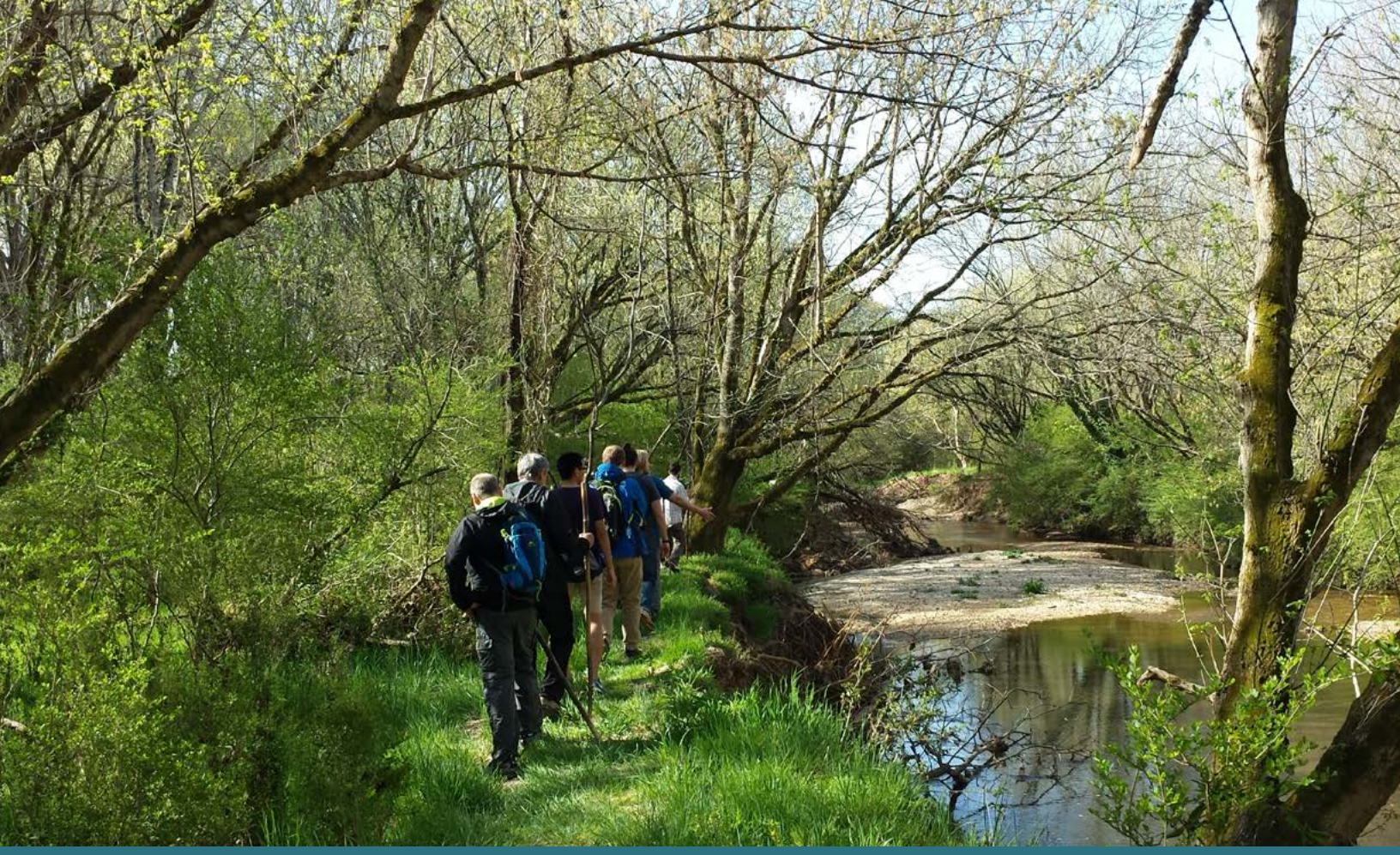

INTRENCHMENT CREEK
ONE WATER MANAGEMENT PLAN

Advancing Equity and Addressing Flooding and Combined Sewer Spills in the Heart of Atlanta

Intrenchment Creek
ONE WATER MANAGEMENT
Task Force

SEPTEMBER 2020

Plan by: The Intrenchment Creek One Water Management Task Force
Lead Partners: American Rivers, Jenny Hoffner and Jeremy Diner;
Environmental Community Action, Dr. Yomi Noibi
Engineering by: Haythem Shata and Jim Remlin, Sherwood Design Engineers
Design by: Hannah Palmer
Cover photo by Jordan Ososki.

THE INTRENCHMENT CREEK ONE WATER MANAGEMENT TASK FORCE

is a voluntary group of stakeholders championing One Water planning in the stadium neighborhoods, including:

Atlanta Regional Commission

American Rivers
RIVERS CONNECT US®

watershed management

CAP
Central Atlanta Progress

CARTER

Community Benefits Coalition

THE CONSERVATION FUND

Eco Action

GDOT
Georgia Department of Transportation

Georgia State University

MECHANICSVILLE

Metro Atlanta Urban Watershed Institute

NPU V

Partnership for Southern Equity
TOGETHER WE PROSPER

PEOPLESTOWN

SHERWOOD
DESIGN ENGINEERS

SOUTH RIVER
WATERSHED ALLIANCE

Southface

Summerhill Residents

TREES ATLANTA

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ONE WATER MANAGEMENT PLAN

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SEPTEMBER 2020


1966

BACKGROUND

INTRODUCTION

The headwaters of Intrenchment Creek are hidden beneath an urban landscape defined by asphalt, from the tangled intersection of I-75/85 and I-20 to vast parking lots surrounding the former Olympic Stadium/ Turner Field. The dominance of pavement and impervious surfaces combined with aging infrastructure underground has resulted in persistent flooding and combined sewer spills in the historic downstream neighborhoods.

Since 2017, the Intrenchment Creek One Water Management Task Force (the Task Force) has been working together to develop an assessment and recommendations for addressing the flooding and combined sewer spills and securing related community benefits. The following plan summarizes this assessment and recommendations.

"ONE WATER"

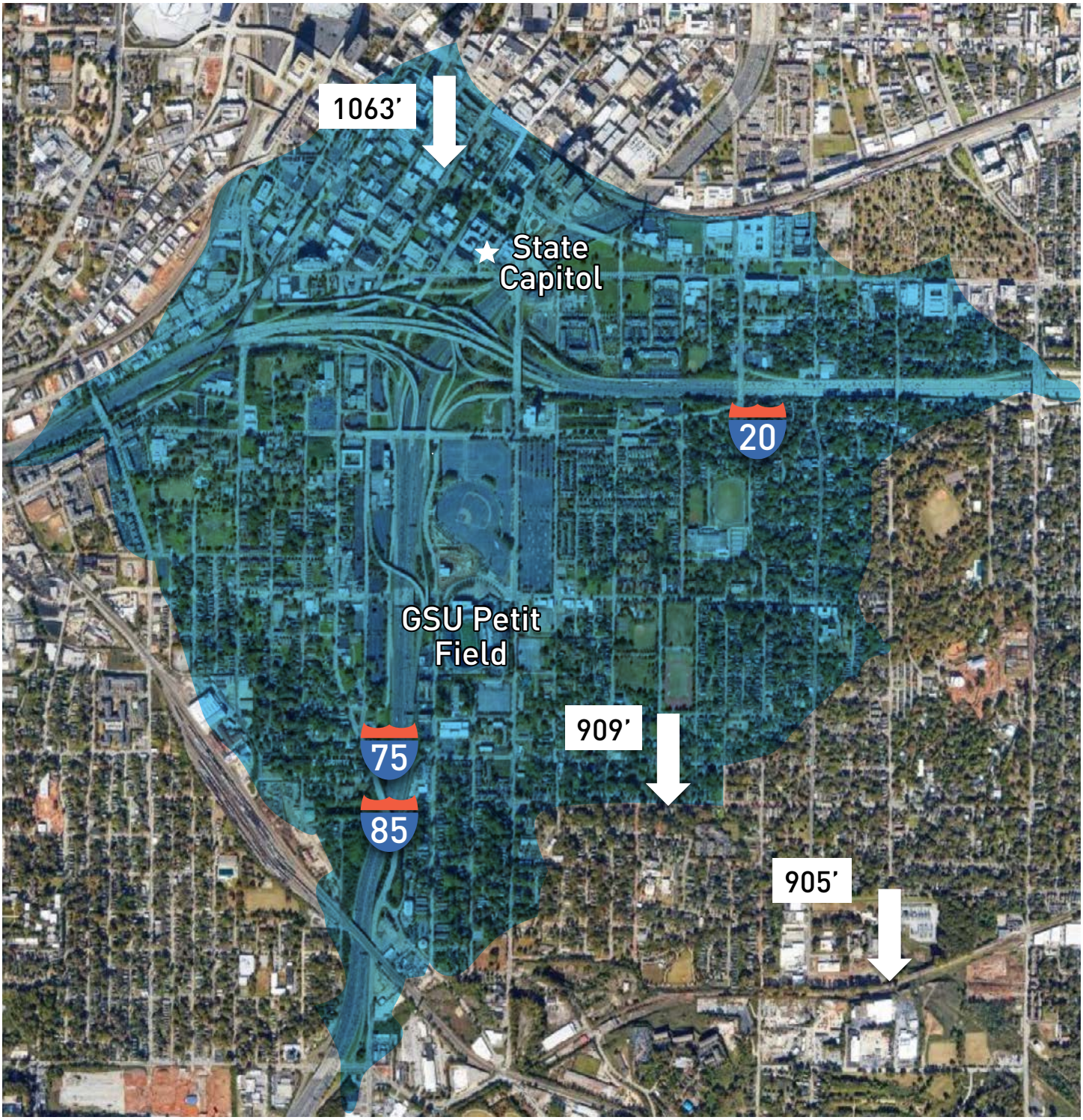
One Water is an approach to water management that considers the urban water cycle as a single integrated system, in which all urban water flows are recognized as potential resources. It is practiced through inclusive and jointly planned management of all water systems—wastewater, drinking water, stormwater and source waters—where all waters are valued and put to use. One Water projects produce multiple benefits—social, economic and environmental—in an equitable and sustainable manner and creates flexible, resilient water infrastructure that can respond to a range of scenarios.

INTRENCHMENT CREEK ONE WATER MANAGEMENT TASK FORCE

The Task Force collaborates to plan, design, and restore the healthy function of the watershed by implementing equitable and integrated water management to build resilience and address persistent flooding and the threat of combined sewer spills for current and future residents.

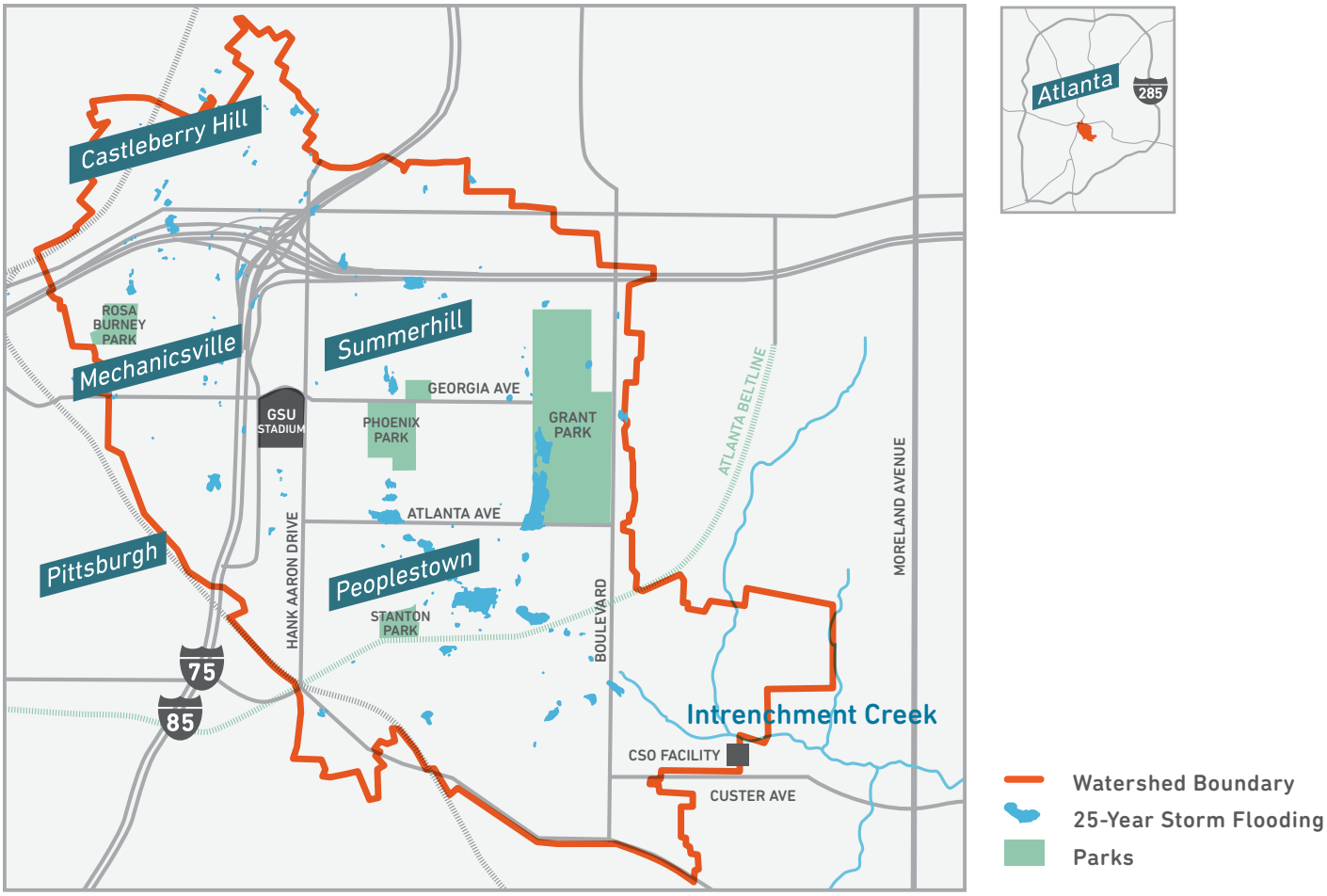
The collaboration of the Task Force is critical to guiding the implementation of effective water management strategies in the area by both public and private entities in the years ahead. While the redevelopment of the area will take place over the next 20 years, many projects, including townhouses, GSU dormitories, retail and restaurants, are already moving forward. In order to incorporate equitable, integrated, and nature-based solutions into the redevelopment plans, diverse partners must work together today.

STORMDRAIN IN THE FOOTPRINT OF THE FORMER ATLANTA FULTON COUNTY STADIUM. PHOTO BY JENNY HOFFNER.



ELEVATIONS

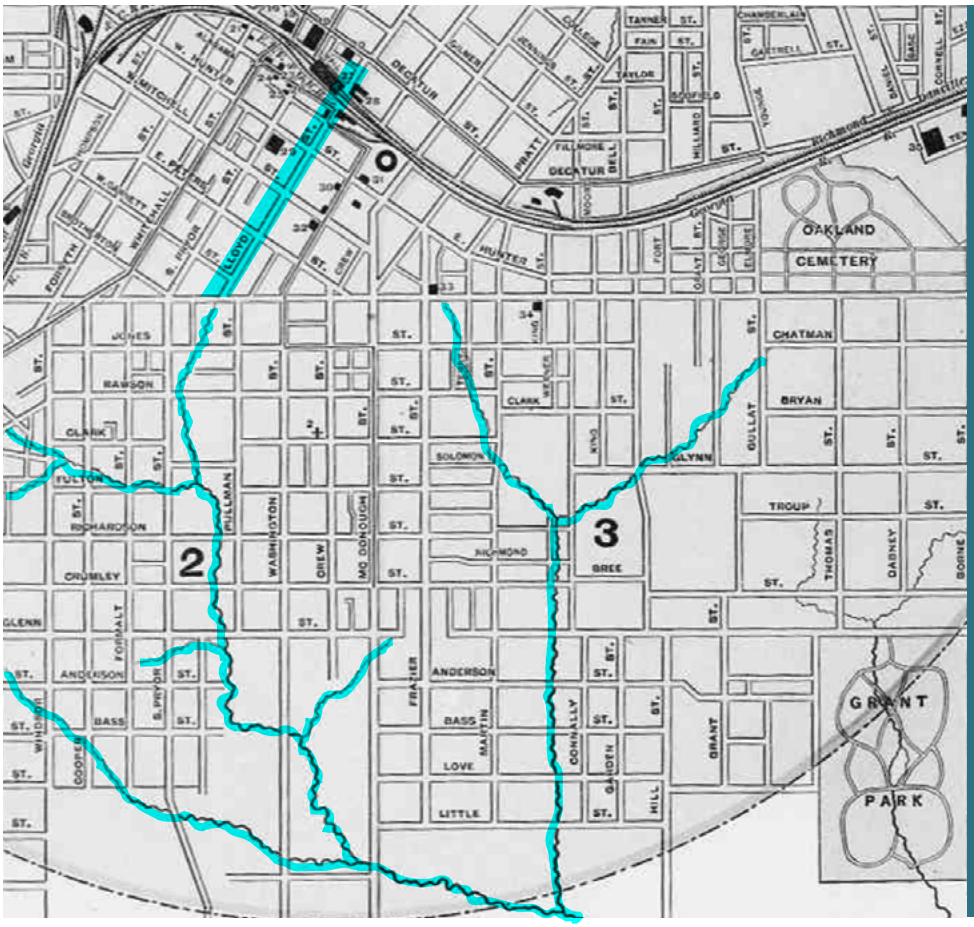
Roughly 2,600 acres of Southeast Atlanta drains to Upper Intrenchment Creek. During a 1” rain event, 35 million gallons of stormwater flows to the creek. The steep uplands (7% slope), feature a large proportion of impervious area and minimal greenspace. Water slows and settles in the shallow lowlands (1% slope).



GEOGRAPHY OF INTRENCHMENT CREEK HEADWATERS

The headwaters of Intrenchment Creek stretch through downtown Atlanta spanning from the southeastern edge of the Gulch and Eastern Continental Divide to the neighborhoods of Summerhill, Peoplestown, Mechanicsville, Pittsburgh, Grant Park, and Castleberry Hill. It includes landmarks such as the Georgia State Capitol, former Olympic Stadium (now GSU stadium), the Olympic Torch, and the site of Hank Aaron's record-breaking homerun.

Geologically, Intrenchment Creek is defined by sharp steep elevations in the upper portions with flatter lowlands in the historic creek channels. Historically, dense industrial development and infrastructure were built in the upper basin to drain sewage and stormwater to historic creek channels. Once these historic channels became polluted, they were converted into a series of combined sewer "trunks" or large pipes leading to the lower basin—away from development. Over 2,600 acres drain to what is now a combined sewer (both stormwater and sewage) system in the Intrenchment Creek Watershed.



MAP OF ATLANTA, 1886.

ATLANTA'S FIRST SEWERS

Historically, sewage was piped directly into creek channels.

Around 1875, the headwaters of Intrenchment Creek were piped as a combined sewer line to serve hotels downtown.

The pipe along Loyd Street (now Central Avenue) was one of Atlanta's first combined sewer trunk lines.

CONTEXT & OPPORTUNITY

The headwaters of Intrenchment Creek start in downtown Atlanta, winding southeast through once thriving African American communities at the heart of the city. These communities experience persistent flooding and combined sewer spills that affect quality of life for residents of the Summerhill, Mechanicsville and Peoplestown communities.

In the wake of the Atlanta Braves' exodus and the purchase of the stadium and associated parking lots by Georgia State University (GSU) and developer Carter USA, an unprecedented opportunity exists to rethink stormwater management and engage in a "One Water" approach which envisions managing all water in an integrated, inclusive, equitable, and sustainable manner. To do so will require an unparalleled collaboration between private and public stakeholders across property lines to create impact at a scale that could holistically address and manage the threat of flooding and combined sewer spills.

PROCESS

- We compiled a synthesis of all known plans and relevant data layers accessible to the public.
- We prioritized community leadership and engagement in the assessment throughout every step of the planning process. For example, meetings were convened by Peoplestown Revitalization Corporation, ECO-Action, and the City of Atlanta.
- The Task Force conducted meetings and interviews with community leaders and partners to share data collected and solicit additional information, as available.
- We presented the synthesis to community members and invited stakeholders who had not yet been involved. We sought community input into the solutions and criteria to select the preferred option, then shared plans for how the information will be used and what is possible in terms of next steps.
- We developed recommendations based on the synthesis of information and input from stakeholders.

CITY OF ATLANTA DEPARTMENT OF WATERSHED MANAGEMENT STORMWATER ROADSHOW OPEN HOUSE, COAN PARK RECREATION CENTER, AUGUST 2019.

FLOODING IN PEOPLESTOWN, 2015-2017. PHOTOS BY BEN SIAN.

KEY TAKEAWAYS FROM SITE ASSESSMENT

1. The Intrenchment Creek headwaters reach all the way into downtown Atlanta and are dominated by asphalt and buildings, which contributes the majority of the water flooding the lower areas that are residential and more pervious.

2. In the headwaters, stormwater pipes are located deep underground in order to cross under the highways and around the stadium, resulting in slower movement of flow between downtown and the areas that are flooding at Atlanta Avenue.

3. Due to the system design and the physics of water, the downtown section of the sewer system has to be managed before the neighborhood stormwater can drain. The lack of this management leads to the flooding witnessed today.

SUMMARY OF RECOMMENDATIONS

Based on the analysis, the recommended approach is to reuse, infiltrate, and slow and store water coming from the upper watershed while developing a framework for improved funding and community engagement to implement integrated storm water management that will reduce the impact of flooding in the downstream communities.

REUSE

- Incorporate reuse into new buildings and districts (Private and Public Developers)
- Create reuse incentive program (City)
- Create regional reuse opportunity at baseball field and/or stadium plaza (GSU, private developers)

INFILTRATE

- Require developments to study the permeability of their property to fully comply with current green stormwater infrastructure (GSI) requirements before building footprints are set. Once studied, these areas should be protected for GSI installation. (City)
- Revise stormwater ordinance to require increased stormwater management in CSO areas and require linear infrastructure to incorporate GSI and rate reduction. (City)
- Retrofit the highways with GSI in order to take stormwater out of the combined sewer (GDOT)
- Build all new roads and retrofit all existing roads with GSI (City, GSU, private developers)
- Build new parks and greenspace to manage stormwater (City, GSU, private developers)
- Construct Bus Rapid Transit with GSI (City, MARTA)

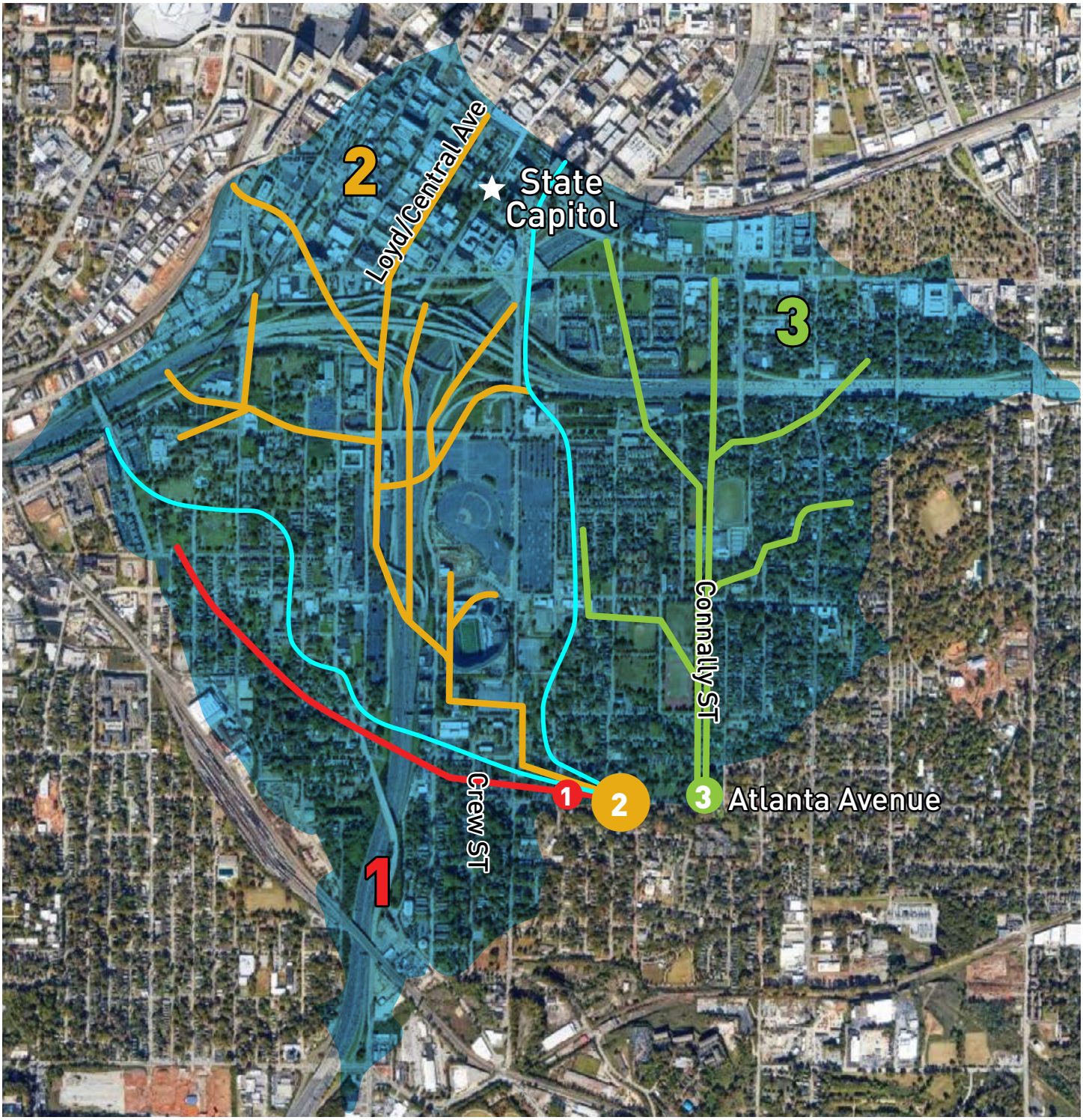
SLOW & STORE

- Implement Central Avenue parking lots project west of highway (TBD-possible public private partnership)
- Evaluate and implement metering of stormwater in areas such as the Media Lot vault, Connally Street vault and upcoming private development **in order to manage volumes of stormwater moving through the pipes** (City)
- Evaluate the GSU plaza and baseball stadium for cistern storage and timed release (GSU/private developers)

OVERALL

- Establish funding mechanism for regional stormwater management, e.g. EIB (All)
- Implement framework for equitable engagement of community leaders in implementation of recommendations (City in collaboration with community leaders and public/private developers)
- **With all projects combined, over 96% of all runoff in the basin can be managed to mitigate downstream flooding, combined sewer spills, and ecological degradation.**

1. DETAILED SITE ASSESSMENT



Sub-basin 1 drains to the Crew Street trunk line.
Sub-basin 2 drains to the Loyd Street trunk line along Central Avenue.
Sub-basin 3 drains to the Connally Street trunk line.

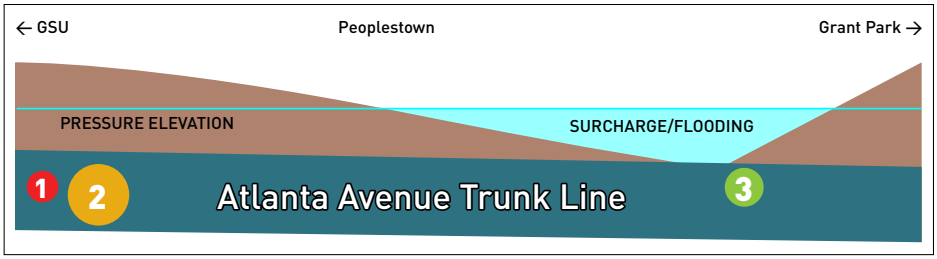
All 3 trunk lines meet at Atlanta Avenue, which is plagued with persistent flooding.

100 YEAR FLOOD — **138** MILLION GALLONS

25 YEAR FLOOD — **85** MILLION GALLONS

EXISTING VOLUMES

3 SUB-BASINS, 3 TRUNK LINES



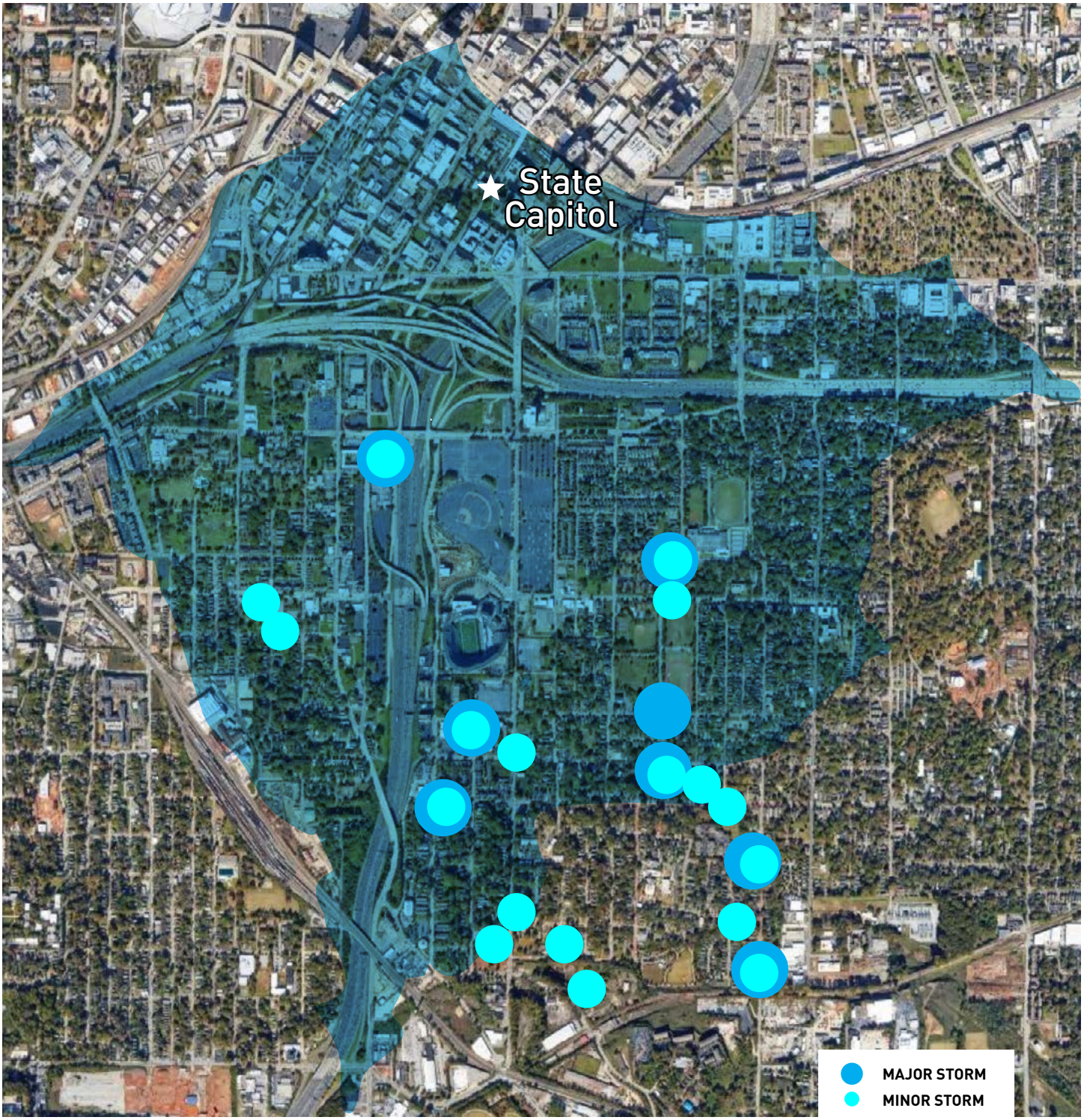
The Intrenchment Creek headwaters' sharp steep elevations in the upper portions with flatter lowlands in the historic creek channels, promote high velocity erosive flows in the upper basin that slow down and accumulate into flooding in the lower portions.

- Runoff from the dense development and highway infrastructure in the upper basin overwhelm capacity in drainage infrastructure not sized for large storm events.
  - This prevents the localized flooding in the lowlands from entering the system, compounding the destructive effects of accumulated runoff.
- Three major basins connect to dual trunks directing drainage southeasterly towards Boulevard Regulator and Custer Ave CSO.
  1. **Crew Street**: 42" x 84" (24.5 ft^2)
  2. **Loyd Street**: 120" x 120" (100 ft^2)
  3. **Connally**: 96" x 108" (72 ft^2)
- The three pipe basin junctions created by these trunks creates a large flooding area along Atlanta avenue that is consistently plagued with flooding and combined sewer surcharge
- Basins 1 and 2 have a high elevation relative to basin 3.
- Impervious area in higher elevations of basins 1 and 2 drain quickly and fill the pipe capacity, decreasing basin 3's ability to drain.
- Until the upper basins fully drain; the lower basin flooding volumes surcharge, accumulate at inlets, and must wait to drain.
  - The lower basin ground elevation is very low compared to the trunk passing through promoting surcharge and backup flooding (ground elev 909 vs invert elev 885).
- This compound effect of velocity, volumes, and elevations causes the flooding.
- The Downtown basin connecting to the Loyd Street Trunk was found to be the largest contributor to basin flooding due to the following:
  - High ground elevation relative to pipe junction elevation (ground elev 923 vs invert elev 909)
  - Large proportion of impervious area compared to overall basin
  - Minimal greenspace and impervious disconnects
- Rough estimates of generated flood volumes are as follows:
  - **100 Year: 138 Million Gallons (MG)**
  - **25 Year: 85 Million Gallons (MG)**
- This method used the SCS volumetric method with City of Atlanta provided storm events/durations for the 100 year and 25 year respectively.

The City of Atlanta Southeast Atlanta Green Infrastructure Initiative includes:

- Phase 1
  - 8 GSI BMPs: 0.34 MG
- Phase 2
  - Media Lot vault: 5.9 MG
  - 4 miles of permeable paver roads, plus 32 stormwater planters: 4.0 MG
- Phase 3
  - 8.1MG Connally Street vault

Phases 1 and 2 of this initiative have contributed significantly to stormwater management in the basin. There is still more that needs to be done, and more work planned by the city in Phase 3.

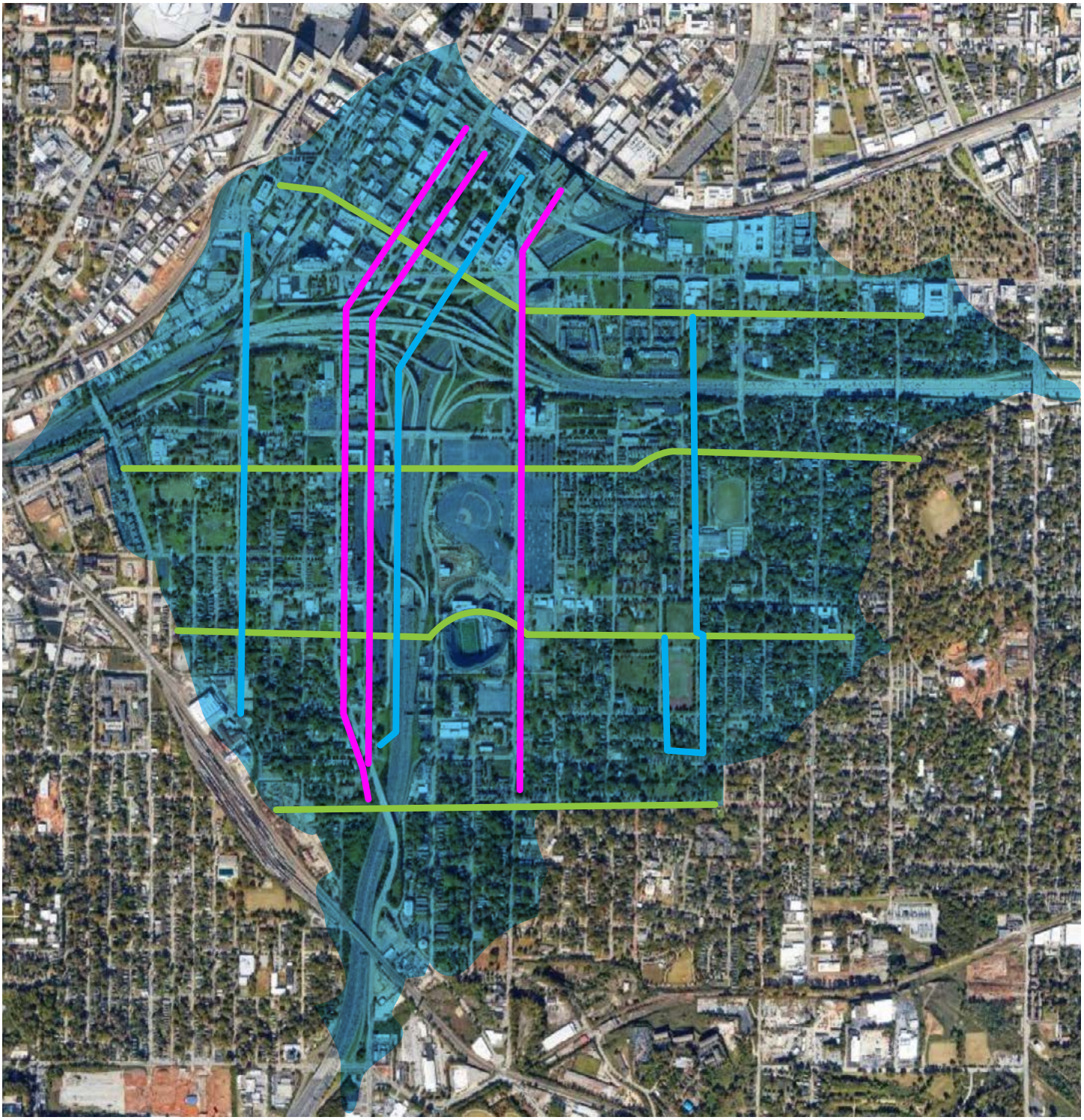


COMMUNITY-IDENTIFIED PROBLEM AREAS

Runoff from dense development, parking lots, and highways overwhelms shallow pipes that don't have the capacity to handle the water that rushes downhill. The result is disruptive and persistent flooding. However, the main issue in this watershed is not stormwater volume, it's velocity.

Interventions to **REUSE, INFILTRATE, SLOW & STORE** runoff before it reaches critical junctions can help mitigate flooding impacts.

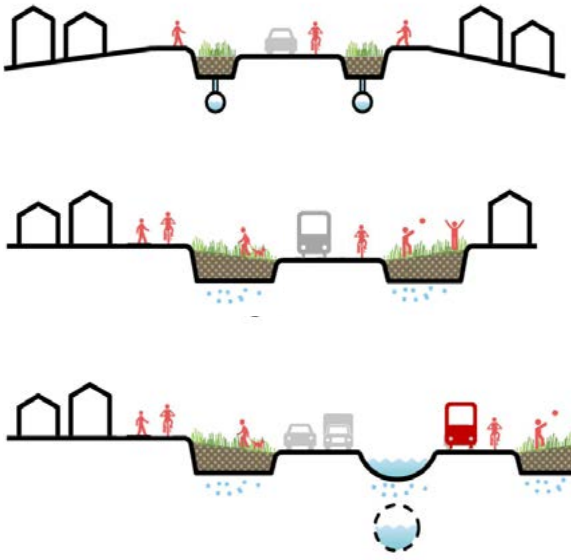
2. DETAILED RECOMMENDATIONS



Channel Roads: North/South streets convey water along historic creek channels.
Spanning Roads: East/West roads that can soak up water flowing downstream.
Arterial Roads: Wide connectors that can provide capacity relief to the trunk lines.

ROADWAYS

How can we look at the road network to manage stormwater?



Blue Streets
Conveyance & Infiltration

Green Streets
Sponge & Slow

Arteries
Connectivity & Capacity

Roadways within the basin align with a couple of typologies relating to their drainage characteristics. Furthermore, they align with larger transit goals including traffic calming, complete streets, multimodal transit, separated bike lanes, etc.

Channel Roads: They fall within historic creek channels and promote conveyance.

- These roads can act like Blue Streets; infiltrating what they can and safely conveying offsite flows to the lower basin without relying on combined sewer infrastructure.

Spanning Roads: They span perpendicularly across basin flow paths opening up the opportunity to act as sponges.

- These roads can act like Green Streets; infiltrating and slowing down water that pass through them before allowing them to safely convey through a blue street intersection or combined sewer lines if required.

Arterial Roads: These wide and impervious right-of-ways connect the upper portions of the basin to the lower sections.

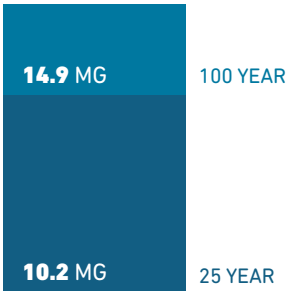
- Their widths and size open up larger opportunities of connective stormwater infrastructure.
- These roads align with many of the backbone trunk lines allowing capacity relief for downstream systems.

Many projects are proposed already that can align with stormwater relief in these right-of-ways.

The runoff within the highlighted roadways (excluding existing pavers) was calculated to be:

- Impervious area ≈ 108 acres
- Stormwater volume in 25-year (4hr) Event ≈ 10.2 MG
- Stormwater volume in 100-year (6hr) Event ≈ 14.9 MG

MANAGED VOLUME

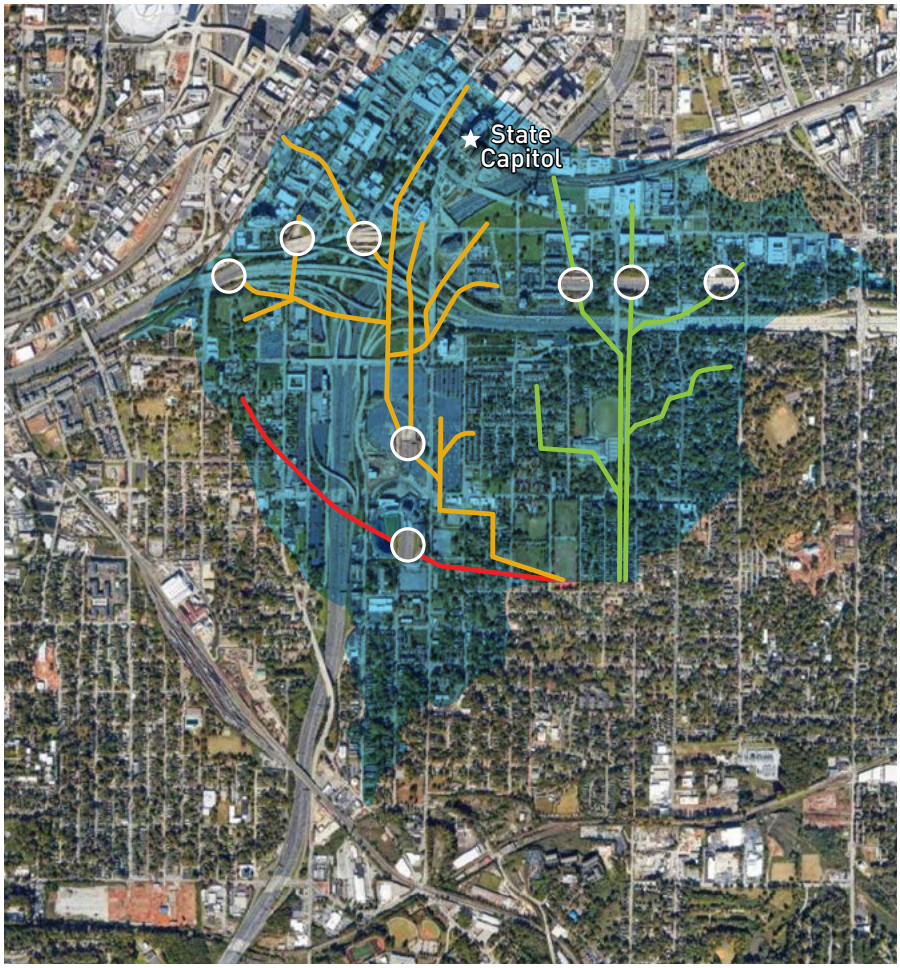


COMMUNITY BENEFITS

- GREEN JOBS
- BEAUTIFICATION
- MOBILITY OPTIONS
- FITNESS & HEALTH

HIGHWAYS

The interstate highways span the basin and act like dams, holding back water. How do we make them sponges?



MANAGED VOLUME

COMMUNITY BENEFITS

- GREEN JOBS
- BEAUTIFICATION
- COMMUNITY EDUCATION
- GREENSPACE
- HEAT REDUCTION

The highway system was built after most of the combined sewer and street network was already built

- Construction of highway required pipe realignment at the intersections of pipes and highway. This lowering of the pipes reduced their effective capacity and created hydraulic "dams" to upper basin. This further exacerbated existing crossings with shallow pipes/channel slopes.

Recommendations include:

- Continued implementation of GSI retrofits
- Coordinate with City of Atlanta on pipe elevations at highway crossings

The runoff within the highway right-of-way was pulled from the Stadium Neighborhoods Livable Center Initiative plan calculations and found to be:

- Area ≈ 130 acres
- Contribution in 25 year (4hr) event ≈ 12.8 MG
- Contribution in 100 year (6hr) event ≈ 24.6 MG

CENTRAL AVENUE PARKING LOTS

MANAGED VOLUME

COMMUNITY BENEFITS

- GREEN JOBS
- BEAUTIFICATION
- GREENSPACE
- HEAT REDUCTION

Most of sub-basin 2—including all of Downtown—drains to one junction under the highway. Combined sewer infrastructure here is not big enough for a 10-year event. Everything beyond a 2-year event is flooding the streets.

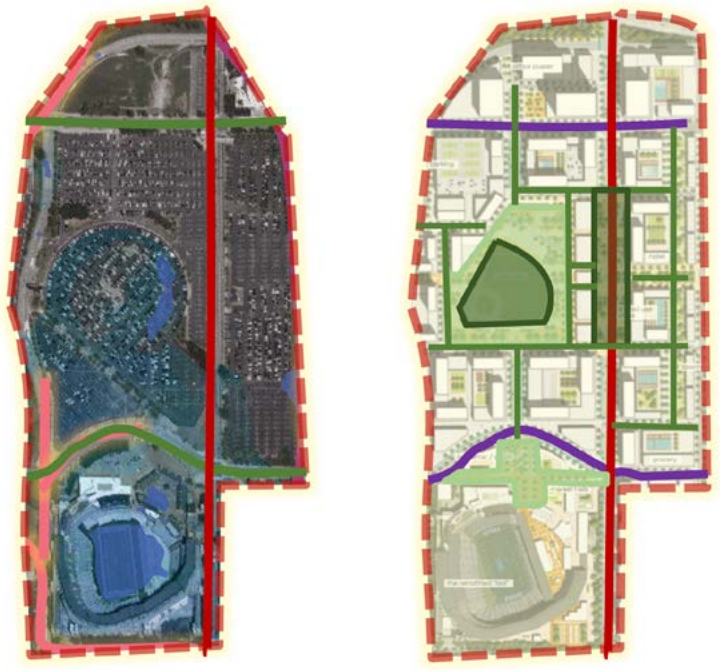
Central Avenue flooding area basin was looked at due the following:

- High elevation relative to junction elevation
- All Downtown flows and flooding pass through this site and under highway
- Minimal existing buildings, currently surface parking
- Public ownership (Fulton County Recreation Authority)
- Over 1/3 of all runoff produced in the three piped basins identified passes through this location before entering the combined sewer system underneath the highways.

Recommendations include:

- Future study of pipes and flooding volumes
- Incorporation of large-scale storage/ grey infrastructure for below ground Combined Sewer flows before crossing the highways at lower elevations.
- Planning and incentivisation of large scale green infrastructure and reuse opportunities for future development on parcels to intercept above ground flows reaching the area.

SUMMERHILL REDEVELOPMENT



MANAGED VOLUME

12 MG — 100 YEAR

7.9 MG — 25 YEAR

COMMUNITY BENEFITS

- GREEN JOBS
- BEAUTIFICATION
- GREENSPACE
- COMMUNITY EDUCATION
- HEALTH & FITNESS
- HEAT REDUCTION
- HABITAT RESTORATION
- MOBILITY OPTIONS

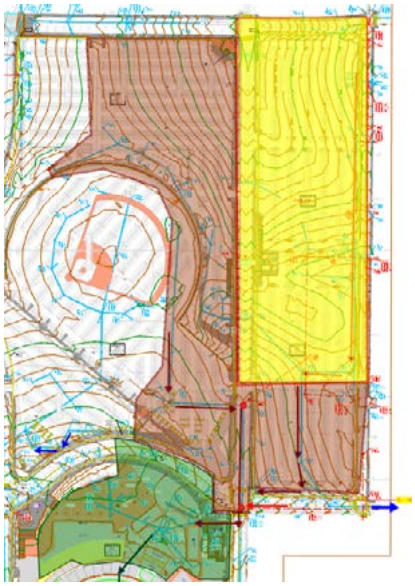
The Summerhill basin was identified as a priority area because of its immediate redevelopment timeline and the following characteristics:

- Largest connected impervious area in the entire basin
- Largest proposed development by land area in the basin
- Centrally located "hub" that can catalyze connective design
- Pipe outfall elevation much lower than ground elevation
  - Backup will occur in the lower basin when pipes are filled with runoff from this upper basin.

Overall opportunities within this basin are as follows:

- Promote development-wide infiltration.
  1. Direct impervious areas to permeable nodes.
  2. Minimize slopes and velocities to promote retention time
  3. Evaluate areas of unsuitable soils and protect soils that can infiltrate.
  4. If site-based infiltration is not feasible, explore regional and reuse options.
- Organize corridors with performative landscape sections that manage stormwater.
  1. **Pavers**, narrow infiltration strips and conveyance
  2. **Bio-swales**, vegetated swales, connective GSI
  3. **Storage and infiltration** nodes
  4. Optimize road corridors to integrate green infrastructure and development overflow connections.
- Optimize outfall to maximize upstream infiltration/storage before conveyance to combined sewer system.
  1. Analyze the upstream storage, downstream elevations, and alternative connections before tying into the combined sewer system.
  2. Incorporate active outfall controls– dynamic valves.
  3. Examine regulation of stormwater flows in pipes through a master planned approach.

GSU'S PROPERTY



MANAGED VOLUME

BASEBALL FIELD

1.67 MG — 100 YEAR

1.1 MG — 25 YEAR

PLAZA

1.0 MG — 100 YEAR

-1.5 MG — 25 YEAR

COMMUNITY BENEFITS

- GREEN JOBS
- BEAUTIFICATION
- GREENSPACE
- COMMUNITY EDUCATION
- HEALTH & FITNESS
- HEAT REDUCTION

GSU stormwater opportunities include developing a stormwater master plan and directing stormwater to large nodes located in the future baseball field and/or GSU Stadium Plaza. Benefits include:

- Reducing detention costs for complying with City of Atlanta stormwater management requirements;
- Allowing future development to occur without new stormwater systems construction costs;
- Increasing developable land area;
- Immediate impacts to downstream communities not tied to future development;
- Reducing runoff pollution and combined sewer overflows to downstream waterways.

GSU and Carter stormwater partnership opportunities allow regional impacts to flooding downstream

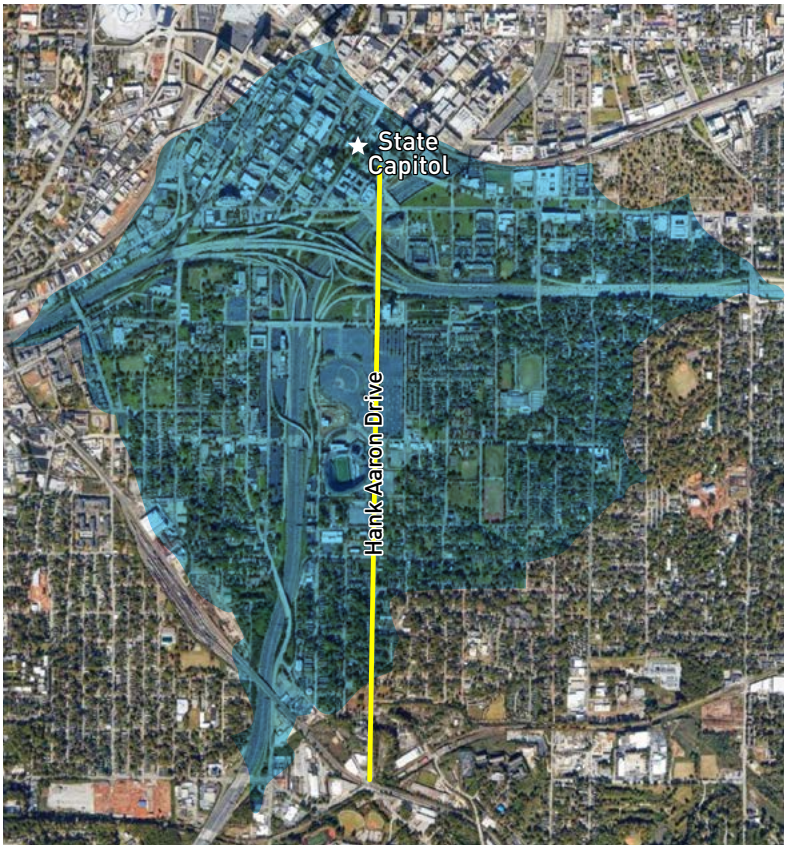
- Two large storage nodes can be implemented to promote reuse and supplement downstream storage proposed within the Connally Street Vault and existing storage in the Media Lot
  - **Redirect existing storm line from northeast quadrant to baseball field**
    - » 4.03 acres of impervious surface
    - Total baseball field storage impacts
      - » 11.78 acres
      - » 25 year = 1.11 Million Gallons
      - » 100 year = 1.67 Million Gallons
  - **Redirect Existing Storm Line to GSU Stadium Plaza**
    - » 9.07 acres of impervious surface
    - Total plaza storage impacts
      - » 10.58 acres
      - » 25 year = 1.00 Million Gallons
      - » 100 year = 1.50 Million Gallons
- This partnership maximizes use of existing designs and separate storm lines.
- Required/proposed easements are minimized through reuse of existing infrastructure/easements.

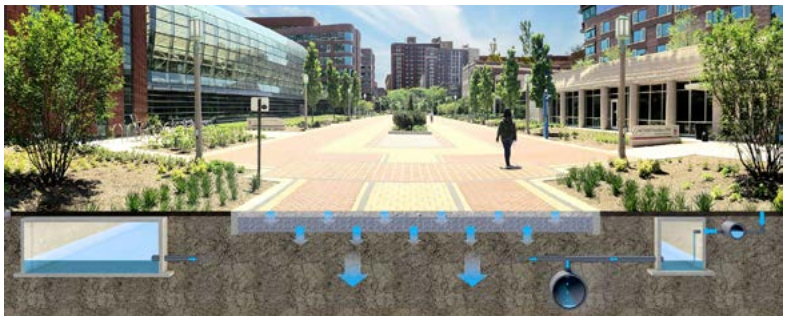
Carter-led development recommendations include:

- Continued parcel by parcel green infrastructure implementation.
- Robust implementation of the City of Atlanta ordinance.
- Future roadway stormwater integration
- Connect to GSU regional stormwater capture.
- Reuse water from GSU regional stormwater capture.

PUBLIC REALM

By incorporating green infrastructure within the Bus Rapid Transit (BRT) corridor and public plazas, we can connect people and address stormwater at the same time.





MANAGED VOLUME

2.4 MG 100 YEAR

1.7 MG 25 YEAR

COMMUNITY BENEFITS

- MOBILITY OPTIONS
- BEAUTIFICATION
- COMMUNITY EDUCATION
- GREENSPACE
- HEAT REDUCTION

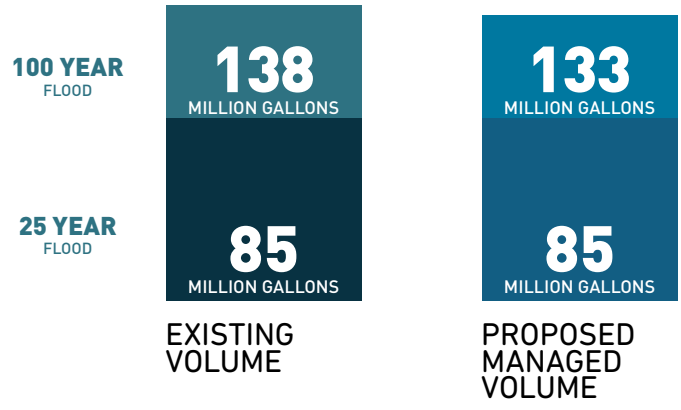
Public realm/right-of-way recommendations include:

- Bus Rapid Transit (BRT) and a multimodal hub is proposed to connect the development to Downtown and the Capitol.
- By aligning sustainable stormwater designs with new roadway/plaza footprints; a connective system of green infrastructure can leverage the impacts of individual blocks and connect the community through infrastructure and ecology.
- Plaza components include:
  1. **Permeable pavers:** Allow rainwater to percolate directly into the soil to reduce runoff.
  2. **Cisterns:** The roof of adjacent buildings can be directed to cisterns for regional reuse and irrigation
  3. **Storage vault:** Rainwater. from basins can be collected and detained before entering the city's sewer system.

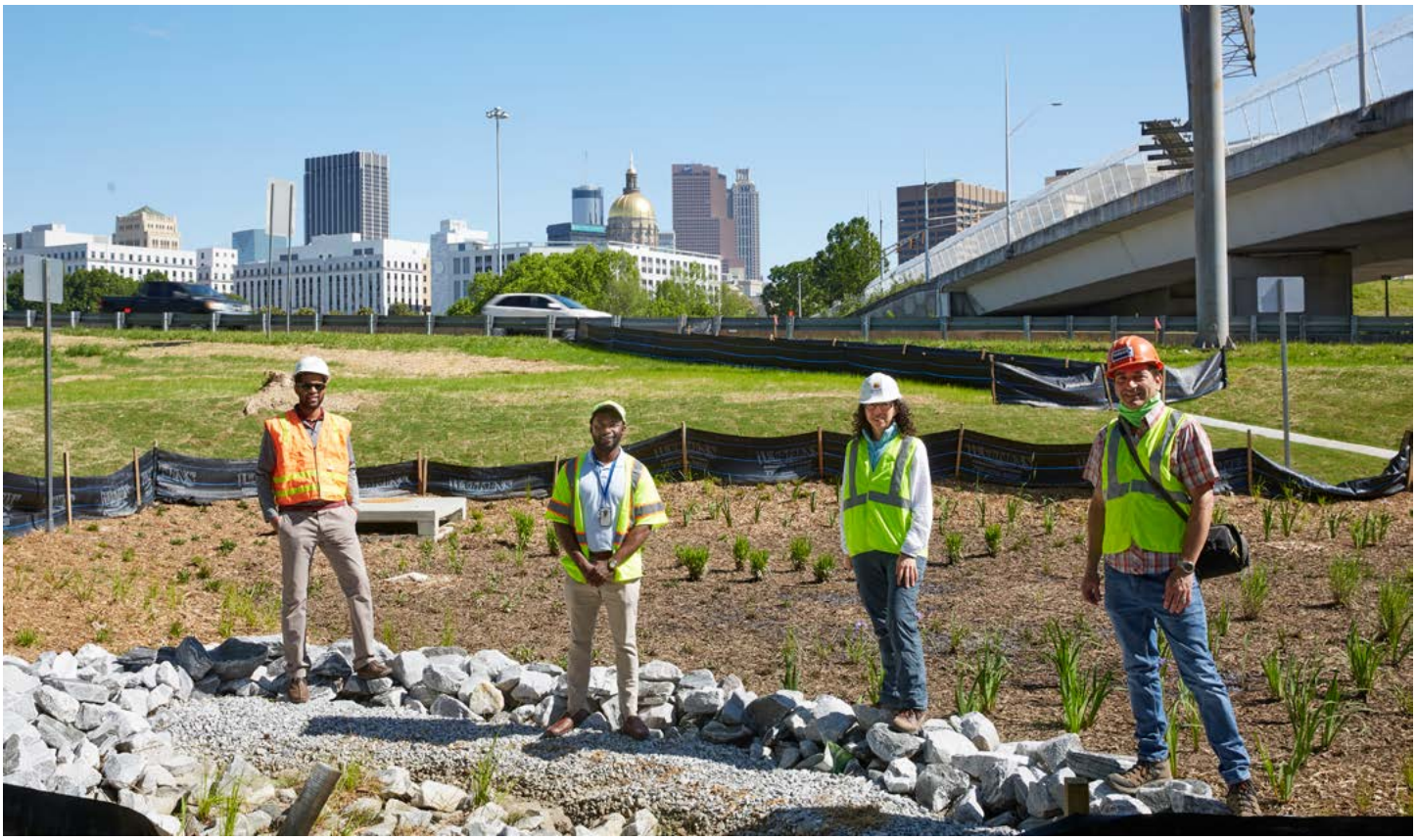
AN INTEGRATED APPROACH

With all projects combined, over 96% of all runoff in the basin can be managed to mitigate downstream flooding, combined sewer spills, and ecological degradation.

- ROADWAYS
- HIGHWAYS
- CENTRAL AVENUE PARKING LOTS
- SUMMERHILL REDEVELOPMENT
- GSU'S PROPERTY
- \+ PUBLIC REALM



TASK FORCE MEMBERS VISIT GSI INSTALLATION AT I-75/85 AND I-20, SPRING 2020. PHOTO BY THE SINTOSES.



CONCLUSIONS & NEXT STEPS

Based on modeling by Sherwood Design Engineers, by integrating the redevelopment of Summerhill, Central Avenue, the roadways that connect the basin, and the completed City of Atlanta Southeast Atlanta Green Infrastructure Projects, **over 96% of all runoff** in the basin can be managed to mitigate downstream flooding, combined sewer overflows, and ecological degradation—all while improving the health and livelihoods of residents.

Community stakeholders and other groups look forward to advocating for this One Water Management Plan for the region through the newly created Intrenchment Creek Community Stewardship Council.

STUDENTS EXPLORE
INTRENCHMENT CREEK PARK
WITH ECO-ACTION, 2019.

CONTRIBUTORS

Deep gratitude to partners, community leaders and participants in developing this plan including:

- Sherise Brown, Coalition for Community Benefits;
- Jon Calabria and Alfie Vick, University of Georgia;
- Steve Carr and Ben Sian, residents of the lower watershed;
- Aileen Daney and Danny Johnson, Atlanta Regional Commission;
- Jason Dozier, Mechanicsville Civic Association;
- Jackie Echols, South River Watershed Alliance;
- Bill Eisenhauer, Metro Atlanta Urban Watershed Institute;
- Jenny Hoffner and Jeremy Diner, American Rivers;
- Chris Lemons, Peoplestown Neighborhood Association;
- Audrey Leous and Wesley Brown, Central Atlanta Progress;
- David Nelson, Patti Neal, Michelle Willis, Carter USA;
- Dr. Yomi Noibi, ECO-Action;
- Keith Parsons, Georgia River Network and South River Watershed Alliance;
- Cory Rayburn, Susan Rutherford, Julie Owens, Todd Hill, Department of Watershed Management;
- Robert Reed and Austin Robinson, Southface;
- Kelly Ridenhour, Trees Atlanta;
- Columbus Ward, NPU-V and Peoplestown Revitalization Corporation;
- Kathy Zahul, Brad McManus, Corey Hardy, Drew Martin, Kelvin Wilson, and Darrin Godwin, Georgia Department of Transportation.

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The Intrenchment Creek One Water Management Task Force is a voluntary group of stakeholders championing One Water planning in the stadium neighborhoods.

INTRENCHMENT CREEK AT KEY ROAD, 2019. PHOTO BY JOHNATHON KELSO.