Stormwater Management Ordinance Update and Site Specific Solutions

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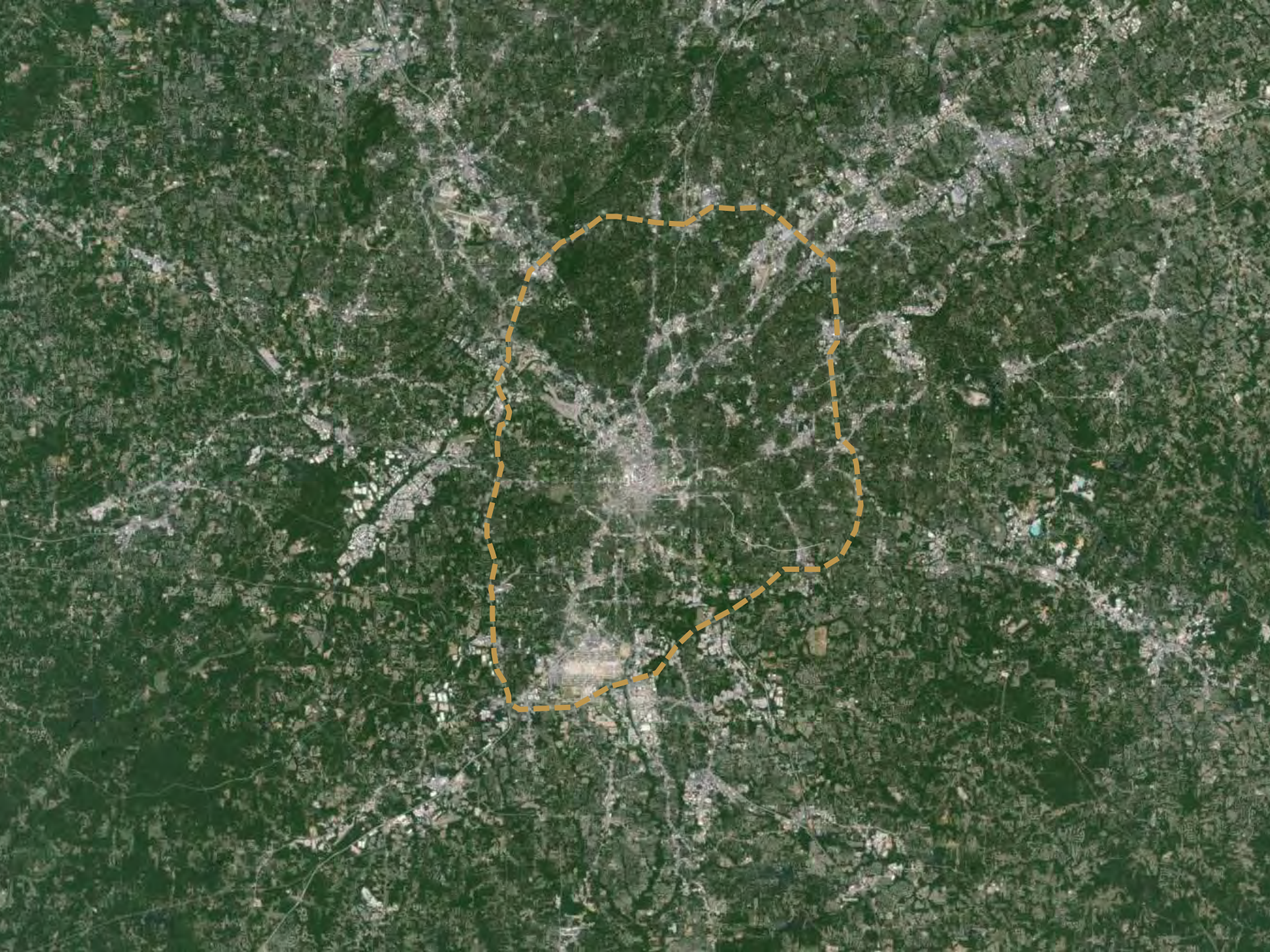
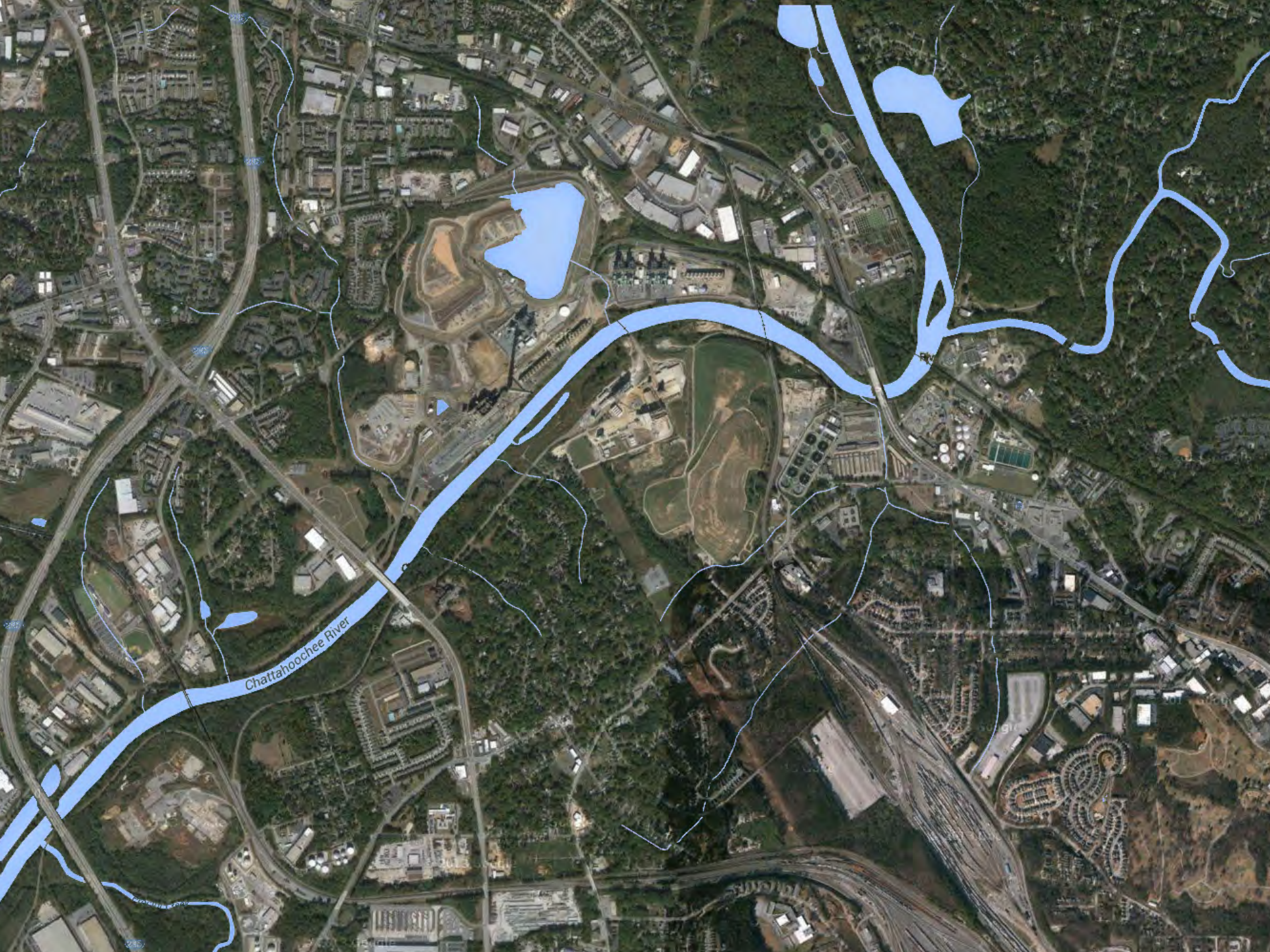
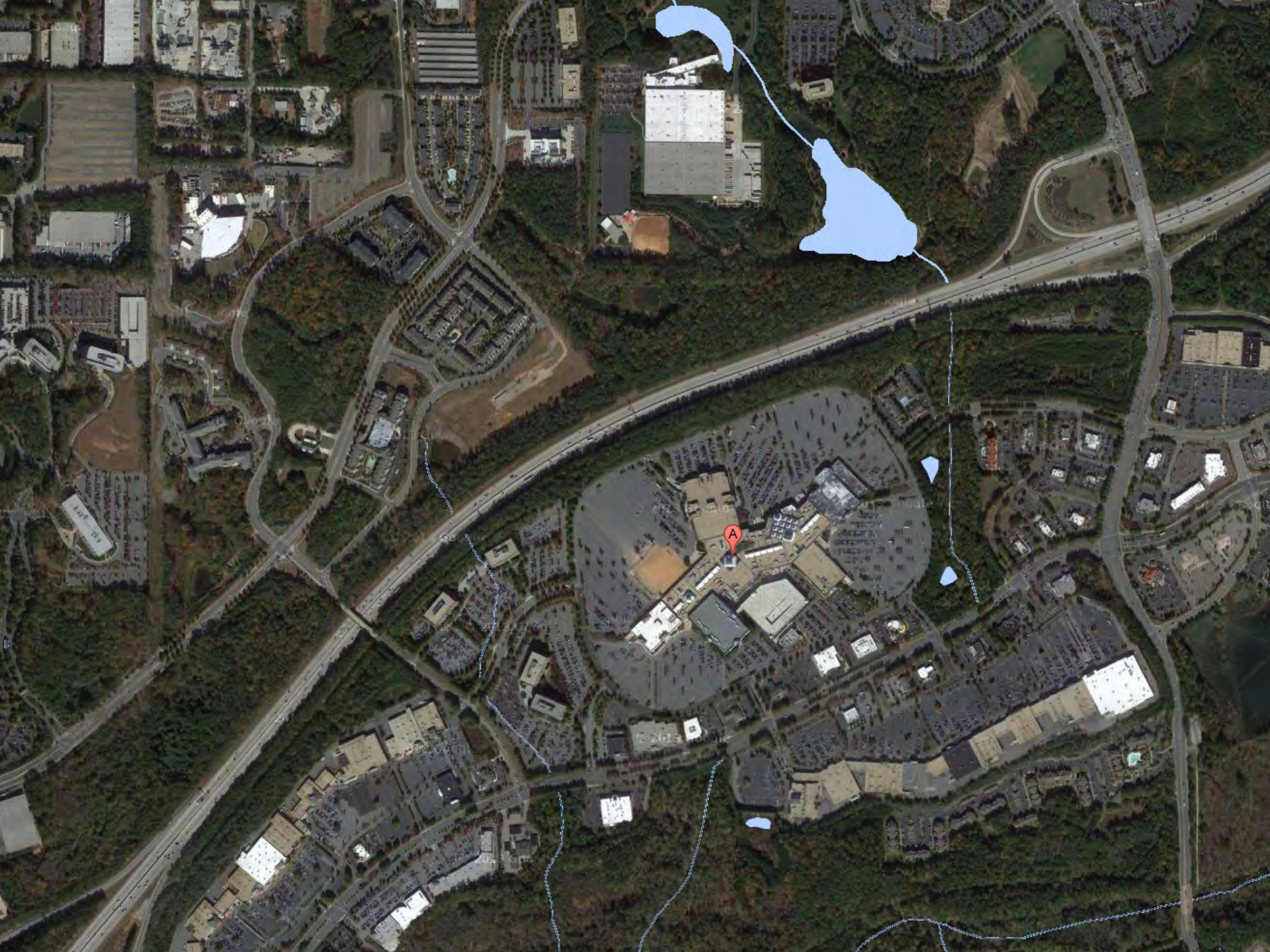
OCTOBER 11, 2013
GEORGIA PLANNING ASSOCIATION




ochee River
Chattahoochee River


Chattahoochee River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Flint Lake

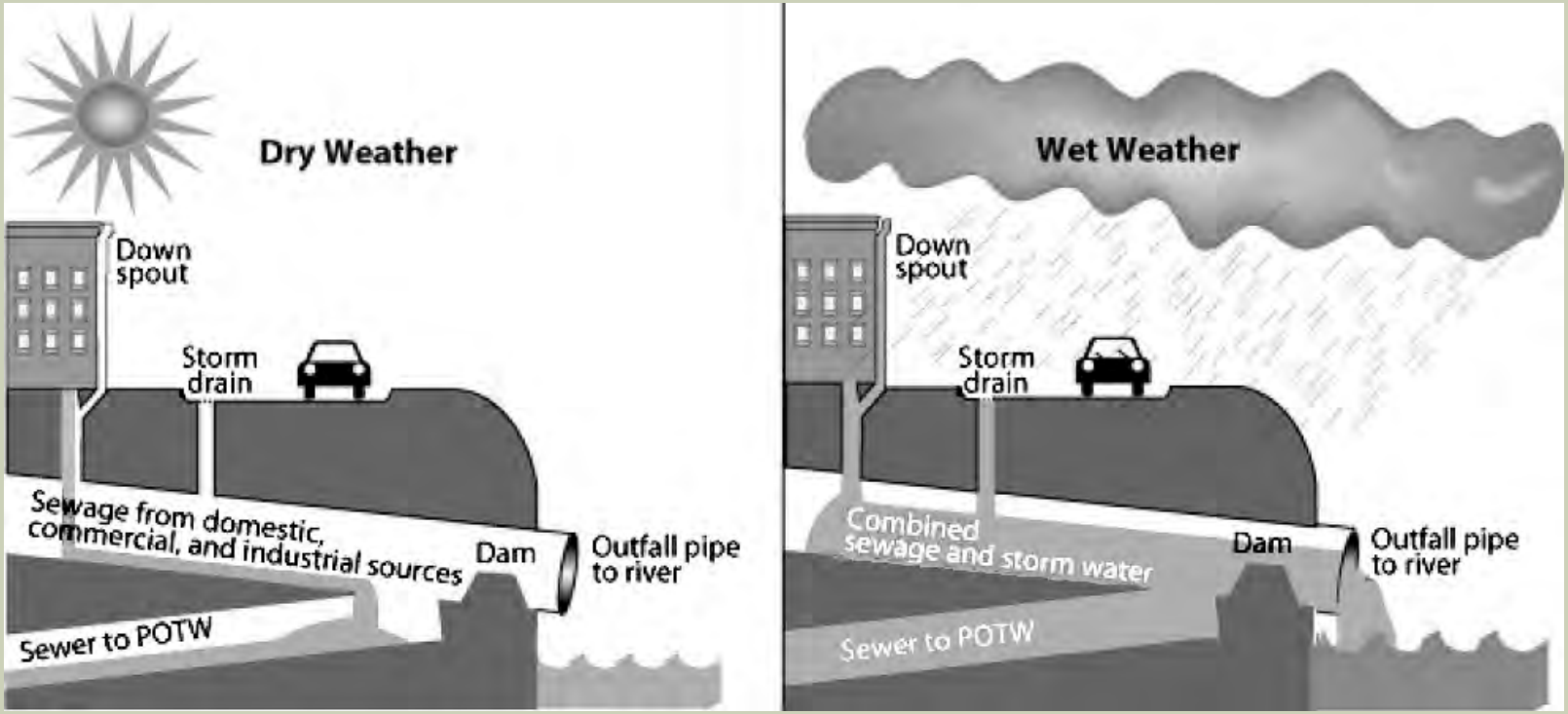

West Expy
West Expy
West Expy
402
20
Chattahoochee River
Frederick Dr SW
Patton Dr SW
Waterfront Dr SW

Regional Atlanta Watersheds:

Upper Chattahoochee
Upper Middle Chattahoochee
Upper Flint
Upper Ocmulgee
Etowah
Coosawattee
Upper Oconee

ARC area

Combined Sewer Overflow



www.epa.gov

Photo Credit: Alan Cressler

History in Atlanta

1880s

- Atlanta's first sewer system, streams walled over. Combined sanitary/storm design chosen to save costs

www.edaw.com

1990s

- Neglected infrastructure, clean water violations. Lawsuit filed against Atlanta. Underground repairs estimated at $3.9 billion.

www.atlanticcities.com

2000s

In Atlanta, over 2,000 miles of sanitary and combined sewers exist in an area of 19 square miles.

New CSO tunnels have been constructed to increase storage and handling capacity but don't address underlying water issues.

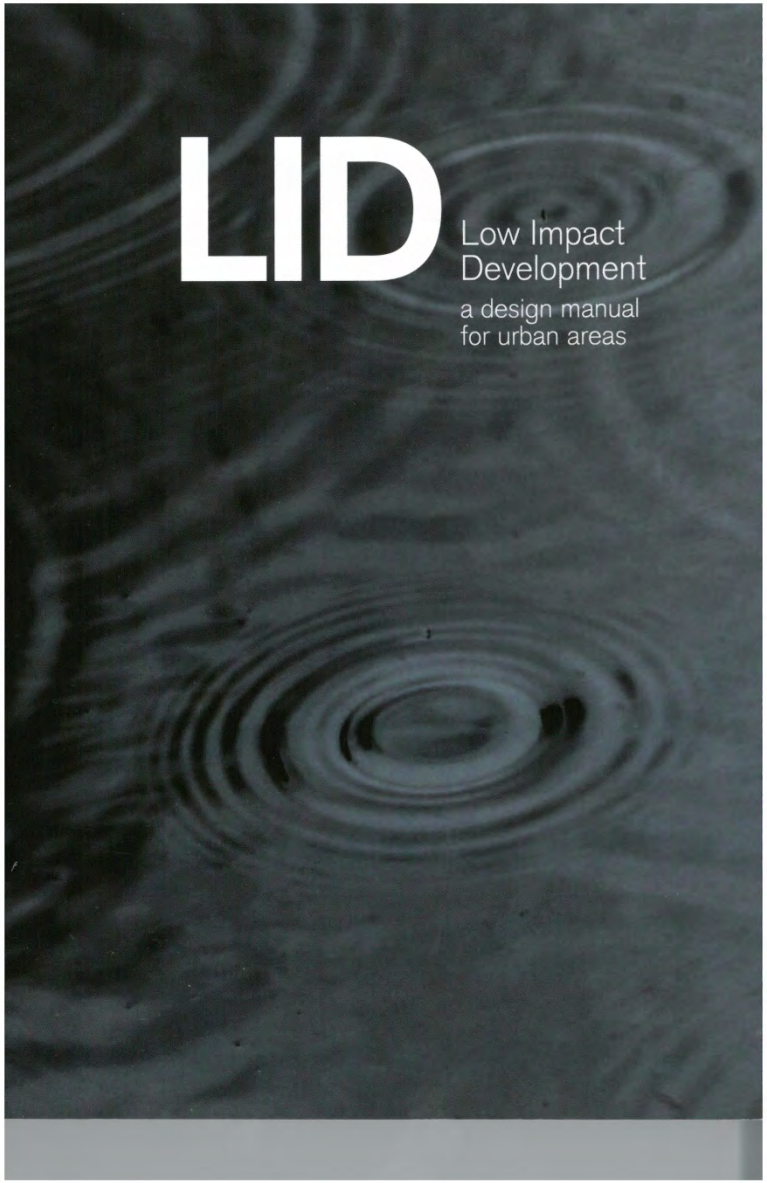
www.lachel.com

www.delonhampton.com

Gray vs. Green

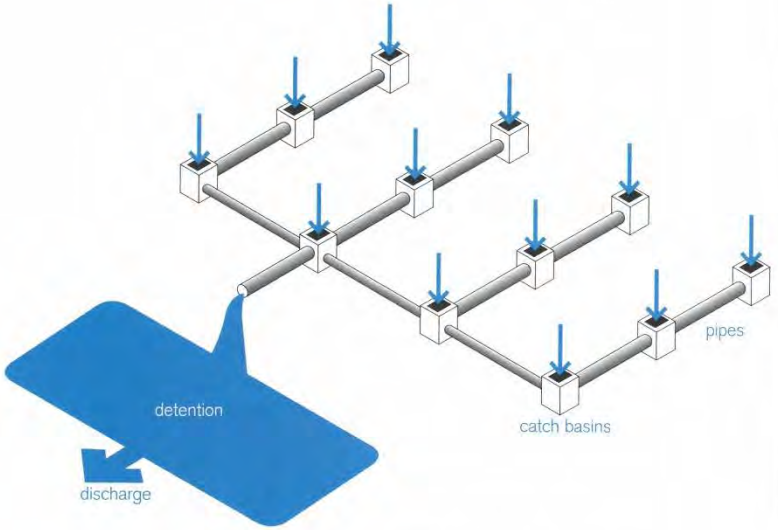
University of Arkansas Community Design Center

2010



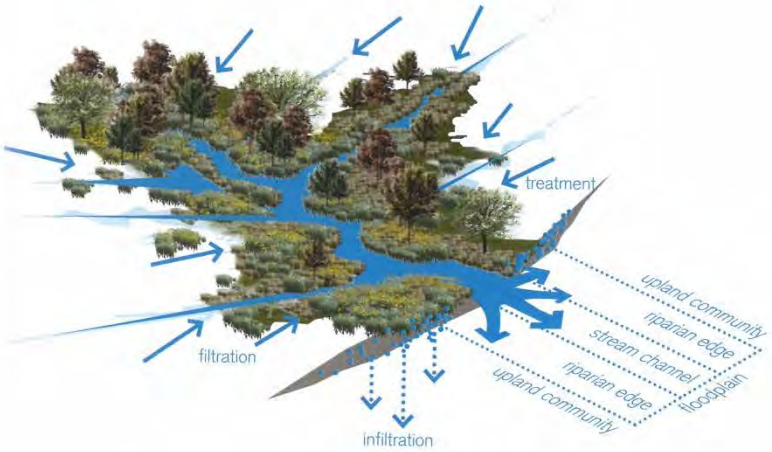
Hard vs. Soft Engineering

hard engineering
...just transfers pollution
to another site



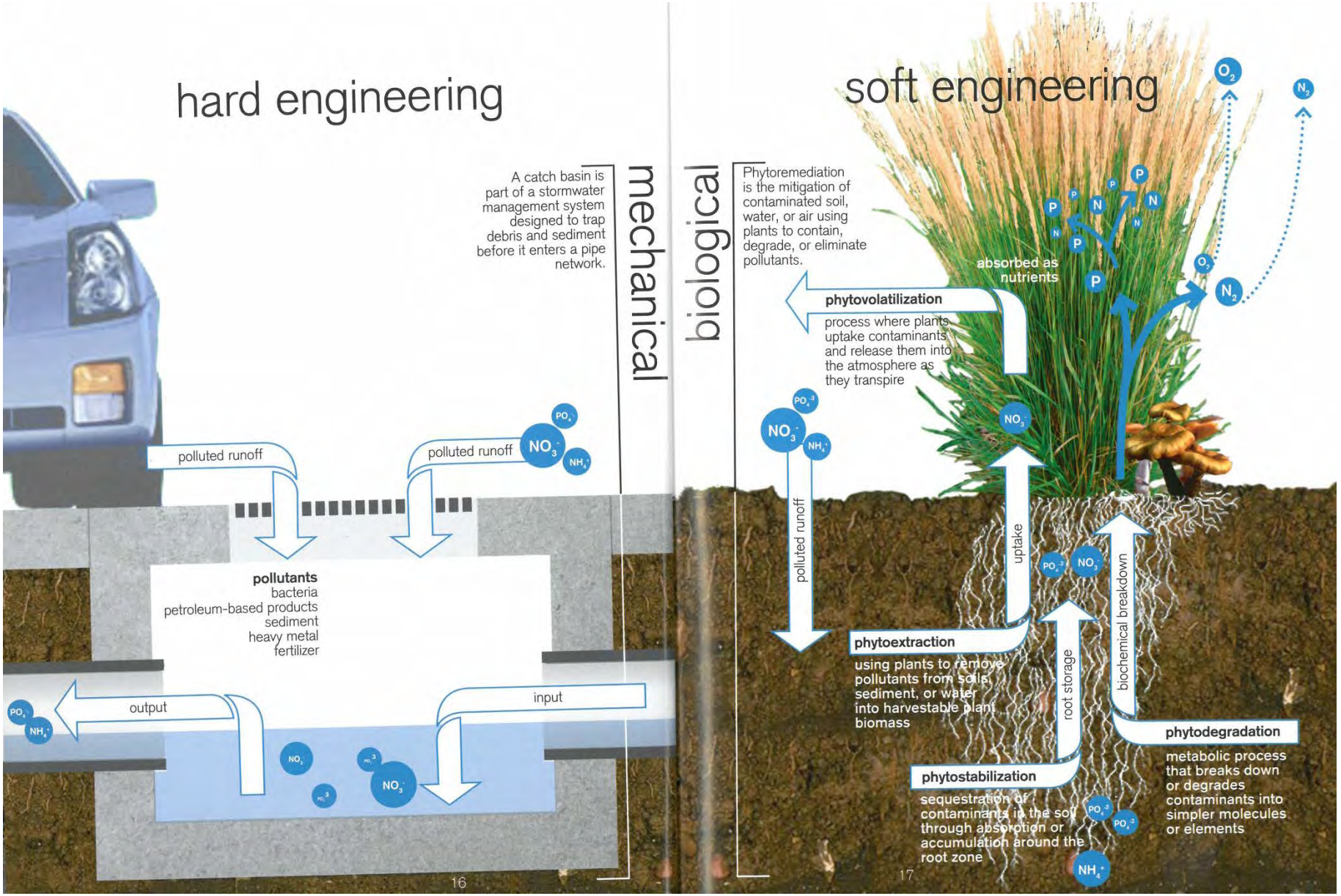
conventional management: "pipe-and-pond" infrastructure
drain, direct, dispatch

soft engineering
...metabolizes pollutants
on site—parks, not pipes!



low impact management: watershed approach
slow, spread, soak

Low Impact Development – a design manual for urban areas. University of Arkansas press


hard engineering
mechanical
A catch basin is part of a stormwater management system designed to trap debris and sediment before it enters a pipe network.
polluted runoff
polluted runoff
pollutants
bacteria
petroleum-based products
sediment
heavy metal
fertilizer
output
input
soft engineering
biological
Phytoremediation is the mitigation of contaminated soil, water, or air using plants to contain, degrade, or eliminate pollutants.
absorbed as nutrients
phytovolatilization
process where plants uptake contaminants and release them into the atmosphere as they transpire
polluted runoff
uptake
phytoextraction
using plants to remove pollutants from soils, sediment, or water into harvestable plant biomass
root storage
biochemical breakdown
phytodegradation
metabolic process that breaks down or degrades contaminants into simpler molecules or elements
phytostabilization
sequestration of contaminants in the soil through absorption or accumulation around the root zone
16
17

integrating hard engineering ...and soft engineering toward a LID approach

flow control: The regulation of stormwater runoff flow rates.

detention: The temporary storage of stormwater runoff in underground vaults, ponds, or depressed areas to allow for metered discharge that reduce peak flow rates.

retention: The storage of stormwater runoff on site to allow for sedimentation of suspended solids.

filtration: The sequestration of sediment from stormwater runoff through a porous media such as sand, a fibrous root system, or a man-made filter.

infiltration: The vertical movement of stormwater runoff through soil, recharging groundwater.

treatment: Proce uti ize phytoremedi bacterial colonies t contaminants in st runoff.

City of Atlanta Department of Watershed Management

Projects

Old Fourth Ward Park

Fire Station #16

Juniper Street

Boone Boulevard

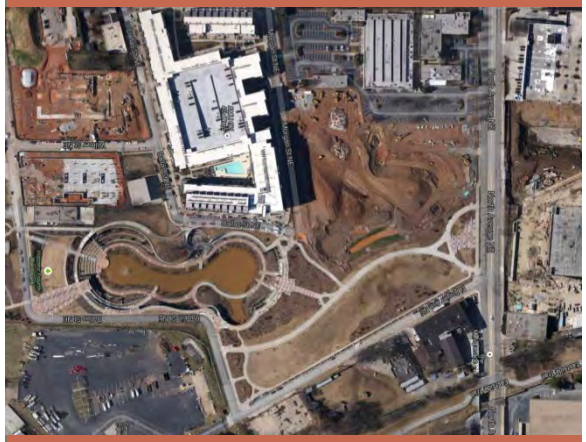
Green Roof Atlanta City Hall	
Rainwater Harvesting Cistern Southface Energy Institute	
Rain Garden Adair Park	
Pervious Paving English Park	

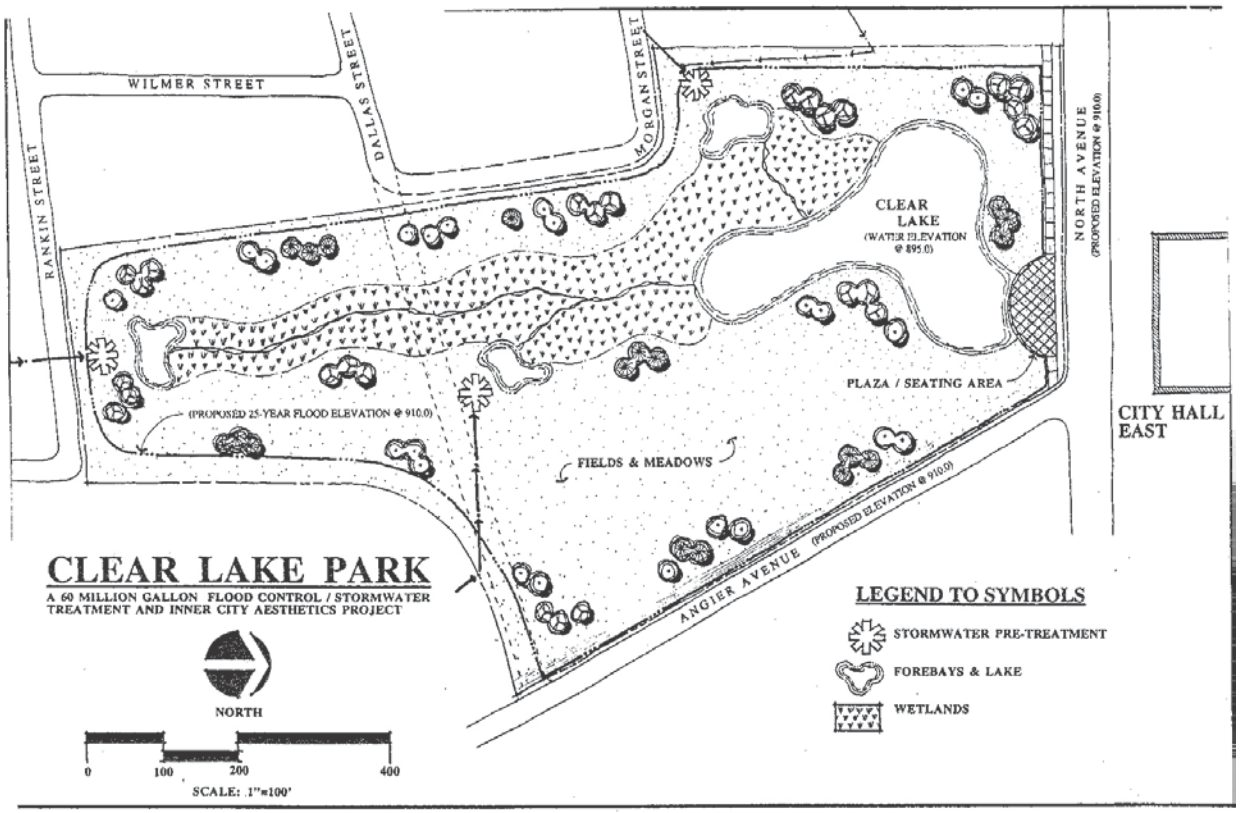
Bioswale Fernbank Museum Parking Lot	
Stormwater Planters Juniper Street (planned)	
Pervious Concrete Felder Street	
Stormwater Bump-outs Whitehall Terrace	

Old Fourth Ward Park

Opened 2011

Combined sewer capacity relief

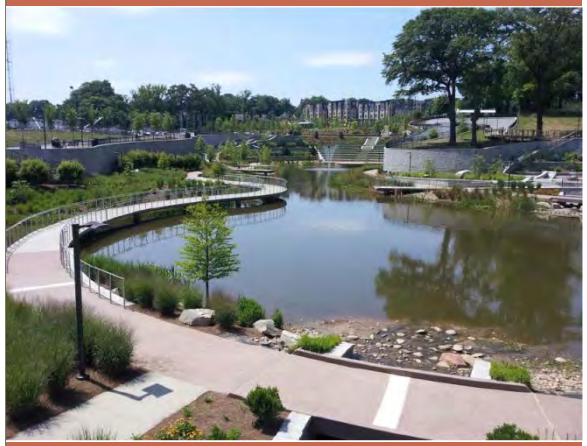




Old Fourth Ward Park

Opened 2011

Combined sewer capacity relief



Fire Station #16 Rain Garden

Built in 2012.

Demonstration.

EPA, EPD, COA, UGA, WAWA

Juniper Street 'Green Street' Improvements

Midtown Alliance funded

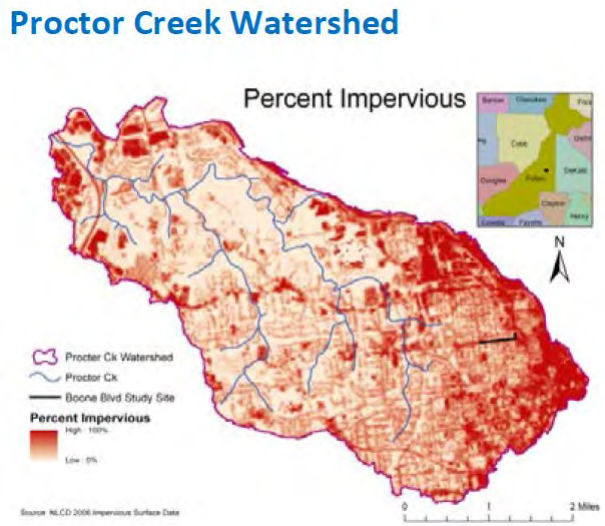
14th Street to North Ave

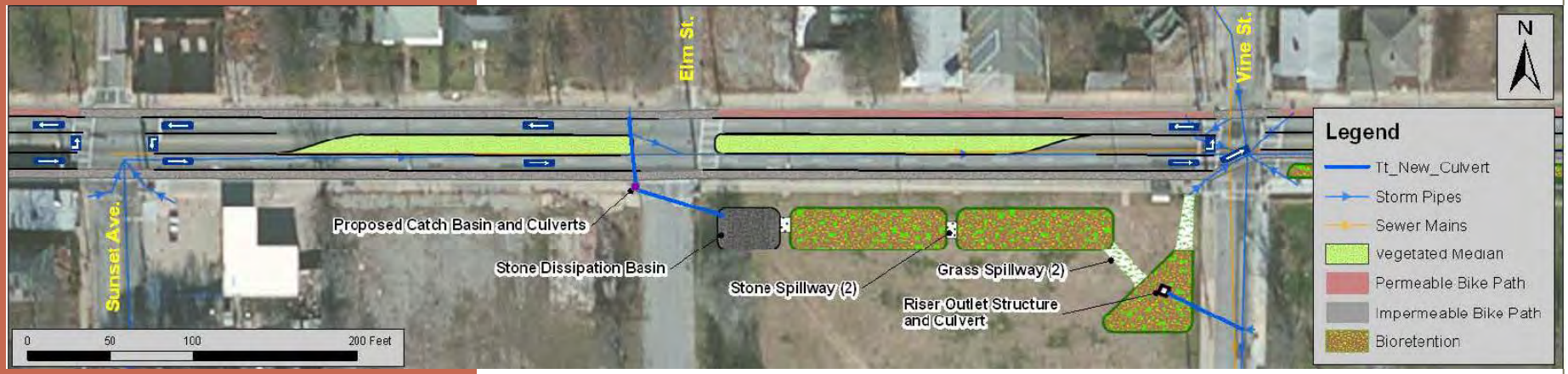
Incorporation of a bioswale system to capture runoff

Boone Boulevard

Green Street

Demonstration Project – EPA Technical Assistant Grant





Post-Development Stormwater Management Ordinance

- Adds a **Runoff Reduction** requirement
  - the stormwater runoff volume generated by the first 1.0” of runoff from the site shall be retained on site.
- Revises the **Rate Reduction** requirement
  - New development cannot increase the peak rate of discharge up to the 100-year storm event
  - Redevelopment must reduce the peak rate of discharge (up to 50%) based on the pre-development impervious conditions for the 1-25 year storm event
- Revises stormwater requirements for **SFR**
  - Applies to any new or redeveloped SFR, plus any additions that add >1,000 sf of impervious cover AND disturbs more than one acre

Post-Development Stormwater Management Ordinance

- Requires **maintenance of existing detention ponds**
- Adds a **stormwater concept plan** and consultation meeting
  - Prior to submitting for a building permit, a consultation meeting with City staff is required to ensure that the design professional is familiar with the new requirements and to actively promote the use of green infrastructure early on in design/permitting process

Questions?

- www.AtlantaWatershed.org/GreenInfrastructure

- Contact:
  - Susan Rutherford, Department of Watershed Management
    (404) 546 – 1251 or at srutherford@atlantaga.gov

  - Cory Raburn, Department of Watershed Management
    (404) 546 – 1334 or at crayburn@atlantaga.gov

Georgia Conservancy

- GC sponsored Georgia Tech studio led by Richard Dagenhart and Tom Debo, Ph.D, P.E.
- *Blueprints for Successful Communities*
  - Sponsored by
    - The Home Depot Foundation
    - The Sartain Lanier Foundation, Inc.
- Goals for the final product

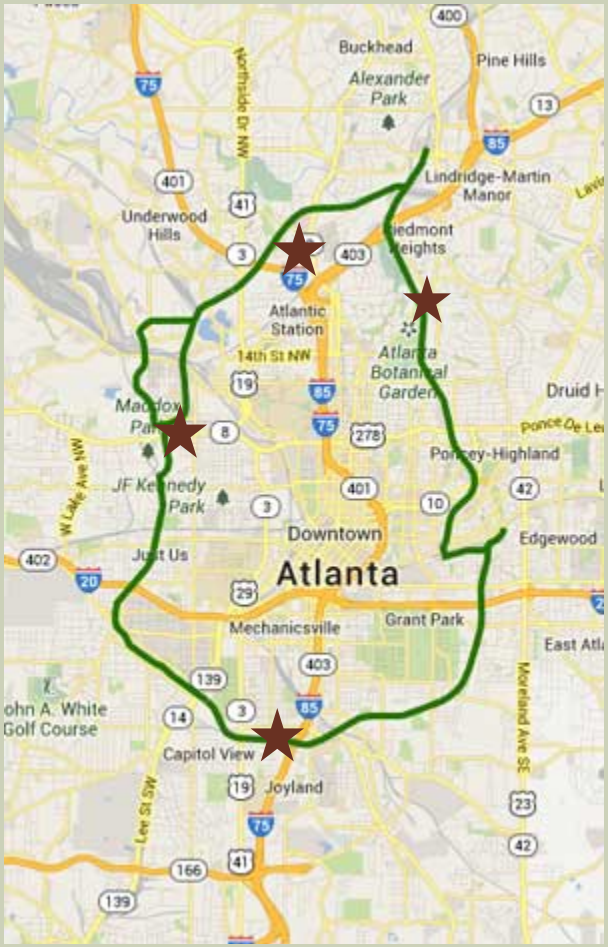
How can urban design address stormwater solutions?

How can stormwater address urban design solutions?

Stormwater in Context

- Not engineering solutions, but projects are about design with a focus on stormwater; solutions fundamental for planning and urban design

- BeltLine subarea plans currently don't address stormwater



Colonial Homes
Peachtree Creek

Threat

Colonial Homes Flooding —— 1

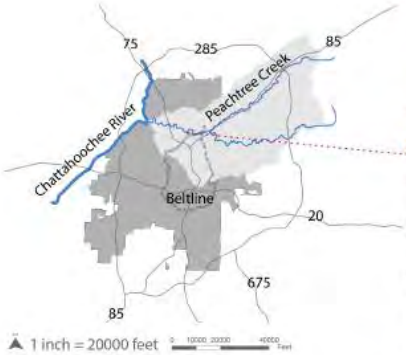
Colonial Homes

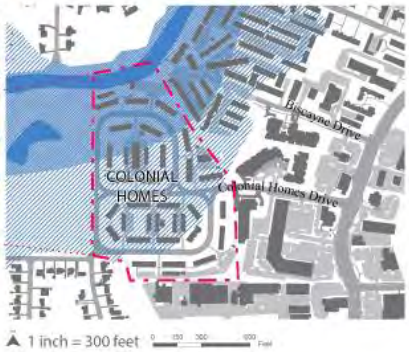
"Colonial Homes Apartments were constructed in the early 1950's. The site boundary encloses 18.4 acres (802,151 square feet). Approximately two-thirds of that area exists in the floodway of Peachtree Creek. Currently the site is occupied by 24 residential multi-family buildings comprising 254 individual residential units serving an adult population of 441.

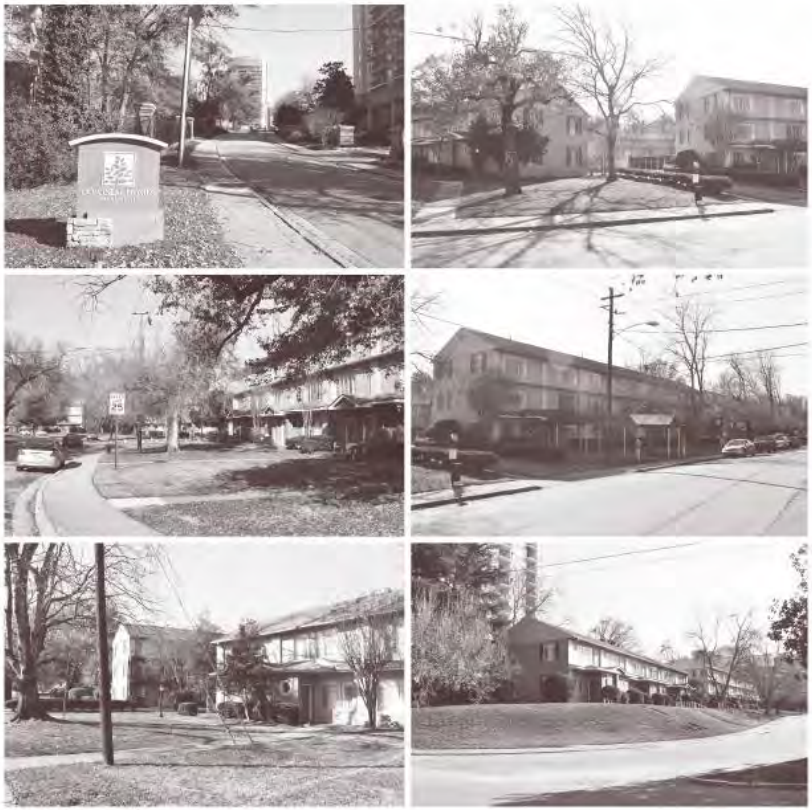
By area market standards, the existing buildings are outdated functionally and aesthetically, and flood plain issues limit options for rehabilitation."

- Alan Maxwell Overton

Sept 21, 2009
Colonial Homes Apartments flooding.



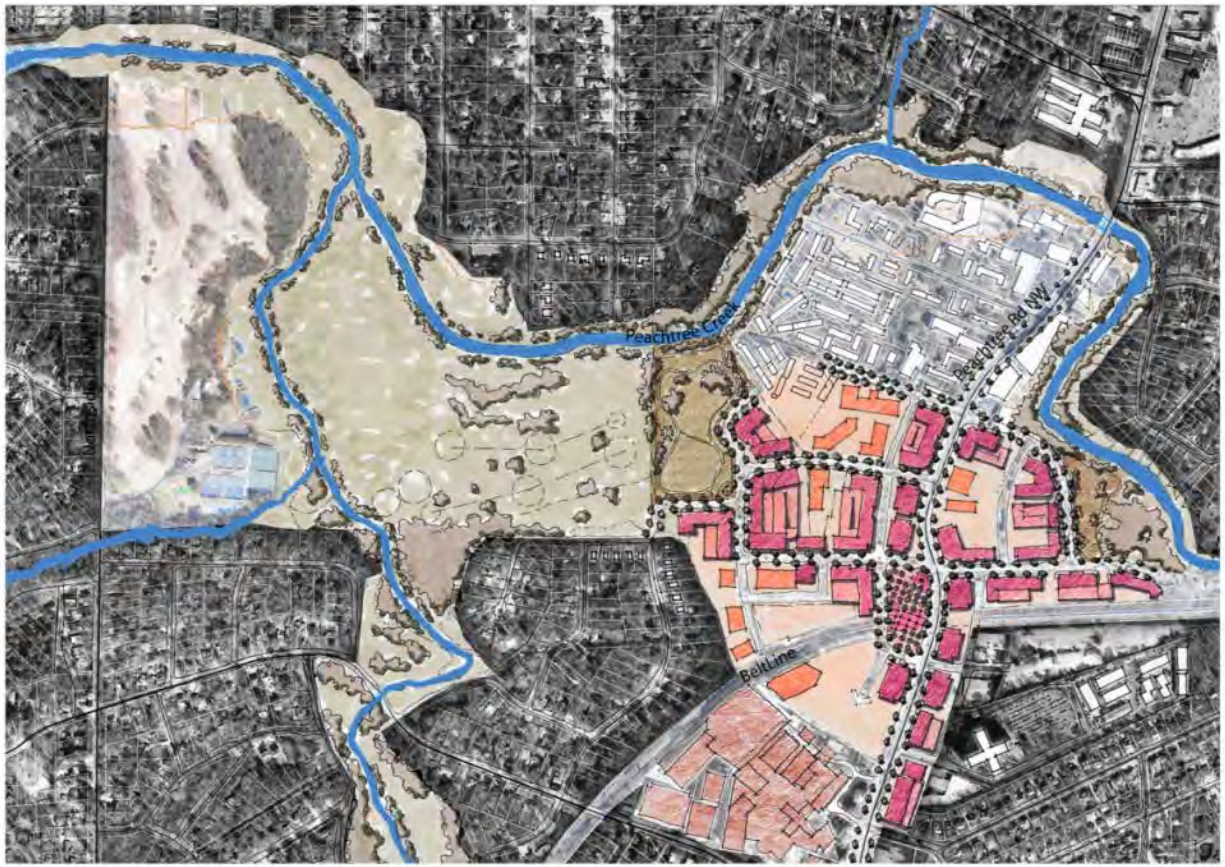




Sunny Days

Flooding Images

Opportunity



BeltLine Plan Recommendations

N 0 200 400 800 Feet

1 inch = 200 feet

New Growth	
Jobs Created	2,473
New Residents	4,357
30-40 units per gross acre (1/4 mile north of the CSX rail corridor)	

Conceptual Development Program			
Use	Proposed Program	% of Demand	Net Demand 2020
Commercial (sq.ft)	84,425	10%	854,211
Office (sq.ft)	688,390	72%	945,292
Residential (units)	2,848	50%	5,647

Summary

- A transit plaza and public space built over the CSX rail line that serves as a signature public space on Peachtree Road, a location for the BeltLine transit stop, and a unique address for surrounding development.
- Higher intensity residential development (10 + stories) with supporting ground floor retail services along Peachtree Road (consistent with the area's future land use and existing zoning).
- New office and mixed use development around the transit plaza with ground floor retail use.
- New residential development adjacent to Peachtree Creek reconfigured to protect significant portions of the floodplain for parks and open space.
- Incorporation of the MOCA GA and portions of the Bennett Street district into the redevelopment with a new address on the future Peachtree Parkway.
- New street connections across the CSX rail line that create better north-south connectivity along Peachtree Road and provide more accessibility to the hospital and adjacent redevelopment.

Beltline Subarea 7

Critique 1:
Tax Allocation District Boundary

Only focuses on redevelopment within the TAD boundary, but does not pay attention to the adjacent areas, especially the large area north of Colonial Homes that is subject to flooding.

We recommend to include these areas in the TAD boundary.

Critique 2:
Stormwater Management

Does not address the entirety of flooding issues. Only removes the residential from the floodplain and turns the remaining land into new public open space.

Lacks concrete stormwater management tactics to mitigate flooding such as green streets, detention ponds and bio-swales.

Critique 3:
Transit Plaza

The transit plaza over the BeltLine transit stop has a good location and significant function.

However, the crude slab overhead will probably reduce the spatial quality of BeltLine underneath.

Consequently the form of its design should be reconsidered.

Critique 4:
Northside Dr -- Peachtree Rd

There is no direct connection between the two main roads bordering the site (Northside Dr. and Peachtree Rd.) within a 10,000 foot radius of the proposed Beltline plaza and commercial center.

Critique 5:
BeltLine -- Peachtree Creek

The connection between BeltLine transit stop and the green space besides Peachtree Creek is very weak and should be enhanced.

Critique 6:
Peachtree Rd -- Opens pace

The stretch between Peachtree Rd. and open space is long in distance and poor in quality.

There should be more agreeable connections between Peachtree Rd. and the green open space associated with the development.

Observation

Stormwater 3

Basin Name:	Area (square miles)	Hydraulic Length (feet)	Land Slope (per cent)	Curve Number (cn)	S 1000 - 10 (cn)	Lag (hours)
Main Peachtree Creek	**24.5**	**37000**	**12.5**	**82.02**	**2.19**	**0.74**
North Fork Peachtree	38.6	72800	10.0	77.82	2.85	0.79
South Fork Peachtree	30.5	58000	10.57	78.96	2.66	0.40
Nancy Creek	40.2	90200	11.6	77.22	2.95	1.20

Using the data of the two nearest gaging stations, Southern Railroad and Northside Drive, runoff per square feet of our site can be estimated by the formula Q = C*I*A.

Gaging Station Name:	Drainage Area (square miles)	Mean Annual Discharge (c.f.s.)	10 Year Discharge (c.f.s.)	25 Year Discharge (c.f.s.)	50 Year Discharge (c.f.s.)	100 Year Discharge (c.f.s.)
Upstream Nancy Creek	93.6	5845	12810	14853	19539	21503
Northside Drive	**86.8**	**5593**	**13005**	**15139**	**19745**	**21827**
Southern Railroad	**69.8**	**5368**	**11891**	**13778**	**17783**	**19548**
Mouth of South Fork	30.5	2996	6383	7335	9504	10301
Mouth of North Fork	38.6	3632	8486	9965	12831	13988
Difference of the Two Nearest Stations	**17**	**225**	**1114**	**1361**	**1962**	**2279**

	Mean Annual	10 Year	25 Year	50 Year	100 Year
Runoff per square feet (feet/second)	4.7×10^{-7}	23.5×10^{-7}	28.7×10^{-7}	41.4×10^{-7}	48.1×10^{-7}

Site Runoff Estimation

Peachtree Creek Watershed

N

0 5000 10000 20000 Feet

1 inch = 5000 feet

Peachtree Creek Basin boundary

Subbasin boundary

Observation

Site Conditions — 4

Site Composite Map

N 0 200 400 800 Feet
1 inch = 200 feet

Locations of site photos below

Major property (group) line

Values

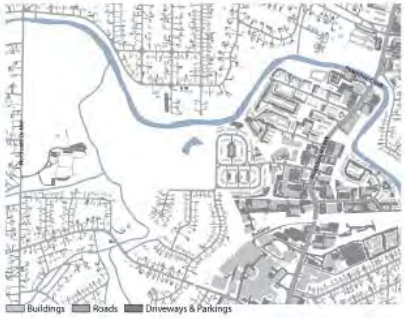
1 inch = 800 feet

Tissues

1 inch = 800 feet

Contours

1 inch = 800 feet



Impervious (32.9%)

1 inch = 800 feet

Paths

Intersections

Water Outlets

Water Pollutions

Design

GOALS

INCREASE EFFICIENCY OF FLOODPLAIN TO MITIGATE VOLUME

CLEAN THE WATER ON THE SITE

PRESERVE AND ENHANCE ECONOMIC VALUE OF ADJACENT LAND

IMPROVED QUALITY OF LIFE FOR RESIDENTS

DEVELOP BELTLINE-PEACHTREE CREEK CONNECTION

CREATE A PERMANENT SOLUTION

TACTICS

REMOVE BUILDINGS FROM FLOODPLAIN

RE-EXAMINE DESIGN OF GOLF COURSE TO BETTER UTILIZE FLOODPLAIN

PROVIDE OPPORTUNITIES TO STIMULATE ECONOMIC GROWTH THROUGH REAL ESTATE DEVELOPMENT

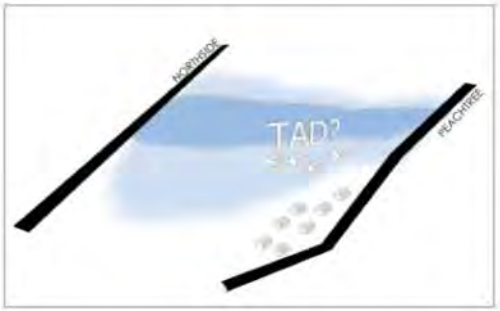
DESIGN MUTUALLY BENEFICIAL INTERRELATIONSHIPS AMONG BELTLINE, COLONIAL HOMES SITE, PEACHTREE STREET, AND GOLF COURSE

DESIGN FOR WALKABILITY/ ACTIVE LIFESTYLES

CONCEPTS

PRESCRIPTIVE MOVES

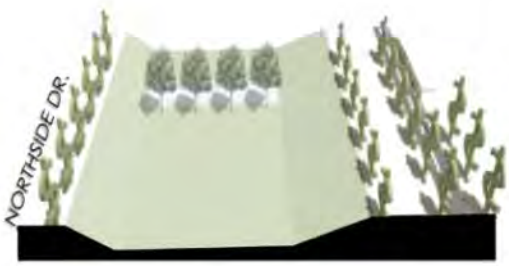
OPTIONS FOR STRUCTURES IN FLOODPLAIN



RECOMMENDED TAX ALLOCATION DISTRICT EXTENSION

GREEN STREET SECTION

CONNECTION OF BELTLINE AND CREEK



CAPITALIZATION OF POTENTIAL VALUE

IMPROVED BELTLINE PLAZA

TYPICAL GREEN STREET PLANT MATERIAL

Design

Master Plan — 6

Master Plan

N 0 200 400 800 Feet

1 inch = 200 feet

Beltline Proposal		Our Proposal	
Single Family Residences	0	Single Family Residences	36
Townhomes	0	Townhomes	296
Condos/Apartments	1,977	Condos/Apartments	2,642

Existing Parcels

1 inch = 800 feet

EXISTING		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
201,355	7,000	332
BELTLINE PROPOSED NEW DEVELOPMENT		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
205,750	436,800	1,977
Net Gain		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
4,395	429,800	1,645

Proposed Parcels

1 inch = 800 feet

OUR PROPOSAL		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
201,355	7,000	332
OUR PROPOSAL		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
279,337	558,674	2,974
NET GAIN		
Retail (sq.ft)	Office (sq.ft)	Residential (units)
77,982	551,674	2,642

Tactic 1:

Relocation and Enhancement of Residential Units

-All homes have been removed from the floodplain.

-To replace and increase residential unit quantities, homes have been proposed on higher land with increased values.

-A variety of housing types is offered.

-The proposed net gain of residential units directly leads to a higher tax base for the Tax Allocation District.

Tactic 2:

Eco-Conscious Golf Course & Eco-Educational Park

-The existing 18-hole Bobby Jones Golf Course is proposed to be transformed into an ecologically-friendly 9-hole golf course in concert with its urban context

-The proposed park not only provides a respite for hectic city life, but also effectively reduces issues of flooding while providing the public educational opportunities about flood mitigation and the importance of protecting our precious water resources.

Tactic 3:

Capitalizing on Land Value Potential

-A total of 296 condominiums overlook the golf course's West end. Four stories each, these buildings are still agreeable with the context on adjacent uses.

-2486 high-value condominiums and apartments overlook the park and rest above a commercial center and office space along Peachtree Rd.

Tactic 4:

Northside Dr.- Peachtree Rd. Connection

-A grand boulevard experience provides increased connectivity on the site without disruption to any residential areas, existing or proposed.

Tactic 5:

Green Connection of Beltline to Peachtree Creek

-Four direct connections are offered for the Beltline user to Peachtree Creek. The first is the park on the East side of Peachtree Rd. The second and third link the Beltline plaza through green streets to the large park next to the golf course. The fourth is a greenway connecting the Beltline to the large park. A greenway is proposed along Peachtree Creek throughout the extent of the study area.

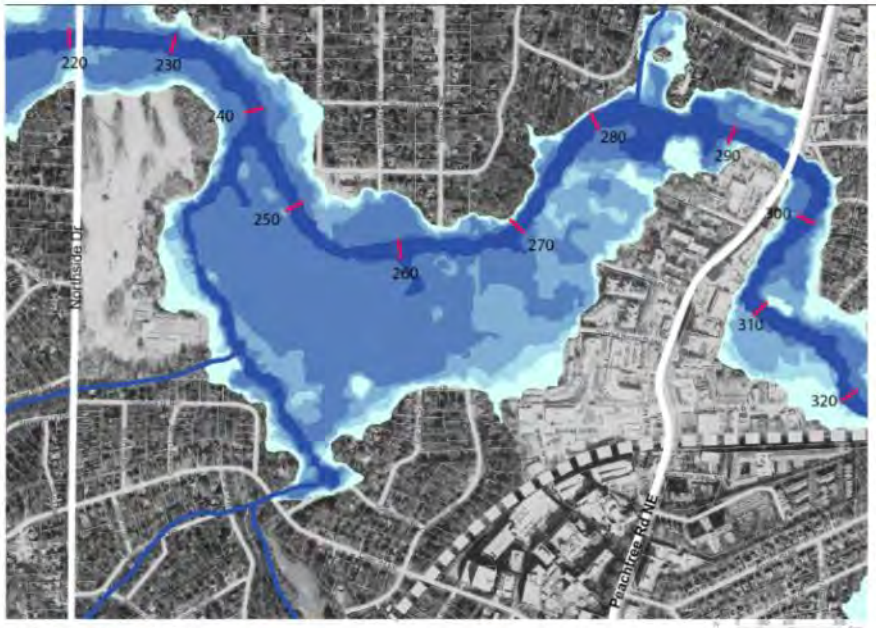
Tactic 6:

Green Streets

-All proposed streets will be proposed as green streets to better handle the issues of water quantity and quality running through and falling on the site.

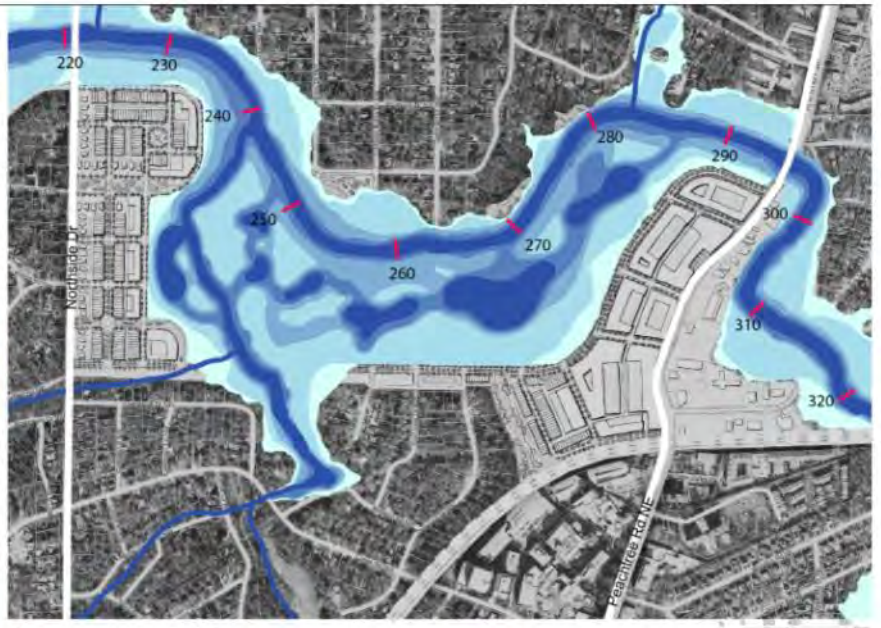
Design

Stormwater Management



Existing Floodplain

1 inch = 400 feet



Proposed Floodplain

1 inch = 400 feet

2 Year Flood Plan

1 inch = 800 feet

5 Year Flood Plan

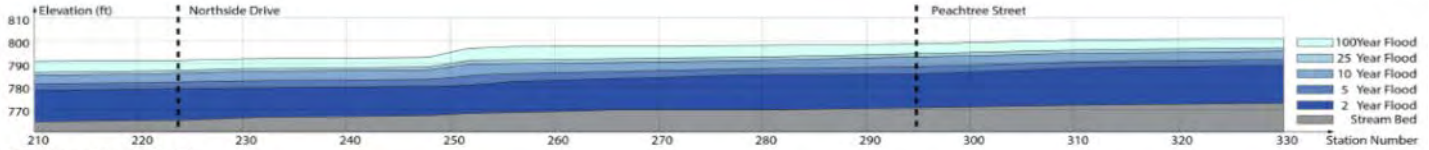
1 inch = 800 feet

10 Year Flood Plan

1 inch = 800 feet

25 Year Flood Plan

1 inch = 800 feet



Peachtree Creek Profile

Retention

1 inch = 800 feet

Detention

1 inch = 800 feet

BMP

1 inch = 800 feet

Infiltration

1 inch = 800 feet

Retention

Detention

BMP

Infiltration

Design

Site Scenes — 8

1. VIEW OF PROPOSED PARK AND DEVELOPMENT

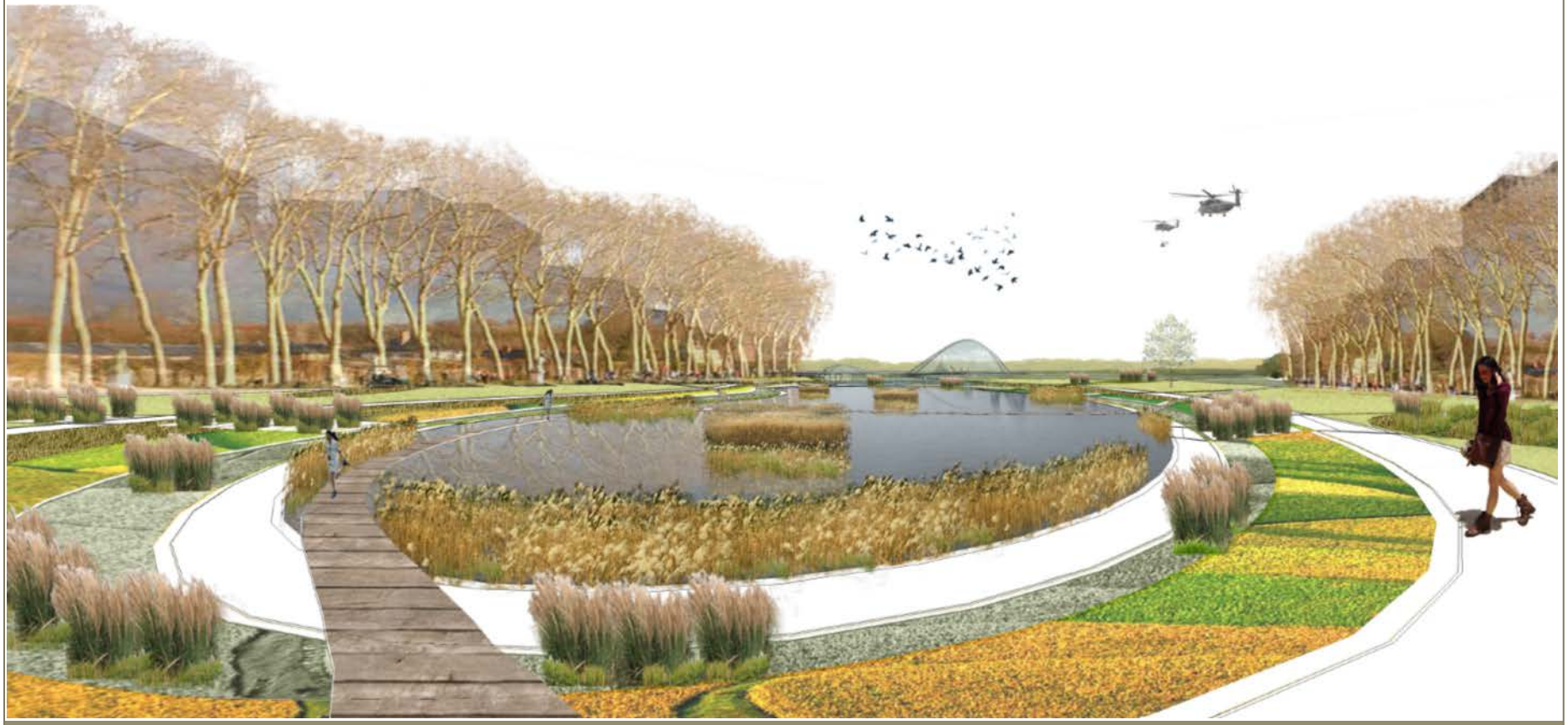
2. GREEN STREET RETROFIT

3. GREENWAY CONNECTION

4. VIEW OF PROPOSED BELTLINE PLAZA

DESIGNED TOPOGRAPHY

University Avenue
Pittsburgh Neighborhood
McDaniel Creek

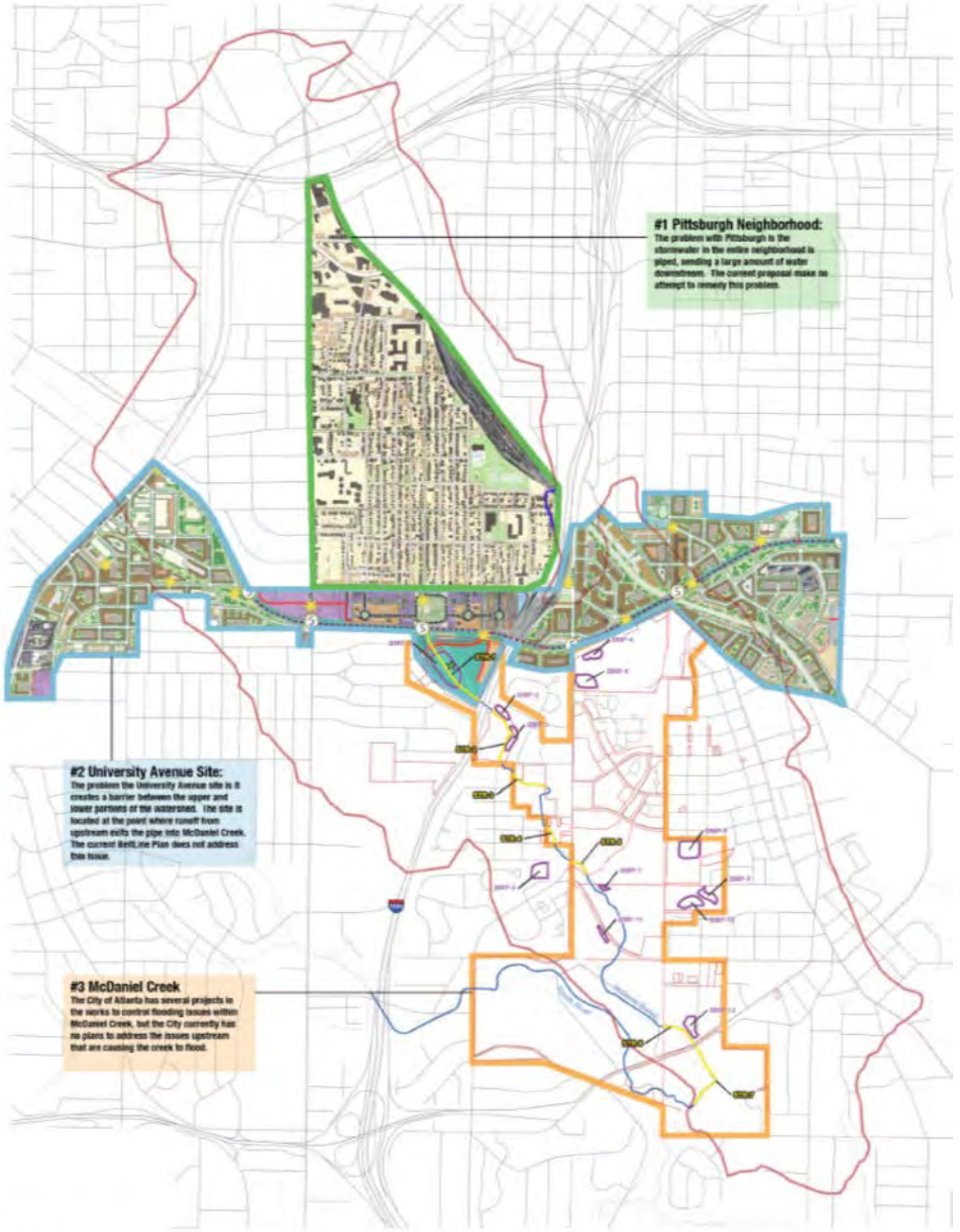


EXISTING CONDITIONS

Pittsburgh Neighborhood

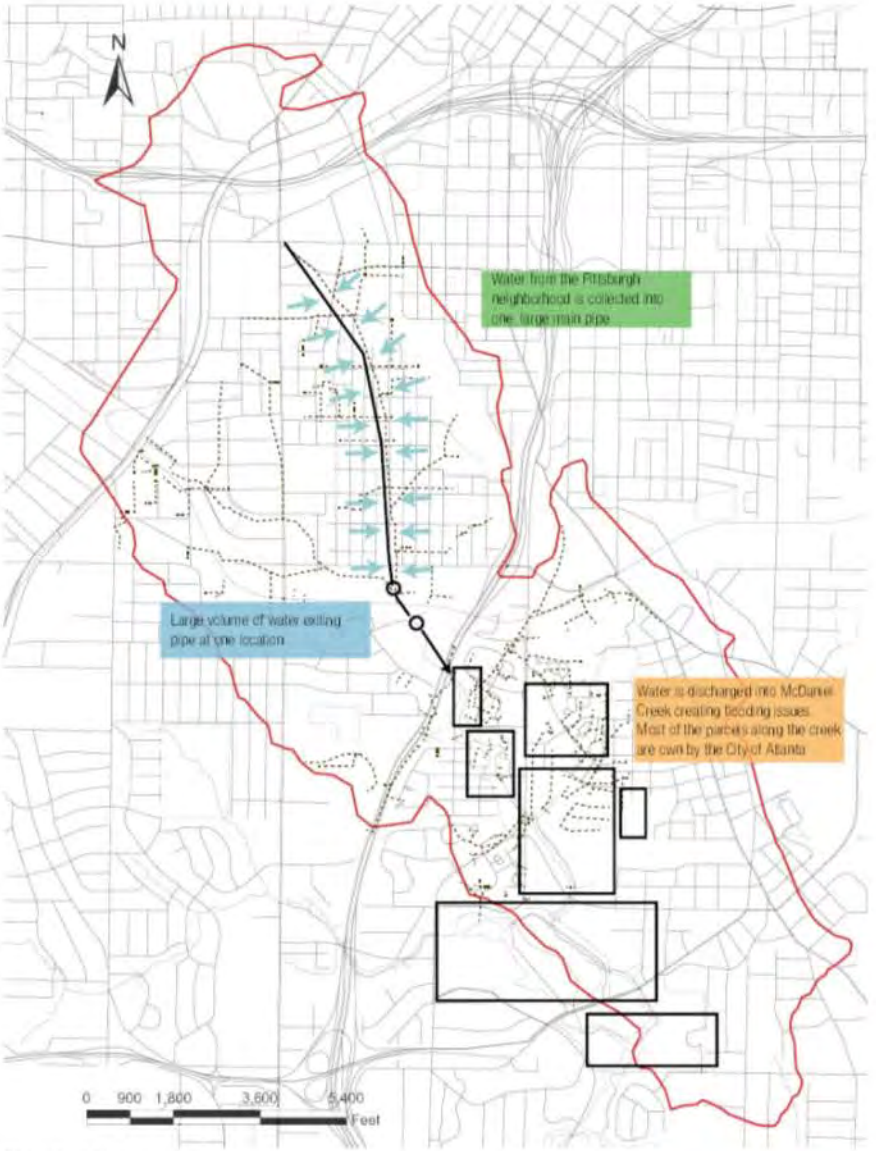
University Avenue

McDaniel Creek

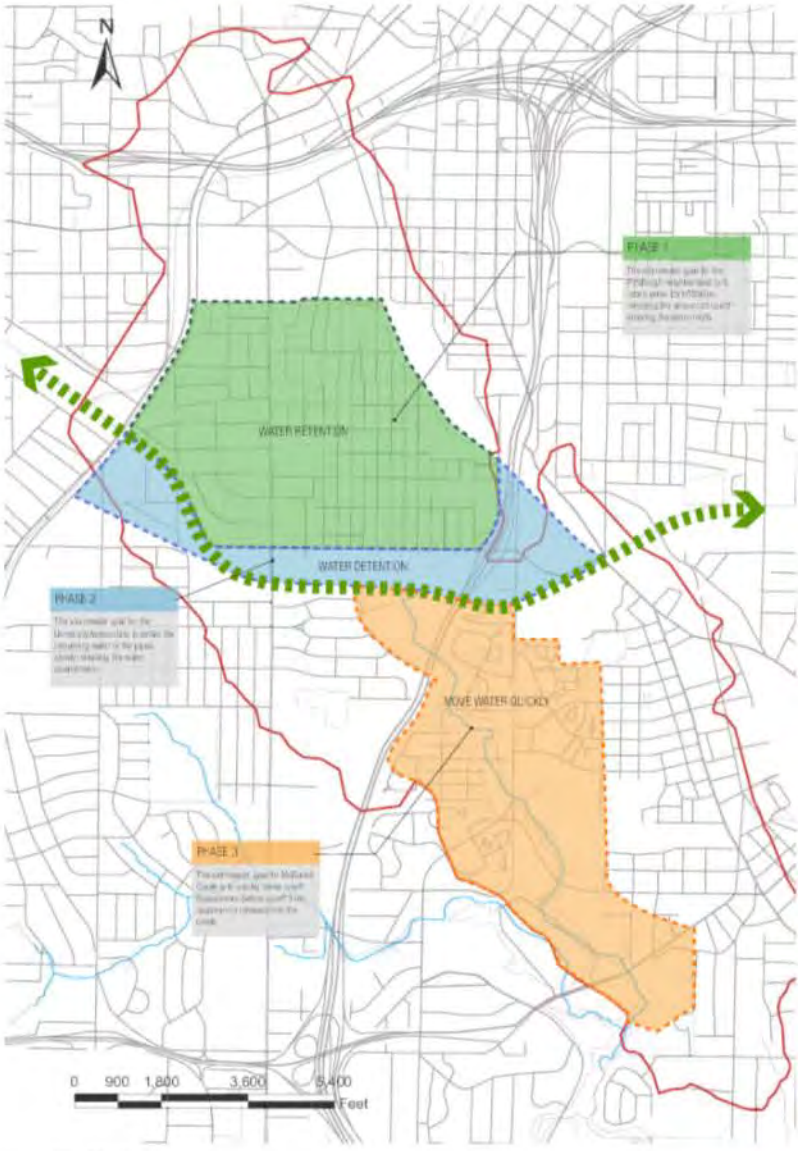


Existing Master Plan

WATERSHED ANALYSIS



Watershed Analysis



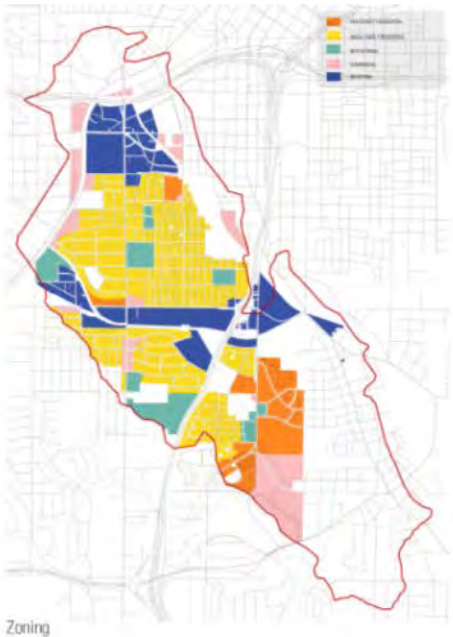
Three Key Strategies

100 Year Flood Plain

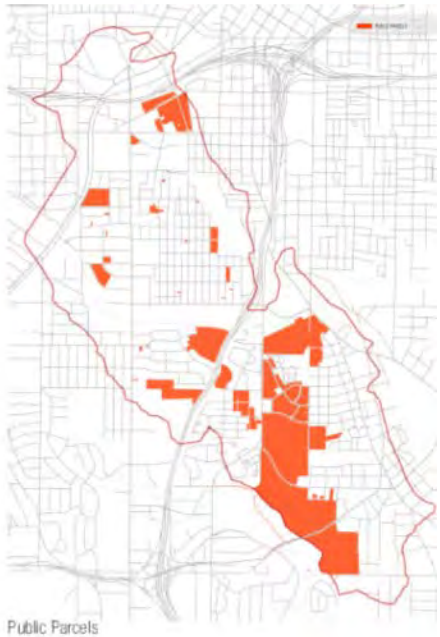
Parks and Greenspace

Topographical Analysis

Impervious Areas

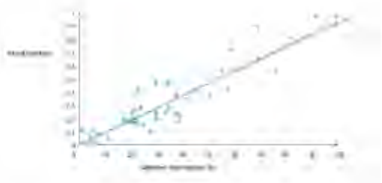


Zoning

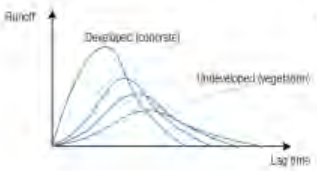


Public Parcels

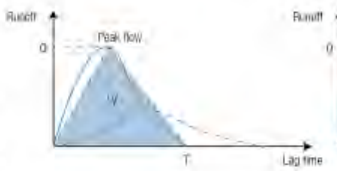
MASTER PLAN



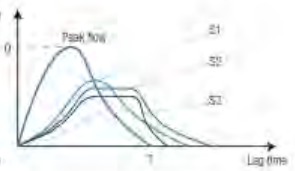
This figure illustrates the coefficient relationship between runoff and imperviousness. We know that the runoff coefficient goes up when imperviousness increases. According to peak flow calculation, the higher the imperviousness, the higher the peak flow rate. When imperviousness is greater than 10%, water quality will decrease. Our watershed is approximately 46%.



This graphic shows the volumes of runoff for different impervious conditions within the watershed. Our goal is to decrease the amount of impervious surfaces to minimize the runoff into the creek.



This graph shows, that by increasing the lag time, we can reduce the peak flow and the volume of water generated during a storm. Currently our site generates 60 ac ft in a 100y storm, 34 ac ft in a 5y storm, and 12 ac ft during a 2y storm.



Strategy 1: Increase infiltration of water to decrease runoff by 40%
Strategy 2: Retain water in ponds and parks to reduce runoff by 30%
Strategy 3: Move water out of the lower portion of the watershed before the water from reaches the creek

PITTSBURGH NEIGHBORHOOD


Street Type


Vacancy

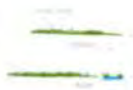

System


Inlets Pipes

Street Retrofits

Vacant Lots Reuse

Slowing down surface water before it enters the pipe



Parks

Trees

Vegetation

Pervious Paving

Daylighting Pipes in Streets

Slowing down water without pipes

Retention

Inlets disuse

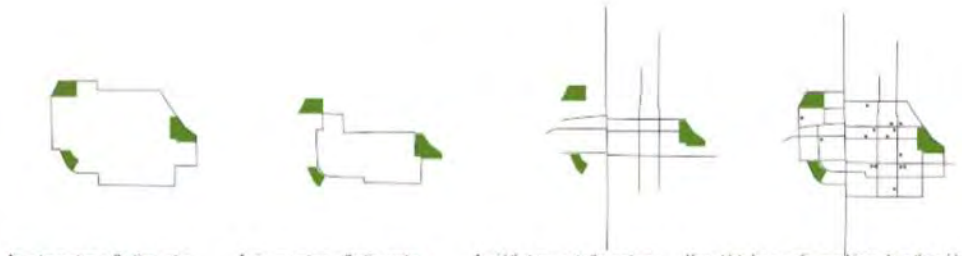
Swales

Rain Garden

The main purpose of Pittsburg area is to infiltrate the water as much as possible by daylighting the pipes and creating more green space with vacant and city parcels.

Since the imperviousness of this area is so high, I want to prevent more runoff to flow into the pipes and then to the McDaniel Creek, which contributes to the flood plan. So, the strategies are retrofitting the streets and vacant lots, daylighting the pipes. Indeed, some of the streets will be transformed to be oneway streets. Meanwhile, by block the inlets and pipes, more runoff can flow out to the ground through the green area.

Then I take one sample area to do detailed design and make a estimated calculation. Finally, the whole area will get 30% off of runoff.



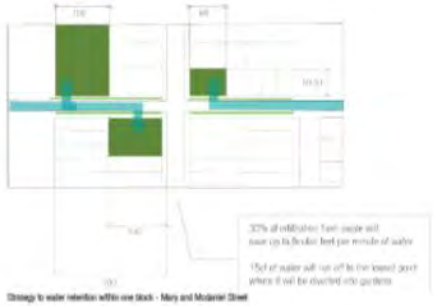
An outer system collecting water

An inner system collecting water

A grid that connects the systems

Vacant lots become live machines along the grid

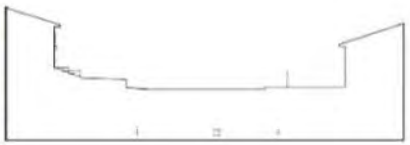
Conceptual approach to water retention



Strategy to water retention within one block - Mary and McDaniel Street

STREET DETAILS

Hubbard Street

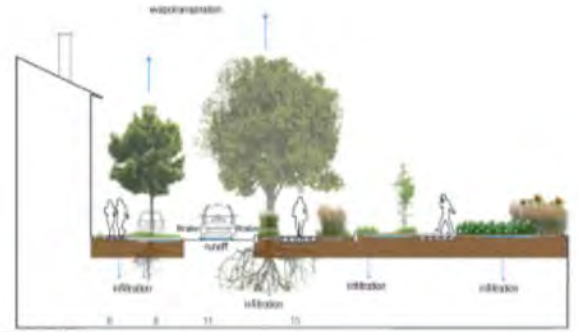


Hubbard Street existing dimensions

Hubbard Street new dimensions

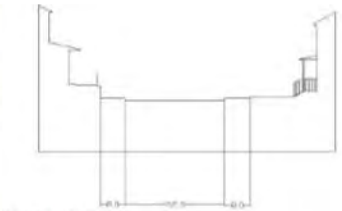
Maryl Street

Maryl Street existing dimensions

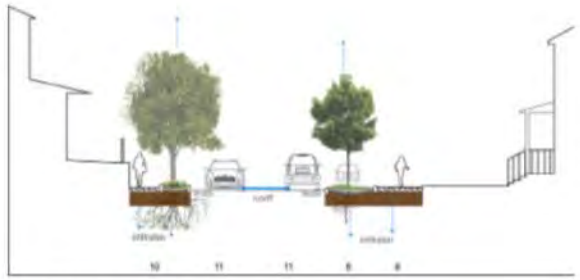


Maryl Street new dimensions

McDaniel Street



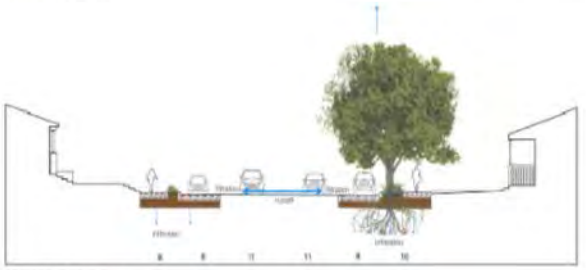
Mcdaniel Street existing dimensions



Mcdaniel Street new dimensions

Metropolitan Avenue

Metropolitan Avenue existing dimensions



Metropolitan Avenue new dimensions

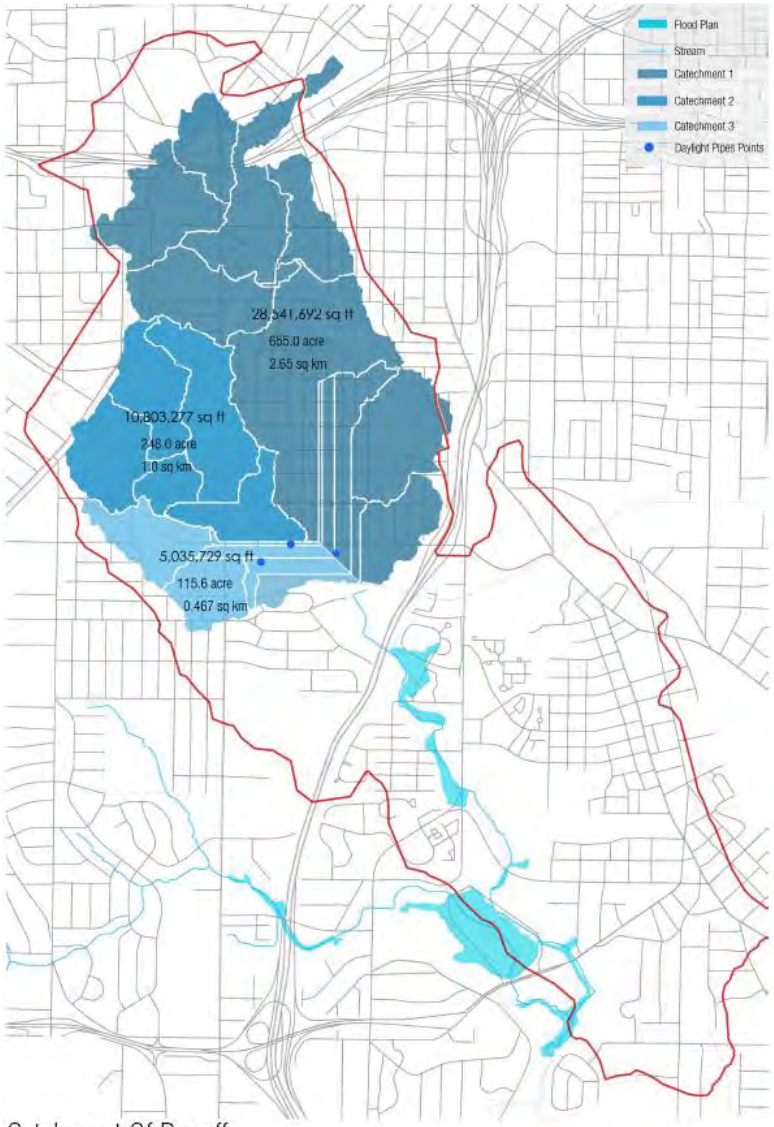
PITTSBURGH NEIGHBORHOOD

Detail plan Mary Streetand Mcdaniel Street

A new Park on a vacant lot

A new Green Street for the neighborhood

UNIVERSITY AVENUE



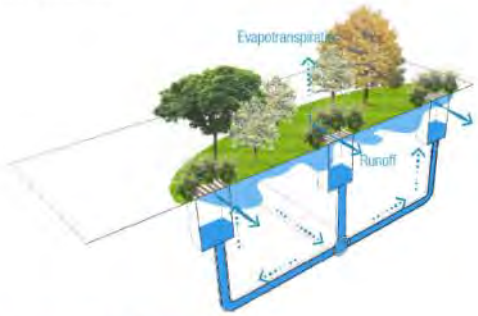
Catchment Of Runoff


Piping Map

Water Volume

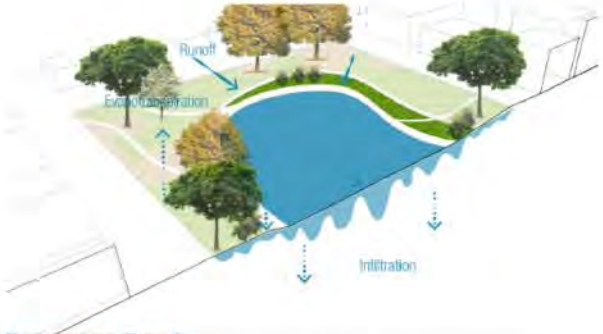
Areas to Deal with Runoff

STRATEGIES



Daylighting Pipes

This strategy is aimed at blocking and daylighting the pipes underground, forcing the stormwater to flow through the infiltration surfaces, like parks, green streets, and detention pond. We will divide the main pipe into several smaller pipes to help disperse the large amount of water, which will force the runoff to infiltrate into the ground



Detention Pond

Holding water in detention pond is the main goal for this phase. The pond is 10ft at the deepest point, which can hold 40 ac ft water. The pond will require a 2 ft permanent water depth to prevent erosion. The topography of the pond will be shaped to allow the water to change levels.

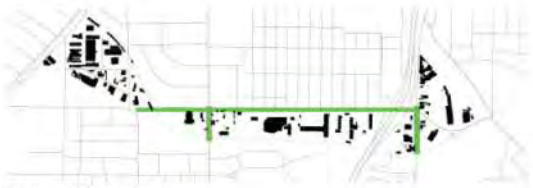
Terraces

In order to allow the water to rise and drop, we will use terraces to handle different volumes of water. Along the terraces, water tolerant plants will be planted to help with erosion.

Daylighting Gardens

New Parks

Terracing the BeltLine

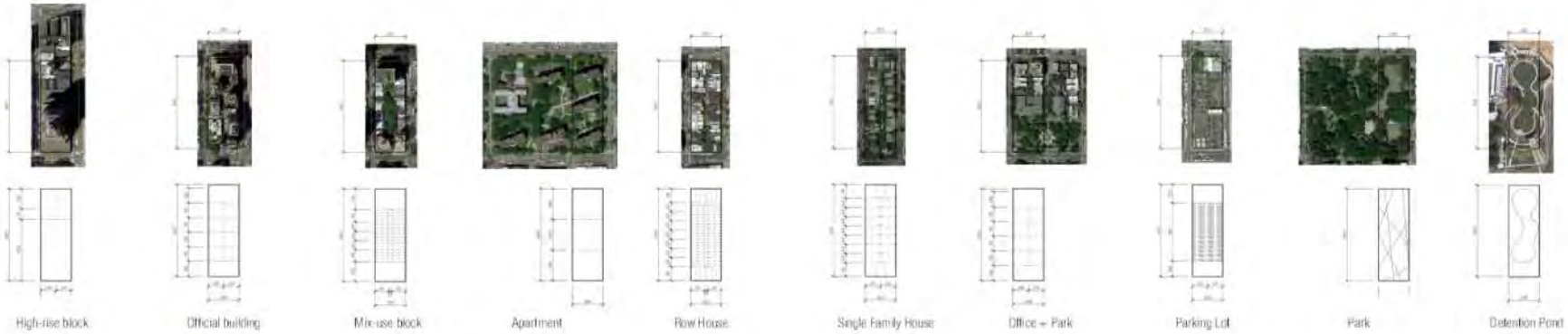


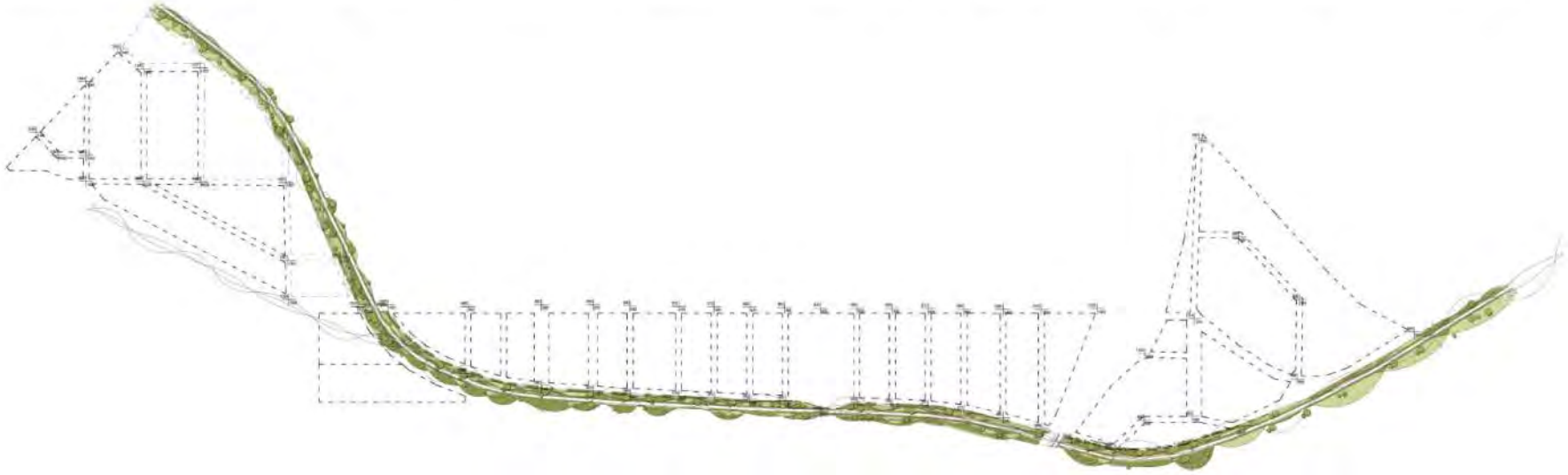
Green Streets

Detention Ponds

Overall Proposal

Subdivision Typologies

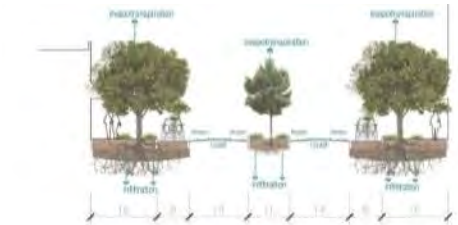




Subdivision Plan for University Avenue

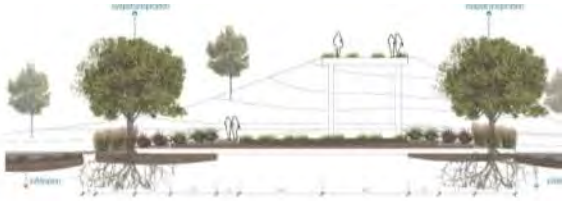
CENTRAL PARK PERSPECTIVE

BIRD'S EYE VIEW OF CENTRAL PARK



Green Street Section

Detention Pond Section



Beltline Section

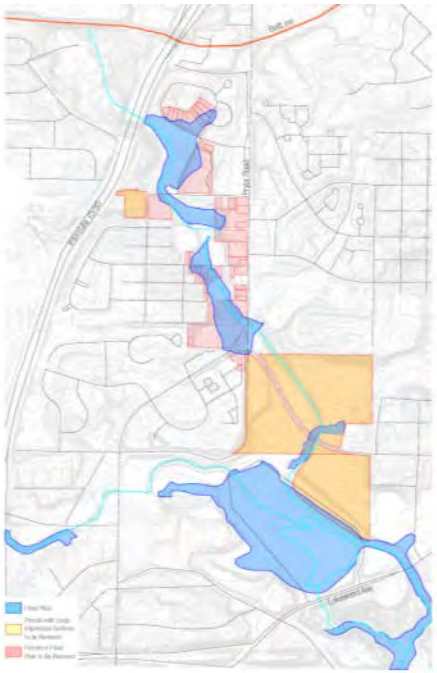
UNIVERSITY AVENUE MASTER PLAN

MCDANIEL BRANCH

Strategy One: Move Water Out Quickly

Strategy Two: Control Velocity of Water Coming Out of Pipes (Over 6 cfs)

Strategy Three: Restore Stream Bank



Strategy Four: Remove Development from Flood Plain and Lame Impervious Areas

MCDANIEL BRANCH MASTER PLAN

Proctor Creek Greenway
University Avenue
McDaniel Branch

Site Location at West Atlanta

Marta Bridges Across Proctor Creek

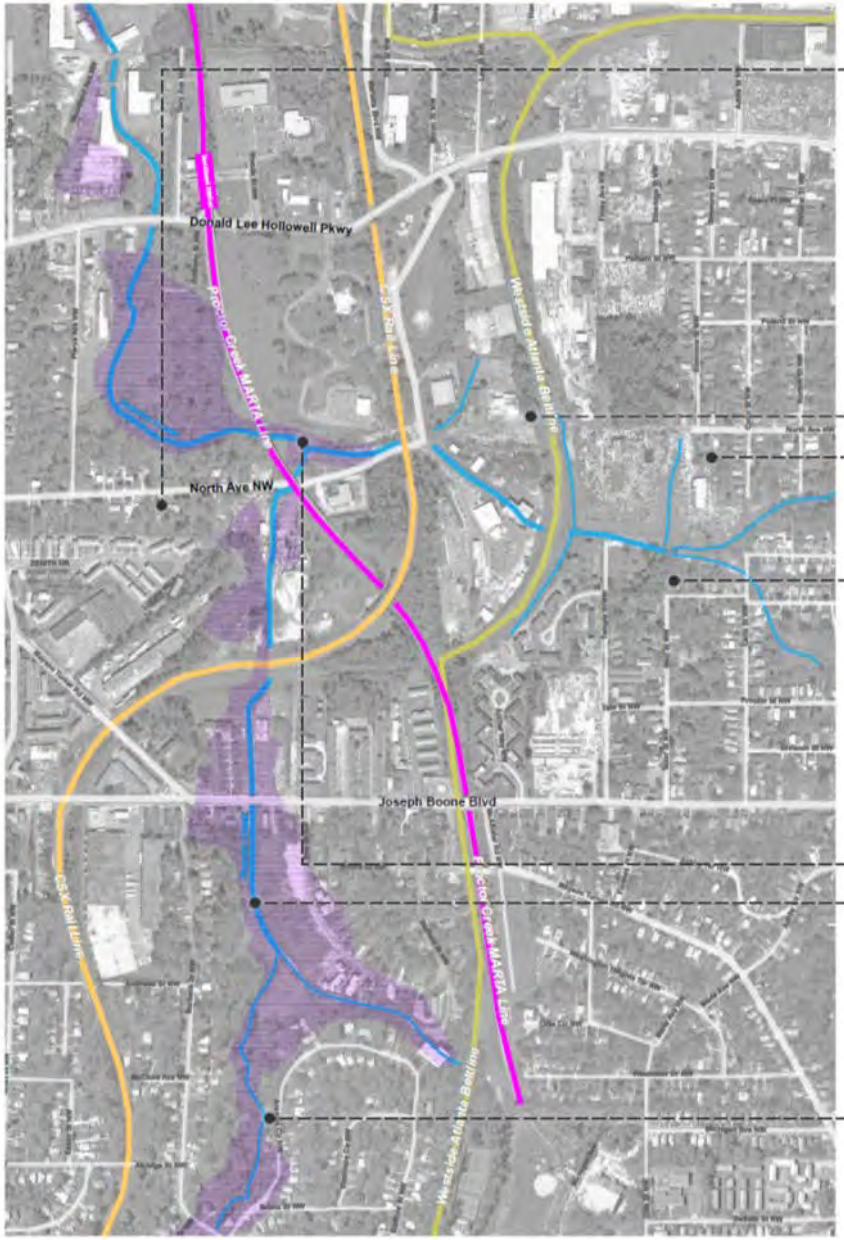
Proctor Creek Through Culvert under North Avenue

Continuous Fence Along the Rail

Beltline Leading to Distance

EXISTING CONDITIONS

EXISTING CONDITIONS



Terrain Problems

Rapid Change of Terrain

Urban Problems

Infrastructure Disruption

Abandoned Land

Ruins in Floodplain

Water Problems

Water Bank Erosion

Concrete Channelization

Terrible Water Quality

URBAN ANALYSIS

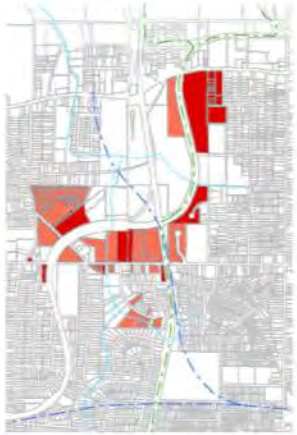
Defining the Site Boundary

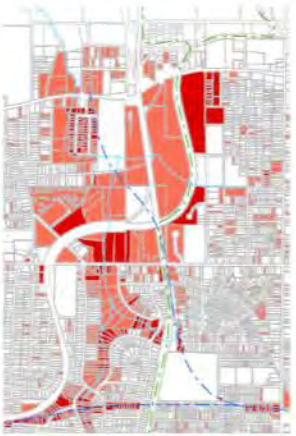
Historic Structures (older than 1940)

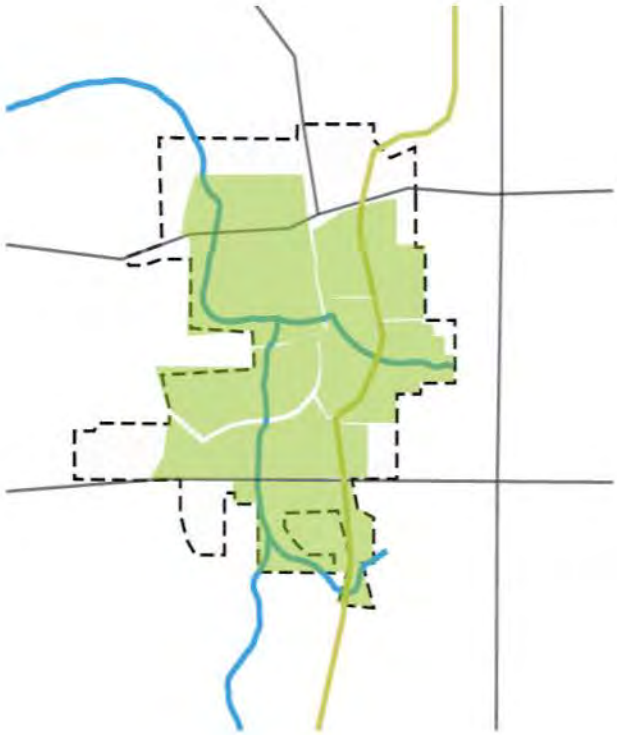

Existing Publicly Owned Parcels


Parcels Affected by Flood Plain


Depressed Property Values (Below $50,000)


Properties in Bad Condition

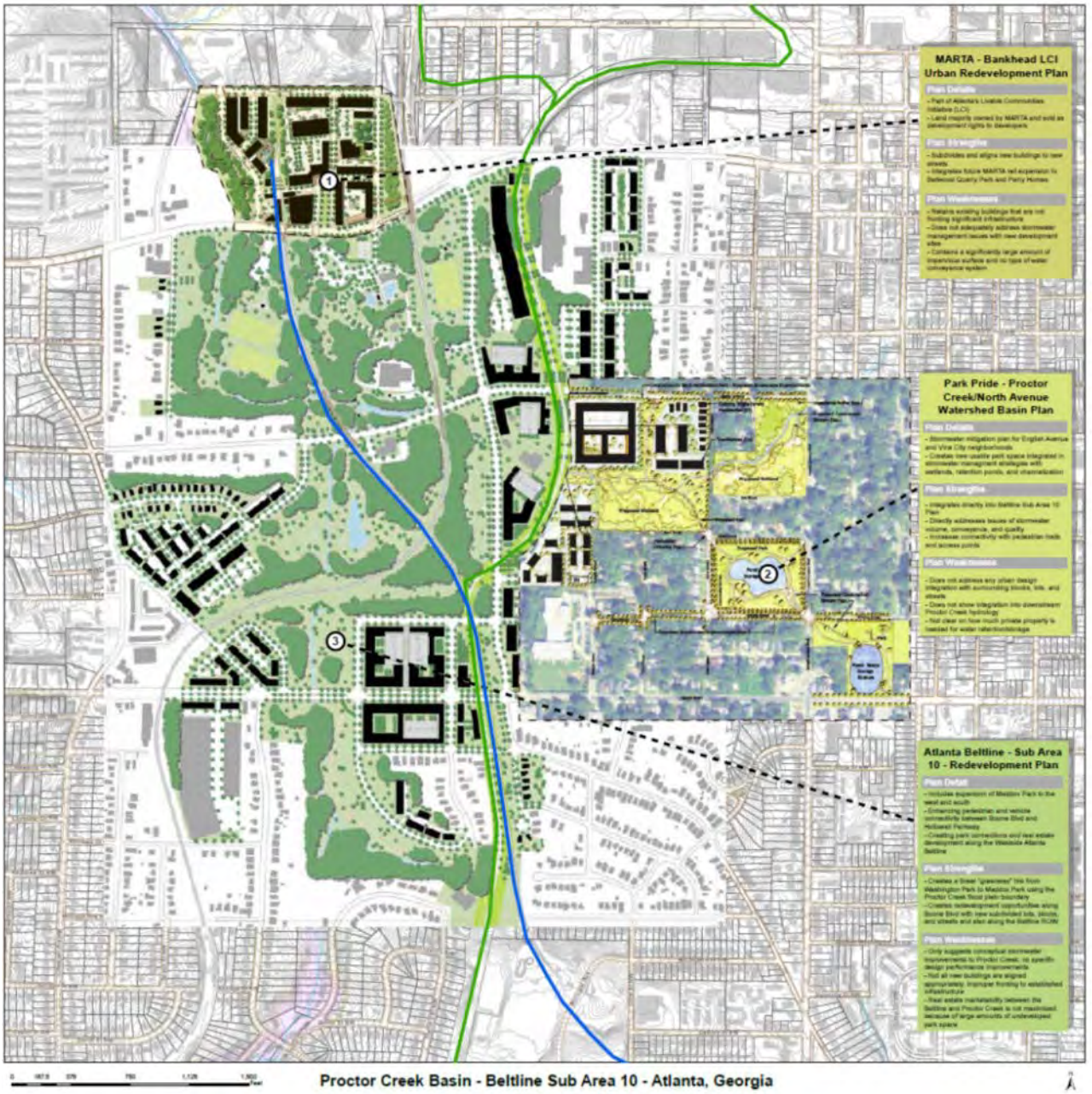

Parcels Most Susceptible to Change



Susceptibility to Change

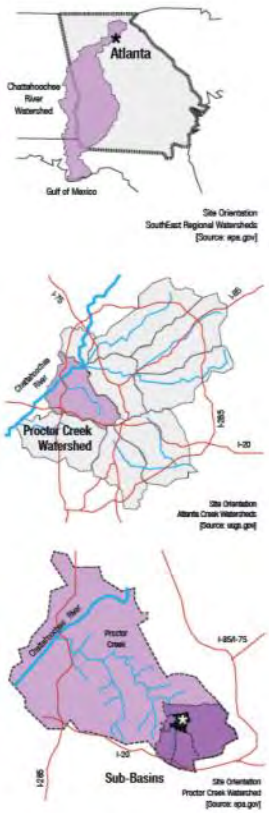
The study area boundary for this site is generated by using a combination of methods using the existing Atlanta Beltline Tax Allocation District (TAD) Boundary along with a series of computer generated, Geographical Information Systems (GIS) analysis that determines which lots and parcels within close proximity of the Proctor Creek, MARTA, and Beltline corridors would be susceptable to developmental change over time.
Each type of generative analysis was assigned an individual score that cumulatively generated a total score of susceptability to change ranging from least likely (white) to Most Likely (Dark Red).

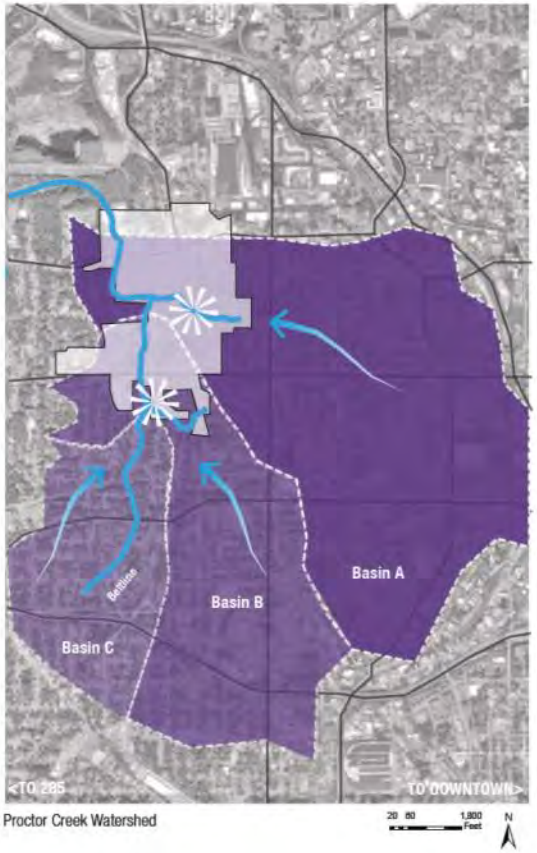
EXISTING PLANS IN DEVELOPMENT



HYDROLOGY

Watershed Boundaries

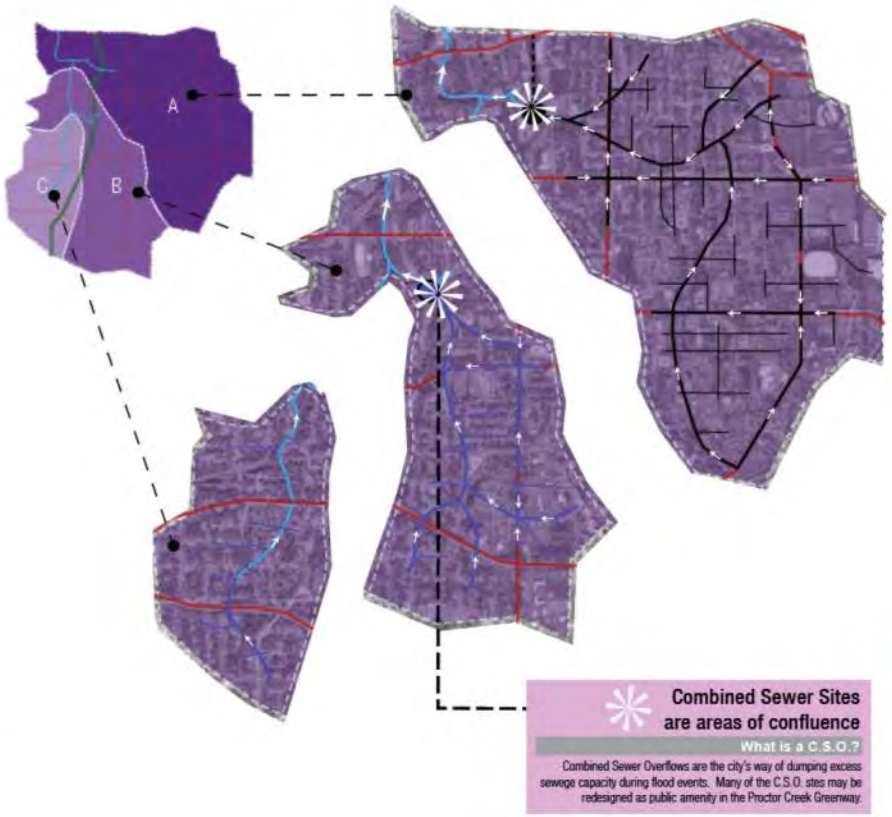




Proctor Creek Watershed

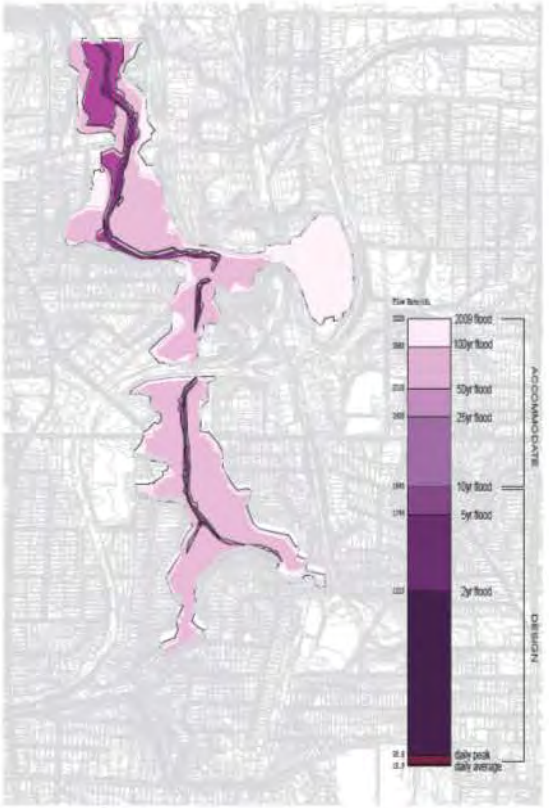
20 80 1,600 Feet N

Stormwater Drainage System

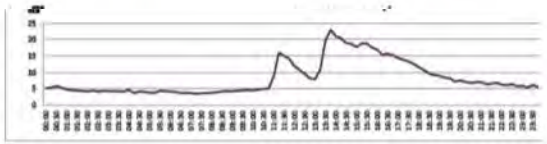


Historic Flow Rates + Current Flood Plain Boundaries

Physical Constraints

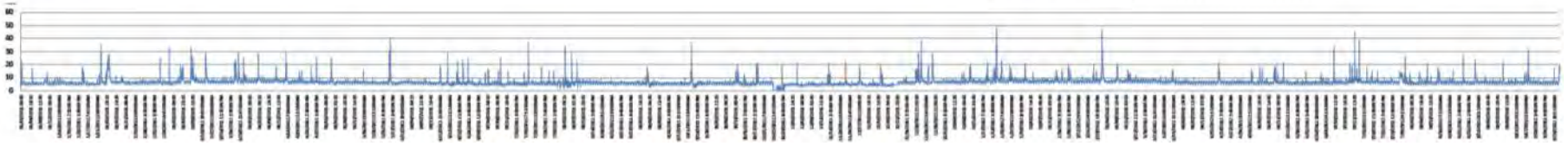


Flood Plain Ranges

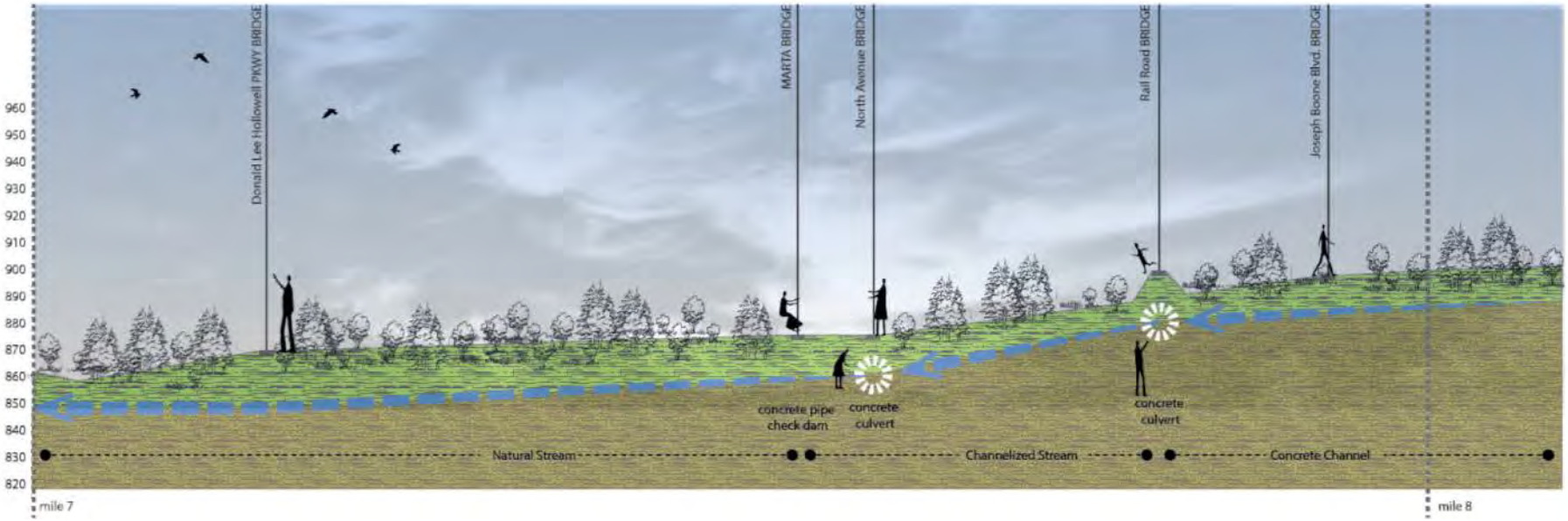


Daily Flow Rate

Annual Flow Rate



PROCTOR CREEK BASIN PROFILE WITH CHARACTERISTICS



PERFORMANCE STRATEGIES

Water Performance

① Reclaim Flood Plain Land

Acquire properties inside the flood plain and demolish all existing development

Designate the entire flood plain as a new continuous linear park

Build new development fronting the flood plain fringes as a new park amenity and manage new stormwater runoff generated with new development

Benefits/Advantages:

- Contains stormwater volume inside flood plain boundaries, guides stormwater conveyance, and improves water quality with wetland development
- Enhances real estate value of surrounding development with new linear park amenity
- Maintains water flow performance within the flood plain without endangering surrounding private property

Urban Performance

② City Stormwater Ordinance

Benefits/Advantages:

- Currently requires all new urban development in the City of Atlanta to retain the first 1.2 inches of rainfall from any given rain event
- Significant redevelopment will make a difference in the short-term, while the remaining built environment will phase in over time with continuing redevelopment
- Alleviates strains on city stormwater and sewer capacity

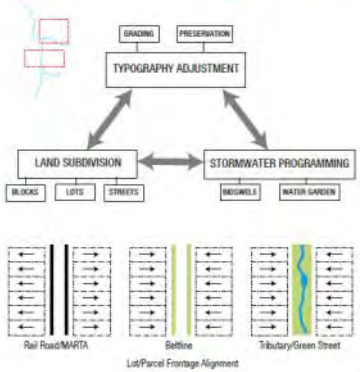
③ Land Ownership Shifting

Benefits/Advantages:

- Creates a new Maddox Park within a connecting linear park from the Bellwood Quarry/Grove Park area to Washington Park in the low-lying flood lands as a natural park amenity
- Utilizes higher elevated lands in the current Maddox Park area for prime real estate development; within close proximity to the Beltline and MARTA stations.

Land Performance

④ Land Subdivision



Benefits/Advantages:

- Provides an urban framework with stormwater mitigation as a subdividing driver
- Integrates a sustainable, easy maintenance stormwater system
- Establishes a model set of rules for future subdivision developments to integrate green stormwater practices and promote them as valued amenities

⑨ Street Redesign

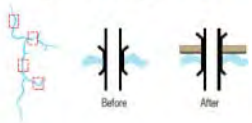
Before

After

Benefits/Advantages:

- Integrating green streets collects, reconveys, and improves the quality of stormwater right off the street and property before it pours into creeks
- Less dependance on underground stormwater piping
- Allows for some water to be infiltrated into the ground

⑩ Bridge Redesign



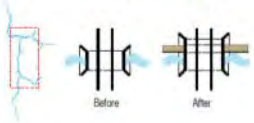
Before

After

Benefits/Advantages:

- Updated bridges with pedestrian railings increases safety from above
- Enhance creek as an amenity with scenic pathway under bridge and over creek water flow
- Create a monumental amenity with bridge's conceptual design and nature framing view

⑪ Culvert Redesign



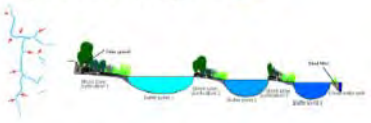
Before

After

Benefits/Advantages:

- Converting current culvert to larger culvert or bridge allows for increased water flow
- Increases daylighting inside tunnel/bridge
- Creates pedestrian access along creek to maintain full connectivity in the linear greenway park.

⑫ Pipe-End Redesign



Before

After

Benefits/Advantages:

- Terminating the pipe before the creek allows water to infiltrate in the ground, decreasing velocity
- Thick grass and wetlands can improve water quality by filtering impurities before it is poured into the creek
- Enhances real estate value as a park amenity

Strategy Applications to Redevelopment Plan

5 Bioengineering

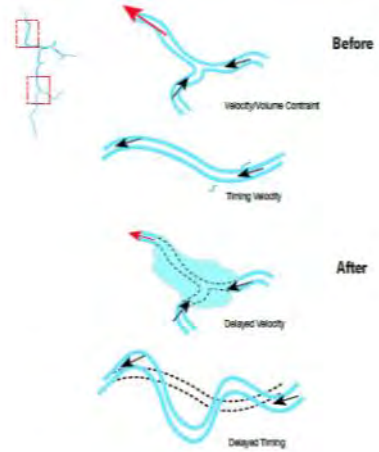
Deepen concrete channel to efficiently increase volume capacity and enhance conveyance

Utilize new design of deepened concrete channel to create new greenway development opportunities adjacent to Proctor Creek

Benefits/Advantages:

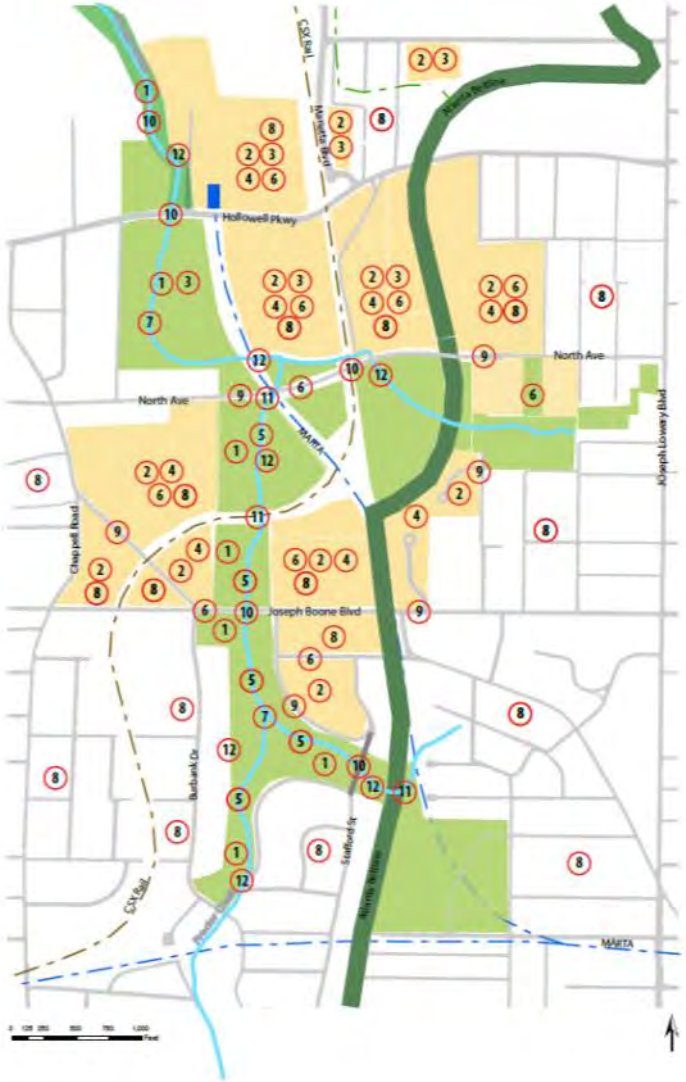
- Increases water flow efficiency and capacity of Proctor Creek
- Keeps the flood plain defined boundaries from increasing in size with more uncontrolled development
- Creates multiple real estate enhancement opportunities for developing park leisure space within the flood plain, once water is re-channeled

7 Retention

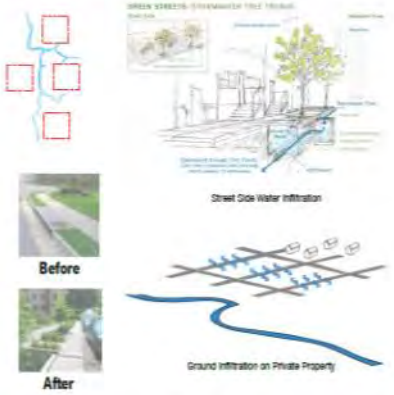


Benefits/Advantages:

- Retention ponds delay water flow velocity, slowing down large amounts of water flowing downstream, releasing only a portion of input flow
- Re-directed conveyance channels increase distance of flow and therefore slow down timing of water flow downstream and increase volume capacity over more land coverage



6 Infiltrate



Benefits/Advantages:

- Retains small quantities of water locally and therfore alleviateing large storm runoff flows into the city stormwater system and Proctor Creek
- Integrates green stormwater infrastructure in established street Right-of-ways for easy construction and maintenance
- Slows down water velocity with ground absorption

8 Collection

Benefits/Advantages:

- Retains small to large quantities of water domestically and limiting storm runoff flow into the city stormwater system and Proctor Creek
- Water infiltrated and collected on individual sites can be reused for local work functions by private landowners and public entities
- Uses include: Irrigation, Park Land Maintenance, Indoor "grey water" Plumbing, and servicing amenity water features

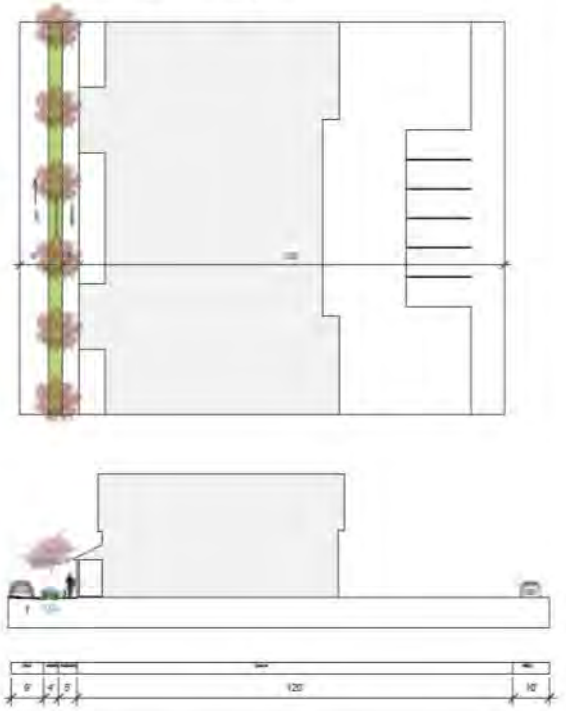
PROCTOR CREEK GREENWAY

Illustrative Master Plan (Scale 1" = 150')

DEVELOPMENT DETAILS

North Avenue Pespective

Street Design



Subdivision Green Street

Subdivision

Subdivision of parcels was divided to be as flexible as possible for various degrees of density and development. The typical parcel size is 65 ft. by 120 ft. which allows a range for low density development to high density development with integrated parking.

Frontage is important in the division of land. Parcels adjacent to a transit right of way face away from the transit corridor. Parcels adjacent to the Beltline and Flood Plain front towards the land in order to increase value along these corridors.

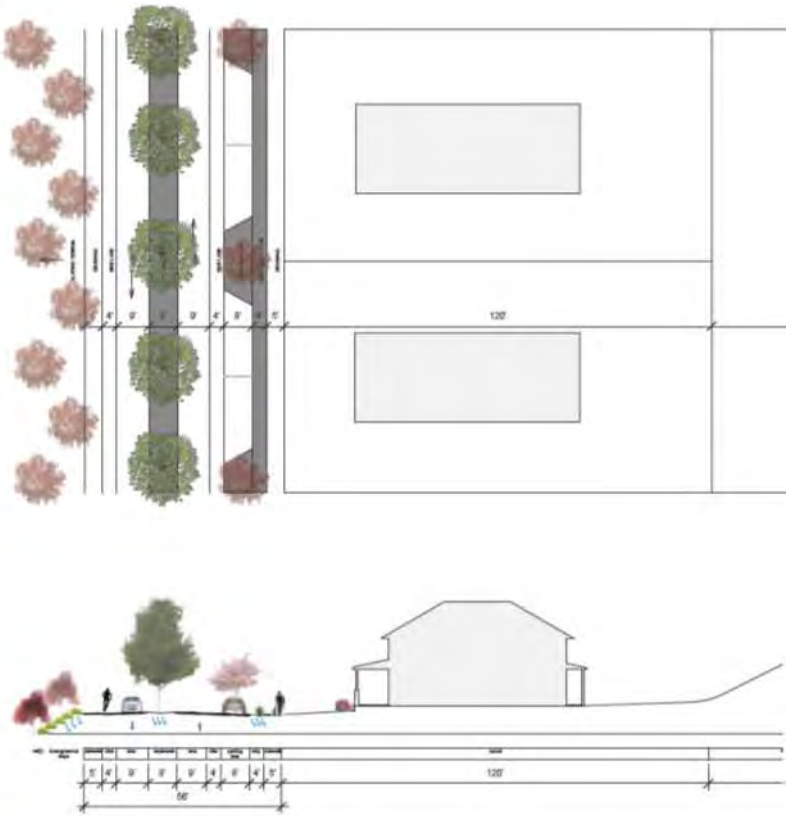
In Maddox Park, the pavilion remains as a memorial and key component to the newly subdivided land.

Right of ways connect vital urban corridors while respecting the lay of the terrain.

Current Spatial System

Proposed Spatial System

Current Street
Railway
Beltline
Marta
Current Main Street
Proposed Street
Pedestrian Path
Linear Park



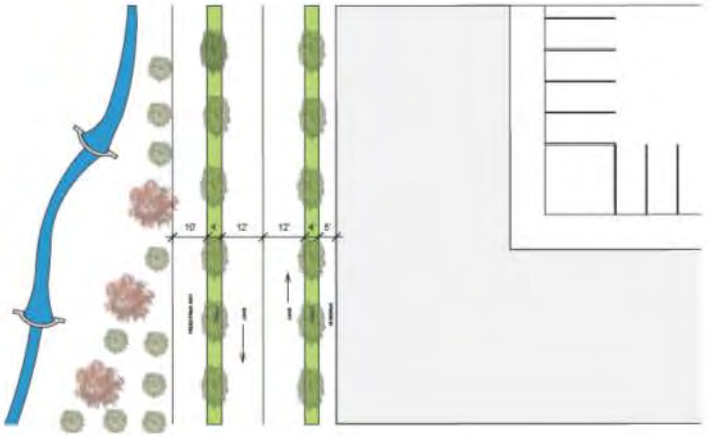
North Avenue at Park

Structure and System

Structural System

Right of Way System

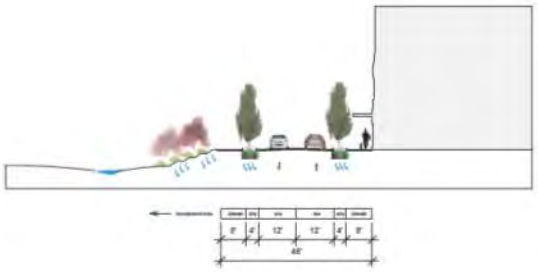
Pedestrian System



Function System

Node System

Interrelated System



Urban Street at Park

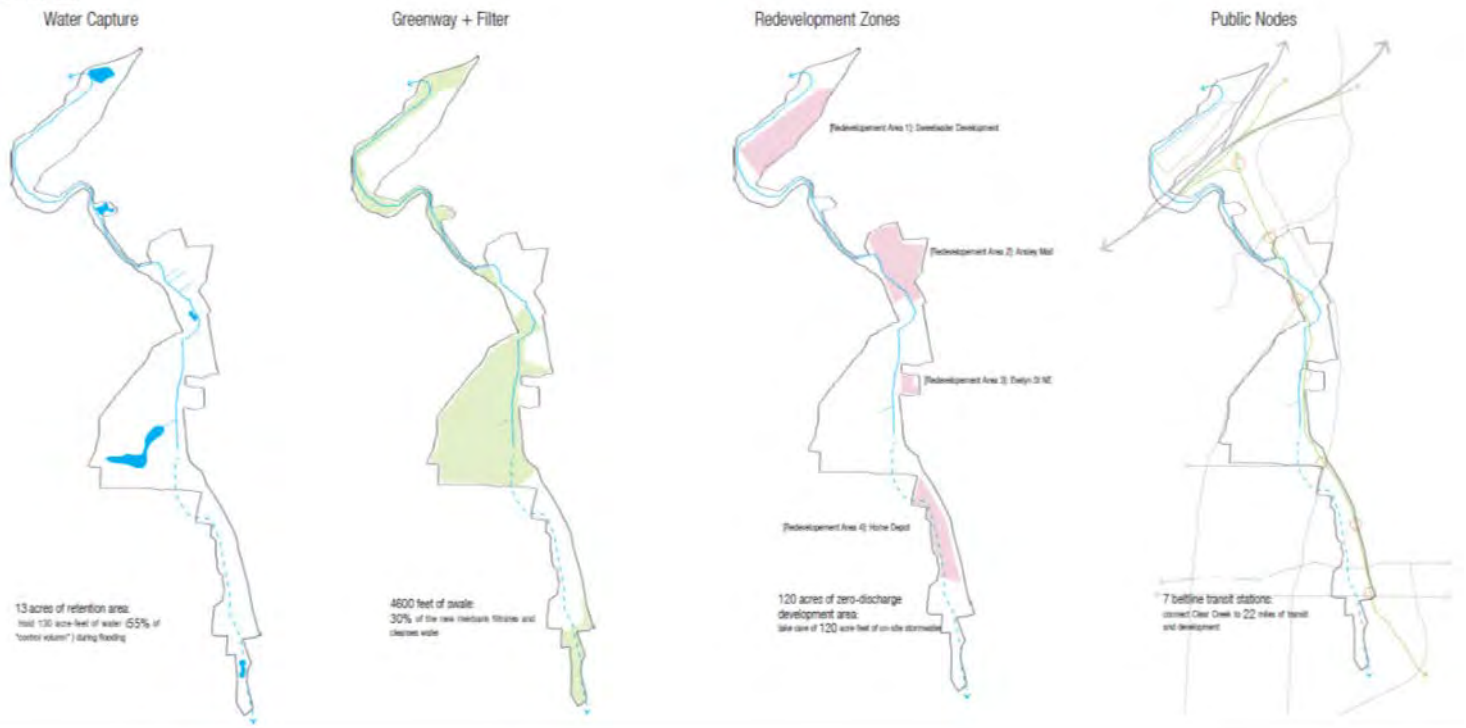
Ansley Mall
Clear Creek Greenway

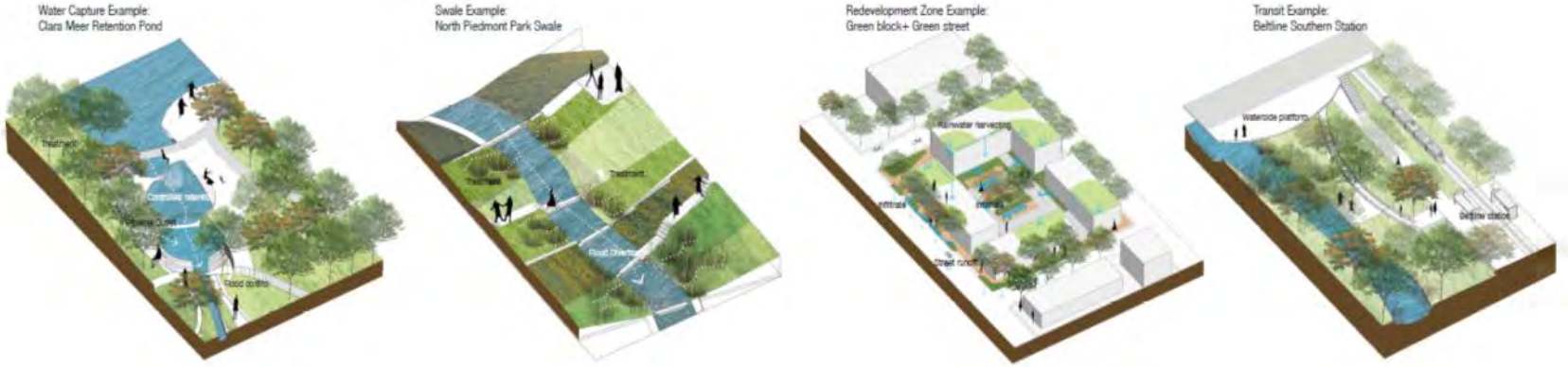
EXISTING CONDITIONS

EXISTING SITE FEATURES

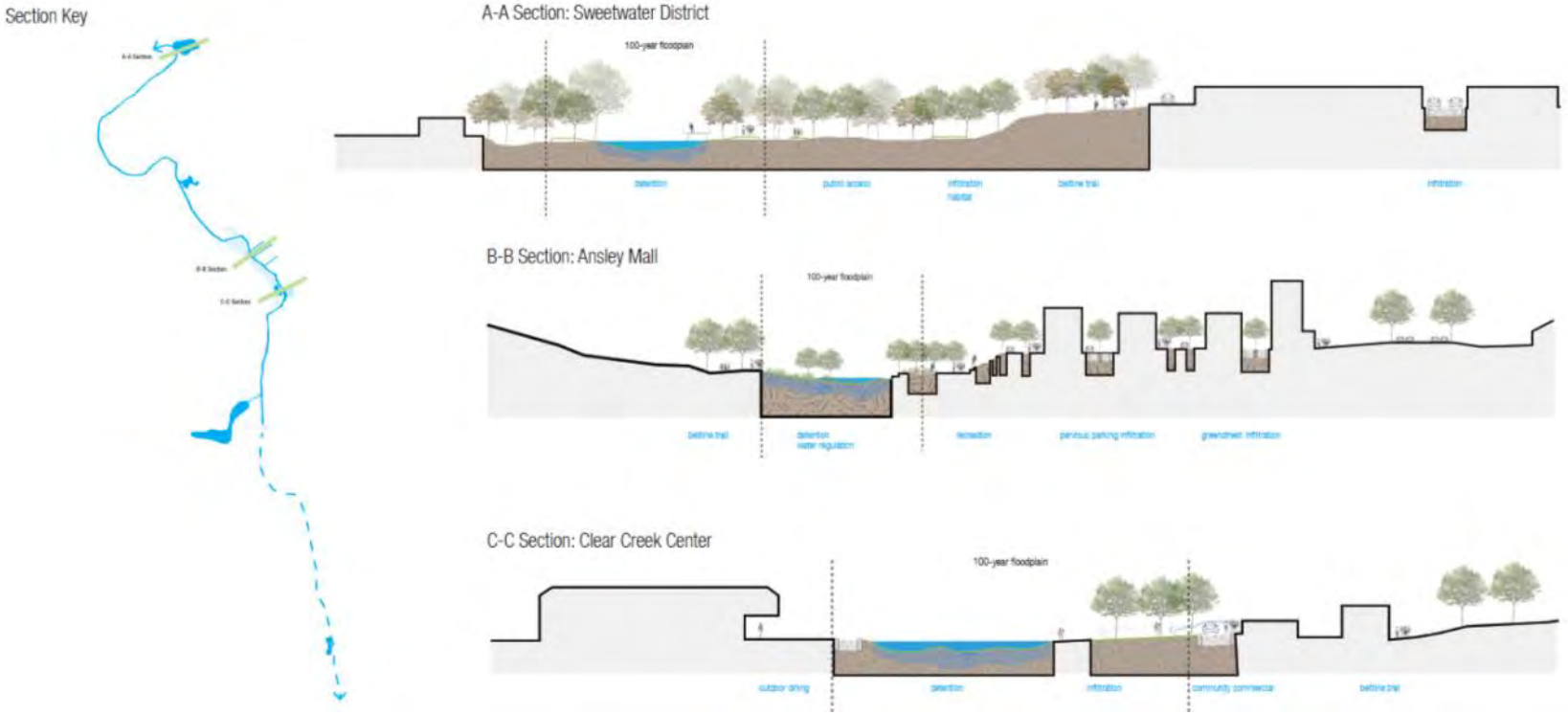
SCHEMES

STRATEGIES





PROPOSED SECTIONS



SUBDIVISION PLANS AND PHASING

PERSPECTIVES OF NEW WATER SYSTEM

CLEAR CREEK GREENWAY MASTER PLAN

Conclusions

- Utilizing park space and floodplains (Proctor Creek)
- Land swap opportunities (Colonial Homes)
- Specific conditions of hard vs. soft infrastructure (University Avenue)
- Private landowners are responsible for their developments (Ansley Mall/Clear Creek Greenway)