



**Pittsburgh
Water & Sewer
Authority**

**South Side Green Stormwater
Infrastructure Project**
South Side Slopes & South Side Flats

August 21, 2019

AGENDA

- Background
- Project Goals
- Review Preliminary Design
- Breakout Session with Design Team

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



COMBINED SEWER SYSTEM

Dry Weather

Residential Wastewater

Business Wastewater

Wastewater Treatment Facility

Roof & Area Drains

Street Storm Drains

Roof & Area Drains

Facility

Sewer

Sewer

Treated Water

Combined Sewer

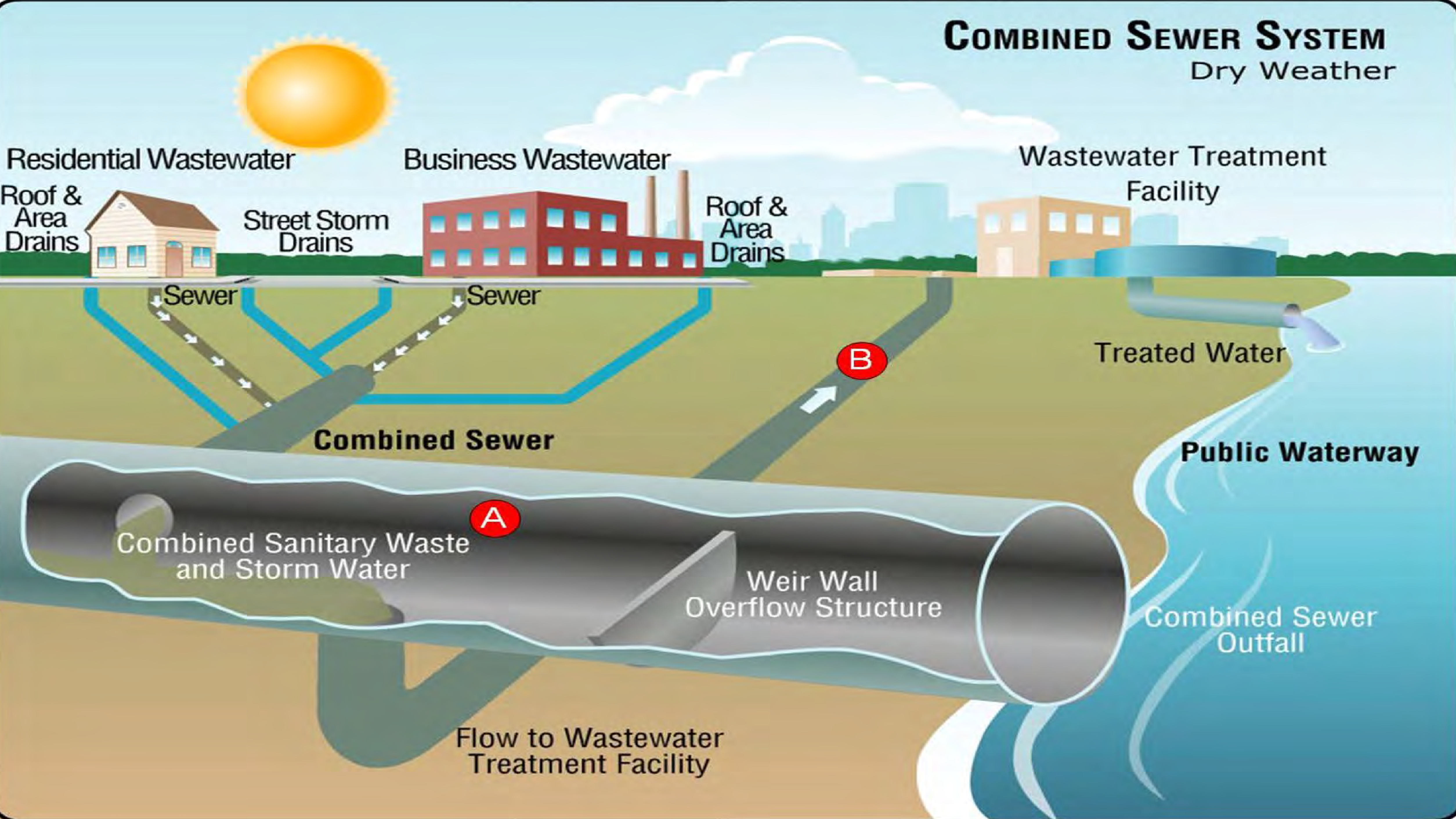
Public Waterway

Combined Sanitary Waste and Storm Water

Weir Wall Overflow Structure

Combined Sewer Outfall

Flow to Wastewater Treatment Facility



COMBINED SEWER SYSTEM

Wet Weather

Residential Wastewater

Business Wastewater

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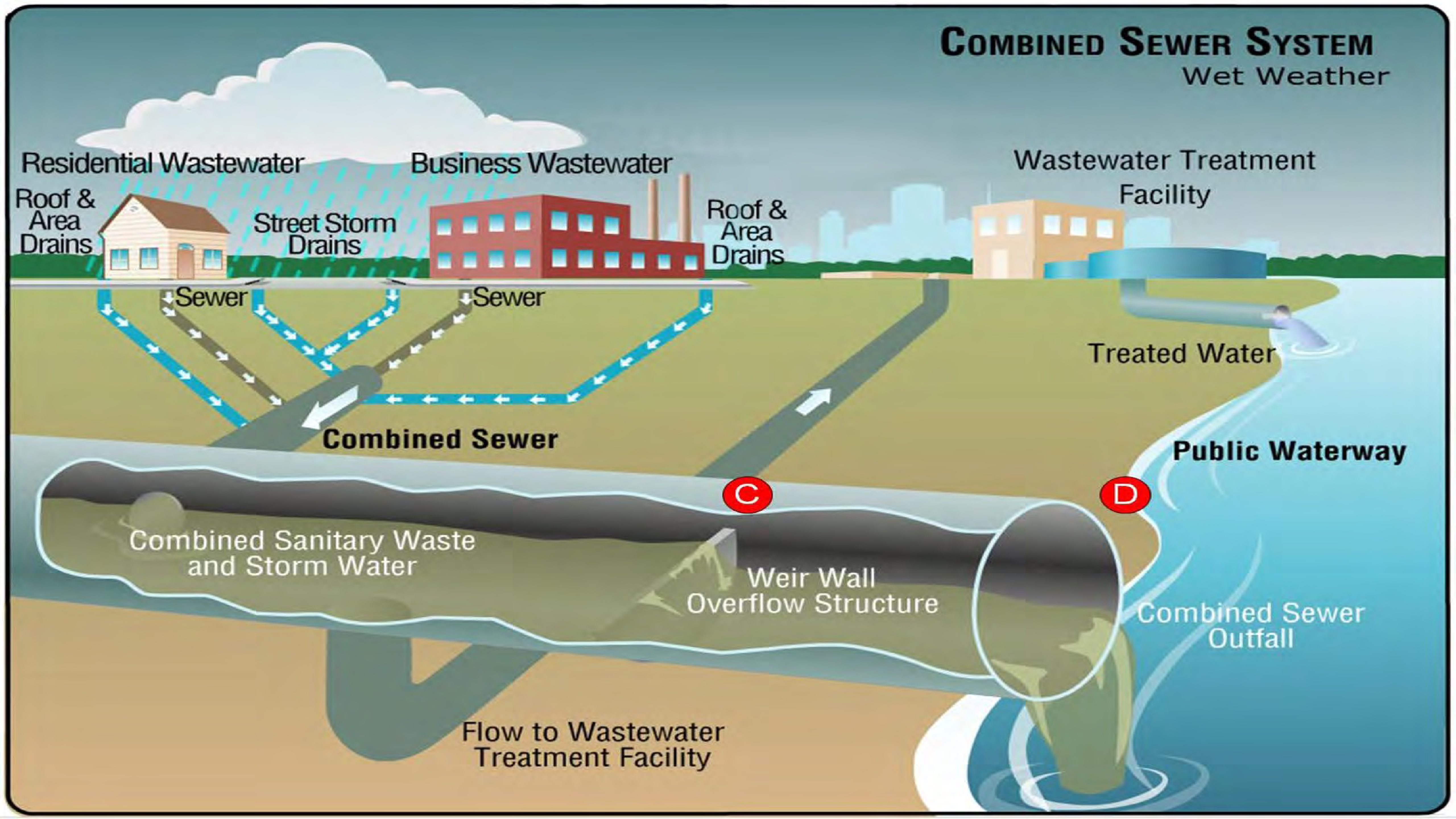
Public Waterway

Combined Sanitary Waste and Storm Water

Weir Wall Overflow Structure

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Flow to Wastewater Treatment Facility



WE HAVE A STORMWATER MANAGEMENT PROBLEM

- Poor water quality
- CSOs/SSOs
- Illicit discharges – sewage in storm sewers
- Surface flooding
- Basement sewage flooding
- Sewers that are 80 – 100+ years old

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



PITTSBURGH HAS A STORMWATER MANAGEMENT PROBLEM

- Averages 38 inches of rain a year
 - Rainfall no longer falls evenly across the year
 - More severe storms dump more rain quicker
- Aging stormwater infrastructure was built for a different time, less population, and communities that had more green space and less pavement



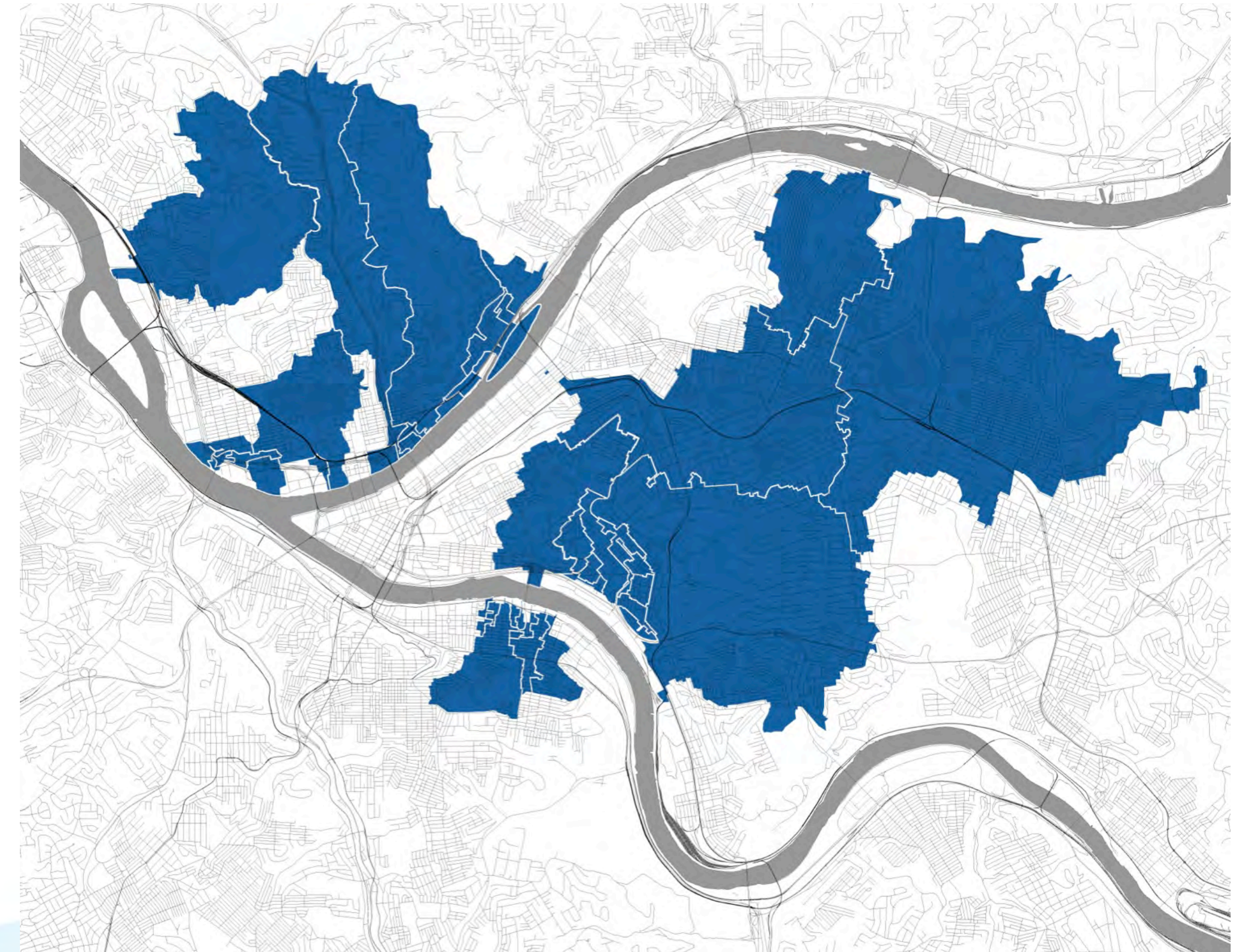
“Heavy Rains Cause Flash Flooding Across Western, PA Region,” CBS Pittsburgh, June 20, 2018 at 4:36 pm

LOCAL CHANGES TO MANAGE STORMWATER

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

Green First Plan: 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.



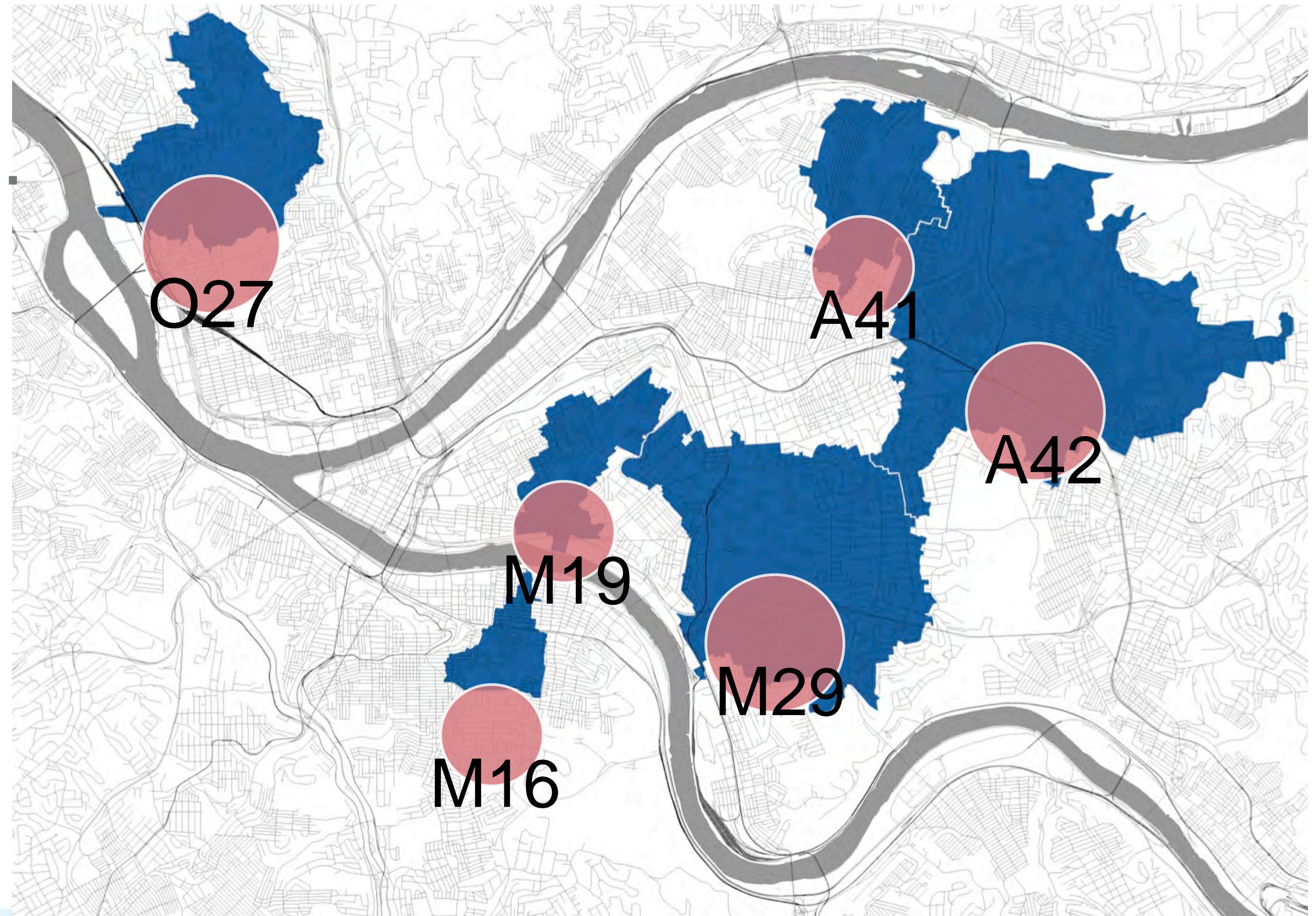
Green First Plan: PROCESS

Identified the **top 30 sheds** and overlaid other criteria...

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

and chose **6 priority sheds**

Goal: Comprehensive watershed-scale solutions



WHAT IS GREEN STORMWATER INFRASTRUCTURE?

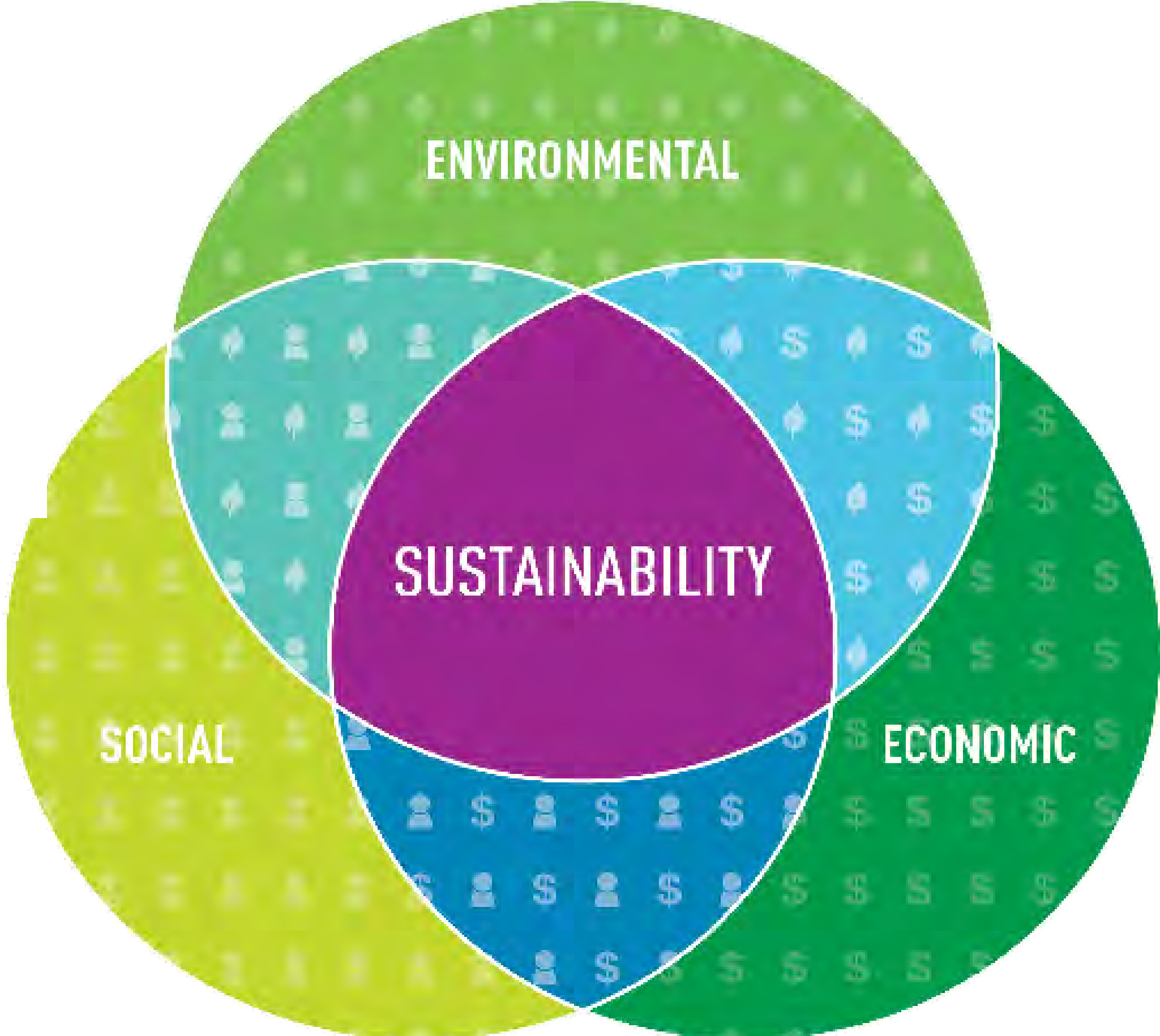


GREEN STORMWATER INFRASTRUCTURE



Pittsburgh's Green First Plan: **BENEFITS**

TRIPLE BOTTOM LINE



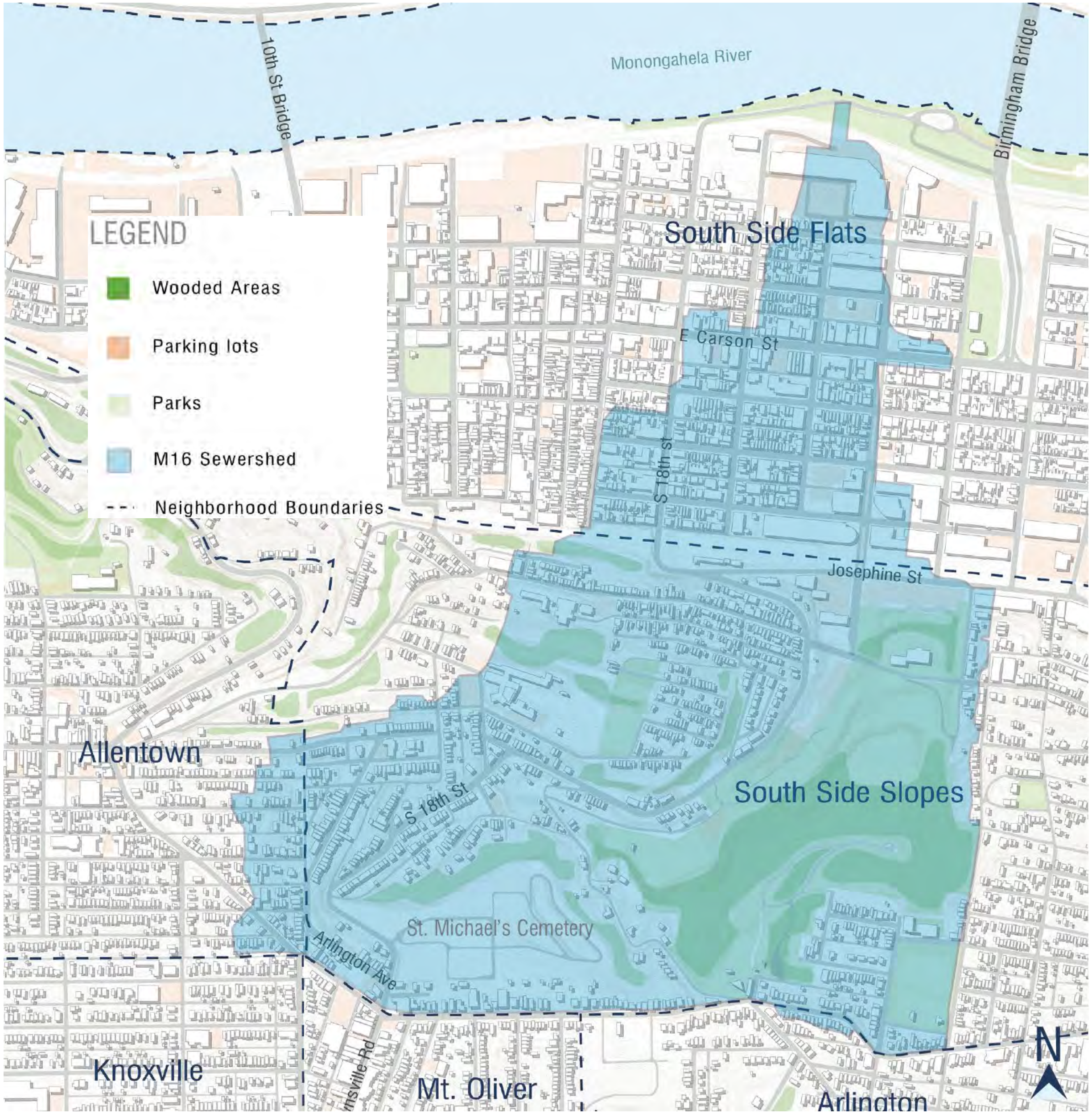
SOUTH SIDE GSI PROJECT PRELIMINARY DESIGN

Community Meeting 1

WED, AUGUST 21ST, 2019
BLACK FORGE COFFEE
1206 ARLINGTON AVENUE
PITTSBURGH, PA 15210

SOUTH SIDE GSI PROJECT : BACKGROUND

- M16 PRIORITY WATERSHED
- IDENTIFIED IN CITY-WIDE GREEN FIRST PLAN
- A DIVERSE MIX OF LAND FORM, USE, AND COVER

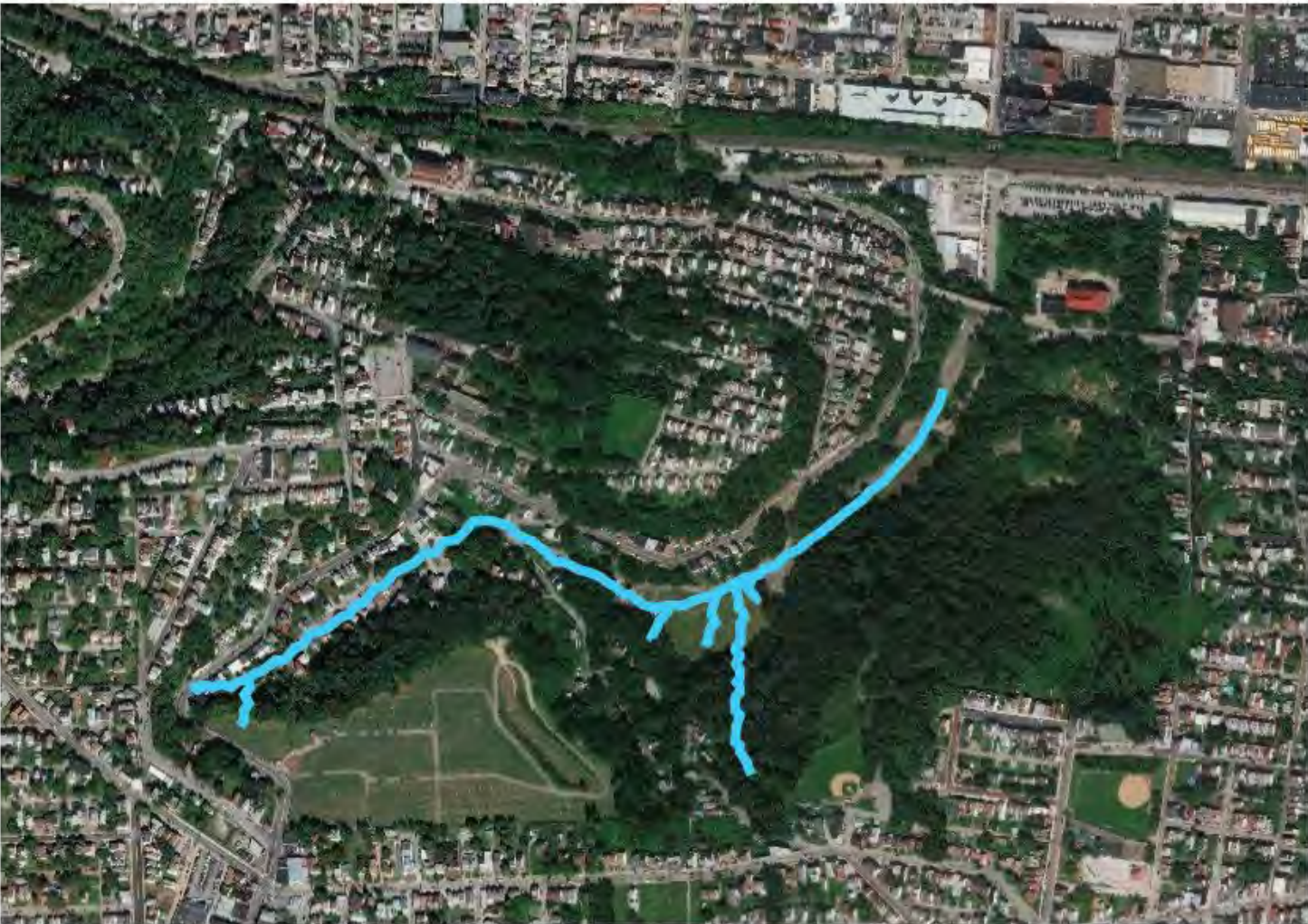


SOUTH SIDE GSI PROJECT : BACKGROUND

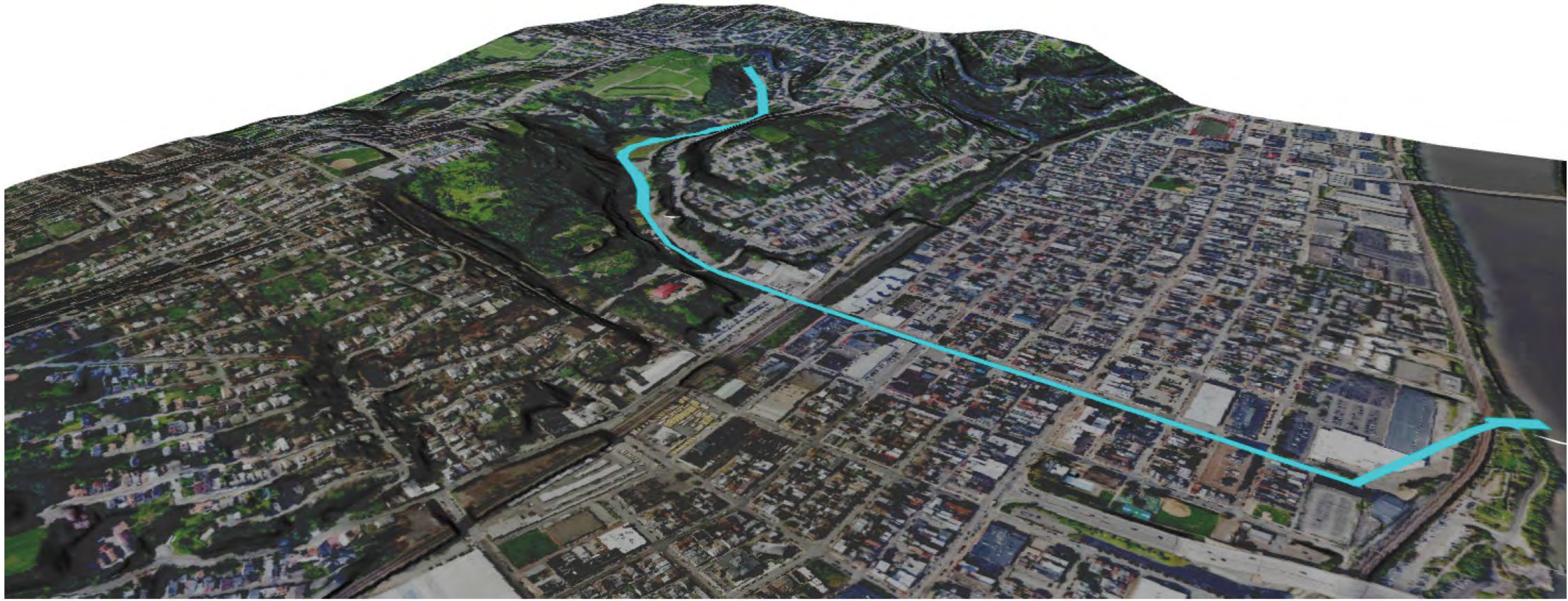
- HISTORIC STREAM VALLEY
- HUB OF INDUSTRIAL & MINING ACTIVITY
- LOCUS OF GREEN STORMWATER INFRASTRUCTURE INTEREST AND OPPORTUNITY



1872 - Historic park with stream identified



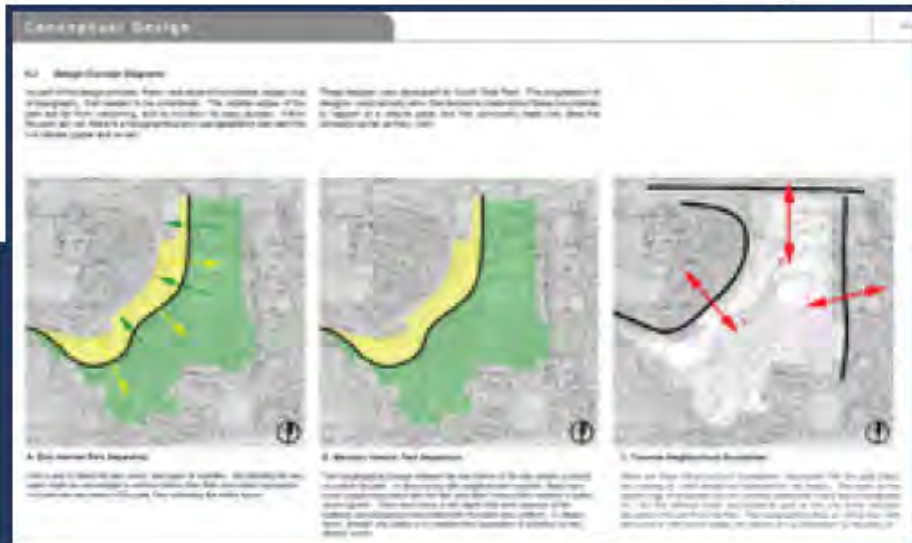
2019 - Current Aerial with stream identified



SOUTH SIDE GSI PROJECT : BACKGROUND

2003

The South Side Slopes Association commissioned Klavon Design Associates to complete a **Master Plan** that detailed, as a guiding design principal, the desire to “manage stormwater on site.”



Where the Water Meets the Concrete: South Side Park Stream Daylighting Project

2008

Where the Water Meets the Concrete introduced the idea of restoring a surface water stream to the park.

2008

The **South Side Park Greenspace Management Plan** identified needs for the park such as erosion control and stormwater management, trail and accessibility improvements, invasive species removal, and intentionally increasing connections between parts of the park.



2013

The **Open Space PGH Plan** articulated the need for green stormwater management in Pittsburgh’s green space, including South Side Park. Stated policies included increasing coordination between the City, Alcosan and Pittsburgh Water and Sewer Authority and developing regional approaches to green stormwater management.



2014

In April, the **South Side Green Infrastructure Charrette** brought together design and environmental professionals to envision a green link along 21st St, connecting South Side Park to the Three Rivers Heritage Trail. The resulting demonstration project detailed strategies that served as a template for green streets and community green space in Pittsburgh neighborhoods in conjunction with intentional community and stakeholder input.



2017

In the **Green First Plan**, the M-16 sewershed was one of six selected for strategic urban planning opportunities, primarily due to the potential alignment with other redevelopment initiatives.



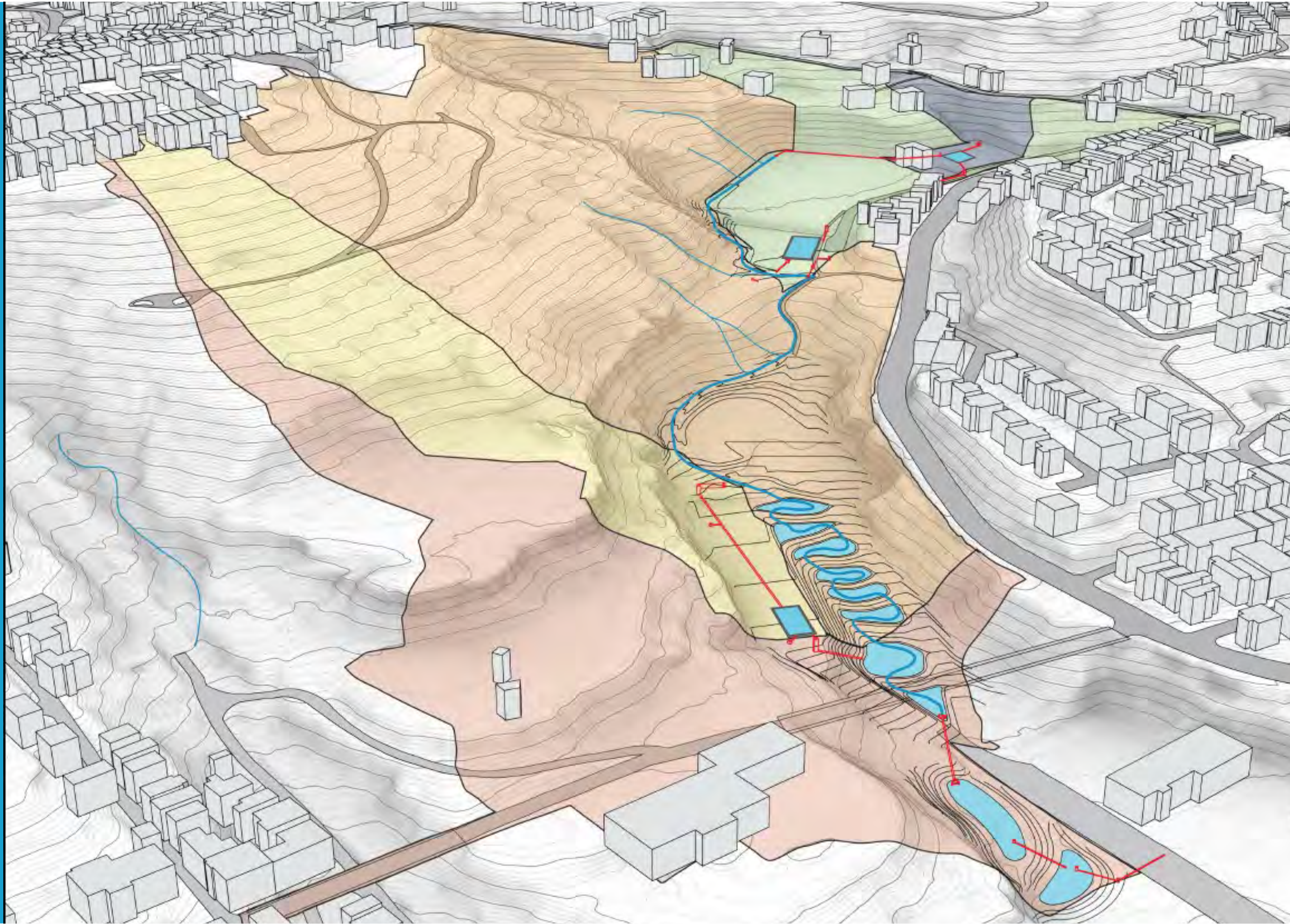
2018

The South Side Park underwent a community-focused master planning process. The resulting **Master Plan** indicated that the South Side community strongly desired to see surface water conveyance through the park. This input dovetailed well with PWSA’s focus on using the Park to detain and store stormwater that contributed to CSO events from this sewershed.



SOUTH SIDE GSI PROJECT : PERFORMANCE GOALS

- 3 PRELIMINARY DESIGN ALTERNATIVES
- > 23 ACRES IMPERVIOUS CAPTURE
- MANAGE 1.5" RAINFALL RUNOFF
- COST-EFFICIENT DESIGN



DESIGN PROCESS : BUILDING ON OPPORTUNITIES

- STUDIO BRYAN HANES
SOUTH SIDE PARK
MASTER PLAN

- Parcel acquired for green infrastructure
- Renovated parking (30 spots)
- Drive
- ADA-accessible boardwalk
- Parking (60 spots)
- Shared-use (bike) path
- Community event area
- Open-air pavilion over small building (includes bathrooms)
- Amphitheater
- Lawn
- Paved push-ramp for cyclists and green infrastructure detention cells
- Renovated entrance with parking (5 spots)
- Children's Discovery Garden
- Basketball court + marble rings
- Resurfaced rectangular field with subsurface detention
- Embankment bleachers
- Renovated bathrooms, concessions, scoreboard
- Parking (40 spots)
- Public art opportunity
- BMX pump track (third-party operator)
- Trail for BMX access
- Embankment slides
- Ropes course (third-party operator)
- Embankment bleachers and new scoreboard
- Sculptural overlook + parking (9 spots)
- Basketball court and play area renovations
- Renovate Arlington Rec Center
- Manage invasive species with native planting
- Seating at Jurassic Valley Overlook
- 1040 Trail and interpretive art

- East/West Connector Trail
- Revealed seeps + seating
- Tombstone Trail considered for ADA accessibility
- Trail through plateau and wetlands +picnic platforms
- New Sierra St. entrance, steps + Sierra Connector Trail
- Canopy overlook
- Boardwalk and wetlands
- Mission St. Connector Trail
- Renovated parking and entrance area with seating
- Drive gated (vehicle access for garden members)

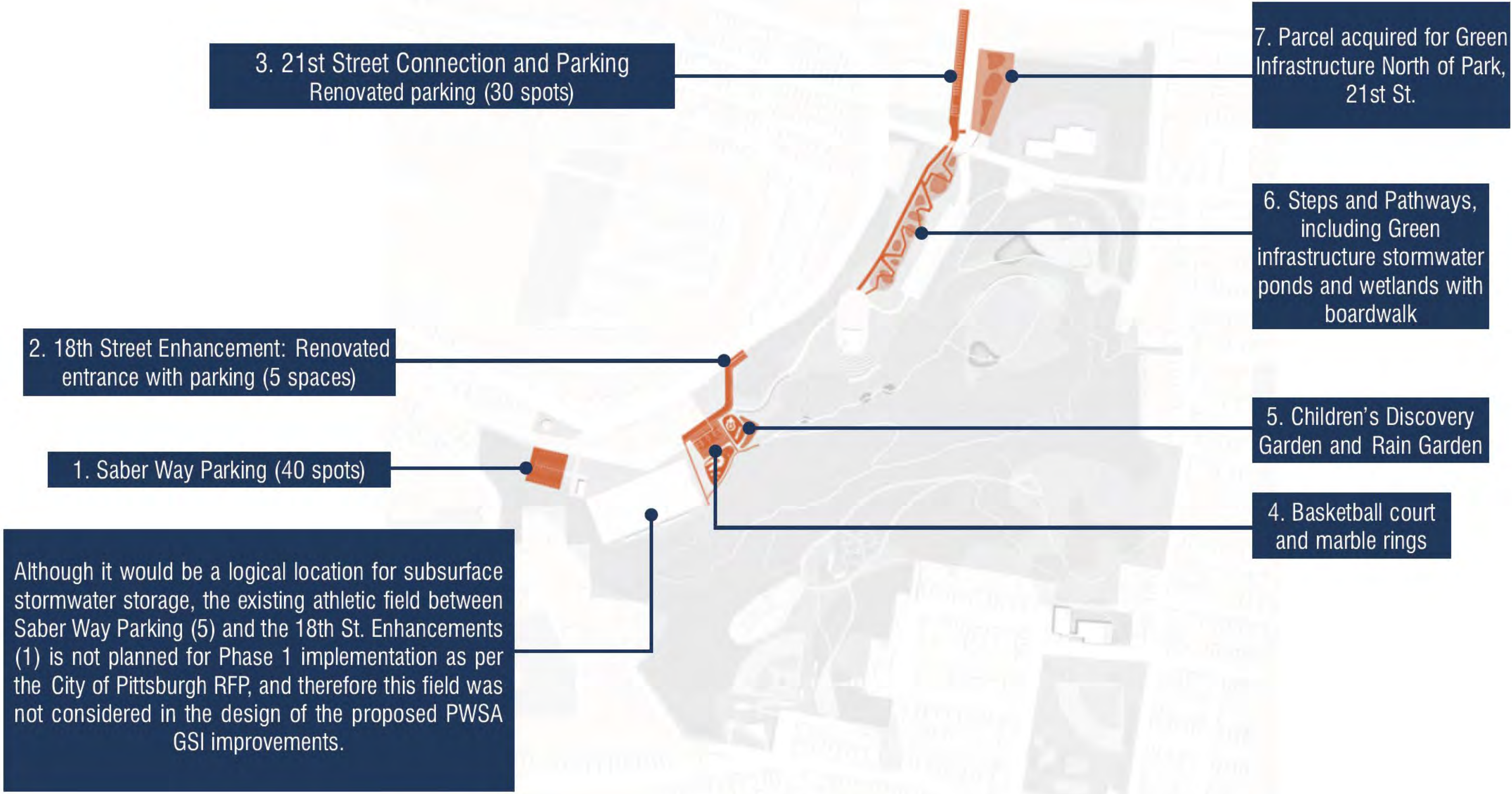


DESIGN PROCESS : BUILDING ON OPPORTUNITIES

- STUDIO BRYAN HANES
SOUTH SIDE PARK
MASTER PLAN



DESIGN PROCESS : BUILDING ON OPPORTUNITIES



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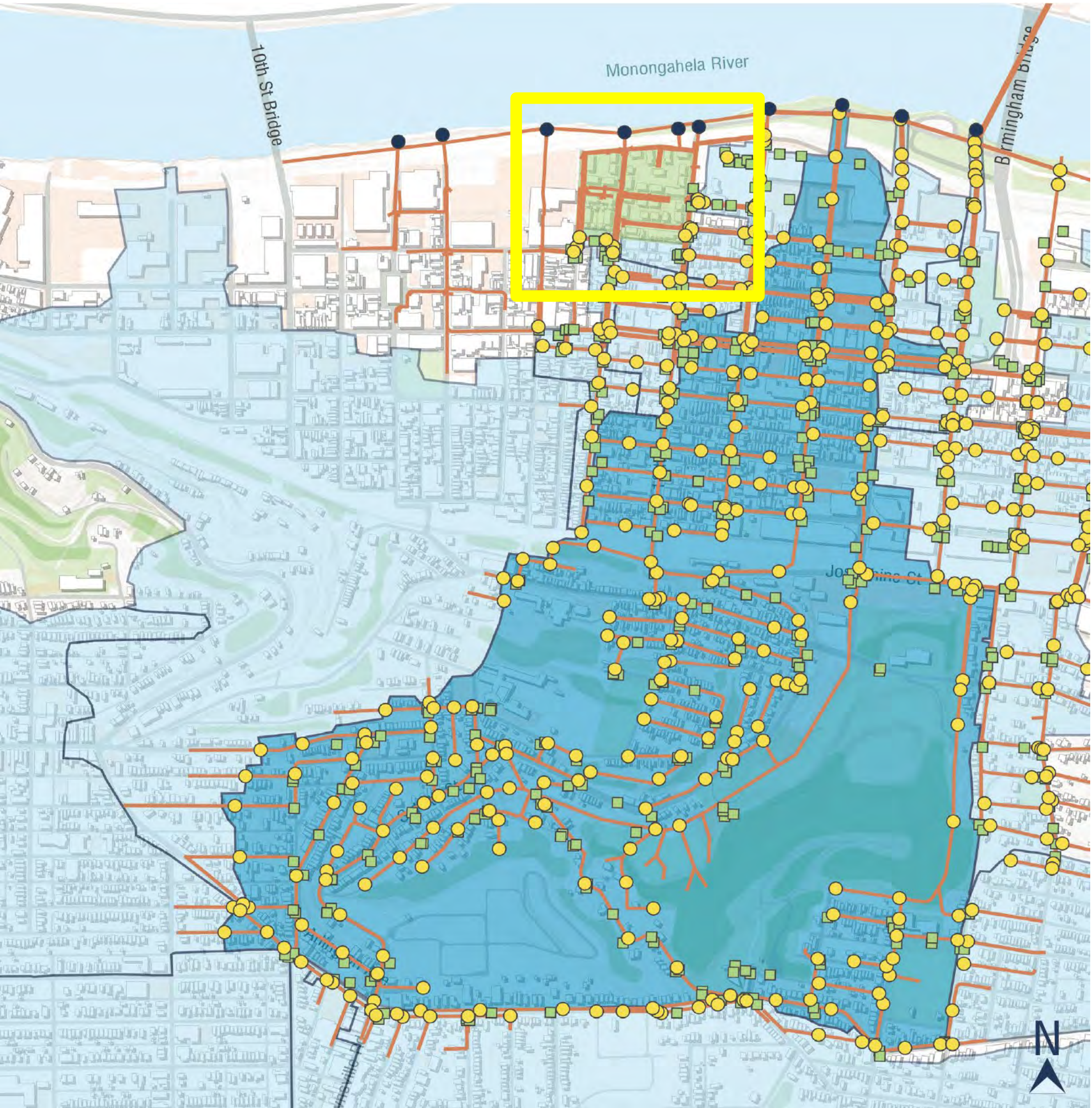
WESTERN PA CONSERVANCY SOUTH 21ST STREET GSI STREETScape

- 4 AC OF CAPTURE
- POROUS PAVER PARKING STALLS
- UNDERGROUND DETENTION CHAMBERS
- DOWNSPOUT DISCONNECTIONS
- 18" DIAMETER STORM CONVEYANCE PIPE FOR FUTURE CONNECTION



DESIGN PROCESS : BUILDING ON OPPORTUNITIES

- COMBINED SEWER INTERCONNECTIONS
- OVERSIZED SEPARATED STORM SEWER



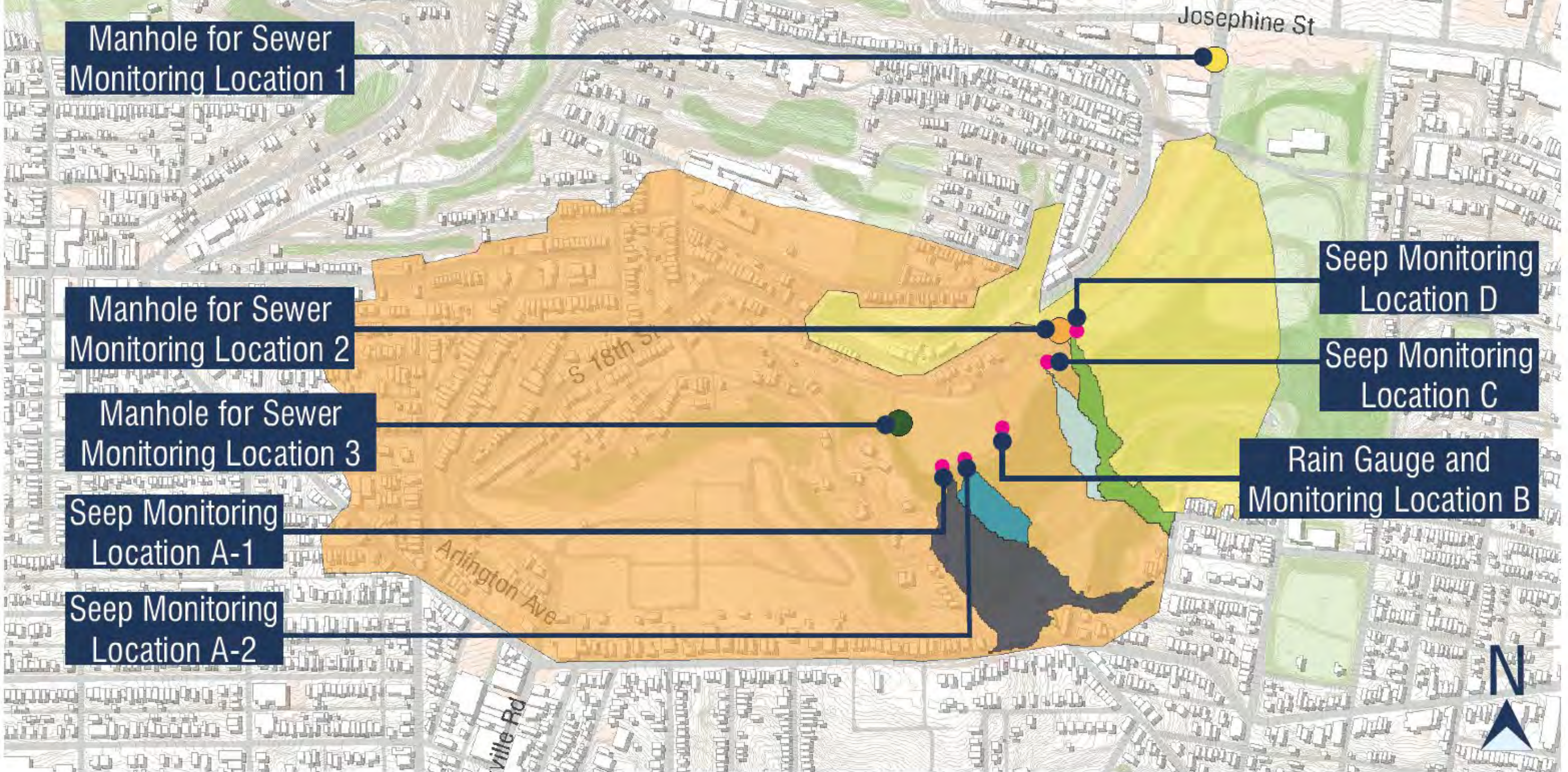
DESIGN PROCESS : SEEP & SEWER FLOW MONITORING

- 4 MONTHS OF CONTINUOUS MONITORING
- CAPTURED +2YR INTENSITY EVENT, INCLUDING 1.5" IN 1HR 45 MIN



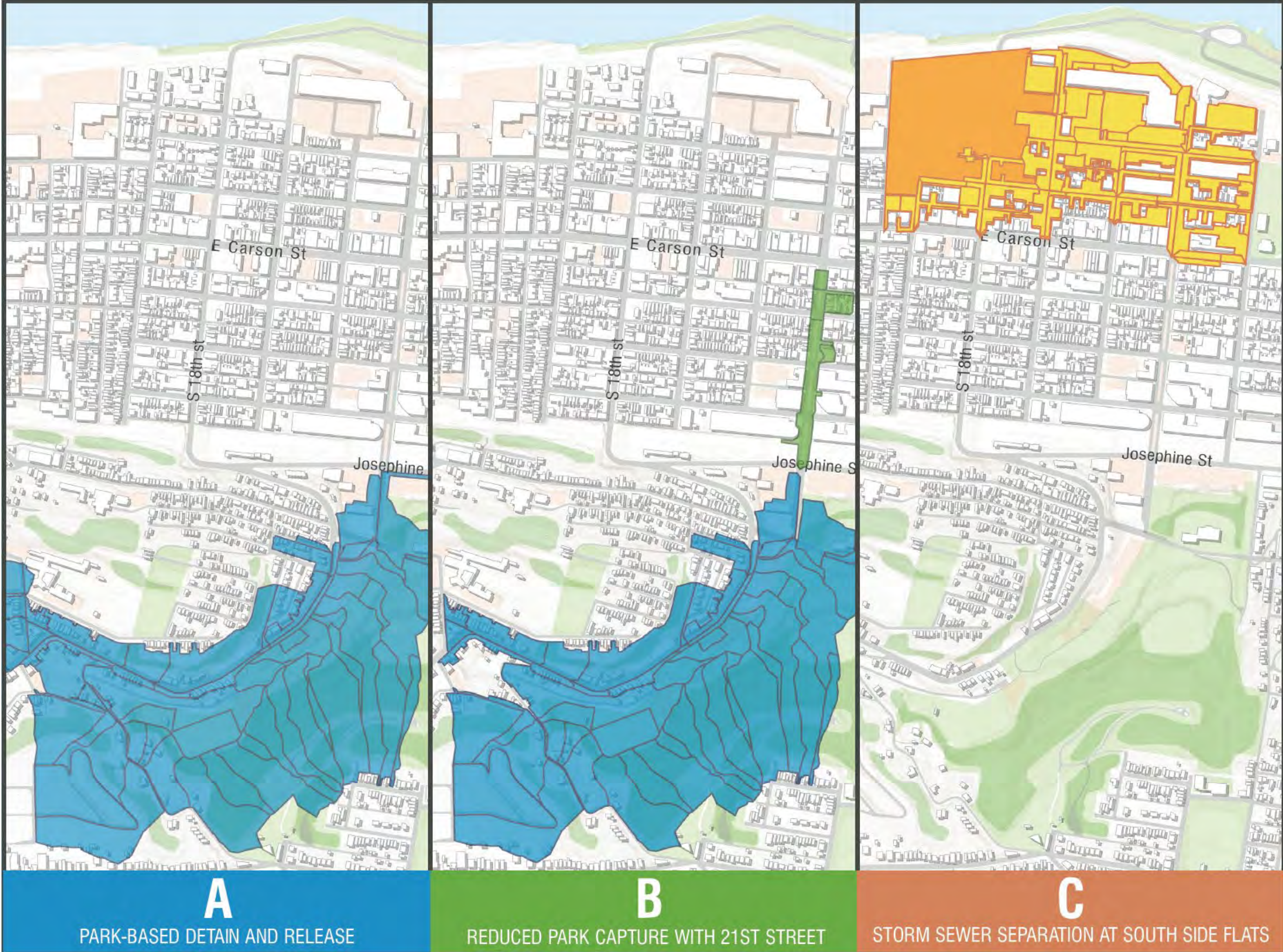
LEGEND

- Drainage Area for Sewer Monitoring Location 1
- Drainage Area for Sewer Monitoring Location 2
- Drainage Area for Seep Monitoring Location A1
- Drainage Area for Seep Monitoring Location A2
- Drainage Area for Seep Monitoring Location C
- Drainage Area for Sewer Monitoring Location D

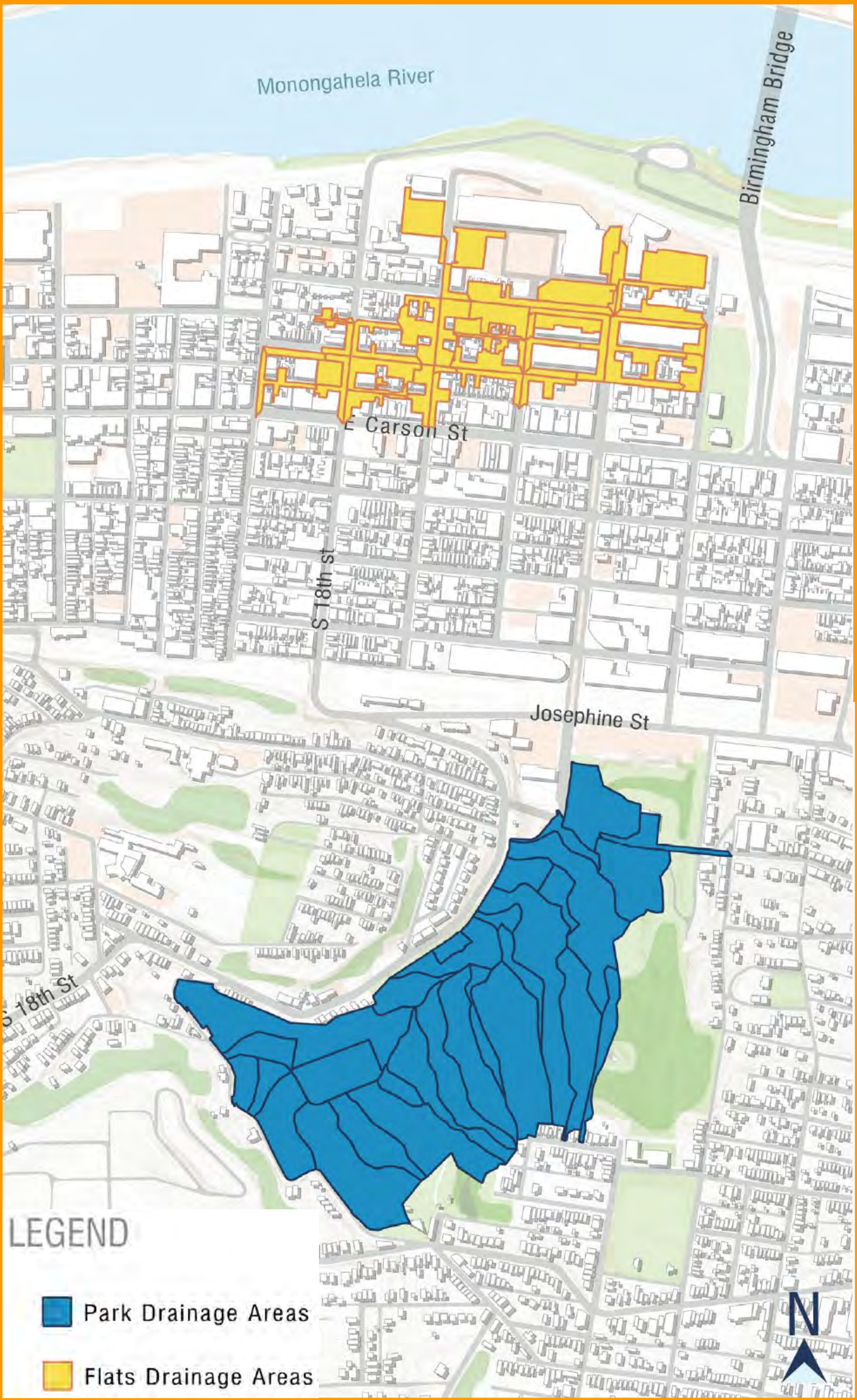
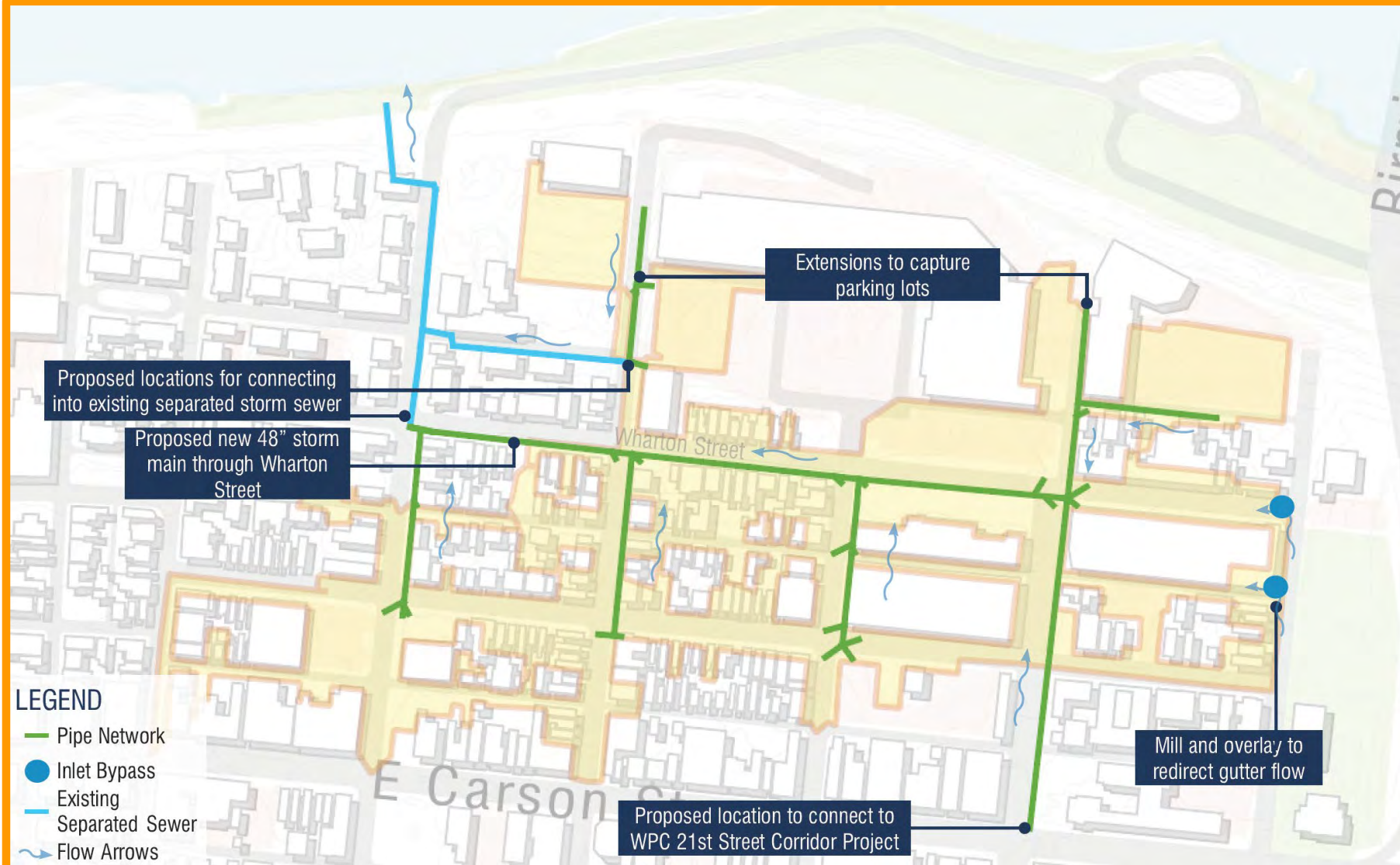


DESIGN PROCESS : ALTERNATIVES

- CONCEPT A
 - MANAGE ALL 23 ACRES WITHIN THE; PARK DETAIN AND SLOW RELEASE
- CONCEPT B
 - INCLUDE 4 ACRES @ SOUTH 21st STREET STREETScape AND REDUCE PARK CAPTURE TO 19 ACRES
- CONCEPT C
 - MANAGE ALL 23 ACRES WITH SEPARATED STORM SEWER IN SOUTH SIDE FLATS



ENGINEER'S RECOMMENDATION : OPTIMIZE PARK CAPTURE AND FLATS

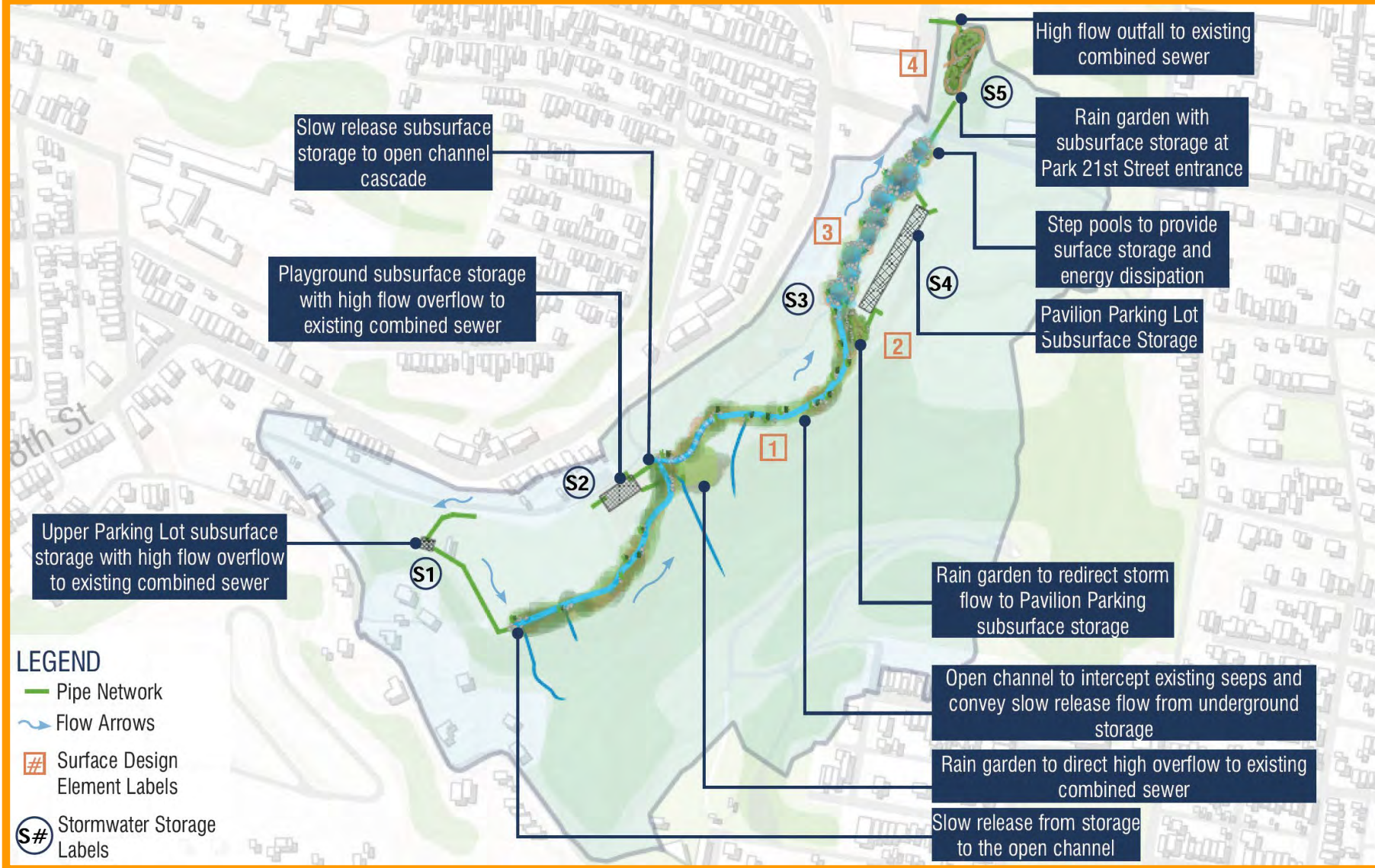


Total Capture:
67 AC

Total Impervious Capture:
26 AC

Cost Estimate:
\$5.4 MM

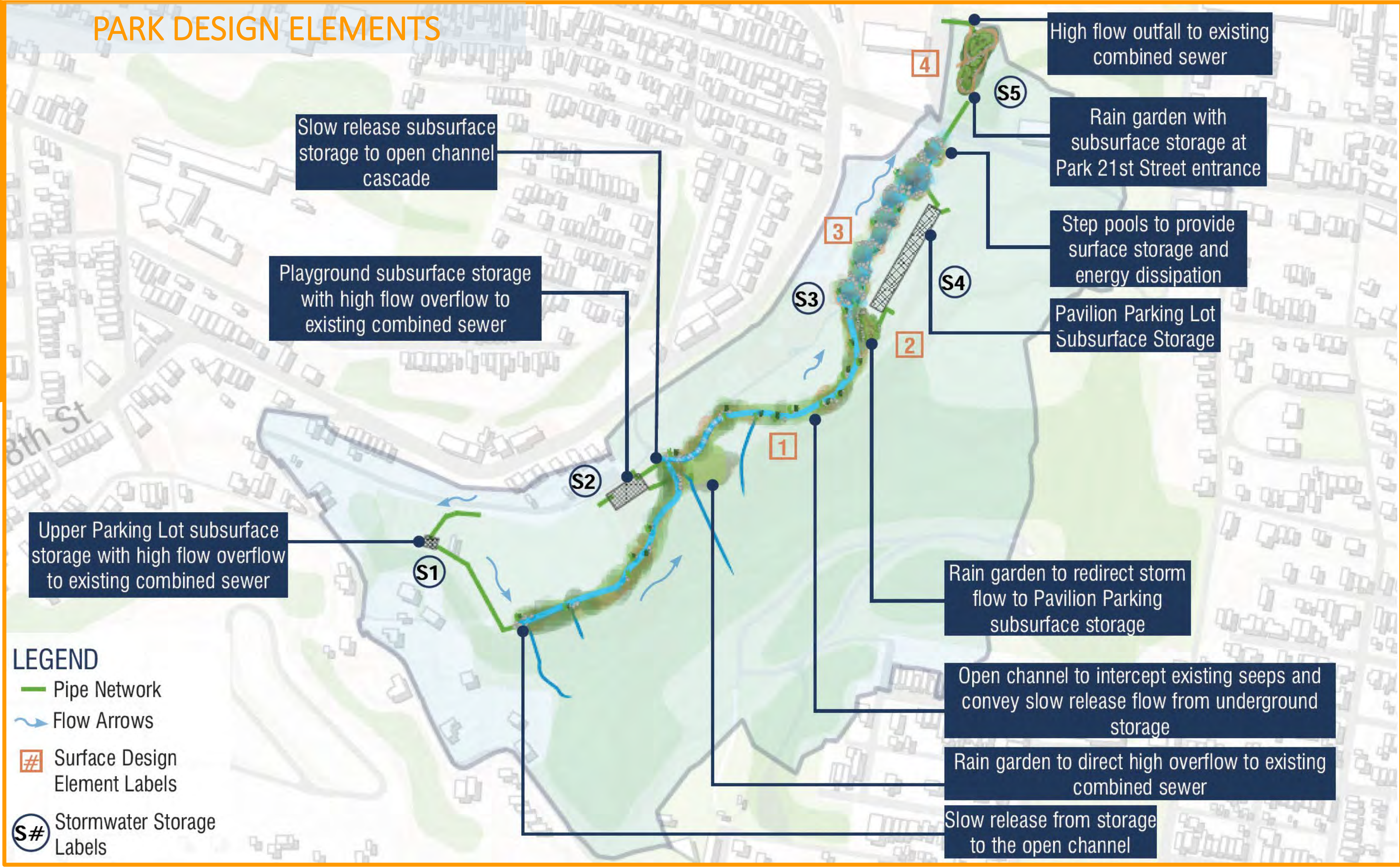
\$207K / Impervious Acre
Captured



ENGINEER'S RECOMMENDATION : OPTIMIZED PARK

Only captures areas presently draining directly to the park

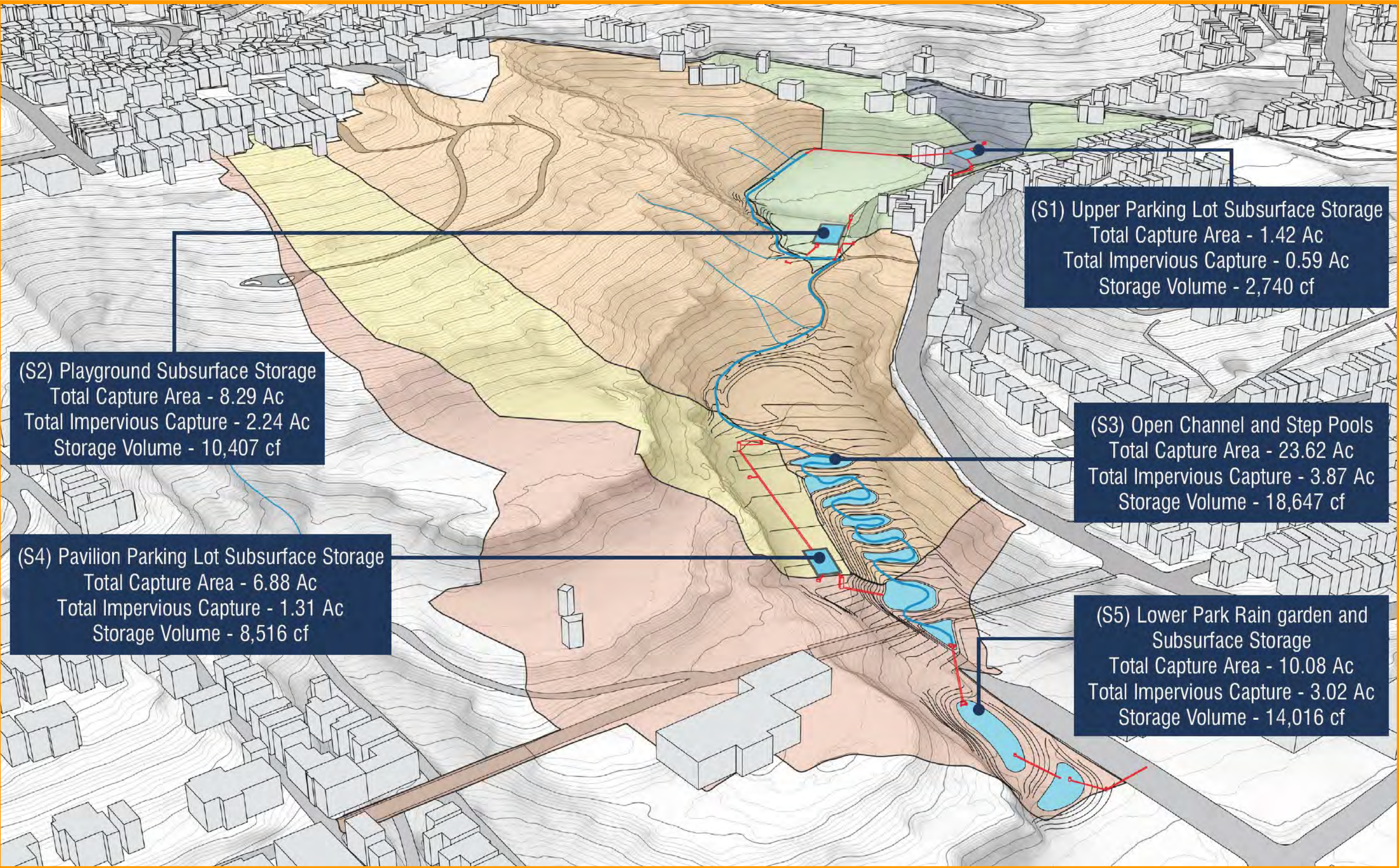
Stormwater storage zones reduced to five critical locations



ENGINEER'S RECOMMENDATION : PARK CAPTURE

Park Total Impervious Capture: 11 AC

Only captures areas presently draining directly to the park

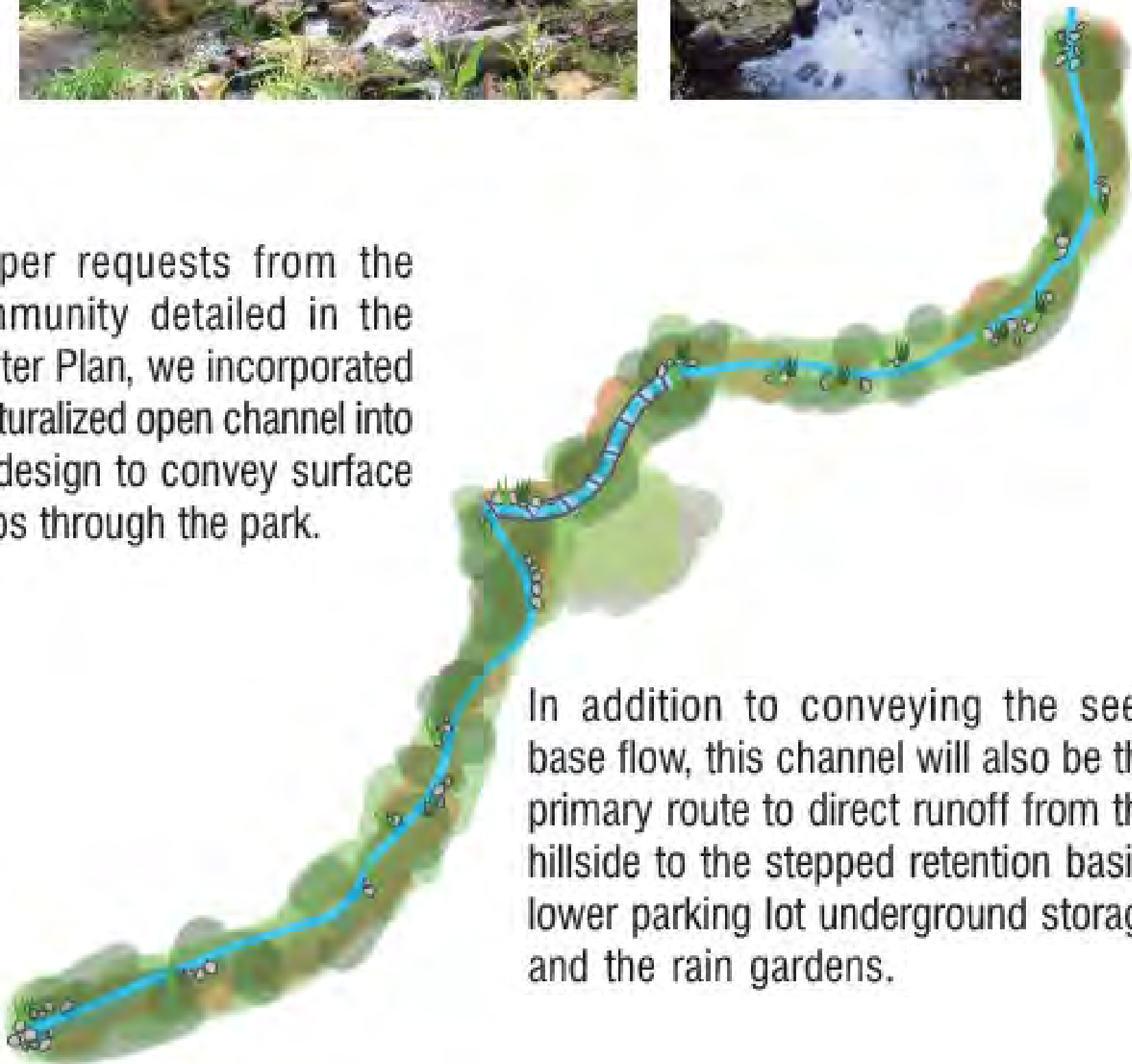


ENGINEER'S RECOMMENDATION : PARK ELEMENTS

1 Open channel for slow release with vegetated flood plain



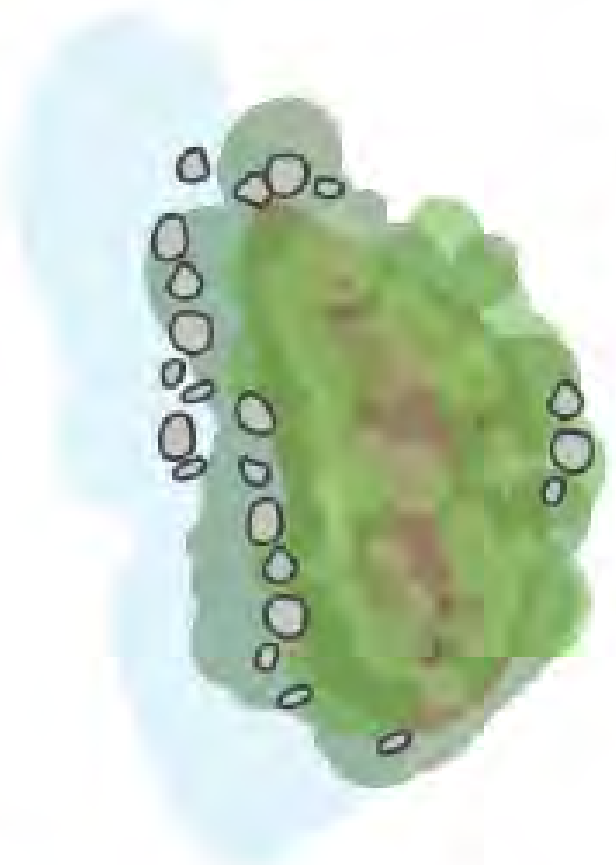
As per requests from the community detailed in the Master Plan, we incorporated a naturalized open channel into the design to convey surface seeps through the park.



In addition to conveying the seep base flow, this channel will also be the primary route to direct runoff from the hillside to the stepped retention basin, lower parking lot underground storage and the rain gardens.

*Pictures shown are conceptual and subject to change in final design

2 Rain garden with overflow connection to underground storage

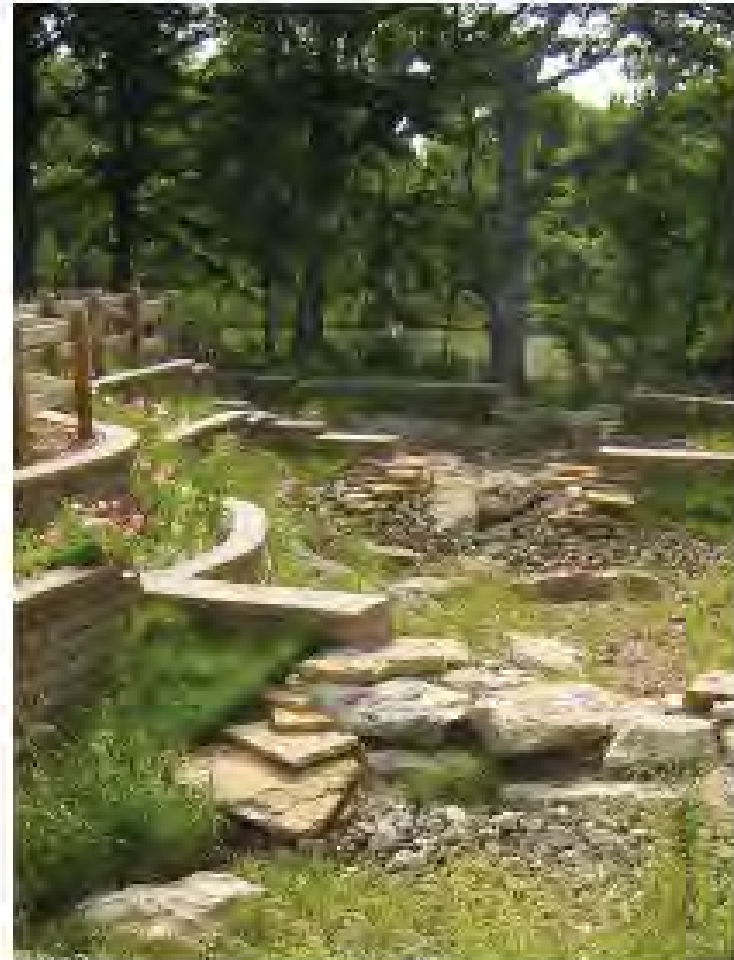


This proposed rain garden is located towards the end of the channel. This basin is designed to detain part of the runoff from the open channel and the retention basins.

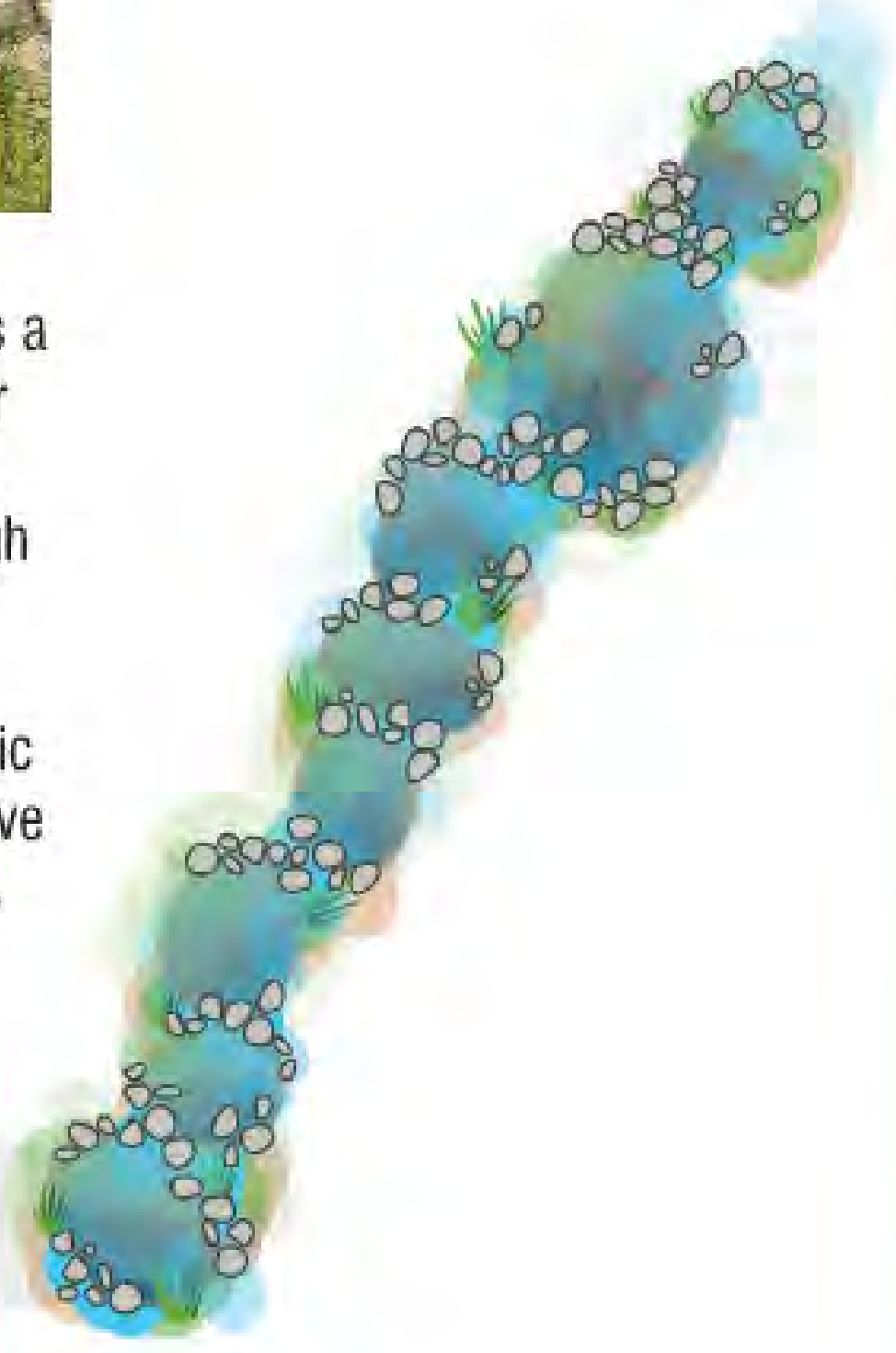


ENGINEER'S RECOMMENDATION : PARK ELEMENTS

3 Stepped retention basins with base flow channel



The recommended design features a series of seven basins in the lower section of the park which will (1) allow base flow to continue through the park, and (2) provide storage during storm events. The basins provide approximately 16,000 cubic feet of storage. The basins will have an underdrain to help drain excess runoff.



*Pictures shown are conceptual and subject to change in final design

4 Rain garden with subsurface storage at 21st Street Entrance



The proposed rain garden is located in the newly acquired URA lot as part of the Phase I of the Master Plan. The current design proposes a terraced configuration and features a path going around and between terraces. This both creates a more dramatic park entrance and also allows maintenance vehicle access.

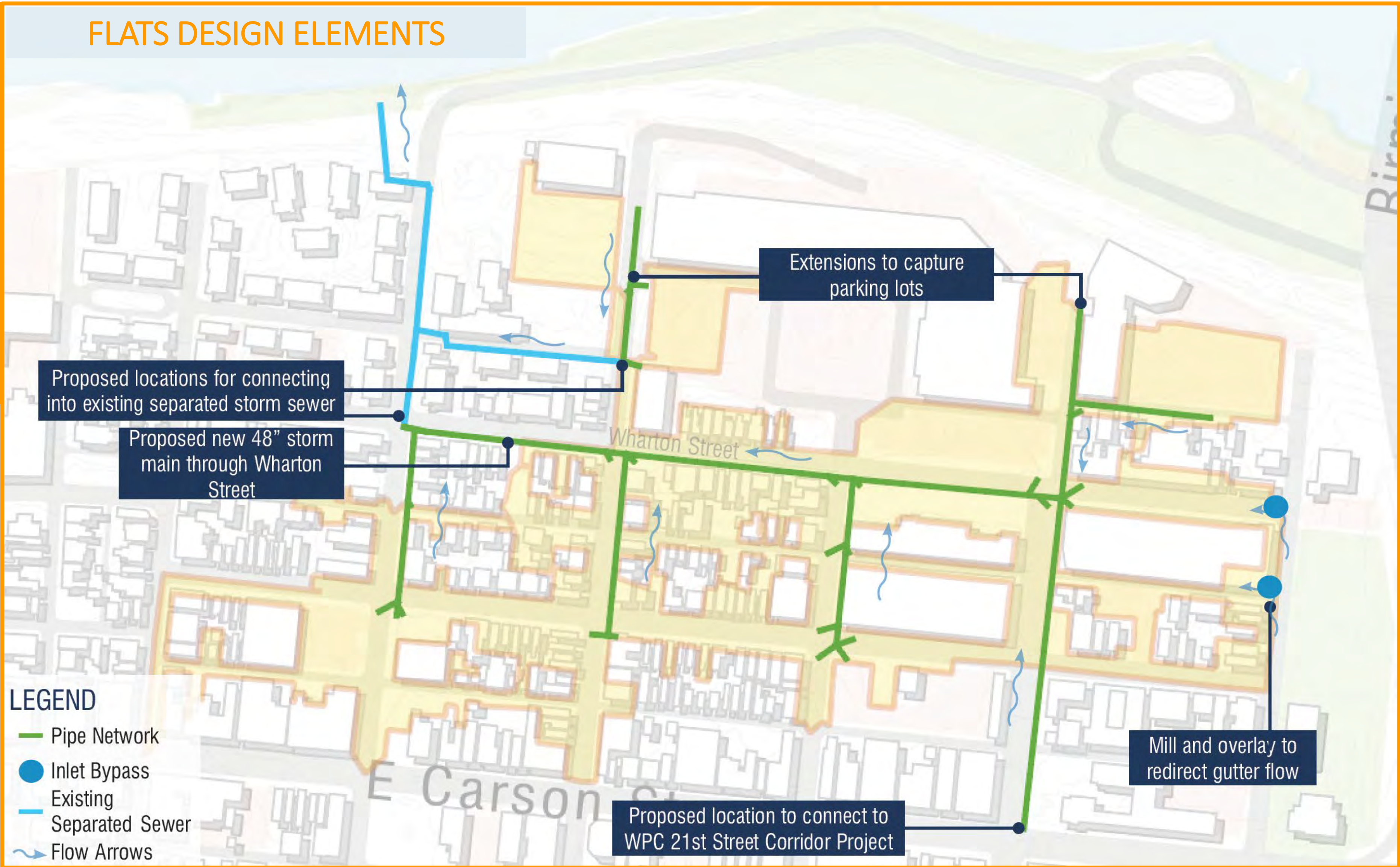
The surface storage proposed is approximately 5,500 cf, with 11,167 cf of subsurface storage.



ENGINEER'S RECOMMENDATION : OPTIMIZED FLATS

Flats storm sewer network expanded only as necessary to achieve the most cost-effective capture areas

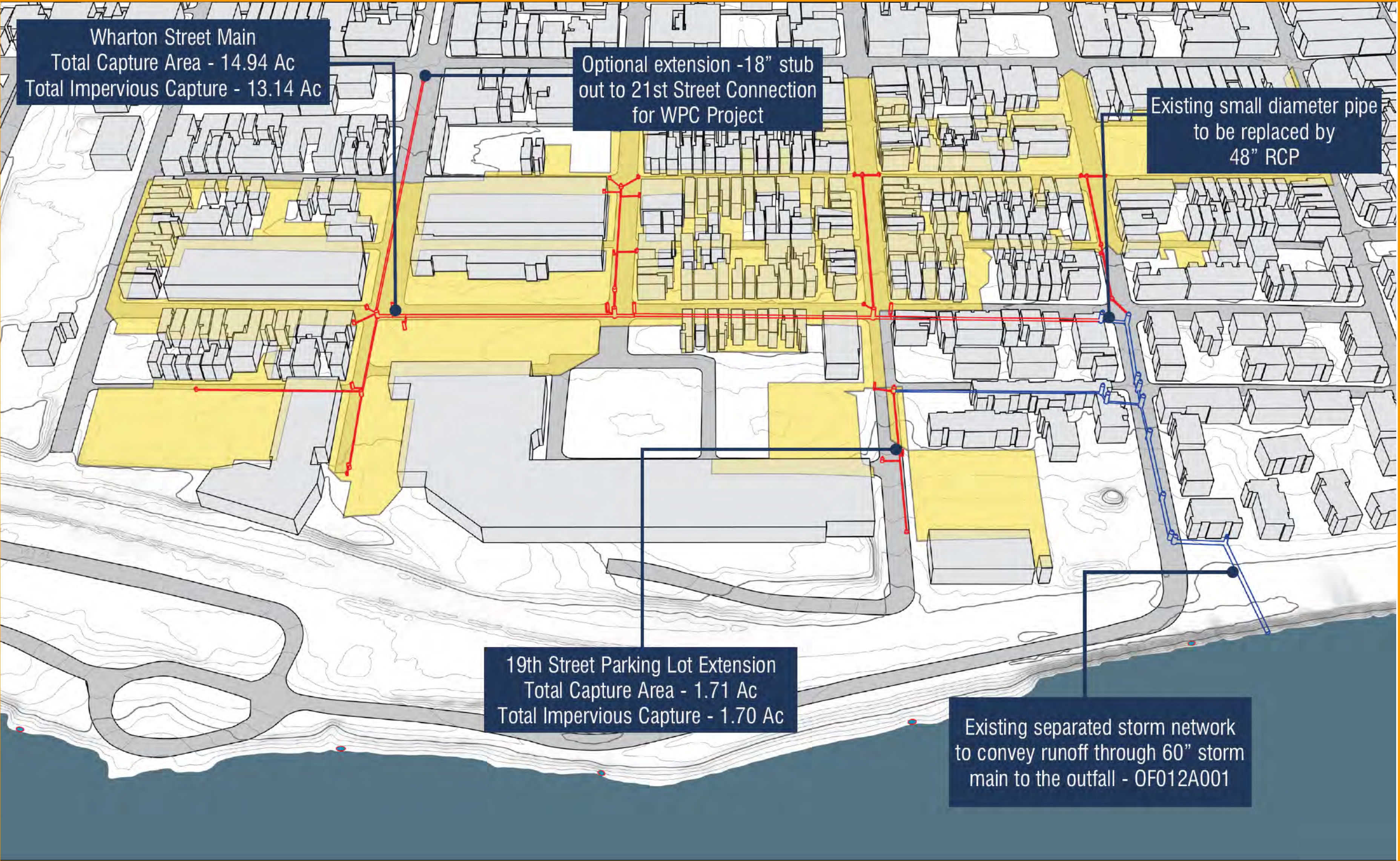
Option to connect to 21st Street Corridor Project



ENGINEER'S RECOMMENDATION : FLATS CAPTURE

Flats Total Impervious Capture: 15 AC

Grabs easily connected streets and private parking lot drainage connections at the ROW

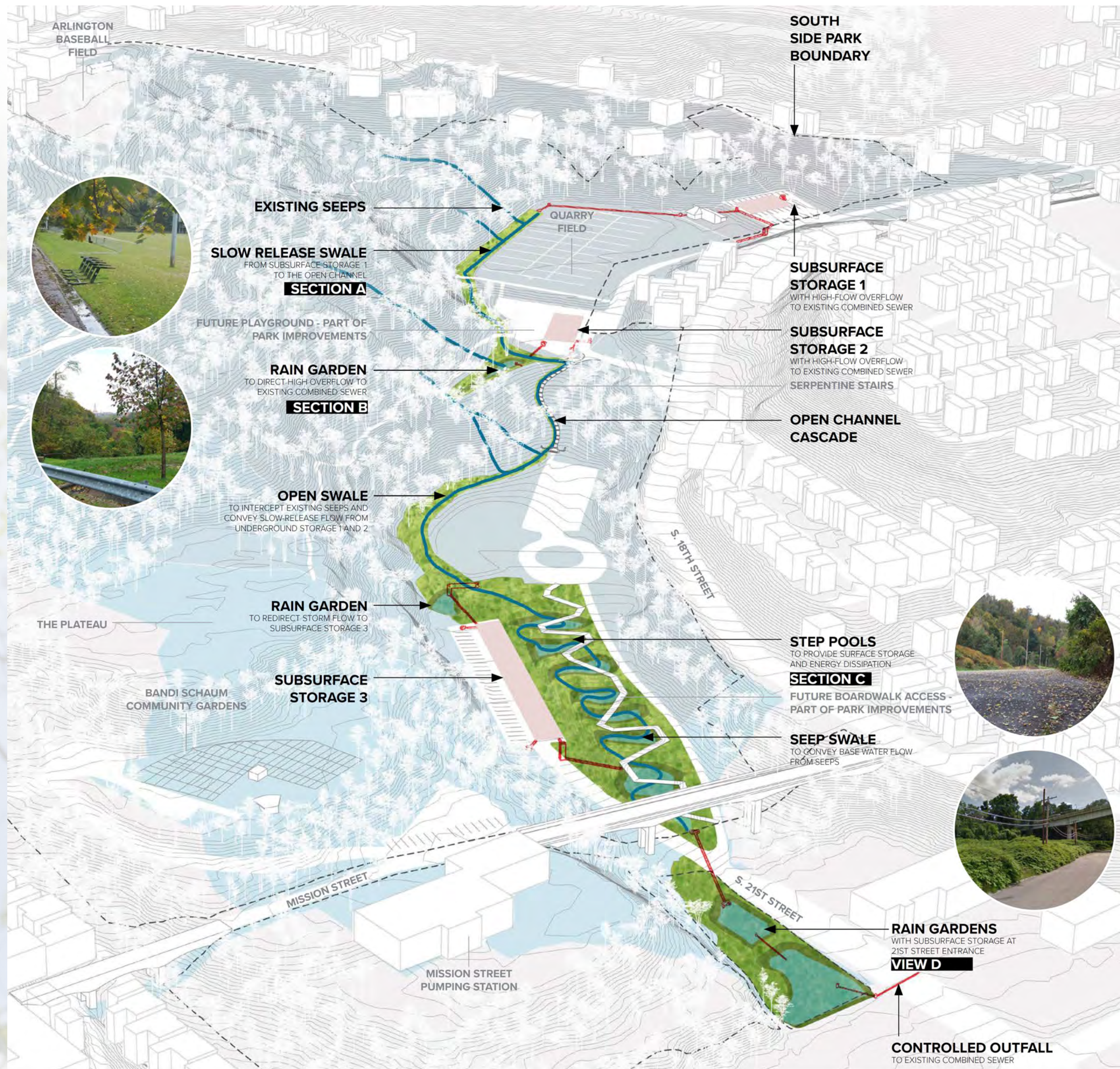


SOUTH SIDE GSI PROJECT : PRELIMINARY DESIGN

ENGINEER'S RECOMMENDATION:

- ✓ OPTIMIZED HYBRID OF PARK & FLATS
 - ✓ CAPTURES 26 AC OF TOTAL IMPERVIOUS RUNOFF
 - ✓ GSI PROJECT COST ESTIMATE: \$5.4 MM
 - ✓ \$207K / IMPERVIOUS ACRE CAPTURED

- ✓ PROJECT ACHIEVES TARGET CAPTURE GOAL ENTIRE M16 SEWERSHED
- ✓ CAPTURES & MANAGES PERVIOUS & IMPERVIOUS RUNOFF COST-EFFECTIVELY
- ✓ OFFERS NUMEROUS OPPORTUNITIES TO EXPAND CAPTURE, DETENTION, & CONVEYANCE WITH POTENTIAL SYSTEM-WIDE IMPACTS



SHARED STORMWATER RESPONSIBILITIES

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





Pittsburgh
Water & Sewer
Authority

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

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Rebecca Zito

Communications Project Manager

412.676.6684 or rzito@pgh2o.com

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