

Walnut Creek Wetland Park

Citizen Planning Committee Meeting #5

Foundation for Tomorrow

Walnut Creek Wetland Park Master Plan

October 16, 2017



Walnut Creek Wetland Park

Tonight's Meeting Agenda

- Recap Meeting #4
- Highlights from Public Workshop
- Ross Andrews Memorial
- Stormwater at WCWP
- Master Plan Document Presentation
- Discussion of Priorities
- Closing Remarks



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Recap Meeting #4



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Highlights from Work Session

- Add connection to church
- Outdoor education play is key
- Apiary idea was popular - bees are the symbol for St. Ambrose
- Consider leaving relics/former materials onsite as site history education
- CPC majority approved to retain access to school to provide teacher/student convenience, but also equitable accessibility for the community
- CPC majority approved of extent of boardwalks, the plan should consider ecological inhabitants first
- CPC majority approved the use of wildlife cameras for both education and security

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Public Workshop #2 Highlights



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Ross Andrews Memorial



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Stormwater at WCWP



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What is a Watershed?

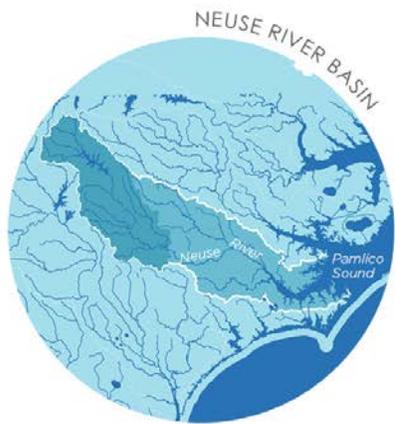
- *Area of land that drains to the same place and ultimately a common water body.*



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What is a River Basin?

- Raleigh, Walnut Creek, Little Rock Creek and the Walnut Creek Wetland Park are all part of the Neuse River basin.



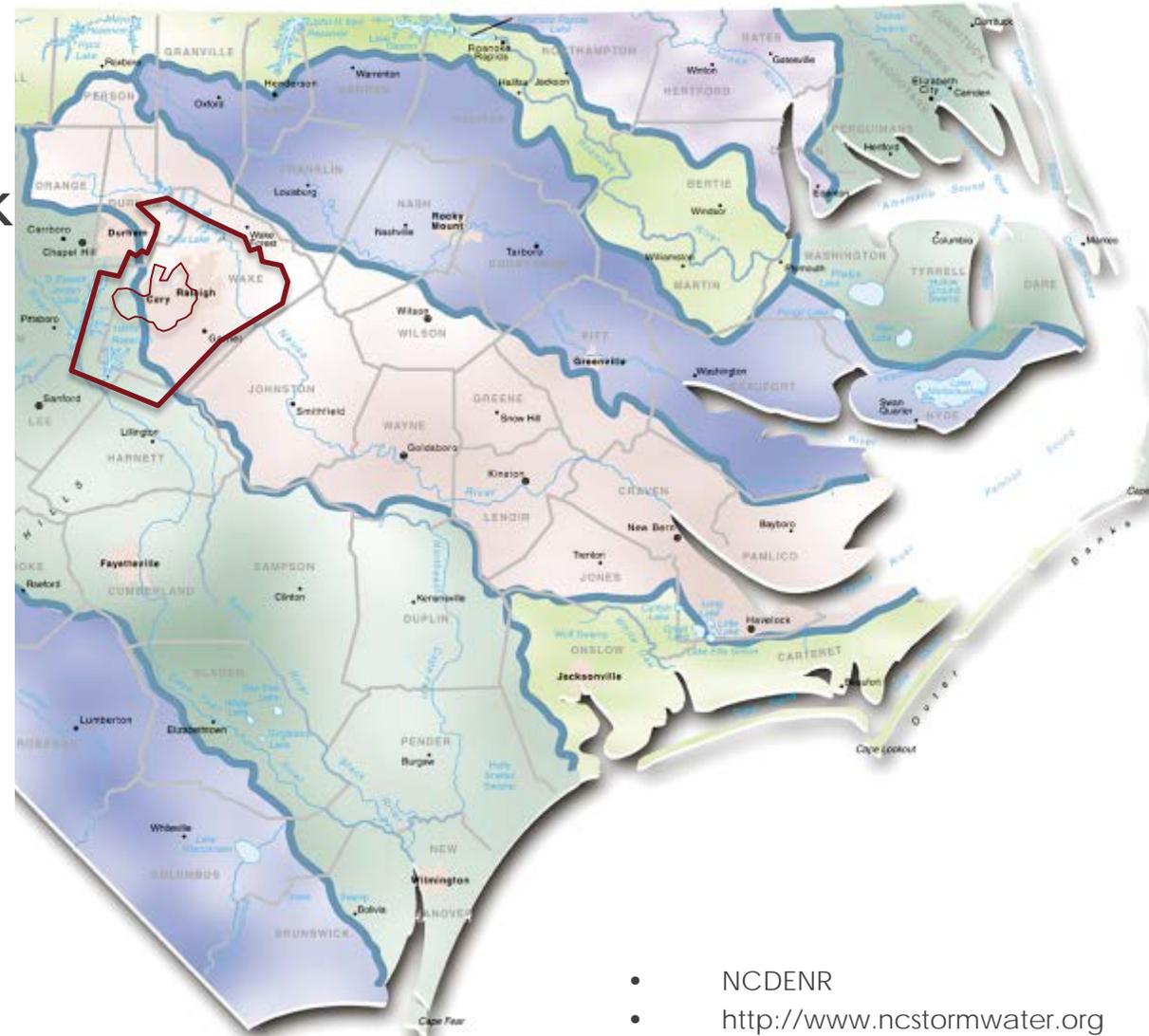
■ UPPER NEUSE SUBBASIN
■ NEUSE RIVER BASIN



■ WALNUT CREEK WATERSHED
■ UPPER NEUSE SUBBASIN



● WALNUT CREEK WETLAND CENTER
■ WALNUT CREEK WATERSHED

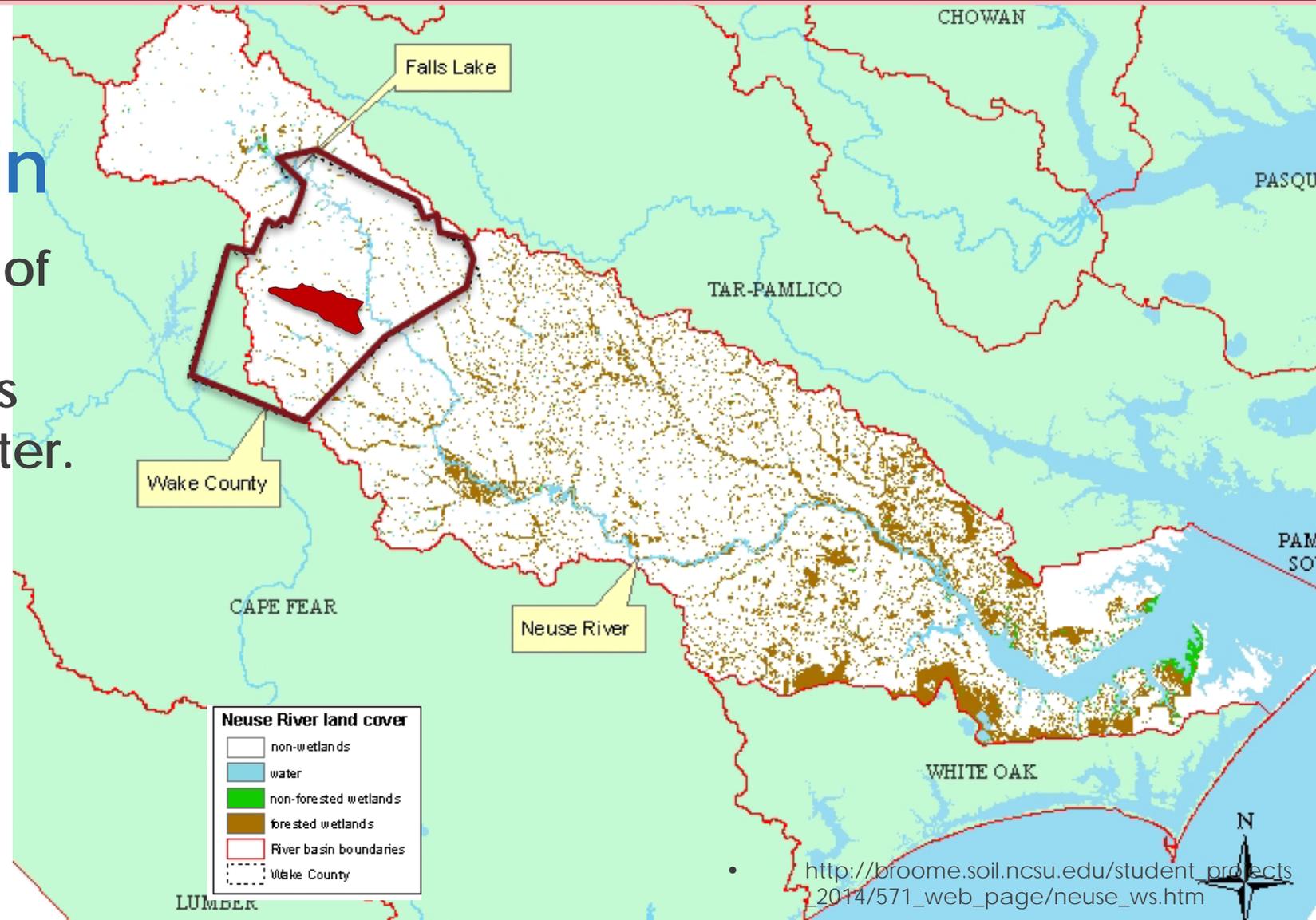


- NCDENR
- <http://www.ncstormwater.org>

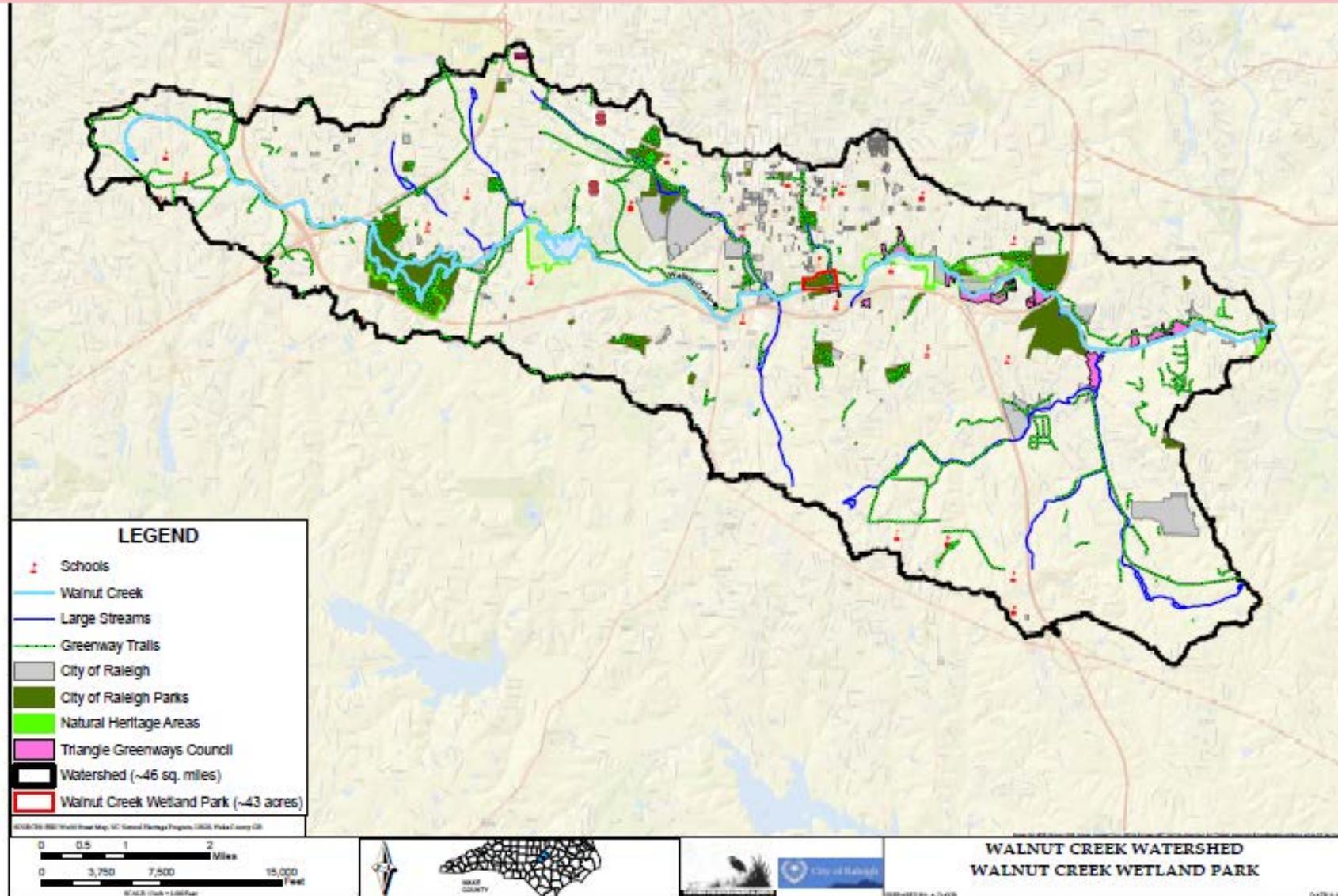
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Wetlands of the Neuse River Basin

- Wetlands are the kidneys of the watershed, removing sediment, run-off, nutrients and bacteria from the water.
- Wetlands are sponges.



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Watershed surfaces

- A watershed absorbs the rainwater through pervious and impervious surfaces.
- Rainwater is stormwater



Impervious 'hard' surfaces (roofs, roads, large areas of pavement, and asphalt parking lots) increase the volume and speed of stormwater runoff. This swift surge of water erodes streambeds, reduces groundwater infiltration, and delivers many pollutants and sediment to downstream waters.



Pervious 'soft' surfaces (green roofs, rain gardens, grass paver parking lots, and infiltration trenches) decrease volume and speed of stormwater runoff. The slowed water seeps into the ground, recharges the water table, and filters out many pollutants and sediment before they arrive in downstream waters.

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What is stormwater?

- Stormwater has surface run-off not soaked into the pervious ground.
- The more impervious surfaces in the watershed, the more stormwater surface run-off will end up in the creeks and river basins



- Annette Lucas, Post-Construction Stormwater Management Presentation
- NCDENR: <http://www.ncstormwater.org>

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What pollutants are in stormwater?

- Dirt, nutrients, bacteria, chemicals, oil, and trash are pollutants that flow unfiltered into our waterways.



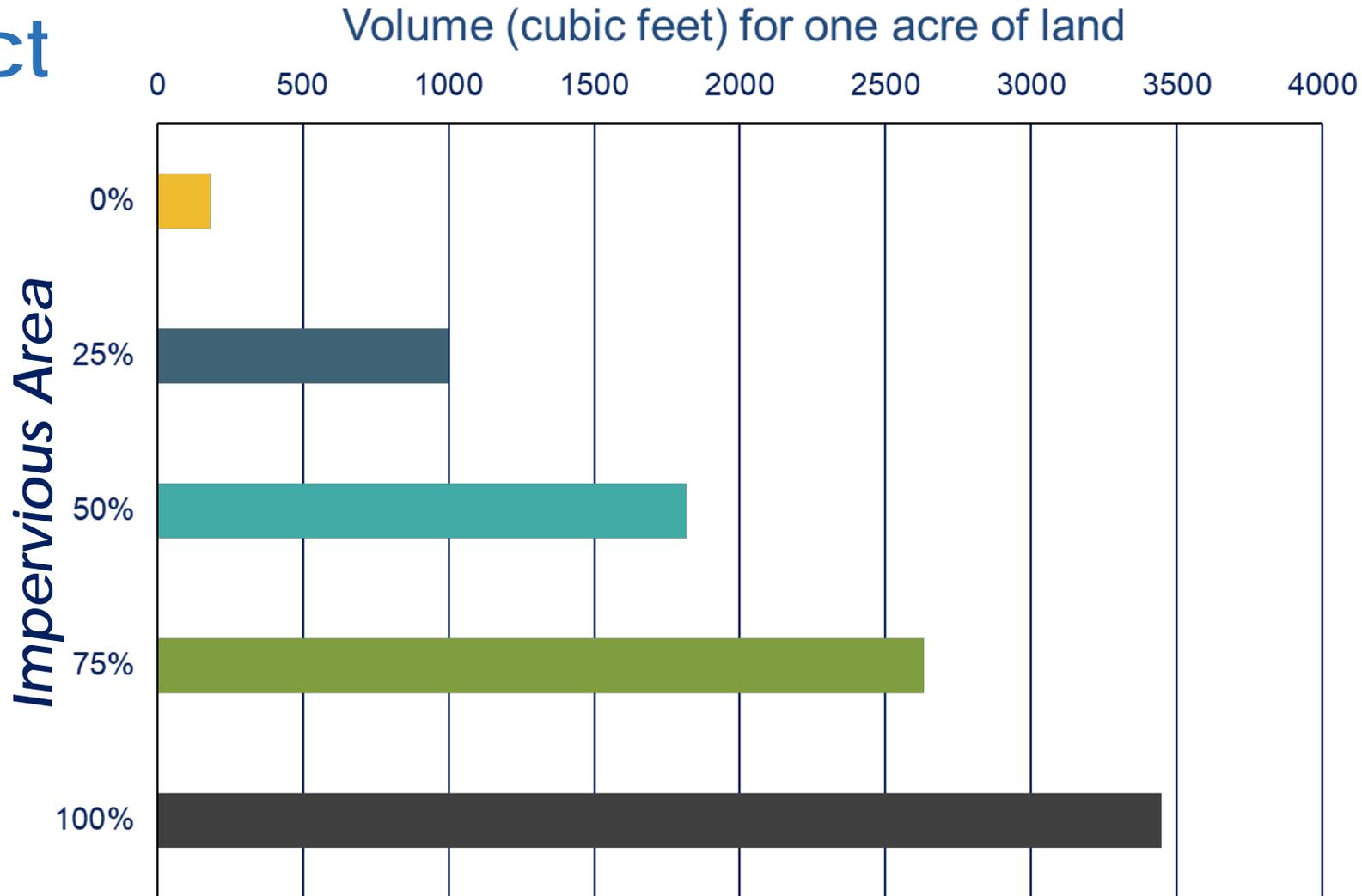
- Annette Lucas, Post-Construction Stormwater Management Presentation
- NCDENR: <http://www.ncstormwater.org>

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Stormwater Impact

*More Impervious Area =
More Stormwater Runoff*

*Volume of run-off...
greatly increased by development*



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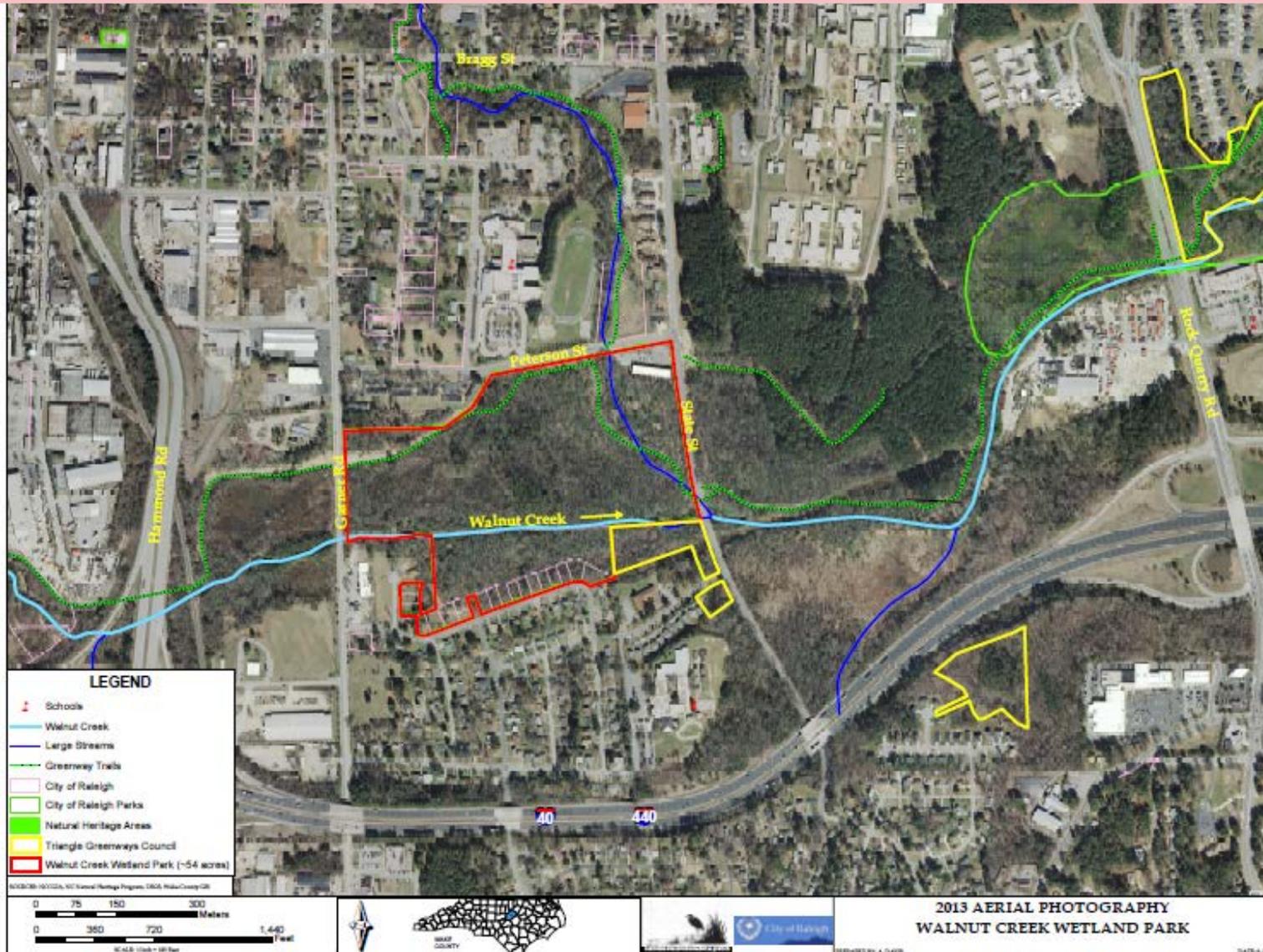
Stormwater Impact

*More Stormwater Runoff=
More Impacts*

- Health of Streams and Lakes=
Valuable Resources
 - Swimming Water
 - Shell fish
 - Drinking water
- Downstream Property
- Flooding



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Stormwater

- Walnut Creek Wetland Park
- Rochester Heights
- Zone AE are areas that have a 1% probability of flooding every year (also known as the "100-year floodplain"), and where predicted flood water elevations above mean sea level have been established. Properties in Zone AE are considered to be at high risk of flooding under the National Flood Insurance Program (NFIP). May 22, 2009

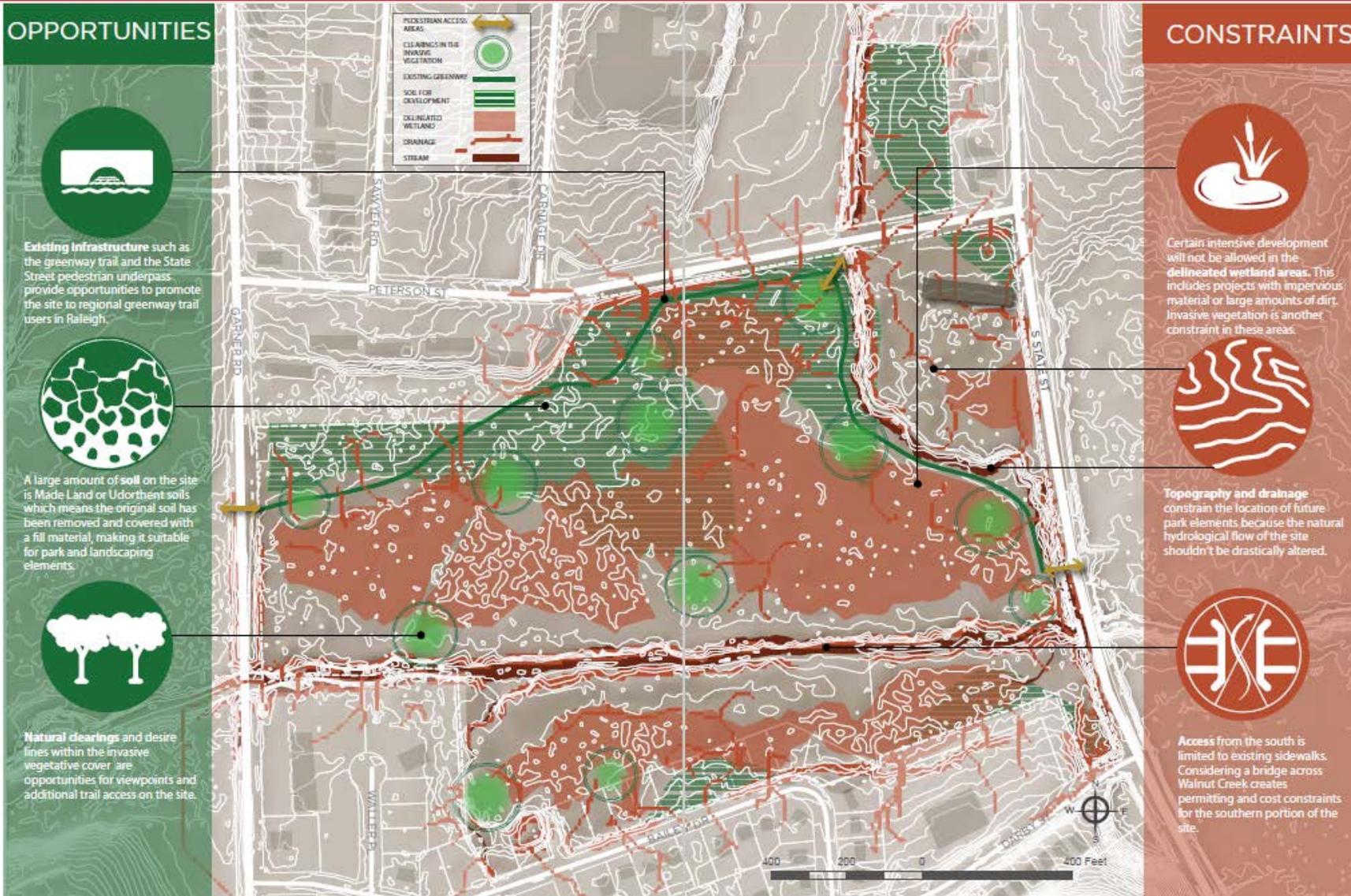


Legend

Panels	Flood Hazard Areas
Political Areas	AE
Stream Centerline	Floodway (AE)
Cross Sections	0.2 % Chance Annual Flood Hazard
Levee	Future Conditions 1% Annual Chance Flood Hazard

- North Carolina Floodplain Mapping Program

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Stormwater Control Measures

- Walnut Creek Wetland Park
 - Conserve, Restore & Maintain Wetland
- Rochester Heights

Green Stormwater Infrastructure (GSI)

- Reduces impacts on streams
- Reduces stormwater runoff
- Promotes infiltration



Pullen Road at NCSU, Raleigh



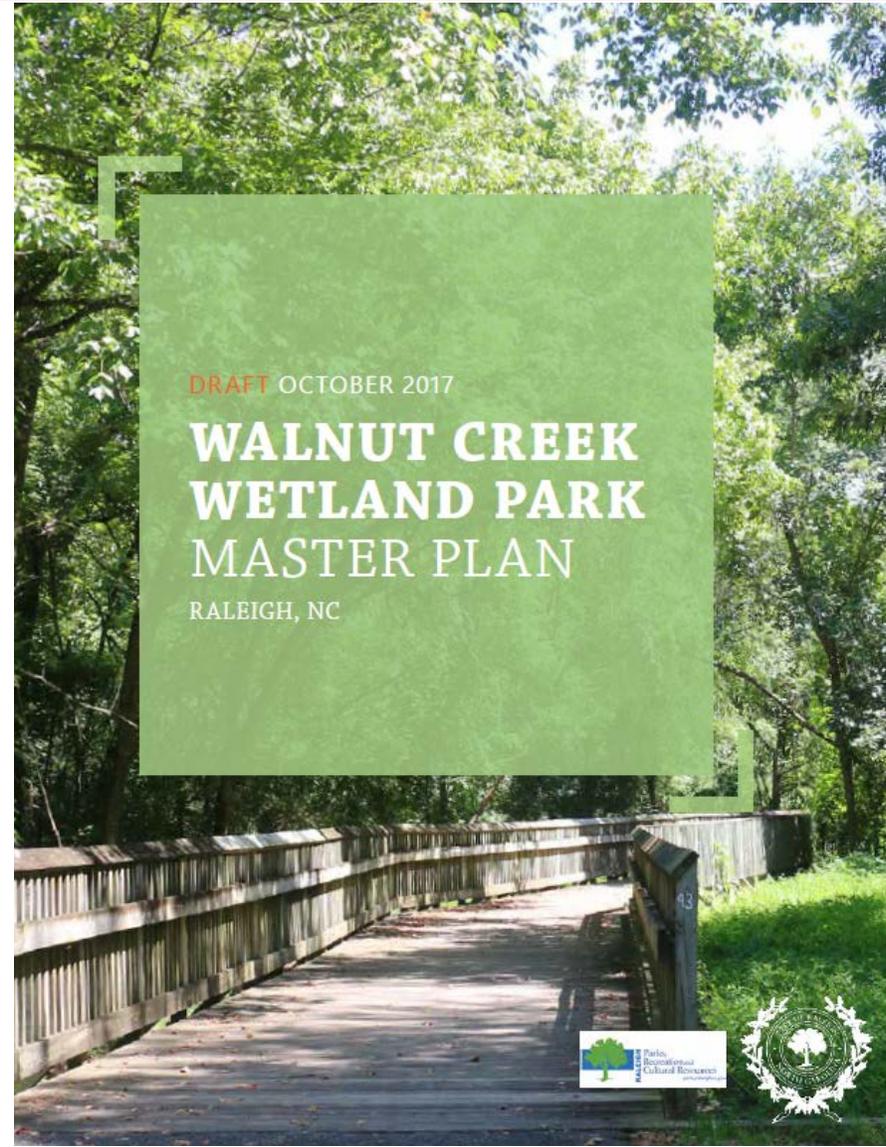
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Wetland Conservation



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Presentation of Master Plan Document



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The Neuse River. Photo credit: James Willamor.

PHYSICAL CONDITIONS

WATERSHED

The Neuse River is the fourth largest watershed in North Carolina, at just over 6,000 square miles. Walnut Creek is a tributary of the Neuse River, arising in Cary and flowing through south Raleigh to Big Branch, into the Neuse River and eventually to the Atlantic Ocean. The Walnut Creek watershed drains an area of approximately 50 square miles, through one of the most developed and urbanized areas of the Neuse River basin. The watershed area upstream of where Walnut Creek leaves the park is approximately 24.4 square miles. The Walnut Creek Wetland Park site is located just upstream from the Walnut Creek Bottomlands, and approximately 3 miles downstream from the Lake Raleigh Hardwood Forest, identified by the North Carolina Natural Heritage Program as a Significant Natural Areas.

WETLAND DELINEATION

Wetlands at the Walnut Creek Wetland Park property were delineated using the methods outlined in the U.S. Army Corps of Engineers (USACE) 1987 wetland delineation manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2). The procedure involves using soil core indicators, hydrology indicators and vegetation surveys to document the presence or absence of jurisdictional wetlands.

As a part of the wetland/stream delineation process, soils mapping for the Park, based on information taken from the Natural Resources Conservation Service (NRCS) Soil

Figure 1: Soil Types + Descriptions by Prevalence in Study Area



- Wehadkee + Bibb
- Made Land
- Helena Sandy Loam with 10 to 15% slopes
- Wehadkee Silt Loam
- Alta Vista Fine Sandy Loam with 0 to 4% slopes
- Appling Sandy Loam with 2 to 6% slopes

Survey, were produced. Figure 1 is the soils map for the Park. There are six soil series mapped on the site:

- Altavista fine sandy loam, 0 to 6 percent slopes, rarely flooded
- Helena sandy loam, 10 to 15 percent slopes
- Udorthents loamy, 0 to 15 percent slopes (Made Land in Figure X)
- Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded
- Wehadkee and Bibb soils, 0 to 2 percent slopes, frequently flooded

These soils are upland soils except for the Wehadkee and the Wehadkee-Bibb soils, which are categorized as hydric soils, or soils where wetlands can occur. The Wehadkee and Wehadkee-Bibb soils cover approximately 75% of the Park site, based on the mapping.

NRCS mapping is a useful tool in determining the location and extent of soil characteristics on the landscape, such as jurisdictional wetlands, but it is not meant to be used as a substitute for more accurate field investigations where site soils, hydrology and vegetation can be directly observed and documented.

The wetland-upland boundary was marked in the field and located with GPS technology and areas for streams (top of bank to top of bank width) and wetlands were calculated within the Park property. The results of the wetland and stream delineation are presented graphically in Figure 2. Stream and wetland areas are presented in Table 1.

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SITE OPPORTUNITIES + CONSTRAINTS

A study area inventory and analysis of physical opportunities and constraints was completed using a combination of field review, remote analysis, and drone aerial imagery. This section summarizes that analysis and its findings.

HYDROLOGY

Walnut Creek Watershed

Walnut Creek and its watershed is a link in a larger hydrological system, as part of the Neuse River Watershed that encompasses parts of Durham, Wake, Johnston, Wayne, Lenoir, Wilson, Onslow, and Craven counties. All the water that flows into Walnut Creek eventually flows into the Neuse River and ultimately into the Atlantic Ocean.

The Neuse River is 275 miles long and is the longest river entirely within North Carolina. The drainage basin is 5,360 square miles and is also entirely contained within the state boundaries. The Neuse river basin is divided into upper Neuse, Contentnea, middle Neuse,

and lower Neuse subbasins. The Walnut Creek Watershed resides in the upper Neuse subbasin, which is an area of 958,347 acres.

The Walnut Creek watershed is 29,422 acres and the creek flows through the most urbanized portion of the Neuse River basin. It originates in Cary and meanders through Lake Johnson and Lake Raleigh before merging with Big Branch and emptying out into the Neuse River.

Floodplain/Floodway

The Walnut Creek wetland park is almost entirely located within the floodplain except for 2.5 acres of the 3-acre northern parcel and 0.7 acres in the southeast corner of the main parcel. The floodway is a large portion of the site with 41.75 acres of the 54.47 acres on the south side of Peterson street being located in the floodway.

The floodplain of Walnut Creek is noted as a constraint because enclosed structures have to undergo a floodplain management ordinance and comply with permitting procedures such as being placed above the regulatory flood protection elevation. The floodplain ordinance does not prohibit us from placing park elements within the floodplain, however.

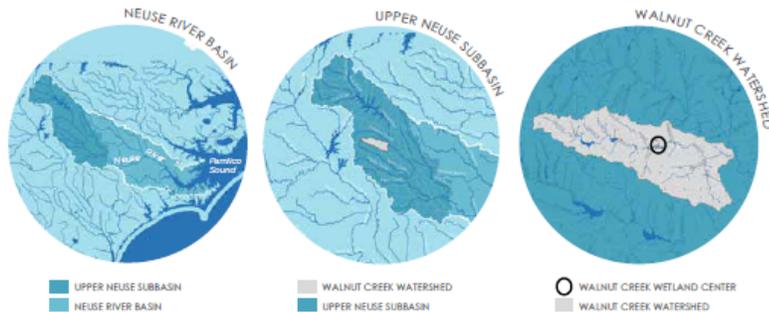
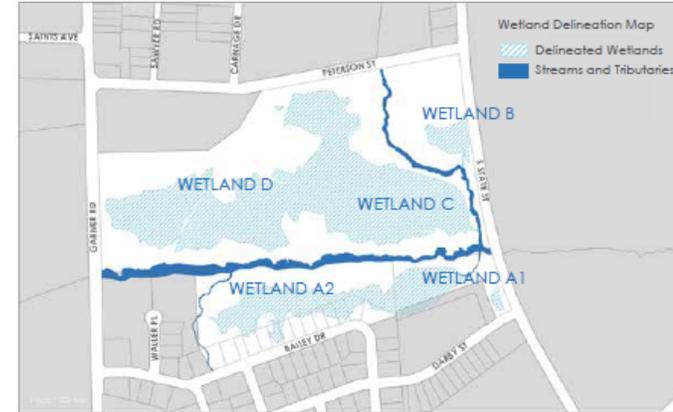


Figure 3: Wetland Groups



The floodway or floodway fringe is a more significant constraint because no encroachments, including fill, new construction, substantial improvements, structures, manufactured homes, use and other developments, are permitted within the floodway or non-encroachment areas unless it has been demonstrated that the proposed encroachment would not adversely affect the capacity of the channel's floodway.

According to Raleigh's Unified Development Ordinance Article 9.3 allowed uses within a floodway are: golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, parks, greenways, bikeways, hiking or horseback-riding trails, botanical gardens, open space and other similar private and public recreational uses that do not impact the ability of the floodway fringe to store water during a flood event. These allowed uses cover what is planned for the park.

Besides potential permitting constraints, locating elements in the floodplain and floodway can have other negative effects such as affecting the natural and hydrological environment and the lasting integrity of the park amenities. Because of this most

elements within the floodplain and floodway should either be elevated or highly flood tolerant and durable.

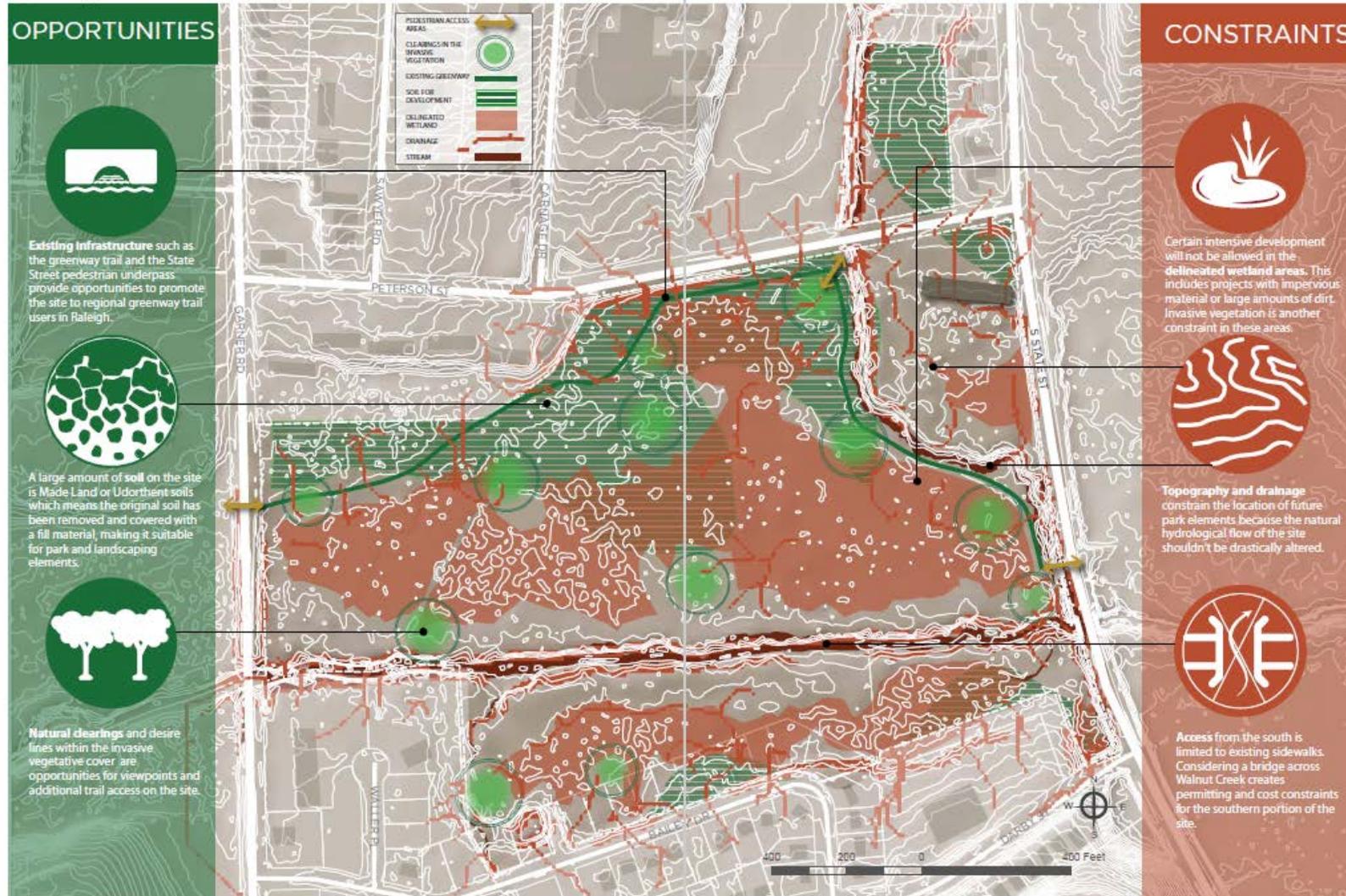
Wetlands

Walnut Creek drains through the site, with two unnamed tributaries and a confluence with "Little Rock Trail Creek," at the eastern boundary of the site. These two creeks and their tributaries reside primarily in the 100 year floodplain. Four wetland groups were delineated on-site and are detailed in the following paragraphs. Indications of a wetland include: saturation at surface, standing water, concave landform, and emergent wetland plants such as crimson eyed rosemallow, arrowleaf tearthumb, common rush, and sedge species.

Wetland A consists of two sub areas located south of Walnut Creek. A1 is 0.11 acres and is located in the southeast corner of the site. A1 encompasses a depression at the culvert outfall near the intersection of State St. and Darby St. A2 is 4.87 acres and is a low gradient ponded floodplain area. The following invasive species were identified: multiflora rose and an exotic invasive, lesser

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Figure 4: Opportunities and Constraints Diagram



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3 CONCEPT ANALYSIS

PARK VISION

Expand Walnut Creek Wetland Center into an equitably accessible destination park with the focus of conserving the area's environment and biodiversity, offering learning and social engagement opportunities for all, and celebrating arts and cultural heritage.

MASTER PLAN OBJECTIVES

- Encourage social engagement, economic development, and community pride
- Promote understanding, awareness, and appreciation of the unique wetland environment
- Protect, conserve, and enhance the natural environment, biodiversity, and cultural heritage
- Support interdisciplinary fun and academic learning opportunities through training and skills development
- Provide a range of access for residents and visitors of all ages and abilities

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ALTERNATIVES ANALYSIS

OPTION A: EDUCATION THROUGH INTERPRETATION

Park Concept Description: An increase in community interaction with the site through multiple connections and interpretive educational spaces allows visitors of the park to experience and gather within the Walnut Creek Wetland site.

- Artistic gateways enhance multiple access opportunities to connect the Community Center to St. Ambrose Episcopal Church and Biltmore Hills.
- Connections are also improved to the north of the site with traffic calming, crossing improvements and stormwater infrastructure along Peterson Street at Carnegie Middle School.
- Bike stations and parking promote sustainable transit to the site and entry features invite cyclists to park their bikes and explore the wetland on foot.
- Outdoor classrooms, natural play areas, and public gardens at the interior of the park create opportunities for visitors to learn and experience first-hand the uniqueness of the wetland habitat beyond.
- A viewing tower invites sightseers over the wetland habitat above the tree canopy to observe the surrounding environs of Walnut Creek Wetland Park.



Results from Public Workshop:

- Too many trails, too much disturbance
- This one is my favorite I do think the community garden may need to be moved, too much in the area with the playground. I think the signage near St. Ambrose is important to community members in that area are enticed to use the wetlands.
- Tower is nice feature
- I like all the access to creeks/nature but am concerned at the distance from the center they would be and I like having lots of trails but would they disturb the area and how would they be maintained? Outdoor classroom and creek access is great.
- It might be cool to have activities like this be supported by museums and cultural heritage institutions throughout the site. There would involve history and nature education, both if which are linking to schools.
- What is being done to address safety -real or perceived?
- The idea of the outdoor classroom is great. I brought a summer camp group of 7-11 year olds here last summer and they had a ton of fun!
- Crossing Strategies
- Very congested activity here with buses etc.
- Too much disturbance in this concept
- I like how many opportunities for nature interaction and programming in nature this plan provides.
- Traffic calming all along State St
- N of Peterson, I like this area for public use. Lots of opportunities for community gardening/education
- I like the trail along walnut Creek here

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ARTISTIC GATEWAYS

Artistic gateways frame the four main corners of the site, drawing in attention to the wetland park. Additional pedestrian-scale gateways enhance multiple access opportunities to connect the Community Center to St. Ambrose Episcopal Church and the Rochester Heights neighborhood. The pedestrian gateway to the south also includes a cultural remembrance wetland garden that will filter stormwater and pay tribute to the neighborhood's history. Connections are also improved to the north of the site with traffic calming, crossing improvements and stormwater infrastructure along Peterson Street at Carnegie Middle School. Bike share station and parking promote sustainable transit to the site and invite cyclists to park their bikes and explore the wetland on foot. The primary access route connects the Wetland Center and the St. Ambrose Episcopal Church via a boardwalk and bridge elevated over the wetlands and Walnut Creek to access a viewing tower at the interior of the park for a prominent perspective of the wetland habitat below. Two pedestrian bridges along State Street and Garner Road are enhanced with viewing platforms and signage that also create safer access to the site and an opportunity for pedestrians to stop and observe Walnut Creek.

CULTURALLY UNIQUE AND ARTISTIC EXHIBITS

Culturally unique and artistic exhibits inform park visitors about the wetland features while preserving a significant amount of the site for invasive species management conservation and wildlife. Three park elements located near the center: a nature play with wildlife exhibits, a wetland plant garden and a small stage for cultural expression enhance the programming and current exhibits of the Wetland Center. The small stage displays the cultural past and present of the surrounding community and is the platform for performances or presentations. Proposed design of the stage will retain and filter stormwater from the Community Center building and parking lot before directing the flow into a restored and accessible wetland.

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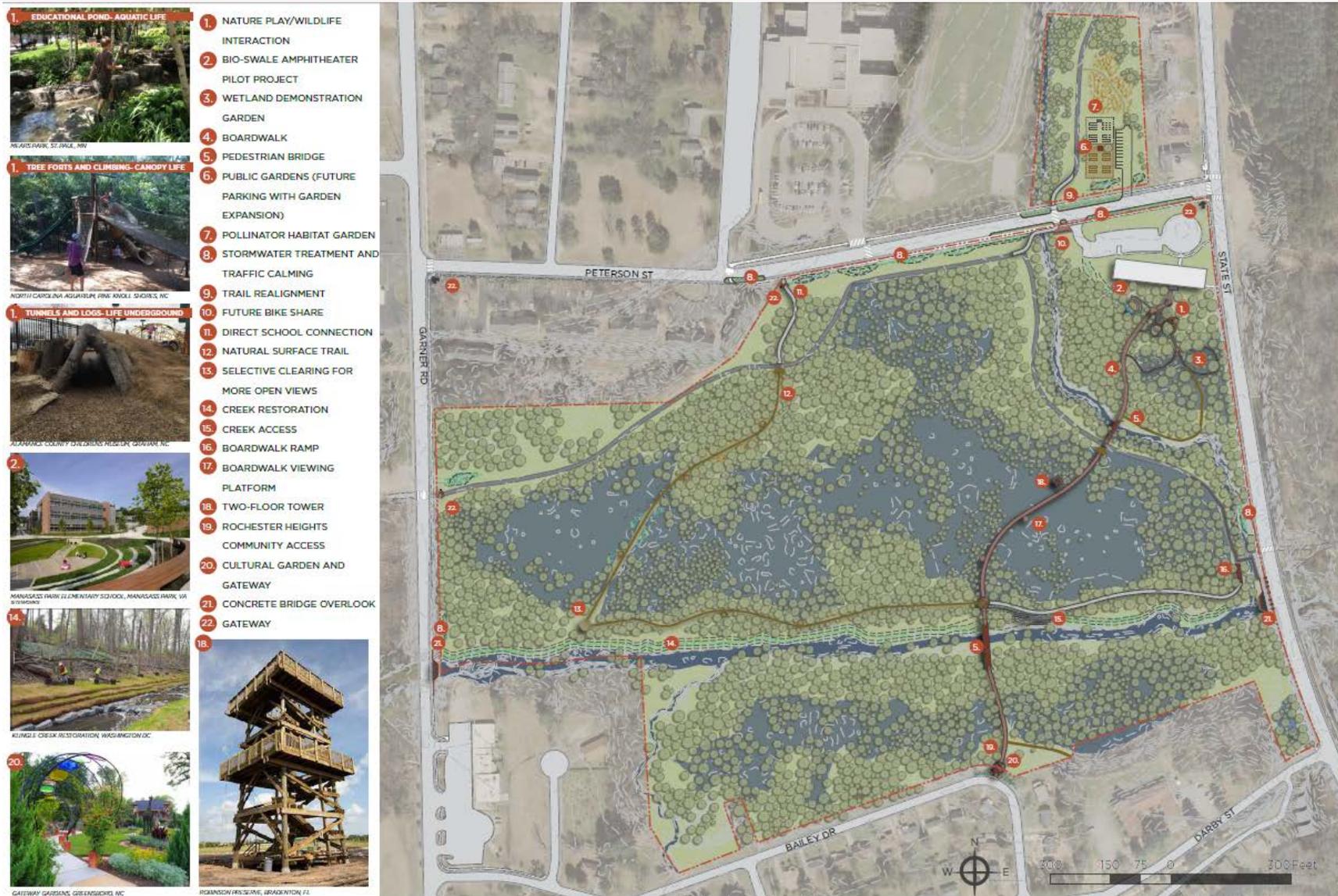


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SIGNATURE FEATURES

On the north side of Peterson Street across from the Community Center, a community garden presents educational opportunities for visitors to learn about the agricultural history of the site, pollinator plants and species, and different ways to grow food. A natural surface loop accesses multiple cleared spaces for viewing that display the wetland through public art and informational signage, framing the beauty of the natural site and informing people about the site's horticulture and its history as a space for higher education initiatives. A walk along the creek educates trail users about urbanization and its effects on our waterways while they view first-hand the process of creek restoration. A space in the middle of the park contains a bridge over Walnut Creek and terraced seating and a handicap accessible ramp, which gives access to the creek and across it. A viewing tower in the middle invites sightseers over the wetland habitat above the tree canopy to observe the surrounding environs of Walnut Creek Wetland Park.

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PUBLIC GARDENS

CPC and Wetland Park City staff expressed an interest in a city maintained community garden. The community garden is an educational opportunity and will require a full or part-time manager. The community garden's educational endeavors are three-fold:

- historic garden
- food garden
- pollinator habitat garden

The historic garden demonstrates the history of the site as an agricultural field that was owned and operated by the Youngs, an African-American family that farmed the land after the Civil War. The garden is envisioned to replicate historical agricultural practices and cultivate heirloom varieties.

The majority of the garden raised beds are food production plots with providing community members, school students and Wetland Center visitors opportunity to grow

their own food and educate them about best practices in North Carolina.

The pollinator habitat garden features a bee apiary, pathways and restoration of the north end of the parcel to a landscape that attracts and supports native birds, bees, butterflies, and other wildlife. The habitat garden should feature native plants, an informal and naturalistic environment to support and benefit wildlife with food, shelter, water and nesting places. The apiary is a bee yard where beehives are kept and beekeepers are necessary to tend to the hives and harvest the honey. More information for apiary and beekeepers association can be found at: <https://www.ncbeekeepers.org/>

Specific recommendations for public gardens include:

- Community Kiosk: A kiosk or bulletin board structure should be located in the garden to provide information on events and programming.

Figure 6: Enlargement, North Parcel



- Garden Shade Structure: A shade structure, minimum 225 square feet should be centrally located for gathering and outdoor classroom opportunities.
- Tool Sheds: Small tool sheds should be included for community tools and program elements storage. A minimum of one tool shed per 6 garden plots is preferred.
- Fencing: Appropriate fencing to deter unwanted wildlife and deer should be incorporated.
- Raised Beds: Garden plots should be four feet wide and accessible from both sides. A minimum 32 sq. ft (4' X 8') is sufficient to grow a good range and quantity of produce.
- Accessible raised beds should be included and should be 24" to 48" above grade, with an accessible path of travel.
- Soil: Soil depth for in-ground and raised beds should be a minimum of 12". Import soil should be tested for PH and contaminants.

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WALNUT CREEK WETLAND PARK: PETERSON STREET TRAFFIC CALMING AND PUBLIC GARDEN



- FILTERING SOIL MEDIA
- CLEAN GRAVEL OR COARSE SAND
- UNDERDRAIN/DRAIN TABLE

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Figure 8: Enlargement, Wetland Center Area Amphitheater + Play Area



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BIOSWALE AMPHITHEATER/ OUTDOOR CLASSROOM

Walking off the Wetland Center Balcony the boardwalk will continue as a ramp to a set of elevated viewing platforms. The boardwalk continues through the northeast corner until it crosses the stream and reaches the existing pathway. To the west of the second viewing platform a pathway will lead to the top of a small amphitheater. This space could be used for small performances but its primary purpose is to function as an outdoor classroom.

The amphitheater itself is a series of concrete terraced seating areas with grass or pea gravel surface in between the tiers. An elevated wooden boardwalk in an elliptical shape will act as a stage and accommodate a bioswale. The elevation will allow for stormwater to move from the site to the wetland gardens behind it.

WETLAND DEMONSTRATION GARDEN

A wetland demonstration garden located at the community center is an opportunity to fully restore the existing wetland in this area of the park. The demonstration will showcase the benefits of stormwater for wetland conservation and even the creation wildlife habitat in the midst of development. The project is symbolic of the commitment to preserve a sensitive ecosystem in a rapidly developing urban context.

The opportunity to fully restore this wetland can provide the Wetland Center with a resource to demonstrate the benefits of wetlands as a repository for native plants, animals and insects as well as reveal the processes of an ecosystem to improve water quality by removing sediment and pollutants, and act as flood protectors.

Also, a natural surface foot path will allow visitors access the wetlands and an opportunity to explore native plant communities and wildlife.

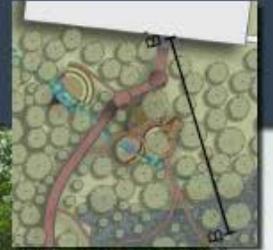
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WALNUT CREEK WETLAND PARK: NATURE PLAY AND BOARDWALK EXPANSION



B

B

- ENGINEERED WOOD FIBER
- DRAINAGE MATRIX AND FELT GEOTEXTILE
- FILTERING SOIL MEDIA

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Figure 10: Enlargement, Park Core-Observation Tower + Bridge



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BOARDWALK RAMPS

To increase the accessible path of travel and the loop the existing boardwalk located at State Street should be improved with an accessible pathway to connect the creek trail.



WILDLIFE CAMERAS

Wildlife cameras will be installed within the interior of the wetland for remote viewing at the Wetland Center. The motion-triggered remote cameras will be affixed to trees and the observation tower to get high quality footage of wetland species within the park. The wildlife cameras will be placed in the lower wooded riparian areas as well as higher-elevation treetops to provide the wetland center with educational feature to observe animals.

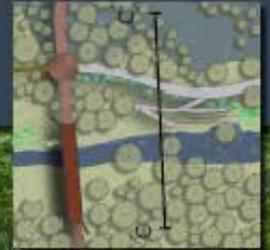
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WALNUT CREEK WETLAND PARK: CREEK RESTORATION AND ACCESS



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COMMUNITY PARTNERSHIP PROGRAMS

GARDENING MENTORSHIP PROGRAM

Many older adults in the community may have gardening experience that can be shared with younger residents. Intergenerational efforts to build community gardens can combine the energy and skills of younger adults with the resources and wisdom of older adults. As an example, students at nearby schools and colleges can help build senior-friendly gardens with raised beds and provide labor in exchange for tools and space to establish a garden.

Ages: 6th Grade and Up



YOUTH-LED COMMUNITY GARDEN

A community garden section dedicated to area youth provides students an opportunity to belong, supports positive relationships and gives both students and residents something to be proud of through their hard work. Partnerships can be created between the garden and area markets to sell fresh, locally grown produce. A youth-organized garden also presents an opportunity to post information on local events and causes, and to find volunteers for projects and programs.

Ages: 9th - 12th Graders

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BIKE SAFETY RODEOS

Bike safety courses can teach kids how to ride a bike and can provide education for adults on responsibilities for both drivers and cyclists. By creating a dedicated, safe space to learn these skills, kids become more confident bicyclists. Strategies for implementation may include identifying potential locations for a bike safety rodeos that are accessible, and ideally adjacent to greenways and trails, partnering with local schools to promote the safety rodeos, and dedicating a semi-permanent space for use as a "Bicycle Traffic Garden", where kids can go at any time to practice their bicycling skills.

Ages: Pre-K - 3rd Graders



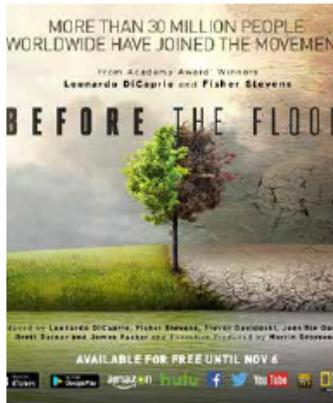
NEIGHBORHOOD CLEANUP CAMPAIGN

A cleanup and beautification initiative enables people to improve their surroundings and take pride in their community. The Wetland Center can support trail, park, and neighborhood cleanups by hosting and providing materials such as trash bags, maps of cleanup routes, and tools to clear weeds and prune overgrown bushes and trees.

Ages: All Ages

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ENVIRONMENTAL JUSTICE FILM SERIES

Environmental Justice is a key part of the struggle to maintain a healthy and clean environment in low income and minority communities, which are disproportionately affected by living, playing, and working closest to major sources of pollution.

This plays a central role in the history and formation of the Walnut Creek Wetland Center, which was formed through neighborhood efforts to cleanup and beautify the community.

A film series that focuses on the issues of environmental racism and environmental justice can bring these issues to light, both as an education tool and as inspiration for the community to build on past campaigns.

Ages: 7th Grade and Up



COMMUNITY BIKE MAINTENANCE PROGRAM

The Walnut Creek Wetland Center can partner with local bicycle shops or bike co-ops to provide free bicycle maintenance to local kids and residents at a fixed time each week. This may be a volunteer-based or sponsored program that can also educate bicyclists on how to maintain their bikes and how/where to safely ride in the area.

Awards or discounts at local bike shops may also be provided as an incentive for employees or residents to arrive at the Wetland Center by foot, bike, or transit.

Ages: All Ages

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NEIGHBORHOOD INFORMATION/EVENTS BOARD

A simple chalkboard or whiteboard posted in a visible location inside the Wetland Center can serve as a community bulletin board for events at the park as well as activities and gatherings throughout the community. Additionally, chalkboards can be used to gather feedback on the types of improvements and events people would like to see at the park.

Ages: All Ages



COMMUNITY GROUP BIKE RIDES

This may include a community-based cycling club or group ride that encourages diversity and inclusion and advocates for community ownership of bicycling as a human right. Many prominent regional and national examples exist, such as Red Bike Green in Atlanta and Slow Roll Bike Rides in Detroit and Chicago. These rides can build a community cycling culture that respects the local history and that works towards environmental, health, and transportation equity.

Ages: 18 and Up

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ARTS-BASED PROGRAMS

LOCAL ARTISTS EXHIBITS

Rotating art exhibits within the park or along trails and greenways can attract new groups to experience the park and wetlands. By combining art and greenway facilities, the community is creating a unique interactive amenity for both residents and visitors. Such programs also attract new partners, promoters, and sponsors of the park and greenways network. To encourage participation by local communities, local artists could be provided the opportunity sell their work that is on display in the Wetland Center or throughout the park.

Ages: All Ages



MUSIC IN THE MARSH

In addition to visual arts, music can draw more people to use the trails through programming and events. To hold concerts and attract musical talent, a temporary or permanent stage may be designed in a prominent and accessible location within the park. Additionally, opportunities for people to interact with music and/or instruments along the trail can provide a fun environment for people enjoying the parks and greenspace. Examples include Atlanta's "Pianos for Peace" program, where retired pianos are placed in public spaces around town for a month each year.

Ages: All Ages



BIKE RACK DESIGN COMPETITION

The Walnut Creek Wetland Center and park are conveniently located at the confluence of the Little Rock and Walnut Creek Trails, which provide excellent access for people arriving on bike. Therefore, bike parking is key to enhancing the bike-friendliness of the park. The simple inverted-U, or staple racks are effective and easy-to-use bicycle racks. They are also affordable and lend themselves to artistic flourishes as they are customizable and easily modified. A competition for local artists to design the bike racks can involve the arts community in the design and enhancement of the local trails and parks. Winning designs may be featured at locations where people need to secure their bikes, such as the Wetland Center, park restrooms, picnic areas, and entrances to pedestrian-only trails.

Ages: 6th Graders and Up

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WATERCOLOR PAINTING FOR ADULTS

The landscapes found in the wetlands and parkland lends itself well to watercolor or other arts classes such as photography and plein air painting. Classes may be open to all skill-levels and materials may be donated from local non-profits and arts supply stores.

Ages: 18 and Up

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HEALTH-BASED PROGRAMS

TRAILS TO HEALTHY FOODS + INCENTIVE PROGRAM

Many communities are recognizing the role that both physical activity and healthy eating play in improving overall public health and wellness. This important link can be highlighted in a fun and interactive manner through promoting healthy food outlets near the park and greenway network and partnering with health food providers to identify safe routes for active transportation to their locations.

The Walnut Creek Wetland Park has direct bike access to healthy food markets such as the State Farmer's Market via the Walnut Creek Trail. Potential partnerships with the Farmer's Markets may include incentives or vouchers for neighborhood residents to pick up at Walnut Creek Wetland Center for those that bike to the Farmer's Market.

Ages: 9th Grade and Up



NEIGHBORHOOD WALKING GROUPS

Group walks are fun ways to engage community members from a variety of ages and backgrounds. These group activities can range in focus from a guided walking tour of local gardens or historic sites to a ride to a local destination or farmers market. The focus of each walk or ride should creatively portray walking as a positive and healthy mode of transportation. After the walk, residents may be surprised to learn that they traveled a couple miles by foot—organizers should take advantage of this opportunity to drive home the point that walking for everyday trips is a healthy and fun form of transportation.

Ages: 18 and Up

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WALK WITH A DOC

Walking is a healthy, low-impact activity for all ages that has numerous health benefits. According to the American Heart Association, walking also has the lowest dropout rate of any form of physical activity.

Walk with a doc was formed as a grassroots effort in 2005 and has since grown into a national movement. Typically, a doctor will lead an informal community walk that is free and open to anyone, and will present on a health topic. Healthy snacks and blood pressure tests are provided, along with the opportunity to ask a doctor questions about personal and community health. Raleigh currently has a Walk with a Doc program based out of the Alliance Medical Ministry. A partnership with the Ministry may open the opportunity for hosting Walk with a Doc events at the Wetlands

Ages: 18 and Up



EXERCISE CLASSES IN THE PARK

Many areas of the park may be suitable for frequent free exercise classes led by volunteers or park staff. This may include a range of classes that target specific age groups and that involve various levels of intensity. Examples may include Yoga, Zumba, Tai Chi, and Qi Gong. Due to the convenient location at the confluence of two trails, there are options for people to arrive by foot or bike, and participants may be encouraged to do so - thereby creating a holistic healthy and active living experience.

Ages: 18 and Up

Walnut Creek Wetland Park

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5K WALK & RUN

A 5K walk and run can attract locals and visitors to the park for a healthy and fun event. This can also provide an opportunity to market the park and the excellent trail connections to various destinations that are within walking and biking (and running) distance. The run could be developed in conjunction with other program ideas, such as a popup wayfinding program, or together with a concert series.

Potential destinations for a 5K walk run from the Wetland Center include the State Farmer's Market, Lake Raleigh (Wetlands to Lake SK?), and Downtown Raleigh.

Ages: All Ages



BIKE SHARE AND/OR BIKE RENTAL DISCOUNT PROGRAM

According to the new Bike Raleigh bike share program, a station location is tentatively planned for the Walnut Creek Wetland Center. This will provide numerous opportunities for bike connections to other major destinations in Raleigh, as well as a great access point for nearby neighborhoods. Depending on the pay structure, many bike share programs may be perceived as too expensive or inaccessible to low-income residents. A program at the Wetlands Center tailored to educate the public on how to use the new bike share program may be paired with information on payment structures. Additionally, low-income payment programs or free vouchers may be developed, such as Atlanta's Relay Bike Share program that allows low-income residents to use bike share for 90 minutes each day.

Ages: 6th Grade and Up

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EDUCATIONAL PROGRAMS

HERITAGE TOURISM MAPS & GUIDES

The Walnut Creek Wetland Park has a unique history based in environmental justice. This story can be told and passed down to future users of this important community space.

A series of strategically developed park guides to heritage tourism can capitalize on and promote the rich history of the park and surrounding neighborhoods. One or more maps could be developed for the Wetland Center showing safe and enjoyable walking and biking routes to visit nearby cultural and historic sites.

Ages: 6th Graders and Up

EDUCATION COURSES FOR YOUNG ADULTS AND OLDER ADULTS

Currently, the Wetland Center provides many education courses for younger children that focus on the ecology and science within the park. These programs can be expanded in scope and targeted towards a range of ages. Additionally, partnerships with local middle and high schools will create opportunities for experience-based learning. Examples of relevant classes for older adults may include:

- Hammock Camping 101
- Edible Plants
- How to reduce your carbon footprint
- Green Building 101
- Health Benefits of Trails/Parks
- Urban Forestry
- Gardening with Native Plants

Ages: 18 and Up

Walnut Creek Wetland Park

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Control of invasive species after they have been established and growing on a site of over 40 acres is challenging. A multi-step process is recommended for addressing invasive species at Walnut Creek Wetland Park.

1. First, a clear definition of what area(s) should be restored and protected should be developed. These areas may include those adjacent to the existing Wetland Center, areas along the existing greenway, areas coinciding with the Master Plan design, etc. The entire park or major sections of it may be identified. This step should be ambitious, optimistic and sweeping, one that sets the tone for the remaining work. This initial step brings into focus the specifics of the site, and the vision of the future.
2. The invasive species that need control should be identified and prioritized. Which species are the most widespread? Which ones are problematic in the areas determined in Step 1?
3. Goals for invasive species control should be set, based on available resources. Total eradication could be the goal for some species, while control is probably more realistic for others. The decision to implement control with staff, volunteers, or a combination of both is an important consideration. Be as specific as possible. Determining a detailed budget is essential for the remaining steps in the process.
4. Once this foundational information is in place, a feasible strategy for accomplishing invasive species control goals can be formulated. Based on the outcomes of Step 2, the strategy should be developed that details the specific techniques, determined through research and available resources, which should be used to control specific species.
5. A map should be developed that identifies which areas are to be treated, in what order, for what species. A schedule for treatment of various areas should be produced, based on the optimal season to control the species present.
6. An adaptive management approach should be used that tracks areas treated, the specifics of the treatments, and the effectiveness of the treatments. The level of success of treatments performed should be evaluated and documented. Adjustments should be made based on these evaluations to maximize invasive species control effectiveness.

Based on visual site reconnaissance, the two invasive species that occupy the most area on the site, and whose presence is most pronounced are Chinese privet (*Ligustrum sinense*), a shrub that occupies extensive areas of the riparian buffers onsite, and Japanese stiltgrass (*Microstegium vimineum*), which occurs extensively in the non-wetland areas of the site.

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INTERPRETIVE AREAS AND DISPLAYS

Maintenance schedules should be generated for each procured sign or panel type for the park and include information on common vandalism or parts replacement. Additional considerations for maintenance include funding options, and interdepartmental and external utility coordination.

INVASIVE SPECIES MANAGEMENT

The NRCS defines a non-native species as a plant introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found. It should be noted that not all non-native plants are invasive because when many non-native plants are introduced to new places, they cannot reproduce or spread readily without continued human help (for example, many ornamental plants). An invasive species is a plant that is both non-native and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems. From the Presidential Executive Order 13112 (February 1999): "An invasive species is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health."

The vegetation survey on the park site identified 12 species with a NC Native Plant Society invasive species rank of 1- Severe Threat. There were 12 species identified with a NCNPS invasive species rank of 2- Significant Threat. There were 5 species identified with a NCNPS invasive species rank of 3- Lesser Threat. There were 3 species identified on the NCNPS invasive species

Watchlist A and one species on Watchlist B. Present on site are invasive trees, shrubs, vines, herbaceous plants and an aquatic plant, parrot feather (*Myriophyllum aquaticum*).

STAFFING OPERATIONS AND MANAGEMENT

With phased development of the Walnut Creek Wetland Park, the City of Raleigh may need to employ new personnel and furnish new equipment to undertake the day-to-day management of the park.

Assistant Park Director

As Walnut Creek Wetland Park development expands, it may become necessary for the City of Raleigh to employ an assistant park director to oversee, coordinate and direct the day-to-day land and facility management operations (among other tasks delegated by the Director) associated with the park. The assistant park director would need to work



Example of hand pulling invasive species

Walnut Creek Wetland Park



PARTNERSHIPS

The success of the Walnut Creek Wetland Park is in part due to working partnerships with non-profit organizations and user groups. Thus partnership standards for future support should be developed for current and future partners.

The following partnership standards are recommended for contributors to Walnut Creek Wetland Park improvements:

- All partnerships should require a written working agreement between the City of Raleigh and the partner with measurable outcomes that will hold each partner accountable for the mutually-desired outcomes and is evaluated on an annual basis.
- All partnerships should track direct and indirect costs associated with the partnership investment in order to demonstrate the level of equity each partner has invested.
- Each partnership should engage in collaborative planning on an annual basis, regular communication and annual reporting to each other's board or owners on how well the partnership is working.

ROLES OF PARTNERS

For a successful park to be developed with the help of partners it is critical for the players to understand their role in supporting and managing efforts.

CITY OF RALEIGH

The Walnut Creek Wetland Park will be developed and managed by the City of Raleigh and its departments. Listed below are the key departments and organizations

that will play a role in this implementation and management of future park elements.

Parks, Recreation, and Cultural Resources (PRCR)

PRCR will have a role in park design, construction administration and management, and maintenance of the park. Walnut Creek Wetland Park staff are an extension of PRCR and will continue to operate and maintain the park. Park staff and key PRCR staff will work closely with project partners and volunteers throughout the development of future phases.

City Police Departments

The City Police Department should assist PRCR with design review, patrolling and law enforcement for the Walnut Creek Wetland Park and associated facilities.

Stormwater Management

The City of Raleigh Stormwater Management will assist PRCR with the inspection and routine maintenance of all proposed stormwater management facilities within and adjacent to the park. The department's cost share program can also help provide assistance for capital improvements on park property. The program also funds education and signage if a benefit to the watershed can be demonstrated.

Public Schools & Educational Organizations

Public schools can support the efforts of the Walnut Creek Wetland Park by helping maintain facilities and assets, promoting amenity and park usage, supporting site needs, providing programs and events, and maintaining the integrity of natural/cultural resources through in-kind labor, equipment, or materials. **Shaw University, Carnegie**

Middle School, The Exploris School, NCSU Natural Learning Initiative, NCSU College of Natural Resources, and NC Museum of Natural Sciences are already partners and can continue to provide contributions to future park implementation.

CIVIC ORGANIZATIONS

Organizations and groups that support the efforts of the Walnut Creek Wetland Park can provide programs and events, including serving specific constituents in the community collaboratively. These organizations can play a vital role in maintaining and managing park facilities, and co-hosting events that raise money for the park. There are many ways in which civic organizations can participate in the development of the Walnut Creek Wetland Park. The most appropriate involvement can be determined by matching the goals and objectives of each organization to the needs of the park program. Local civic groups include **Top Teens, the Junior League, Boy Scouts and Girl Scouts, Chamber of Commerce, St. Ambrose Episcopal**



City of Raleigh Stormwater Management is an excellent partner for the facilities being recommended along roadways adjacent to the park.

Walnut Creek Wetland Park

PLANT LIST

A.1 Checklist of Vascular Flora

Plant	Common Name	Invasive Rank
<i>Ferns</i>		
<i>Aspleniaceae</i>		
<i>Asplenium platyneuron</i>	Ebony Spleenwort	
<i>Athyriaceae</i>		
<i>Athyrium asplenoides</i>	Southern Lady Fern	
<i>Blechnaceae</i>		
<i>Lortnseria areolata</i>	Netted Chain Fern	
<i>Dryopteridaceae</i>		
<i>Polystichum acrostichoides</i>	Christmas Fern	
<i>Onocleaceae</i>		
<i>Onoclea sensibilis</i>	Sensitive Fern	
<i>Ophioglossaceae</i>		
<i>Sceptridium bternatum</i>	Southern Grapefern	
<i>Sceptridium dissectum</i>	Cutleaf Grapefern	
<i>Gymnosperms</i>		
<i>Cupressaceae</i>		
<i>Juniperus virginiana</i>	Red Cedar	
<i>Taxodium distichum</i>	Bald Cypress	
<i>Pinaceae</i>		
<i>Pinus taeda</i>	Loblolly Pine	
<i>Tsuga canadensis</i>	Eastern Hemlock	
<i>Monocots</i>		
<i>Alismataceae</i>		
<i>Alisma subcordatum</i>	American Water Plantain	
<i>Sagittaria latifolia</i>	Duck Potato	
<i>Alliaceae</i>		
<i>Allium sp.</i>	Onion Family	
<i>Amaryllidaceae</i>		
<i>*Leucojum aestivum</i>	Summer Snowflake	
<i>*Narcissus sp.</i>	Daffodil Family	
<i>Araceae</i>		
<i>Peltandra virginica</i>	Arrow Arum	

* Denotes non-native species. Invasive species ranking from NC Native Plant Society

A.1 Checklist of Vascular Flora (Continued)

Plant	Common Name	Invasive Rank
<i>Monocots (Continued)</i>		
<i>Commelinaceae</i>		
<i>*Commelina commutis</i>	Asiatic Dayflower	
<i>Commelina erecta</i>	Whitemouth Dayflower	
<i>Commelina virginica</i>	Virginia Dayflower	
<i>*Murdannia ketsak</i>	Marsh Dewflower	1
<i>Cyperaceae</i>		
<i>Carex crinita</i>	Fringed Sedge	
<i>Carex festucacea</i>	Fescue Sedge	
<i>Carex frankii</i>	Frank's Sedge	
<i>*Cyperus trita</i>	Ricefield Flatsedge	
<i>Carex lupulina</i>	Hop Sedge	
<i>Carex retroflexa</i>	Reflexed Sedge	
<i>Carex squarrosa</i>	Squarrose Sedge	
<i>Cyperus strigosus</i>	Straw-Colored Flatsedge	
<i>Dulichium arundinaceum</i>	Three-Way Sedge	
<i>Eleocharis obtusa</i>	Blunt Spikerush	
<i>Scirpus cyperinus</i>	Woolgrass	
<i>Dioscoreaceae</i>		
<i>*Dioscorea polystachya</i>	Chinese Yam	
<i>Dioscorea villosa</i>	Wild Yam	
<i>Hemerocallidaceae</i>		
<i>*Hemerocallis fulva</i>	Orange Daylily	
<i>Hyacinthaceae</i>		
<i>*Ornithogalum umbellatum</i>	Star of Bethlehem	Watchlist A
<i>Juncaceae</i>		
<i>Juncus acuminatus</i>	Tapertip Rush	
<i>Juncus effusus</i>	Common Rush	
<i>Luzula acuminata</i>	Hairy Woodrush	
<i>Poaceae</i>		
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	
<i>Chasmanthum latifolium</i>	River Oats	

* Denotes non-native species. Invasive species ranking from NC Native Plant Society

Walnut Creek Wetland Park

Draft Master Plan Document Review Process

- City of Raleigh Staff Review: 10/18 – 10/27
- Public review, City website: 11/6 – 11/14
- Presentation to Park Planning: 11/9
- Presentation to PRGAB: 11/14
- Presentation to City Council for Adoption: 1/2



Walnut Creek Wetland Park

Group Work Session



Walnut Creek Wetland Park

Prioritization...what to think about

- Development permits (time and \$)
- Construction access (equipment and heavy machinery)
- Construction season
- Grant opportunities/seasons
- Existing park bond funding
- Value vs. cost of park elements
- Community and public desires
- Return on investment
- Vision and objectives of the master plan



WCWP-Costs

AREA A

- Peterson Street Stormwater
- Trail Re-alignment
- Bike Share
- Public Gardens,
- Parking Lot
- Habitat Garden

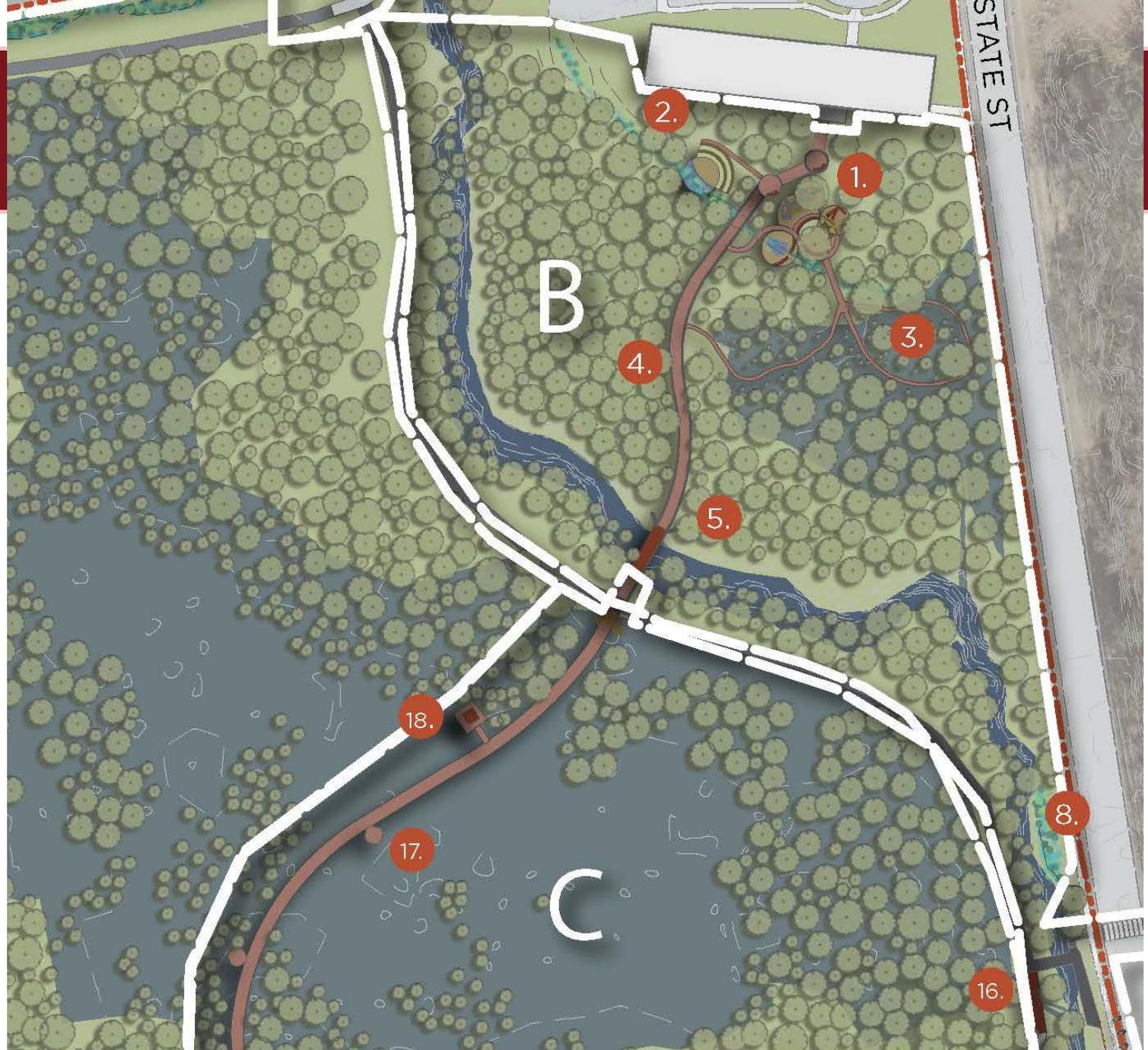
- \$1.8 million - \$2.2 million



WCWP-Costs

AREA B

- Community Center
- Boardwalk Access
- Amphitheater
- Play Area
- Little Rock Creek Restoration & Bridge
- Walnut Creek Overlook & State Street Loop
- Demonstration Wetland Garden
- \$2.17 to \$2.85 million



WCWP-Costs

AREA C

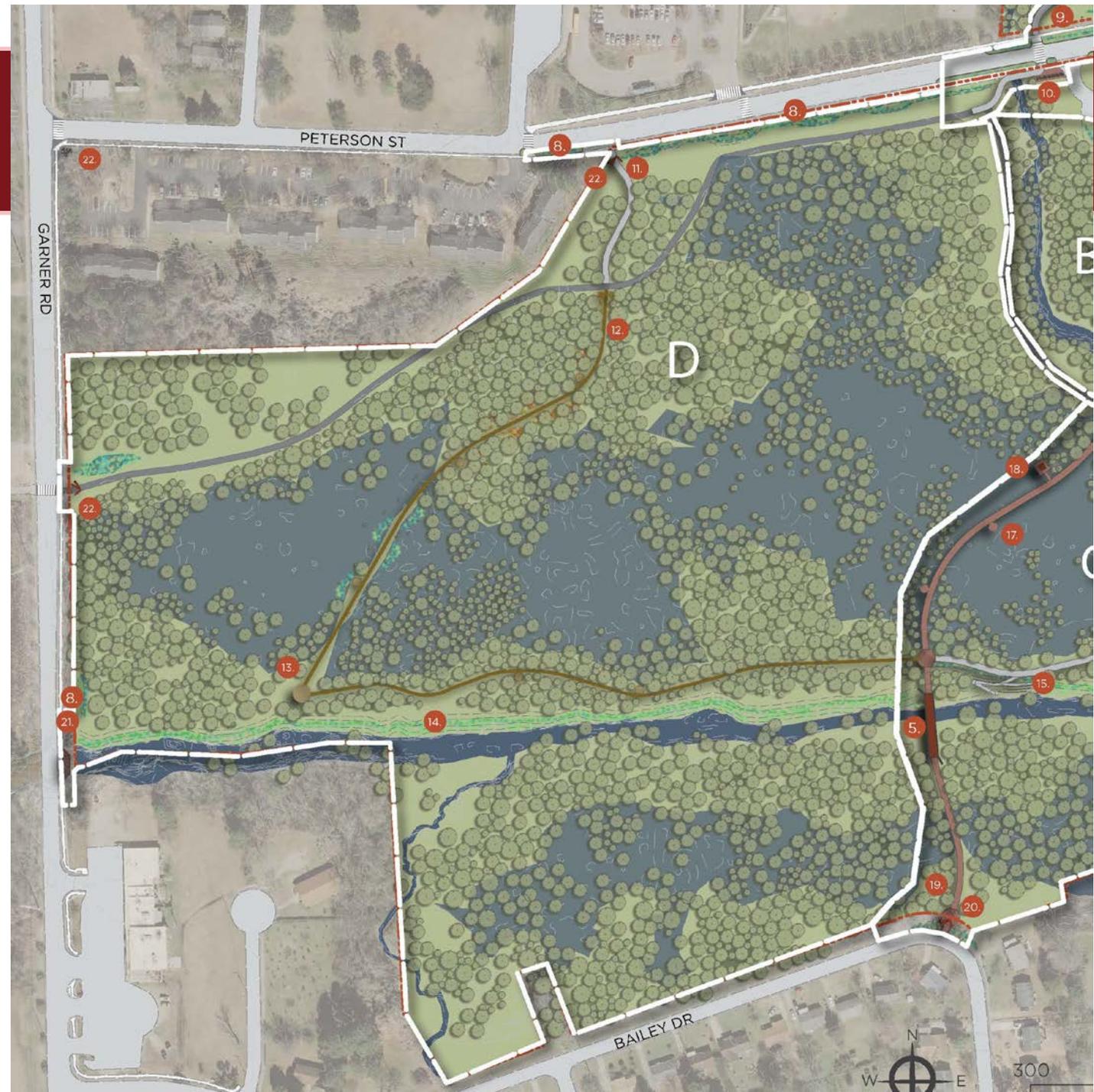
- Boardwalk
- Observation Tower
- Creek Access
- Creek Trail
- Walnut Creek Bridge
- Wetland Rehabilitation
- Bailey Drive Cultural Garden & Storm water
- \$4.1 to \$4.89 million



WCWP-Costs

AREA D

- Natural Surface Trails
 - Boardwalk Access
 - Walnut Creek Restoration & Overlook
 - Demonstration Wetland Garden
-
- \$2.08 to \$2.56 million



WCWP-Costs

AREA A

- \$1.8 million - \$2.2 million

AREA B

- \$2.17 to \$2.85 million

AREA C

- \$4.1 to \$4.89 million

AREA D

- \$2.08 to \$2.56 million

TOTAL COST: \$10.15 to \$12.52



Walnut Creek Wetland Park

- Boardwalk \$85-\$100/square foot
- Creek Bridge (50') \$85,000-\$100,00
- Observation Tower \$450,000- \$550,000
- Play Area \$250,000 - \$350,000
- Amphitheater \$80,000- \$100,000
- Trails (Natural Surface) \$8.00/square foot
- Creek Restoration \$100-\$150/ linear foot
- Wetland Restoration \$7.00-\$8.00/square foot



1. NATURE PLAY/WILDLIFE INTERACTION
2. BIO-SWALE AMPHITHEATER PILOT PROJECT
3. WETLAND DEMONSTRATION GARDEN
4. BOARDWALK
5. PEDESTRIAN BRIDGE
6. PUBLIC GARDENS (FUTURE PARKING WITH GARDEN EXPANSION)
7. POLLINATOR HABITAT GARDEN
8. STORMWATER TREATMENT AND TRAFFIC CALMING
9. TRAIL REALIGNMENT
10. FUTURE BIKE SHARE
11. DIRECT SCHOOL CONNECTION
12. NATURAL SURFACE TRAIL
13. SELECTIVE CLEARING FOR MORE OPEN VIEWS
14. CREEK RESTORATION
15. CREEK ACCESS
16. BOARDWALK RAMP
17. BOARDWALK VIEWING PLATFORM
18. TWO-FLOOR TOWER
19. ROCHESTER HEIGHTS COMMUNITY ACCESS
20. CULTURAL GARDEN AND GATEWAY
21. CONCRETE BRIDGE OVERLOOK
22. GATEWAY



Walnut Creek Wetland Park

\$1,000,000 Park Bond

- Master Planning: **\$150,000**
 - Design fees, Phase 1: **\$100,000**
 - Survey, Geotechnical, Civil Engineering, Permitting, General Requirements: **\$50,000**
-

= \$700,000 Park Bond

Walnut Creek Wetland Park

Your Consensus Choices:

-  1. **Endorsement** (Member fully supports it)
-  2. **Endorsement with minor point of contention** (Member likes it)
-  3. **Agreement with minor reservation** (Formal disagreement, but will not block or hold up the proposal/provision)
-  4. **Stand aside with major reservations** (Formal disagreement, but will not block or hold up the proposal/provision)
-  5. **Block** (Member will not support the proposed plan)

Walnut Creek Wetland Park

Measuring Consensus:

- **Consensus** = All committee members present rate the proposal as a 1,2, or 3
- **Consensus with Major Reservations** = All committee members present rate the proposal as a 1,2, or 3, except at least one Committee member rates it as a 4
- **No Consensus** = Any committee member rates the proposal as a 5

Walnut Creek Wetland Park

Let's Vote!



Walnut Creek Wetland Park



**WALNUT CREEK
WETLAND PARK
MASTER PLAN**

