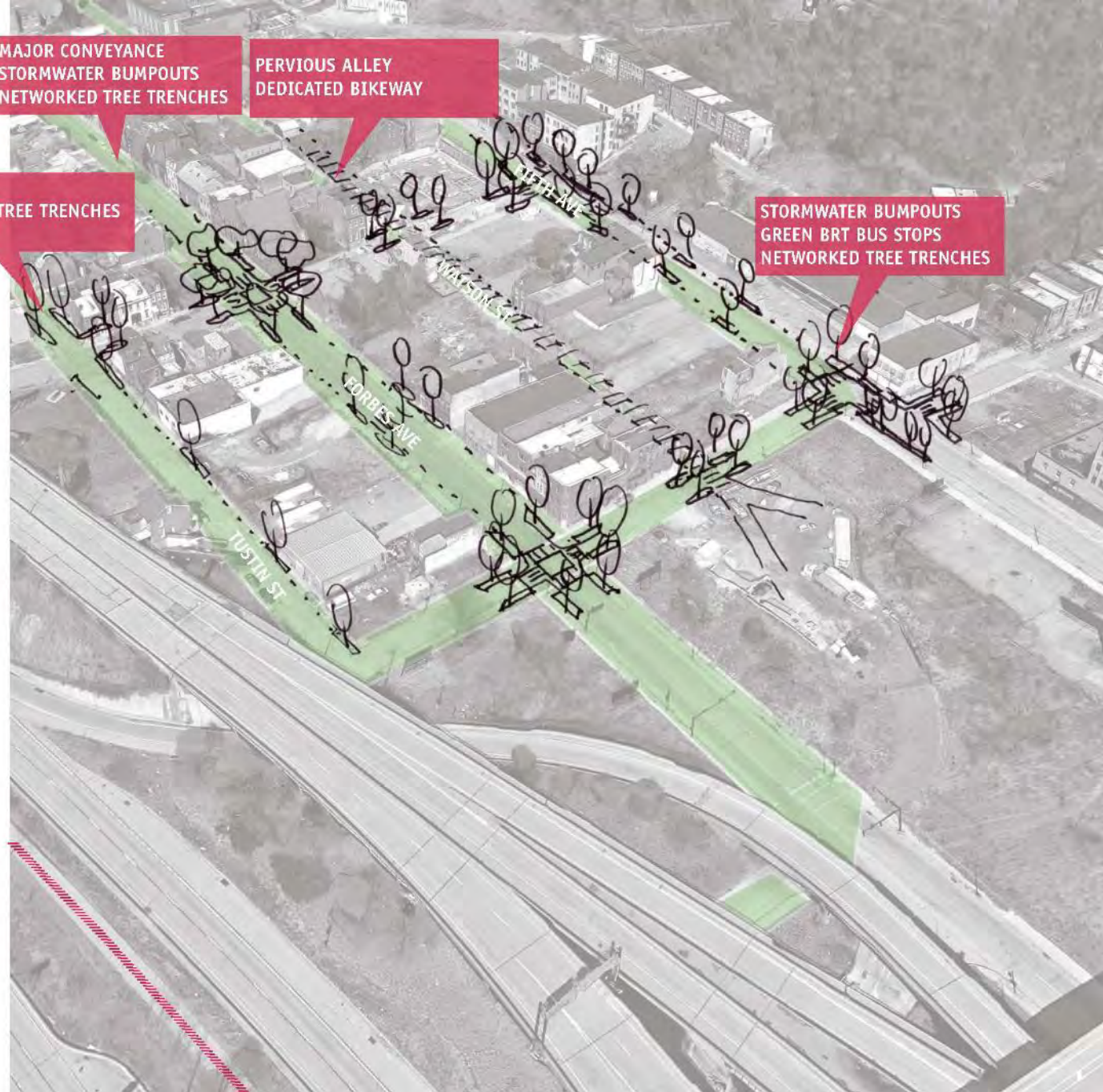


NETWORKED TREE TRENCHES

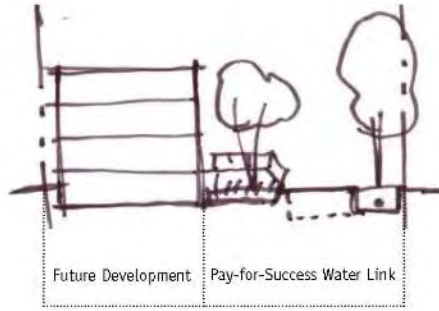
MAJOR CONVEYANCE
STORMWATER BUMPOUTS
NETWORKED TREE TRENCHES

PERVIOUS ALLEY
DEDICATED BIKEWAY

STORMWATER BUMPOUTS
GREEN BRT BUS STOPS
NETWORKED TREE TRENCHES

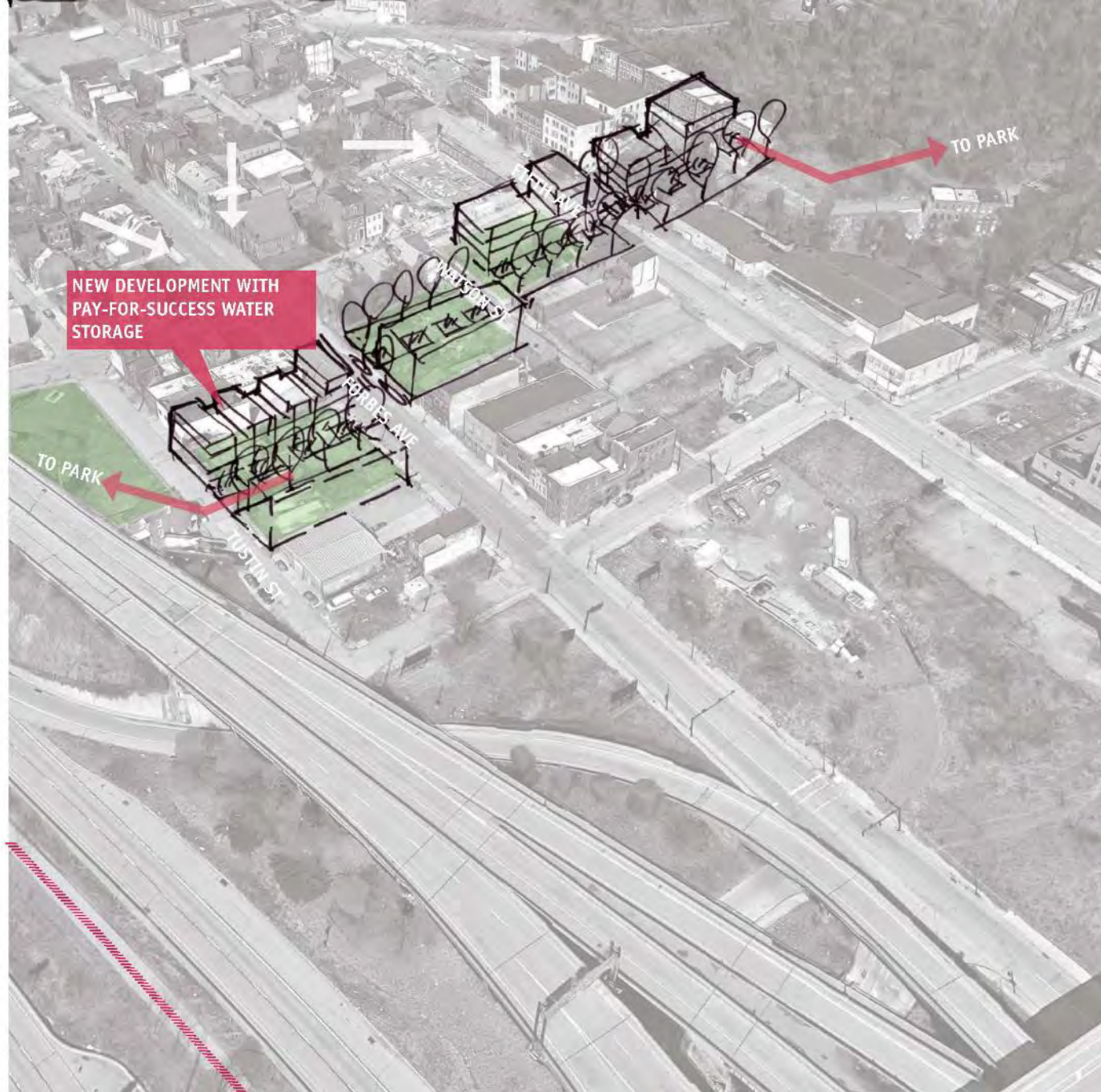


MID BLOCK WATER LINKS

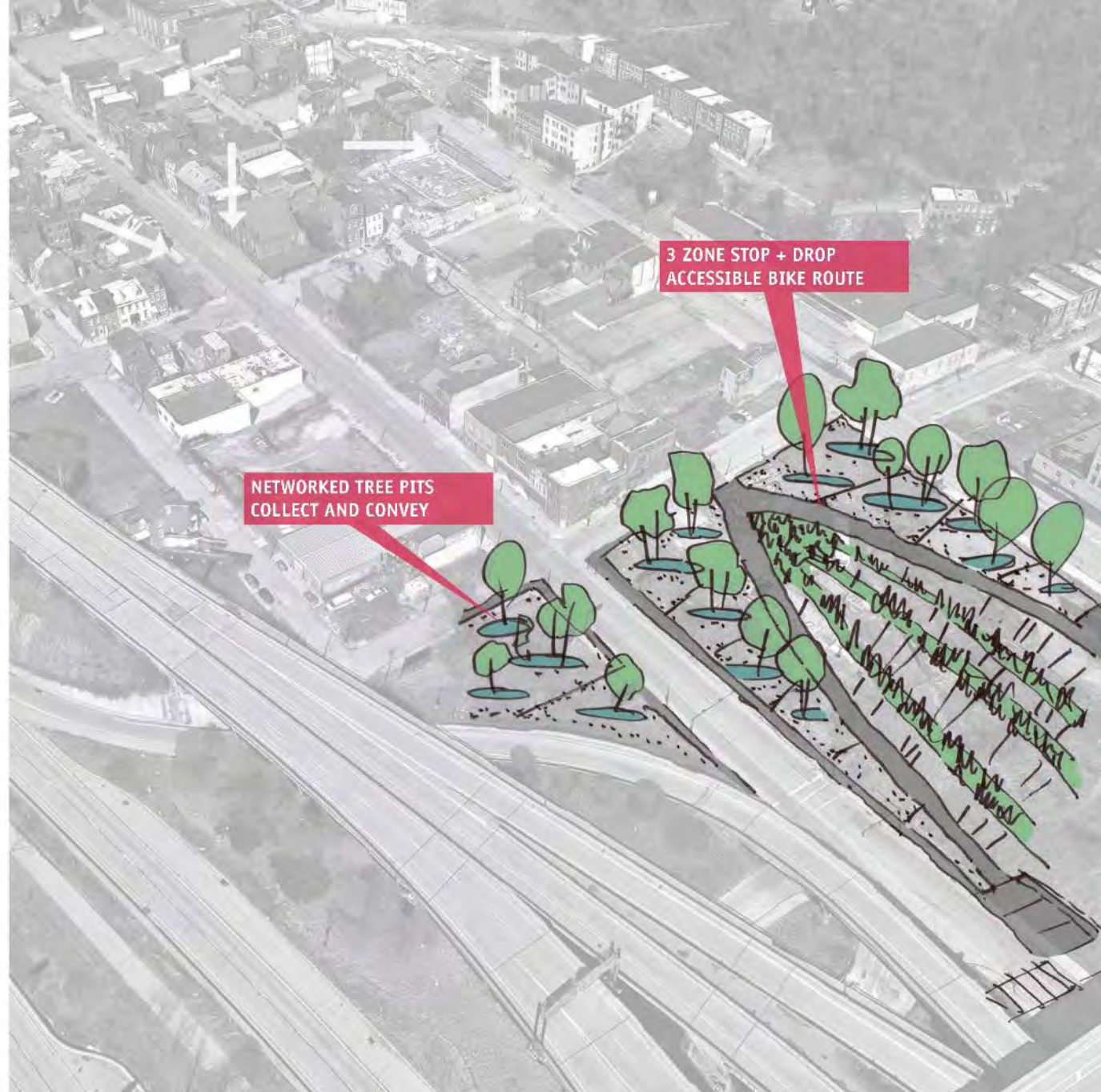


Forbes Avenue Streetscape with networked conveyance and detention infrastructure.

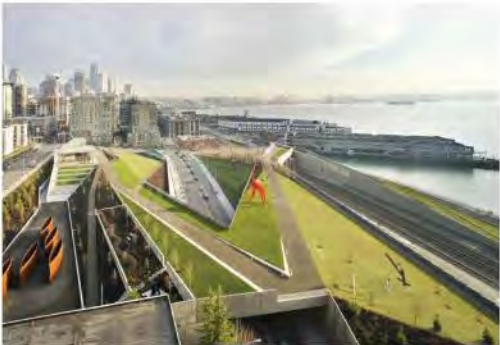
M19
SOHO RUN



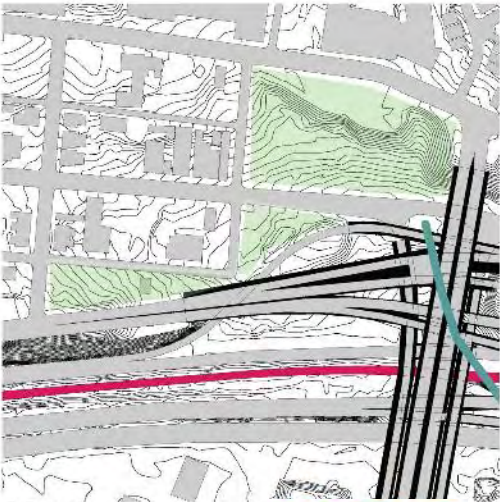
UPTOWN PORTAL PARK



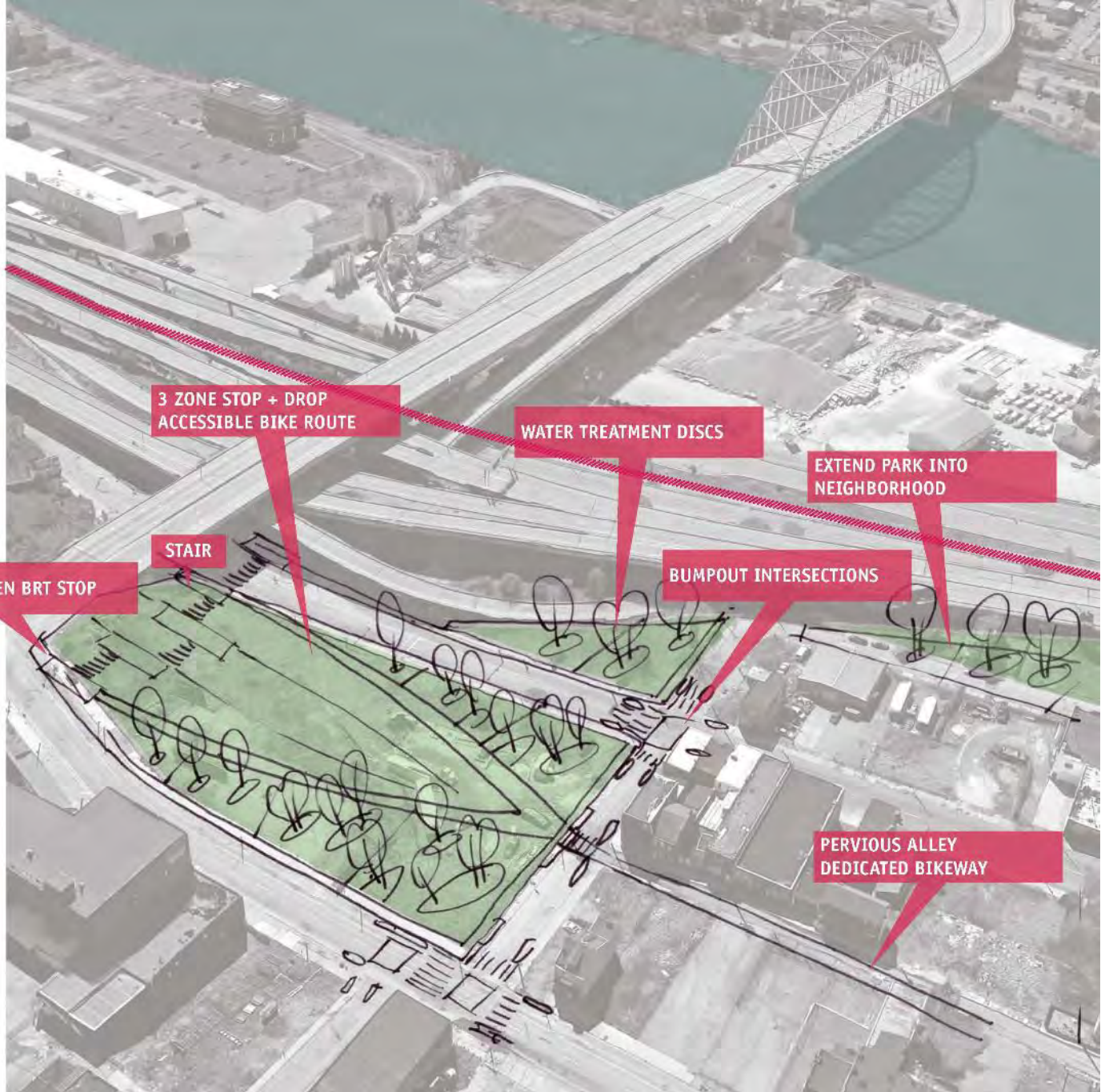
UPTOWN PORTAL PARK



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





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

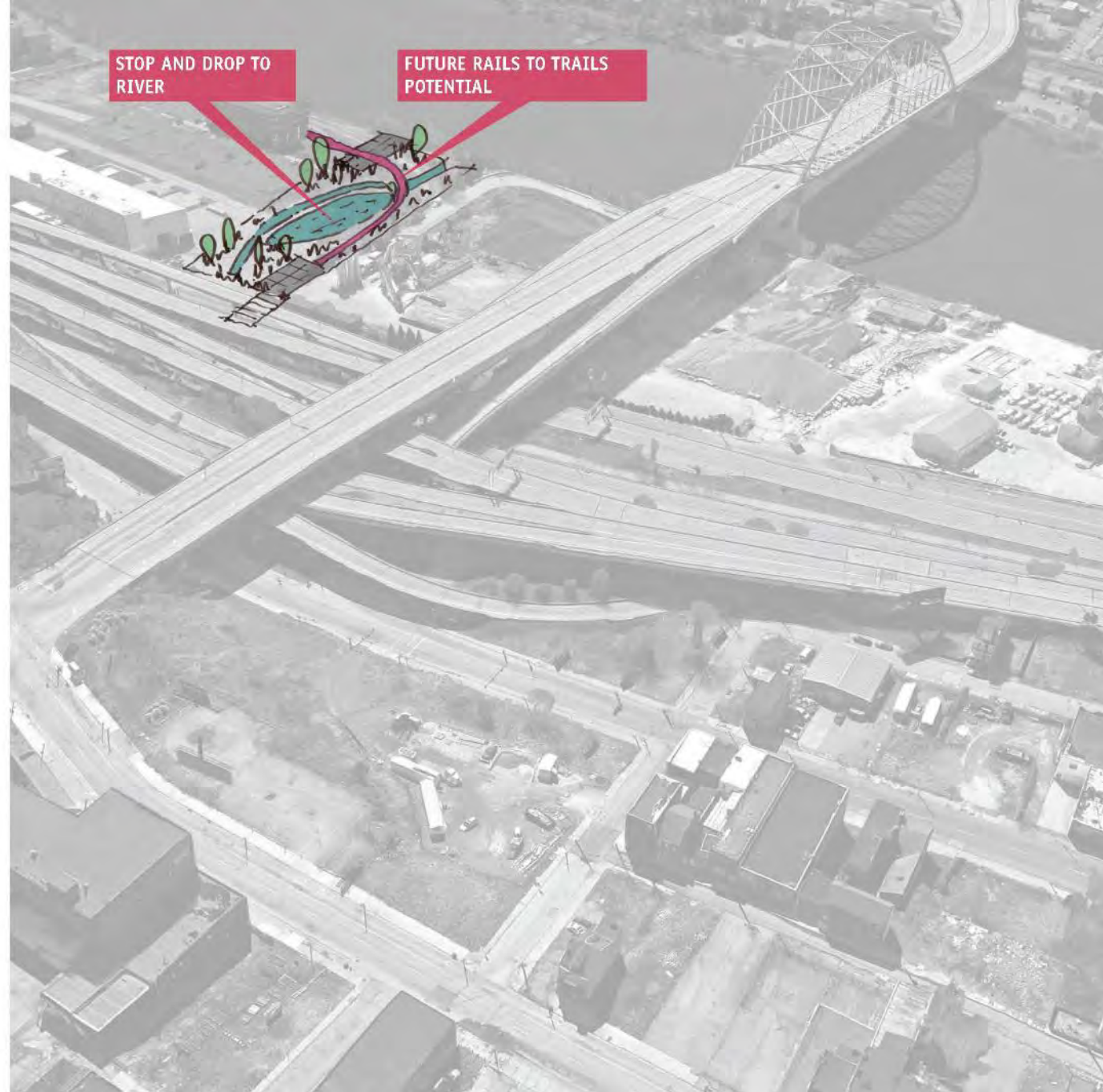
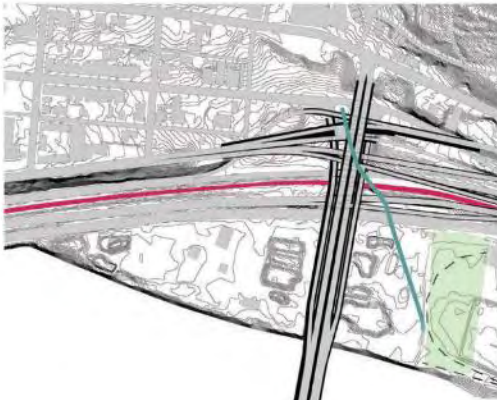
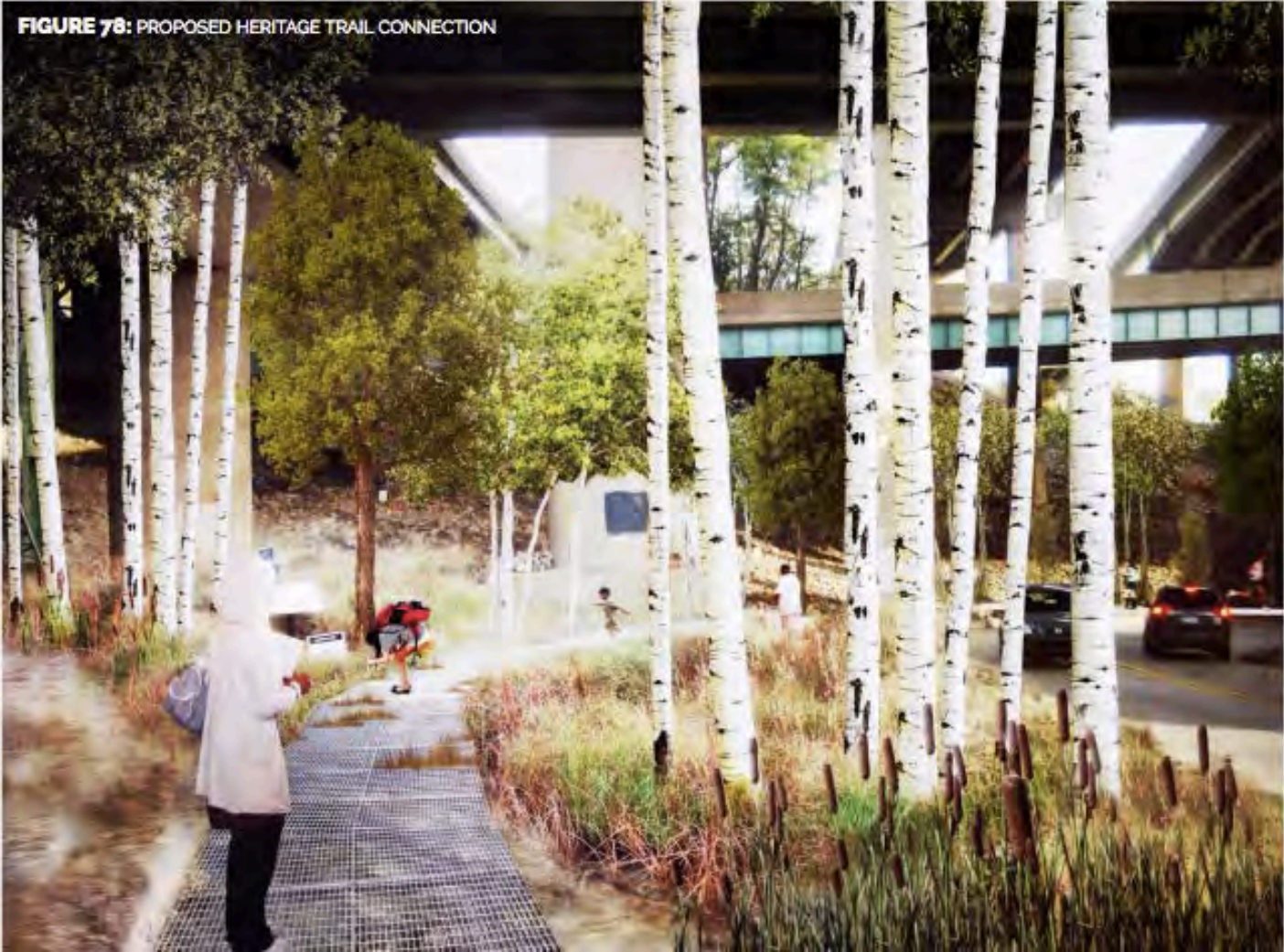


FIGURE 78: PROPOSED HERITAGE TRAIL CONNECTION



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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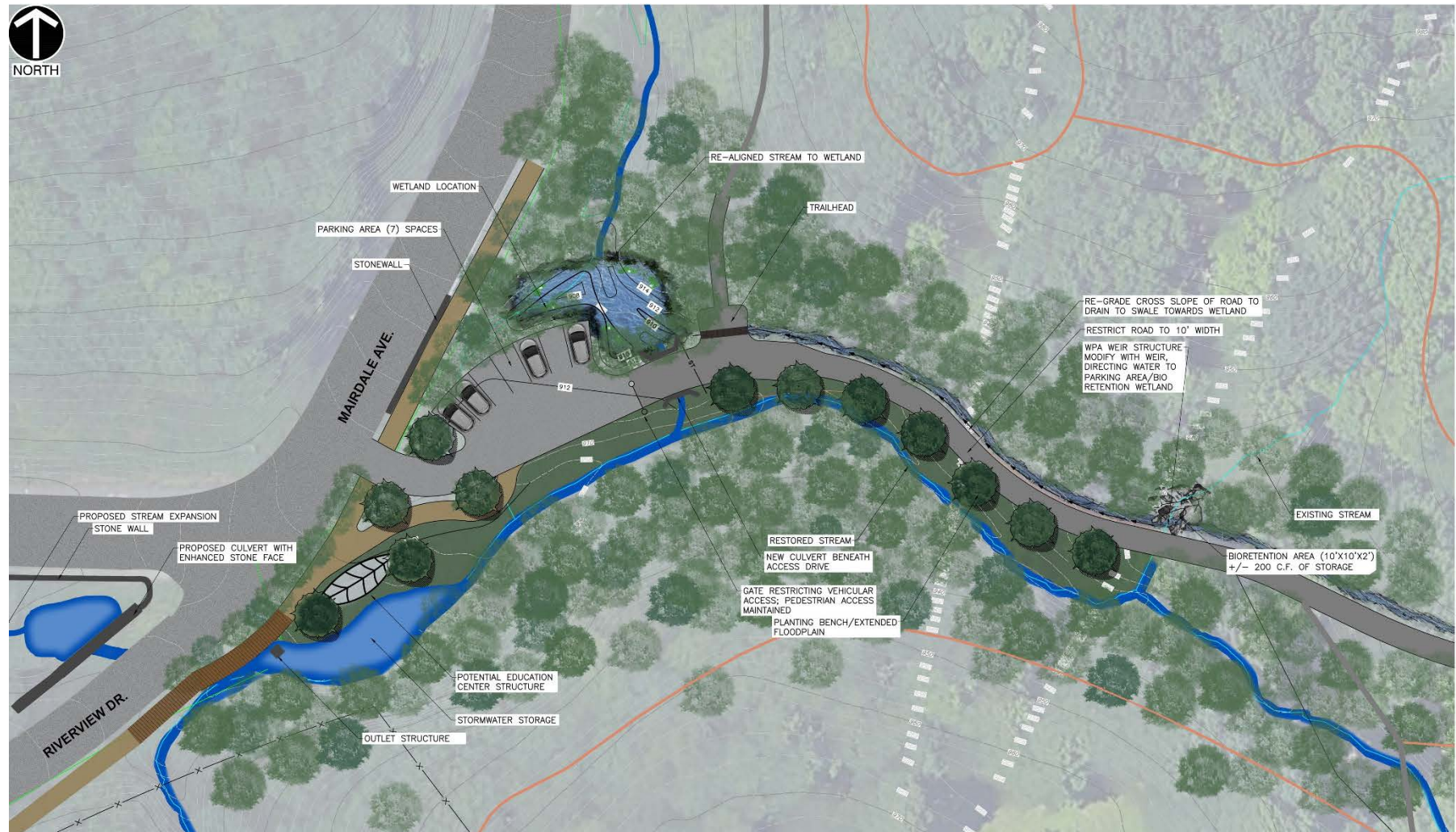


PROJECT
Herron and Centre Avenues
Grand Opening: June 20 18
PWSA

Works in progress



O27: WOODS RUN | RIVERVIEW PARK



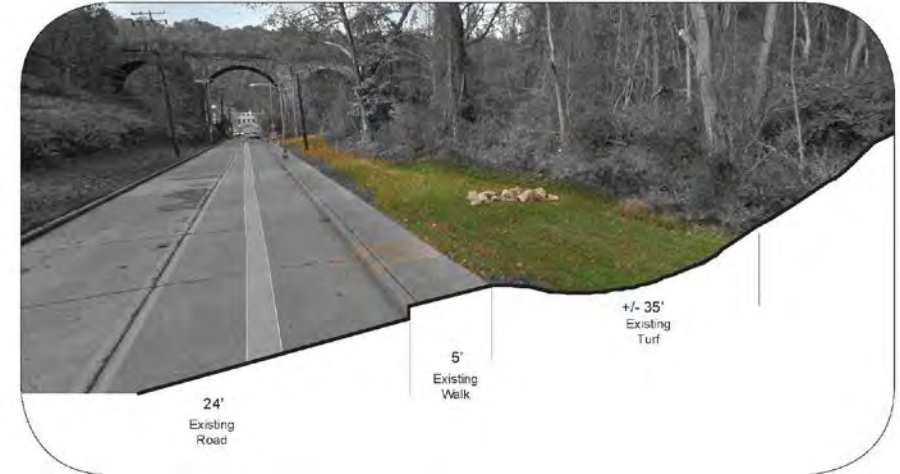
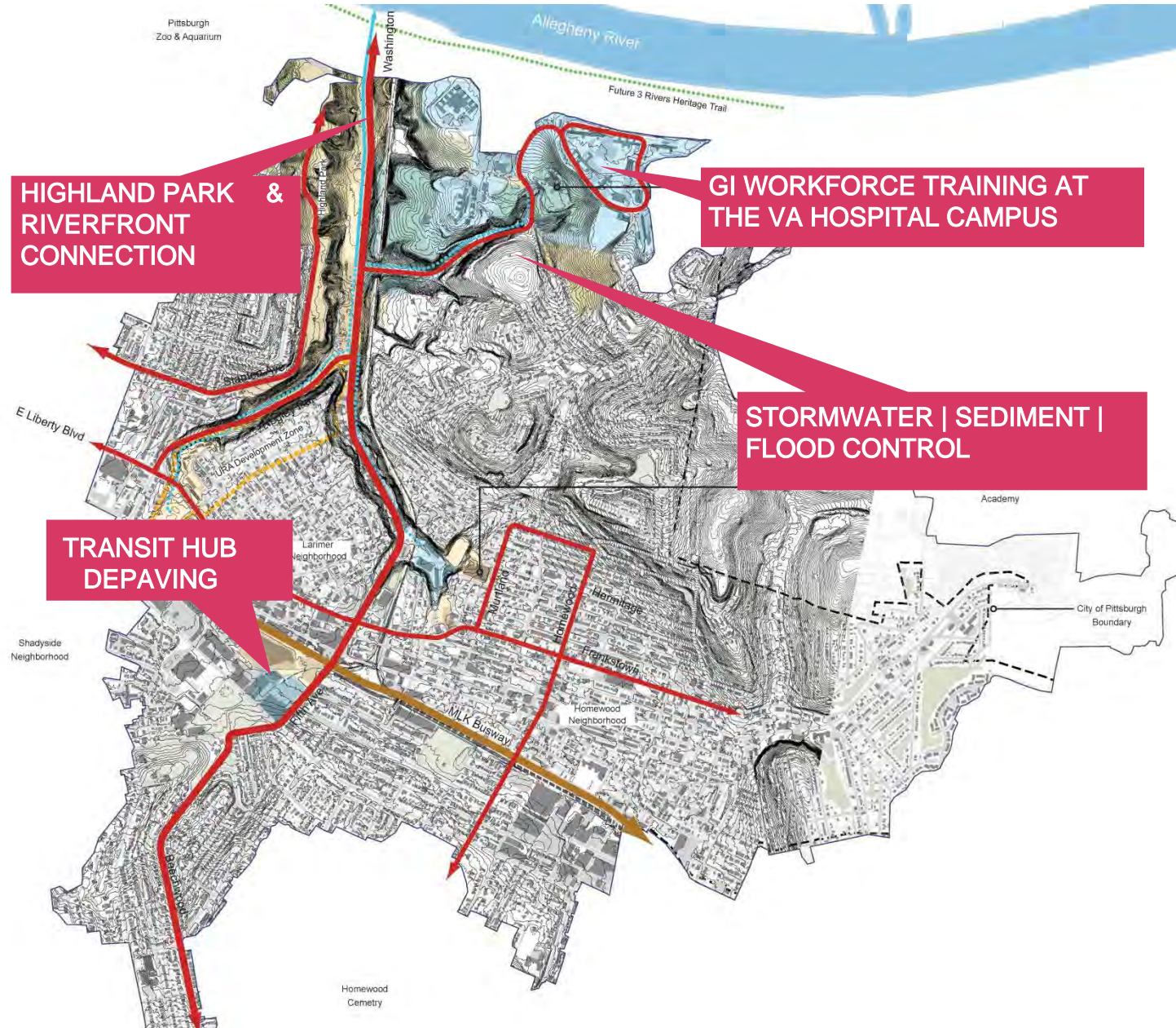
O27: WOODS RUN | RIVERVIEW PARK



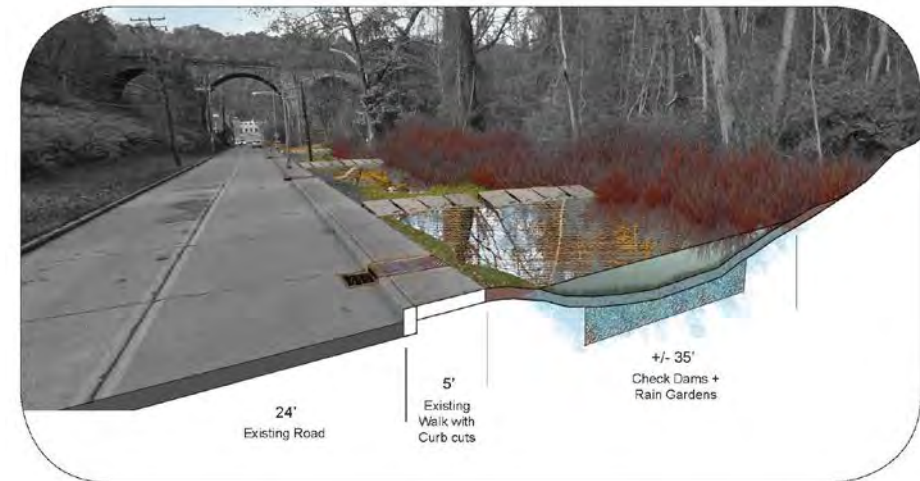
A42: WASHINGTON BLVD | NEGLEY RUN



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

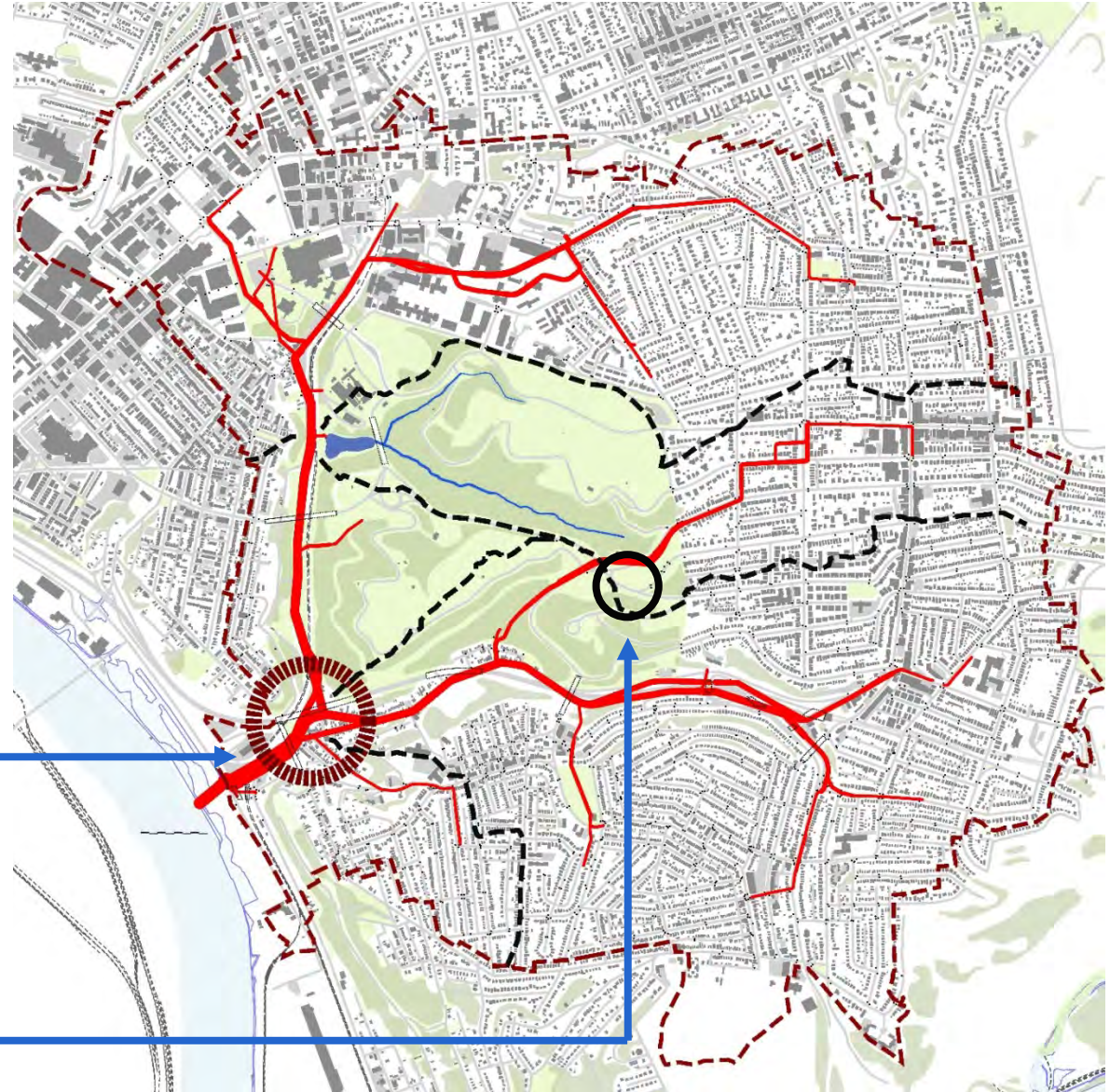
PANTHER HOLLOW
LAKE

JUNCTION HOLLOW
STREAM DAYLIGHTING

ALMONO SITE

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

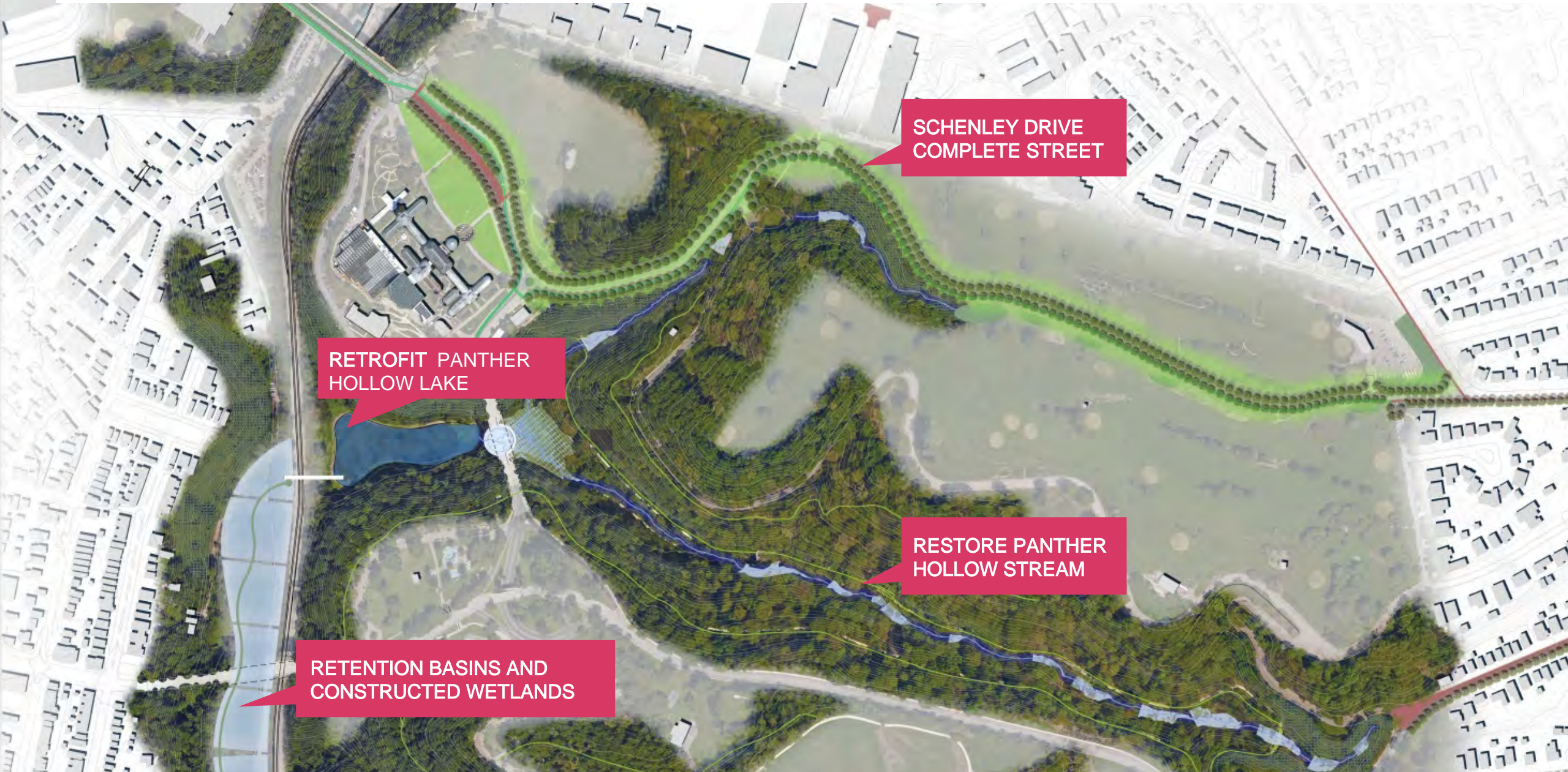
M29: FOUR MILE RUN | JUNCTION HOLLOW



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



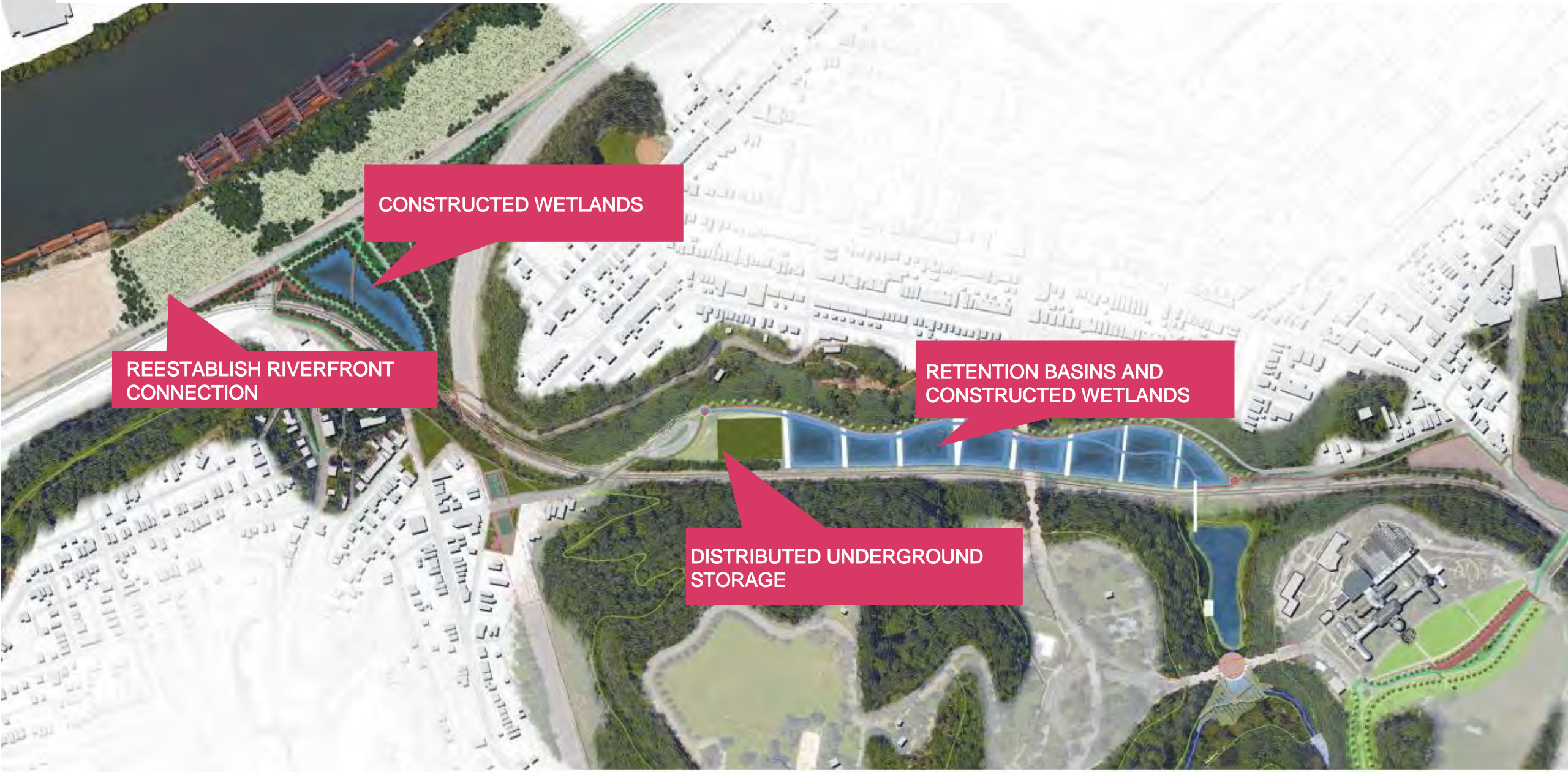
SCHENLEY DRIVE
COMPLETE STREET

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



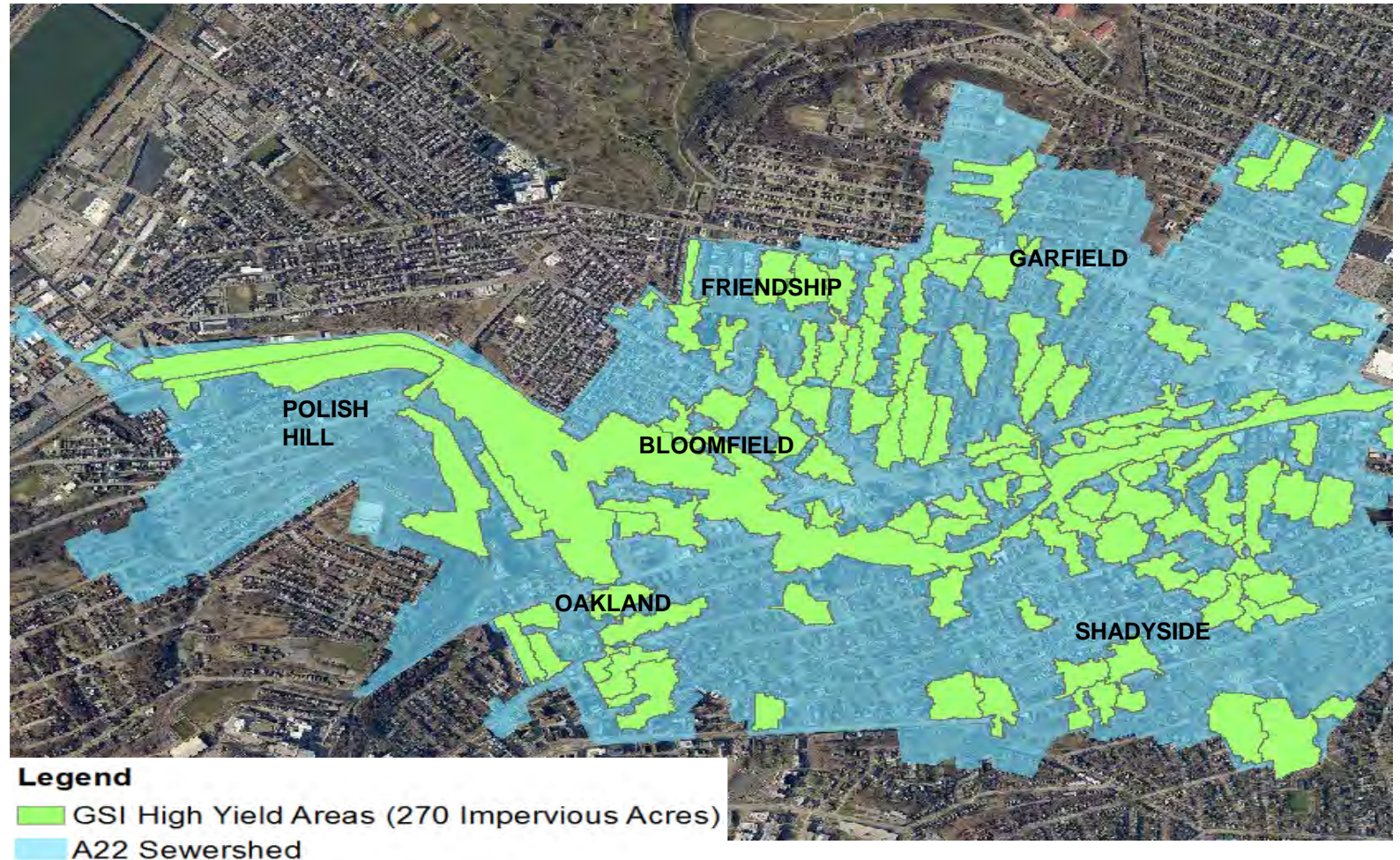
A22 SEWERSHED | EAST END FLOODING



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



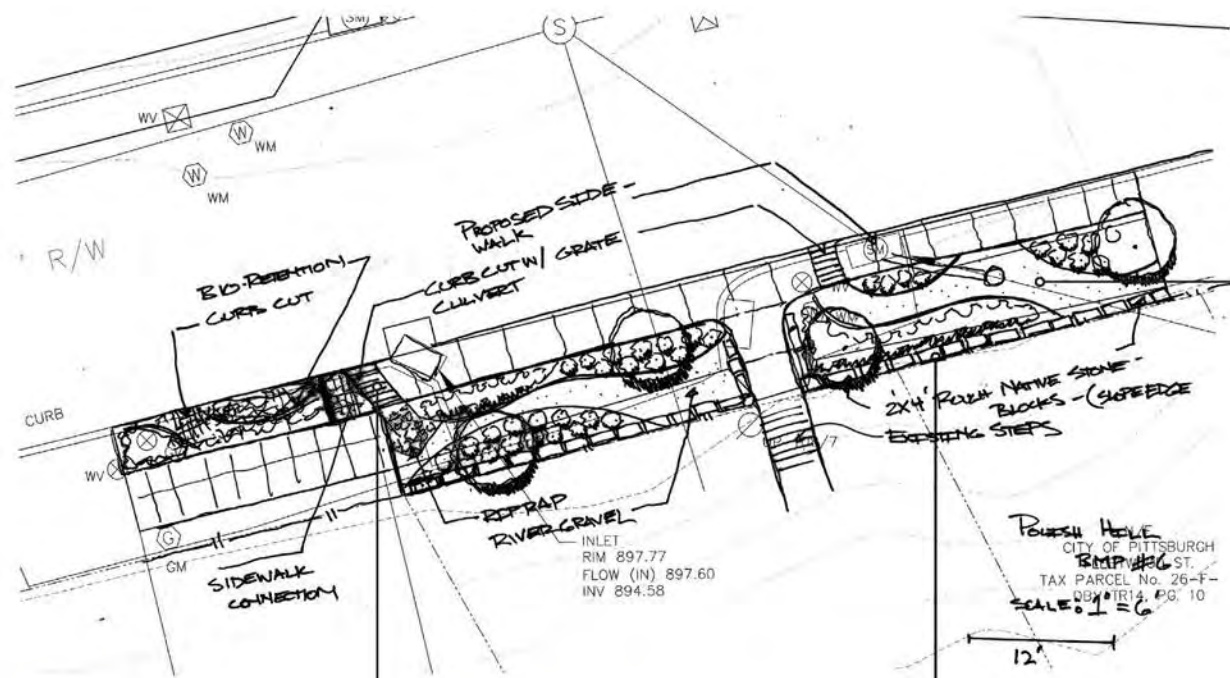


A22 SEWERSHED: HILLCREST PROJECT





A22 SEWERSHED: MELWOOD PROJECT



GRAVEL BED OF BIORETENTION



LIMESTONE BLOCK 1 COURSE HIGH TO TERMINATE SLOPE



SIDEWALK GRATE



A22 SEWERSHED: SHADYSIDE PROJECT



PLANTS FILTER AND
TRANSPIRE WATER WHILE
ENHANCING THE
STREETSCAPE

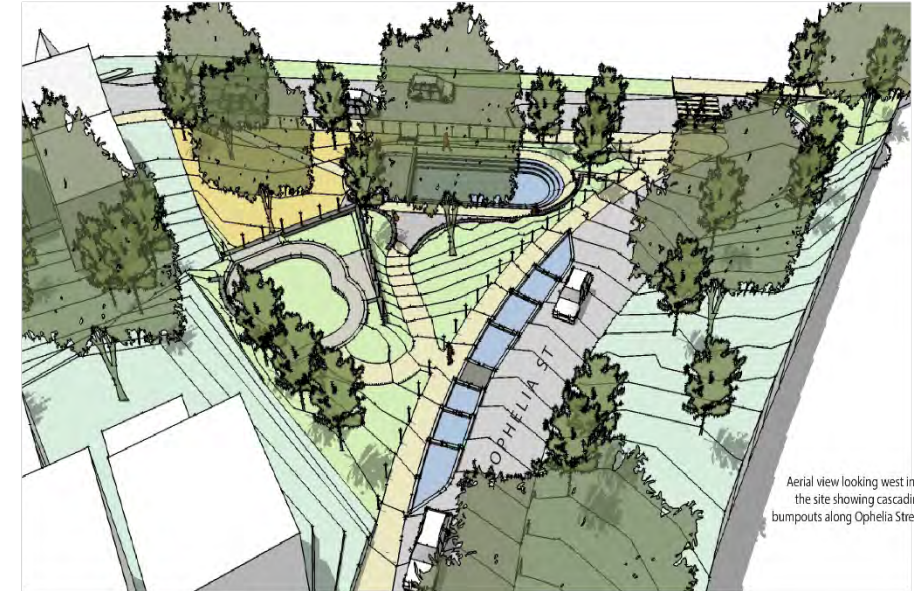
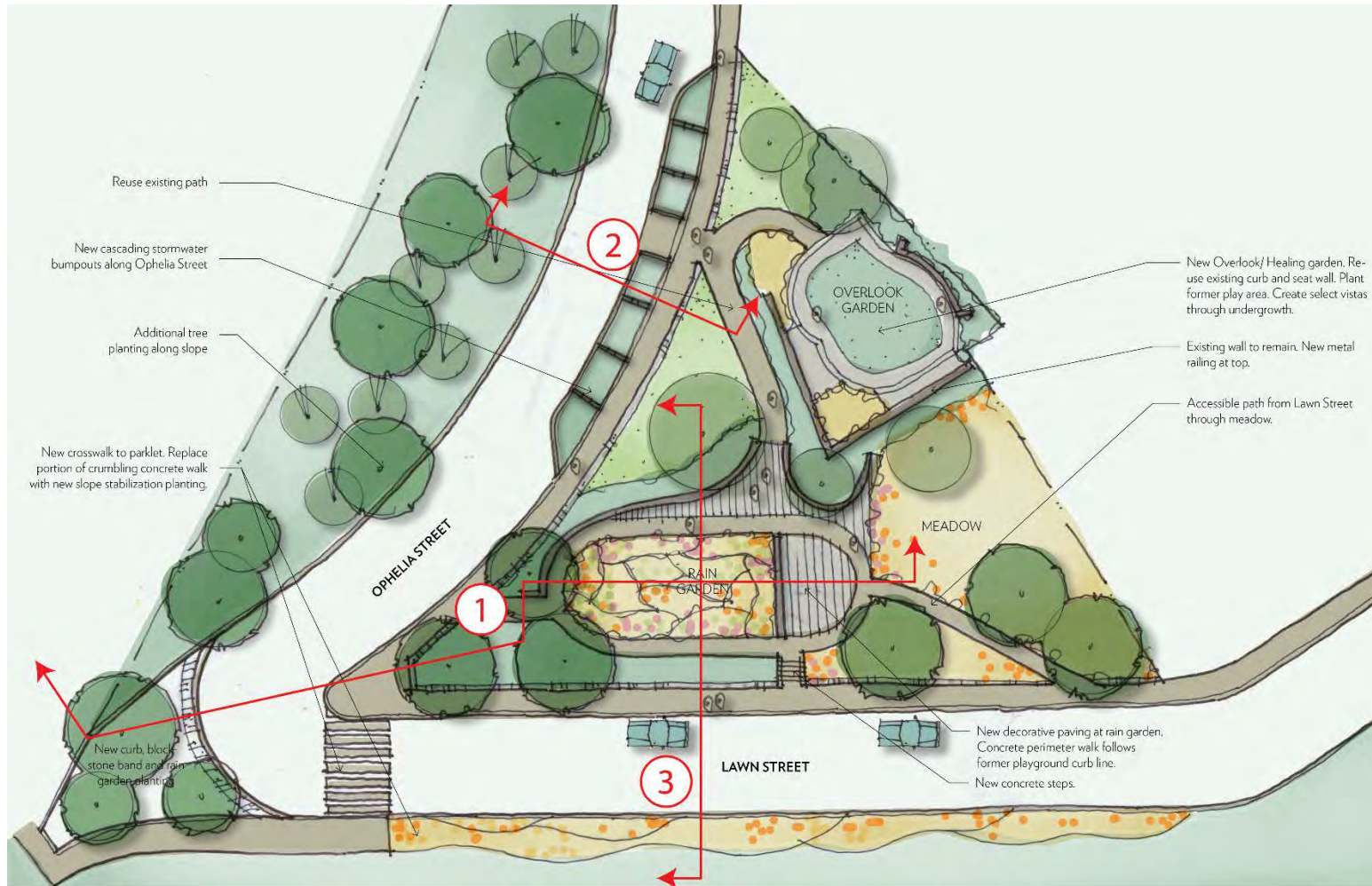




A22 SEWERSHED: CHATHAM UNIVERSITY



M19B: LAWN AND OPHELIA PARKLET



Christine Mondor

evolve environment::architecture

christine@evolveEA.com

Megan Zeigler

Pittsburgh Water and Sewer Authority

mzeigler@pgh2o.com