



PARKS, RECREATION
AND CULTURAL RESOURCES

Pre-Development Assessment Plan Thornton Rd. Property

6100 THORNTON RD.
PIN: 1738647227, 1738623451
MARCH 2021



EXECUTIVE SUMMARY

The intent of the Pre-Development Assessment Plan (PDAP) is to document existing conditions, inventory natural & cultural resources, and provide an interim management plan prior to master planning and park development. The PDAP will provide recommendations for development potential based on opportunities and constraints of the site as shown in the suitability analysis.

Thornton Rd. Property is located at 6100 Thornton Rd. near the intersection of I-540 and Capital Boulevard (US 1 N) in Northeast Raleigh on the Neuse River. The property consists of a northern parcel (66.5 acres) and a southern parcel (65.3 acres) totaling 131.8 acres. The site is found in the Neuse Crossroads community.

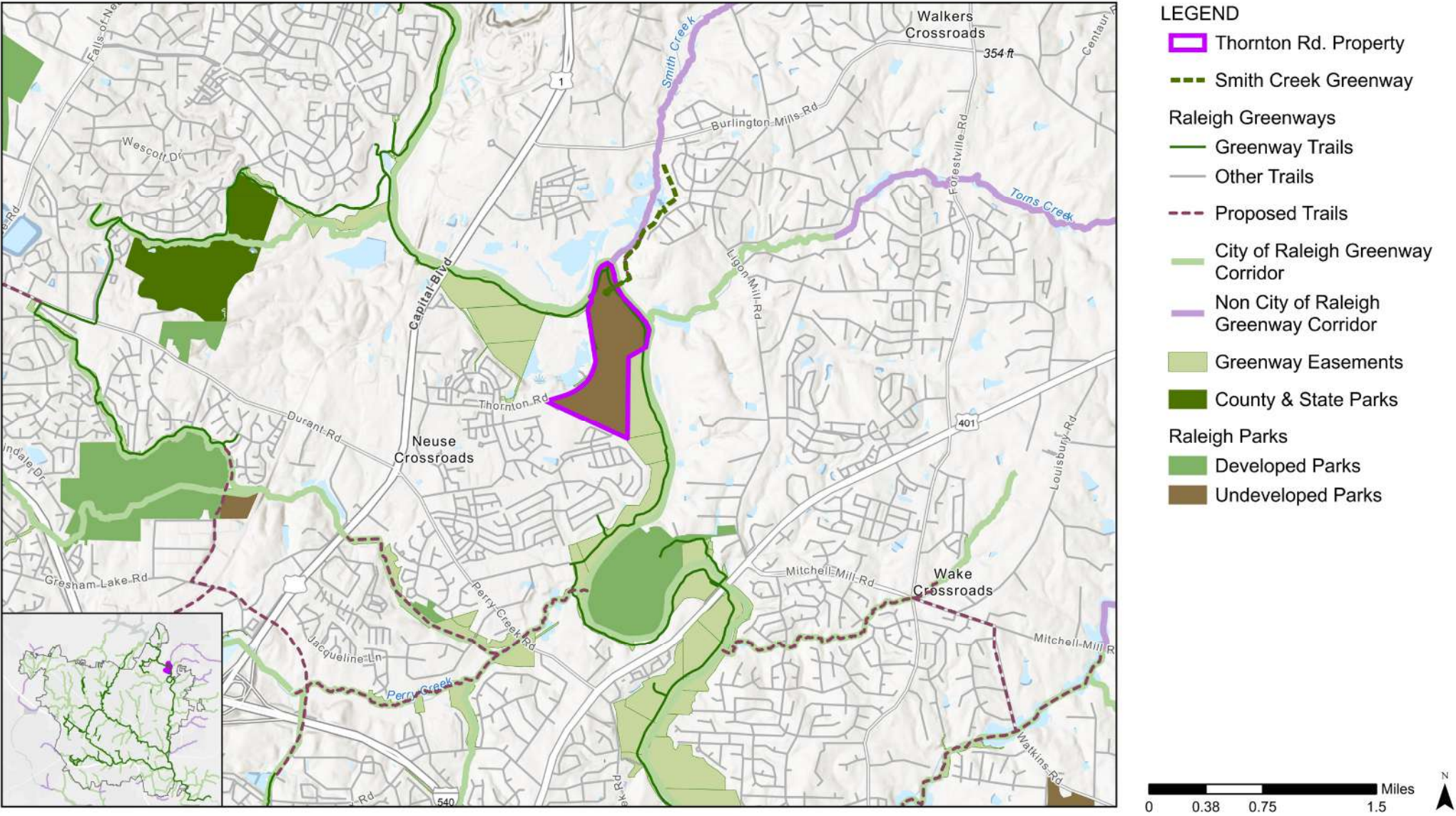
Running through the Thornton Rd. Property is the Neuse River Greenway, a 33 mile trail connecting Falls Lake Dam to the southeastern border of Wake County. One and a half miles north of Thornton Rd. Property is the Abbott's Creek Greenway Trail Connector, which branches off of the Neuse River Trail and joins the Simm's Branch Trail Greenway Trail Connector. There are many park properties near the Thornton Rd. Property that range in experiences from nature preserves and community pools to athletic complexes and active adult centers. What is especially interesting in context of the Thornton Rd. Property is the many parks connected to the property by the Neuse River Greenway.

There is a proposed 2-lane divided avenue that will traverse the southern end of the Thornton Rd. Property. This avenue will cross the Neuse River and connect Thornton Rd. with Ligon Mill Rd. The Transportation Dept. has no current plans for developing this avenue, but any development of the Thornton Rd. Property should keep in mind this future use.

The landscape at Thornton Rd. Property is mostly forested, has gently sloping topography and is located within the floodplain.

Natural Resources Inventory was collected at the Thornton Rd. Property as well as at the three surrounding easements both to the east and west of the property. Data from the Natural Heritage Program and site visits was analyzed and it was determined that there are Threatened and Endangered animal and plant species found at the site, including Bottomland Skullcap, Neuse River Waterdog, Triangle Floater, Roanoke Slabshell and Eastern Lampmussel.

Greenway Context Map



Site Suitability

Based on the analysis of the site suitability overlay, the following map delineates areas of the site that are recommended to have very limited, limited, or regular development.

Very Limited Development

- These areas are suitable for low impact uses such as natural surface trails, canoe/kayak launches, invasive removal, and river bank stabilization

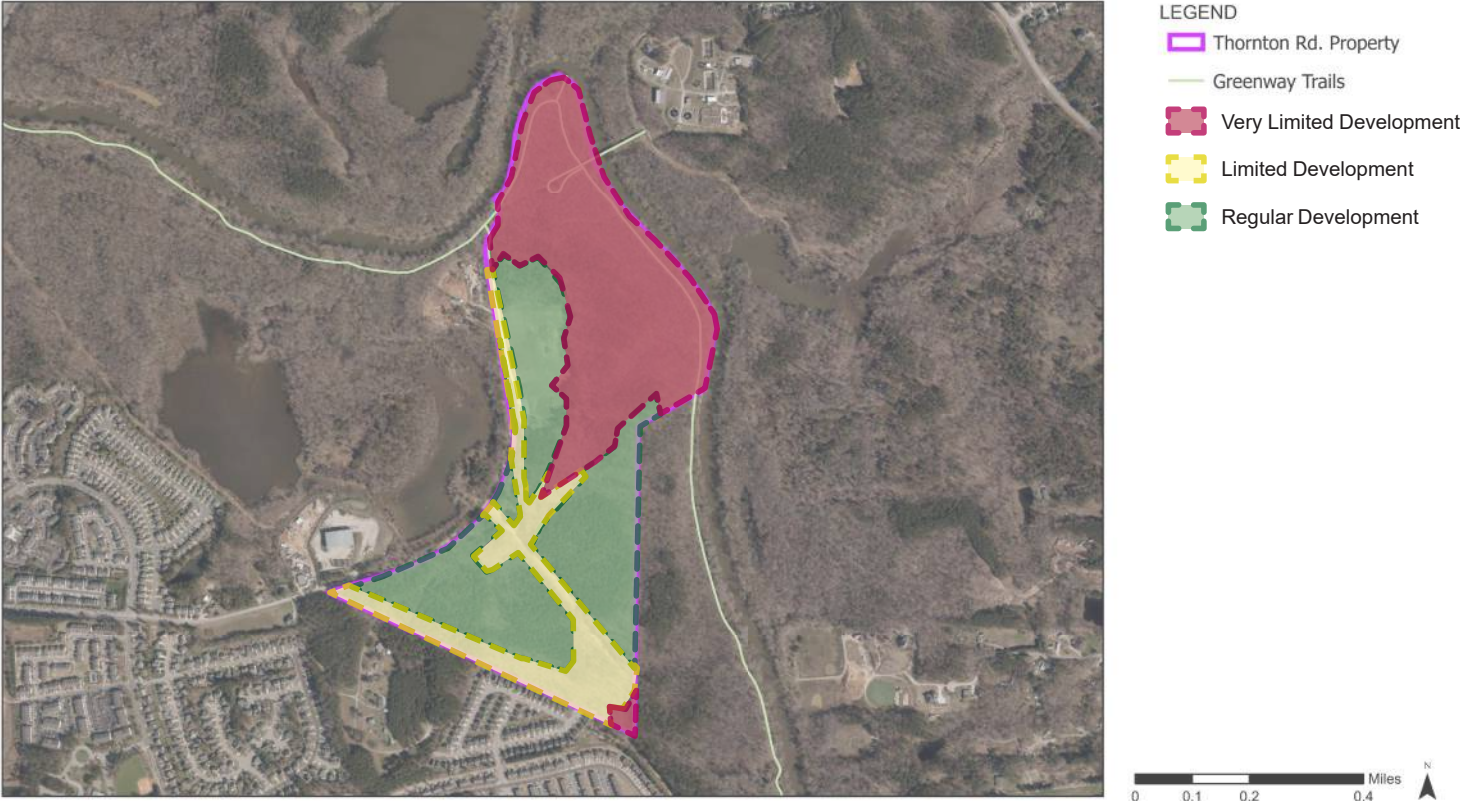
Limited Development

- Any development in these areas should be able to withstand frequent inundation, or be able to be relocated for maintenance or road construction.

Regular Development

- These areas have no limitations on development and are open to any design choices that will facilitate a versatile park property.

Site Suitability Map



Interim Management Plan

Primary short-term goals for natural resource management on this Property include quality land stewardship practices and the protection of significant ecological elements. To accomplish these goals, six specific management objectives have been identified by PRCR Natural Resources staff, developed to address the most pressing and practical natural resource management needs.

Primary Short-term Goals

1. Implementation of coordinated monitoring and mapping efforts aiding in the development of comprehensive biological inventories
2. Nature Preserve Criteria
3. Prioritization and control of invasive plant species
4. Removal of trash and debris found in scattered dumping sites
5. Reduction of unauthorized vehicular & foot traffic to prevent illegal hunting and the degradation of sensitive ecological areas
6. Early successional habitat management in the open field

Long-term Goals

1. Implementation of additional ecological monitoring and mapping efforts
2. Retention and protection of documented significant plant and animal species
3. Improvement of wildlife habitat and natural plant communities through ecological restoration practices

These interim management recommendations will incorporate accepted best management practices as they pertain to the biotic and abiotic elements found on the Property. The following recommendations are also intended to be flexible, with the goal of supporting adaptive management as additional site characteristics, responses to development, and management challenges are identified. Resource availability will be an additional consideration when implementing management recommendations, as equipment, staffing, and expertise may limit management capabilities.

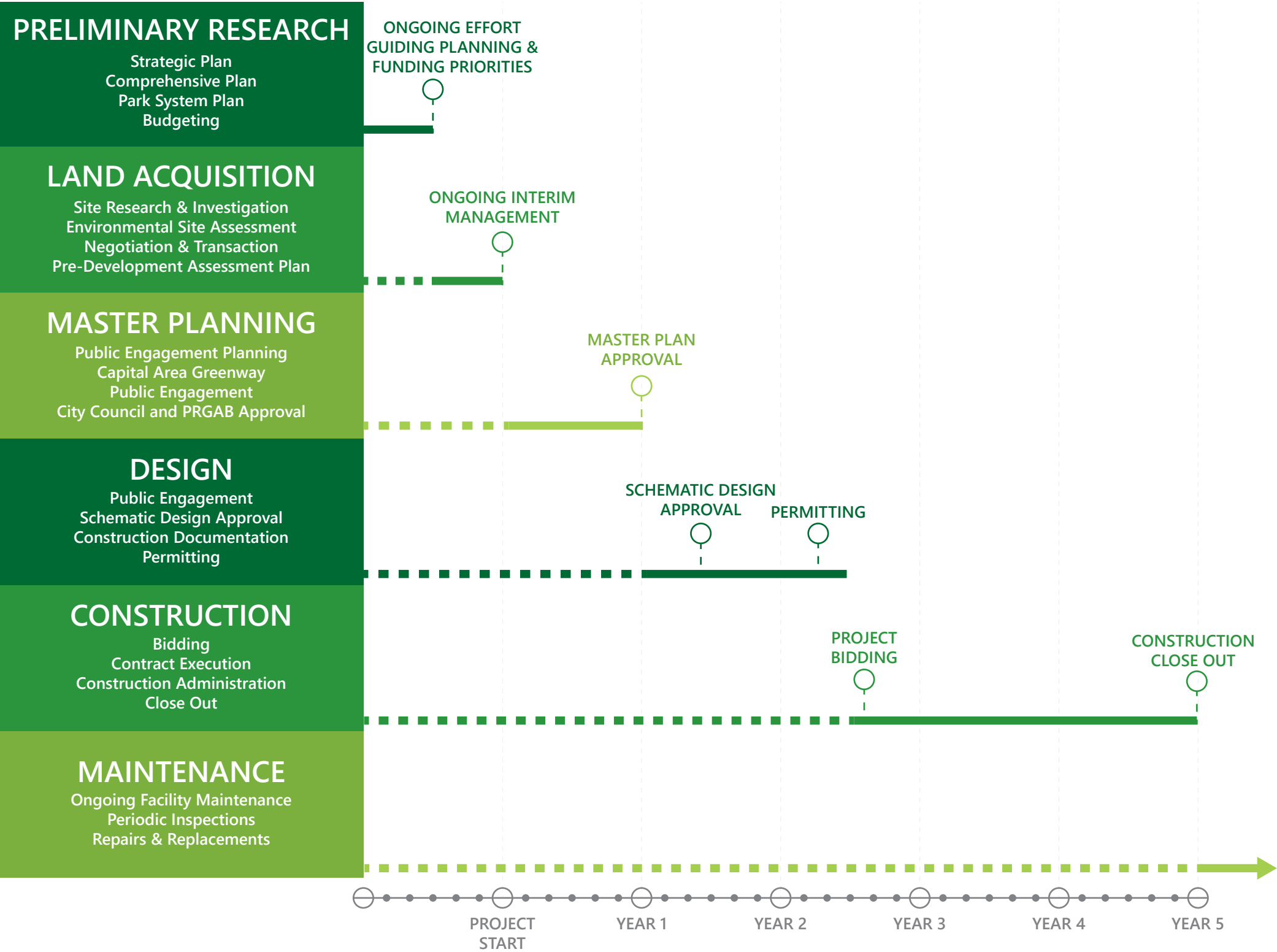
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PLANNING PROCESS

A Pre-Development Assessment Plan (PDAP) is conducted on an undeveloped park property after the site has been acquired by the City of Raleigh and before any master planning for the site occurs.

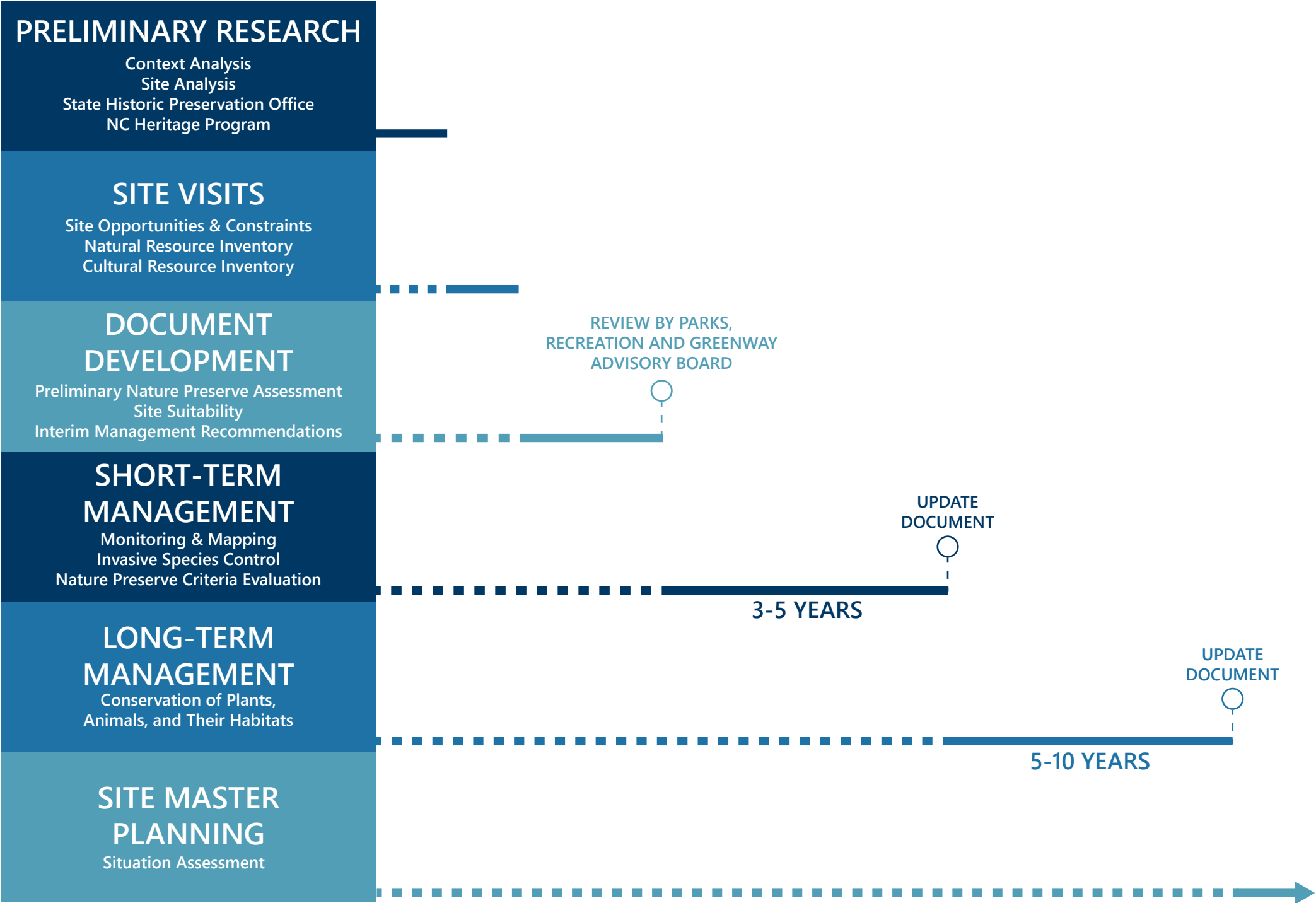
The intent of the Pre-Development Assessment Plan (PDAP) is to document existing conditions, inventory natural & cultural resources, and provide an interim management plan prior to master planning and park development. The PDAP will provide recommendations for development potential based on opportunities and constraints of the site as shown in the suitability analysis.



The Pre-Development Assessment Plan (PDAP) includes context and site analysis, as well as data acquired by the State Historic Preservation Office and the NC Heritage Program. Multiple site visits occur where City staff document site opportunities & constraints, and conduct natural & cultural resource inventory. While staff develop the PDAP document, they conduct a preliminary Nature Preserve assessment, as well as developing site suitability diagrams, and interim management recommendations.

Once the PDAP document is reviewed by the Parks, Recreation and Greenway Advisory Board (PRGAB), short-term management of the site begins. This includes but is not limited to monitoring & mapping, invasive species control, and a full Nature Preserve criteria evaluation. On average, short-term management takes 3-5 years after the PDAP document is reviewed by PRGAB. New information gathered during the short-term management, as well as the results of the Nature Preserve criteria evaluation are then updated in the PDAP document.

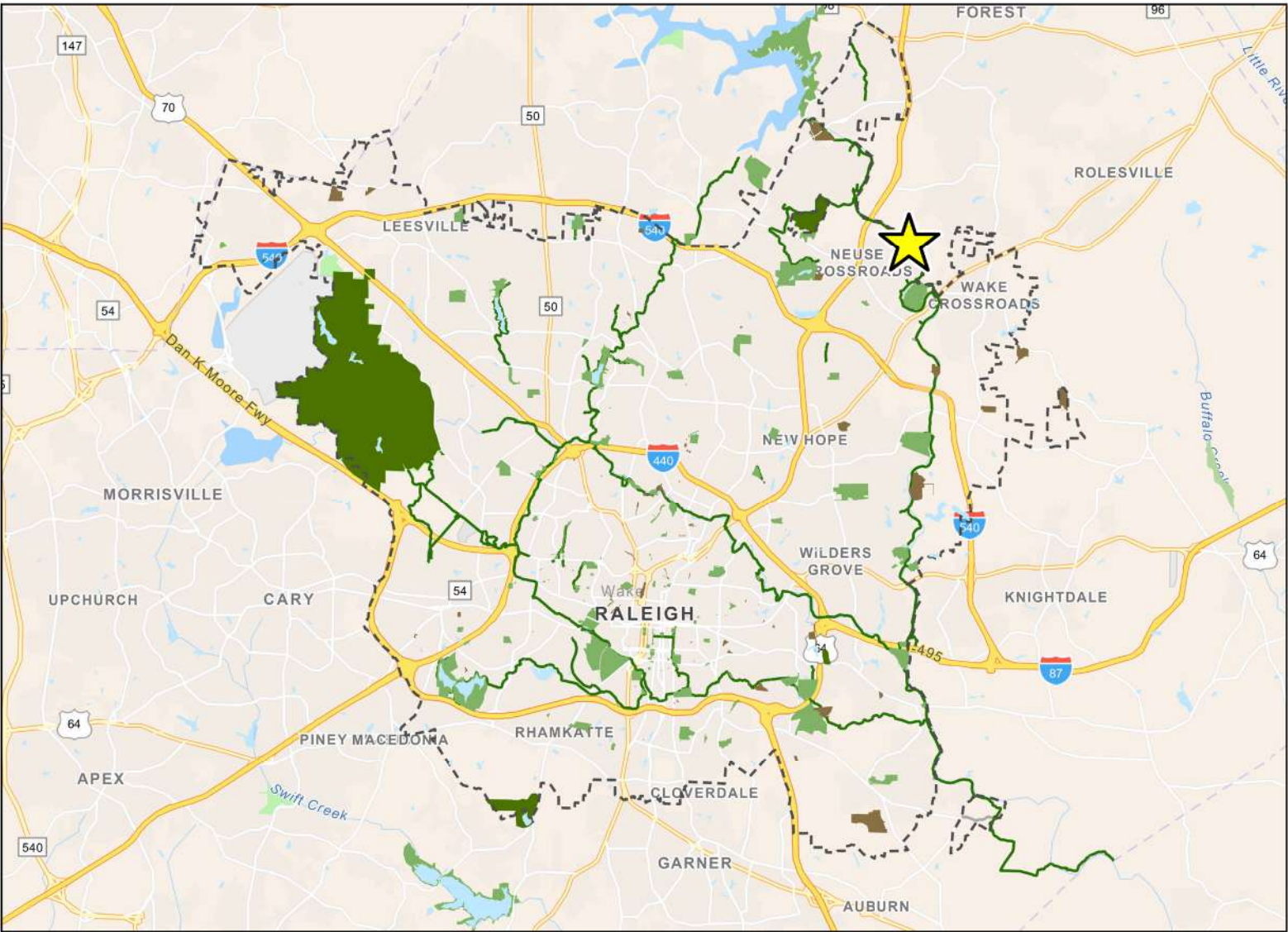
After short-term management is complete, the site moves into long-term management. This includes but is not limited to conservation of the site’s plants, animals and their habitats. On average, long-term management takes place 5-10 years after the PDAP document is reviewed by PRGAB. New information gathered during the long-term management is then updated in the PDAP document. At this point the site usually moves onto site master planning, although some sites may remain in long-term management past the 5-10 year mark. When the site moves onto the master planning phase, information from the PDAP will be included in the Situation Assessment, that is the first step of the master planning process.



INTRODUCTION

Thornton Rd. Property is located at 6100 Thornton Rd. near the intersection of I-540 and Capital Boulevard (US 1 N) on the Neuse River. The property is within the City of Raleigh extra-territorial jurisdiction. The property consists of a northern parcel (66.5 acres) and a southern parcel (65.3 acres) totaling 131.8 acres. The site is found in the Neuse Crossroads community.

Context Map



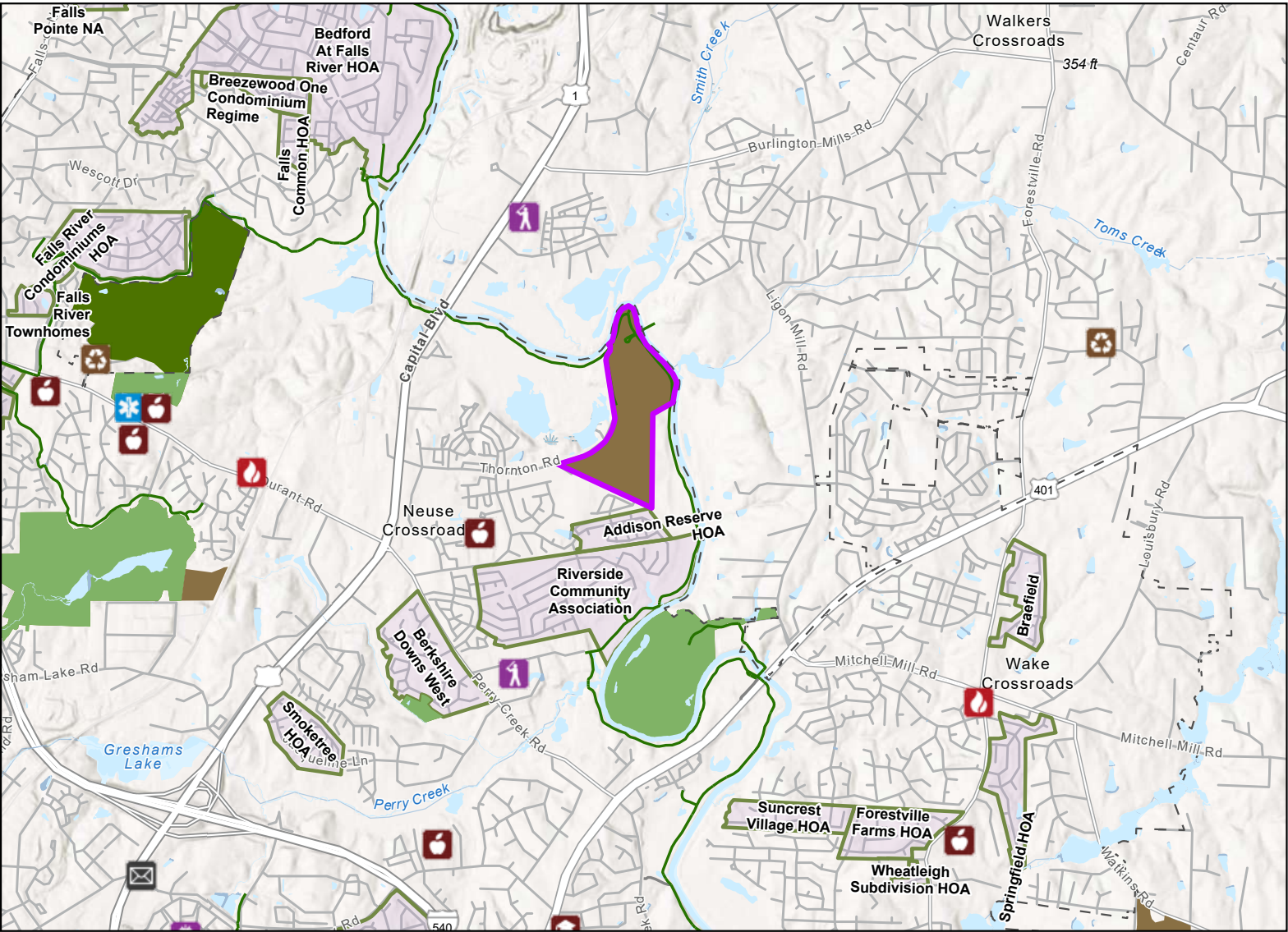
- LEGEND**
- Raleigh Extra-territorial Jurisdiction
 - ★ Thornton Rd. Property
 - County & State Parks
 - Raleigh Parks
 - Developed Parks
 - Undeveloped Parks
 - Raleigh Greenways
 - Greenway Trails
 - Other Trails

CONTEXT ANALYSIS

The Thornton Rd. Property is located along the Neuse River and the north-eastern boundary of the Raleigh Extraterritorial Jurisdiction. There are several Community Associations and Homeowner Associations in the vicinity including a few that are immediately adjacent to the property. There are many schools in the area, mostly elementary schools but there is also a Wake Tech Community College Campus located near the site. There are EMT stations, Fire Stations, a post office, and recycling centers nearby. The WRAL Soccer Fields are located south of the property off Perry Creek Rd.

It is recommended that during a community engagement process for the development of the Thornton Rd. Property that outreach is conducted through the Community & Homeowner Associations, as well as the nearby elementary schools and university.

Vicinity Map

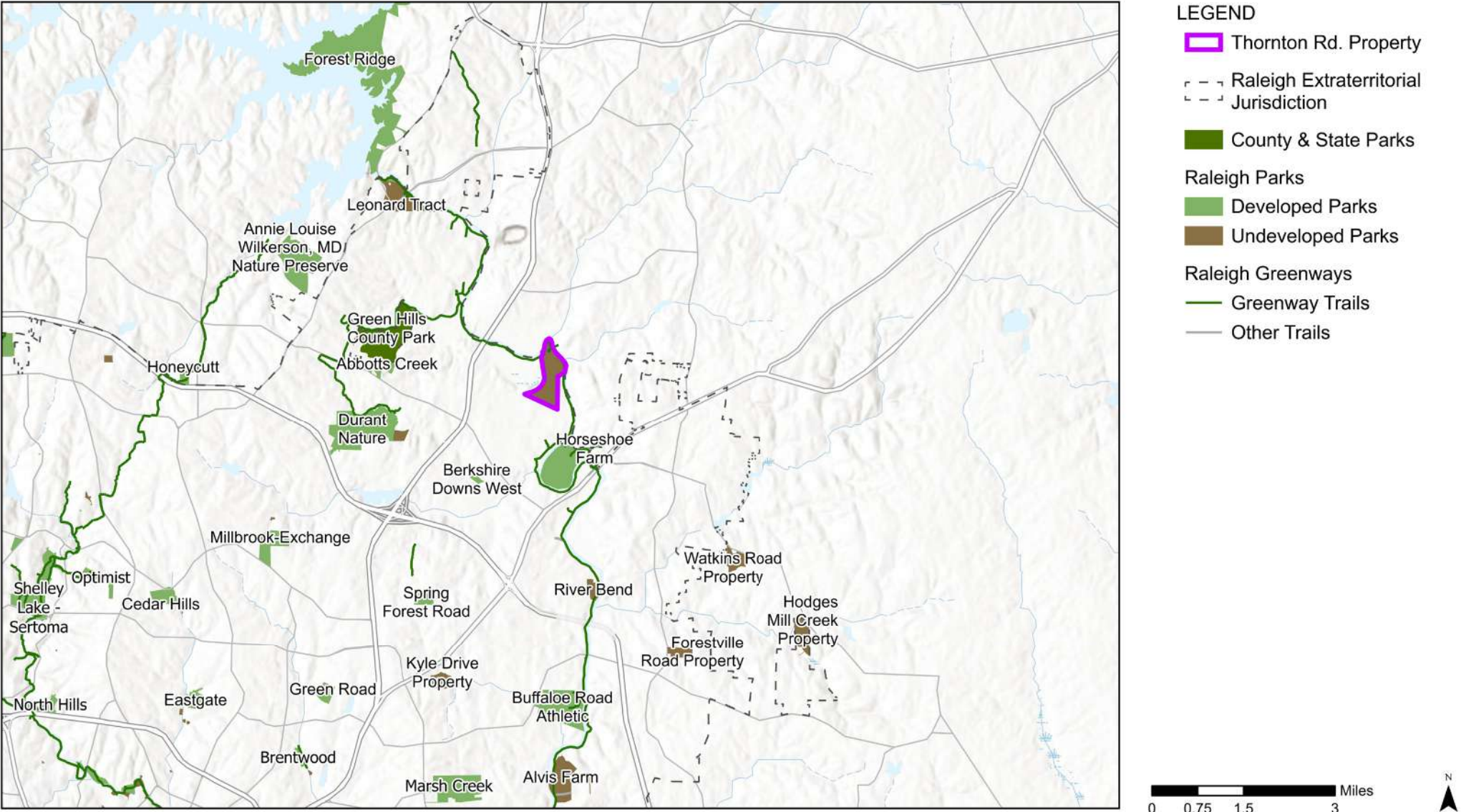


- LEGEND**
- Raleigh Extraterritorial Jurisdiction
 - Thornton Rd. Property
 - Raleigh Neighborhoods
 - County & State Parks
 - Raleigh Parks**
 - Developed Parks
 - Undeveloped Parks
 - Greenway Trails
 - Other Trails
 - Places of Interest**
 - EMS Stations
 - Fire Departments
 - Post Offices
 - Recycling Centers
 - Schools
 - Shopping Centers
 - Sports Facilities
 - Universities/Colleges

There are many park properties near the Thornton Rd. Property that range in experiences from nature preserves and community pools to athletic complexes and active adult centers. What is especially interesting in context of the Thornton Rd. Property is the many parks connected to the property by the Neuse River Greenway. Some of the park properties are currently undeveloped, but some of the undeveloped properties already have City Council approved Master Plans.

It is recommended that any future planning of the Thornton Rd. Property consider how this property could compliment the system of parks already in this area, and the other undeveloped park properties.

Parks Context Map



To the right is a table of all park experiences provided within a 5-mile radius of the Thornton Rd. Property. It is recommended this list be updated at the start of any Master Plan process.

Park Experiences Table

Experience	Parks Providing the Experience
Bike Repair Station	Forest Ridge
Car Charging Station	Annie Louise Wilkerson, MD Nature Preserve
Comfort Station	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Horseshoe Farm, Marsh Creek, Spring Forest Road, Green Hills County Park
Grill	Berkshire Downs West, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Marsh Creek, Millbrook-Exchange, Spring Forest Road
Educational Signage	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Horseshoe Farm
Outdoor Water Fountain - People	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Marsh Creek, Millbrook-Exchange, Spring Forest Road, Green Hills County Park
Outdoor Water Fountain - Dogs	Buffaloe Road Athletic, Millbrook-Exchange
Aquatic Center	Buffaloe Road Athletic
Splashpad	Millbrook-Exchange
Swimming Pool - Indoor	Buffaloe Road Athletic, Millbrook-Exchange
Swimming Pool - Outdoor	Millbrook-Exchange
Active Adult Center	Millbrook-Exchange
Community Center	Abbotts Creek, Green Road, Marsh Creek, Millbrook-Exchange
Environmental Education Center	Annie Louise Wilkerson, MD Nature Preserve
Computer Lab	Marsh Creek
Dance Studio	Abbotts Creek
Fitness Center/ Weight Room	Abbotts Creek, Green Road, Marsh Creek, Millbrook-Exchange
Library Room	Annie Louise Wilkerson, MD Nature Preserve, Millbrook-Exchange
Rentable Building	Durant Nature Preserve
Disc Golf	Forest Ridge
Pollinator/ Native Garden	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Horseshoe Farm, Marsh Creek
Sensory Garden	Durant Nature Preserve
Bio-Retention Pond/Rain Garden	Annie Louise Wilkerson, MD Nature Preserve, Horseshoe Farm
Permeable Pavement	Annie Louise Wilkerson, MD Nature Preserve, Horseshoe Farm, Spring Forest Road
Historic Exhibit	Annie Louise Wilkerson, MD Nature Preserve
Historic Structure	Annie Louise Wilkerson, MD Nature Preserve, Horseshoe Farm
Museum	Annie Louise Wilkerson, MD Nature Preserve
Visitor Center	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge
Fishing Access	Durant Nature Preserve, Forest Ridge
Wildlife Viewing	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Horseshoe Farm
Nature Education	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Horseshoe Farm, Green Hills County Park
Nature-Oriented Exhibit	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Horseshoe Farm
Nature-Oriented Educational Signage	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Horseshoe Farm
River	Buffaloe Road Athletic, Horseshoe Farm
Lake	Durant Nature Preserve, Forest Ridge
Pond	Annie Louise Wilkerson, MD Nature Preserve, Berkshire Downs West, Marsh Creek
Wetland	Abbotts Creek, Berkshire Downs West, Buffaloe Road Athletic, Durant Nature Preserve, Horseshoe Farm, Marsh Creek
Creek	Abbotts Creek, Annie Louise Wilkerson, MD Nature Preserve, Berkshire Downs West, Buffaloe Road Athletic, Durant Nature Preserve, Horseshoe Farm, Marsh Creek, Millbrook-Exchange, Green Hills County Park,
Other Natural Water	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Green Hills County Park
Ballfields	Buffaloe Road Athletic, Green Road, Honeycutt, Marsh Creek, Millbrook-Exchange, Spring Forest Road
Basketball - Indoor (Full Court)	Abbotts Creek, Green Road, Marsh Creek, Millbrook-Exchange
Basketball - Outdoor (Full Court)	Green Road, Honeycutt, Millbrook-Exchange
Multipurpose Field	Abbotts Creek, Buffaloe Road Athletic
Open Play Field	Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Horseshoe Farm, Millbrook-Exchange, Spring Forest Road
Pickleball Court - Indoor	Millbrook-Exchange
Tennis Center	Millbrook-Exchange
Tennis Courts	Green Road, Millbrook-Exchange, Spring Forest Road
Volleyball - Indoor	Abbotts Creek, Marsh Creek
Volleyball - Sand	Durant Nature Preserve, Green Road, Honeycutt
Dog Park	Buffaloe Road Athletic, Millbrook-Exchange
Rock Climbing/Bouldering	Annie Louise Wilkerson, MD Nature Preserve
Ampitheatre	Durant Nature Preserve, Green Hills County Park
Park Bench	Abbotts Creek, Annie Louise Wilkerson, MD Nature Preserve, Berkshire Downs West, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Horseshoe Farm, Marsh Creek
Picnic Table	Abbotts Creek, Annie Louise Wilkerson, MD Nature Preserve, Berkshire Downs West, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Horseshoe Farm, Marsh Creek
Picnic Shelter	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Green Road, Honeycutt, Horseshoe Farm, Marsh Creek, Millbrook-Exchange, Spring Forest Road
Playgrounds: 2-5	Abbotts Creek, Annie Louise Wilkerson, MD Nature Preserve, Durant Nature Preserve, Forest Ridge, Honeycutt, Marsh Creek, Millbrook-Exchange, Green Hills County Park
Playgrounds: 5-12	Abbotts Creek, Berkshire Downs West, Buffaloe Road Athletic, Forest Ridge, Green Road, Honeycutt, Marsh Creek, Millbrook-Exchange, Spring Forest Road, Green Hills County Park
Playgrounds: Nature-Oriented	Annie Louise Wilkerson, MD Nature Preserve, Green Hills County Park
Track - Non-Competitive/Lined	Spring Forest Road
Track - Competitive/Lined	Buffaloe Road Athletic
Trails - Paved	Abbotts Creek, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Honeycutt, Horseshoe Farm, Millbrook-Exchange, Spring Forest Road
Trails - Natural Surface/Unpaved	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Horseshoe Farm, Millbrook-Exchange, Green Hills County Park
Trails - Loop	Annie Louise Wilkerson, MD Nature Preserve, Buffaloe Road Athletic, Durant Nature Preserve, Forest Ridge, Horseshoe Farm, Spring Forest Road, Green Hills County Park
Walking Path	Green Hills County Park
Inline Skating	Marsh Creek
Mountain Bike Trails	Durant Nature Preserve, Forest Ridge
Skate Park	Marsh Creek, Green Hills County Park
Bleachers	Buffaloe Road Athletic, Green Road, Marsh Creek, Millbrook-Exchange, Spring Forest Road

Running through the Thornton Rd. Property is the Neuse River Greenway Trail, a 33 mile greenway trail connecting Falls Lake Dam to the southeastern border of Wake County. One and a half miles from the Thornton Rd. Property is the Abbott’s Creek Greenway Trail Connector, which branches off of the Neuse River Trail and joins the Simm’s Branch Trail Greenway Trail Connector.

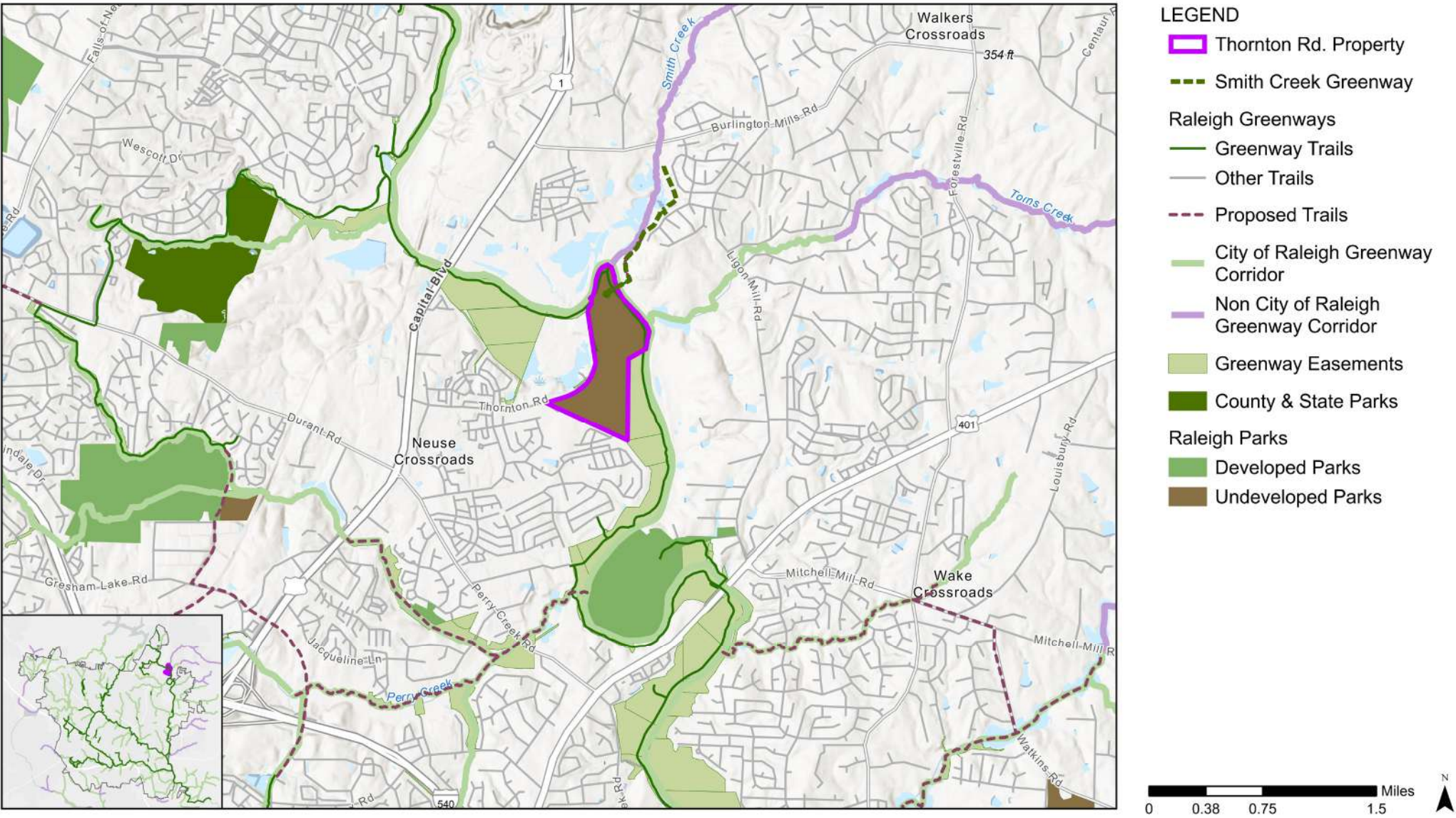
The three greenway easements to the west of the Thornton Rd. Property combined total 93.31 acres. US 1 North borders the Northwest easement and there is a large wooden greenway boardwalk that can be seen from the highway. These three easements contain wetlands, bottomland forest and heritage species. The smallest easement to the south is mostly made up by a large, semi-permanent water body. The wetland habitat located in this area supports a variety of reptiles and amphibians. It is recommended that this area remains undeveloped for conservation purposes.

The three greenway easements to the east lead to Horseshoe Farm Nature Preserve. They remain undeveloped with the exception of the Neuse River Greenway Trail. There are two neighborhood developments to the west of these easements

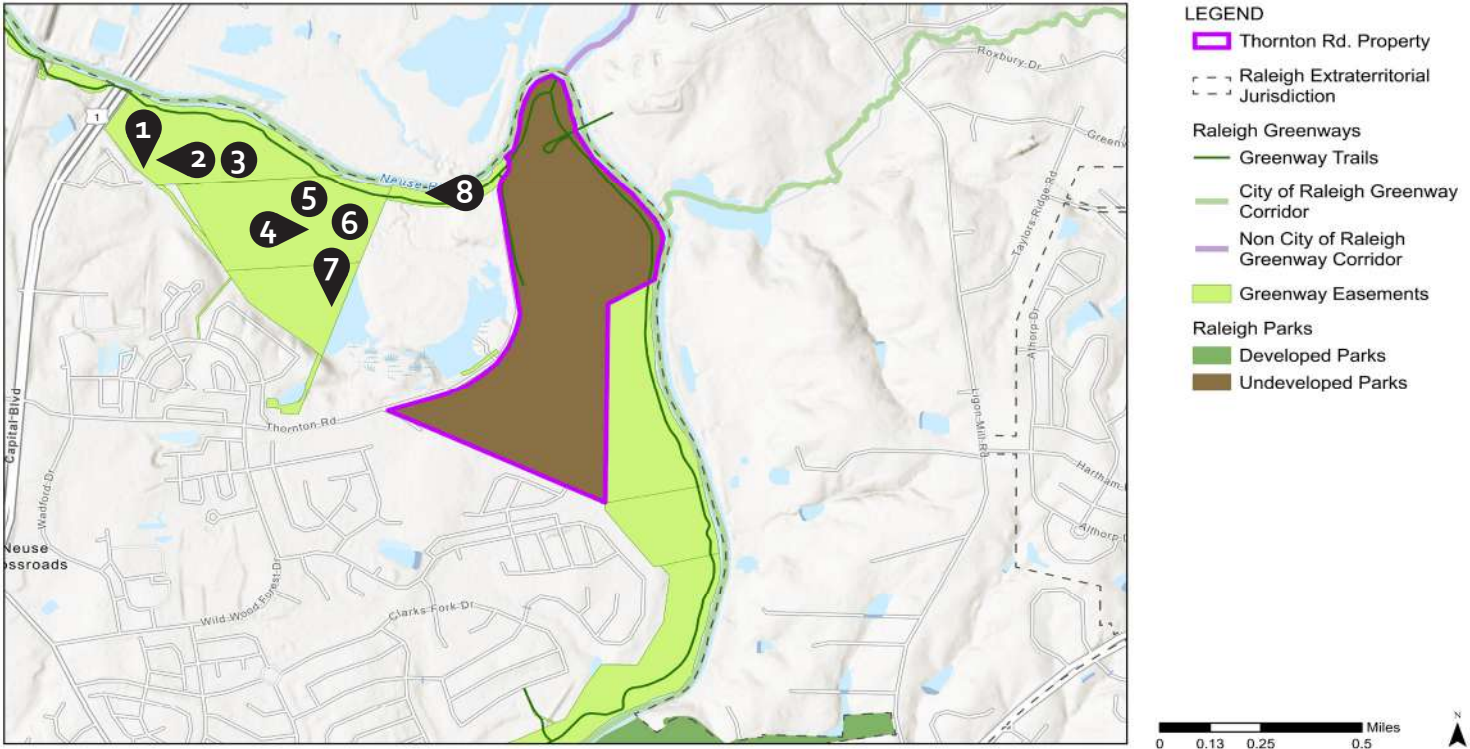
A 558-ft. pedestrian bridge over the Neuse River is located on the Thornton Rd. Property, and connects the Neuse River Greenway Trail with the Town of Wake Forest’s Smith Creek Greenway Trail. As part of the Neuse River Greenway project in 2011-2012, the Town of Wake Forest funded the \$1.4 million pedestrian bridge.

There is a greenway corridor along the Perry Creek, which once easements are fully acquired and the trail is built, would connect Durant Nature Park with Horseshoe Farms Nature Preserve. This trail would also form a loop connecting the Neuse River Greenway Trail north of the Thornton Rd. Property, Abbott’s Creek Greenway Trail Connector, Simm’s Branch Greenway Trail Connector, and back to the Neuse River Greenway Trail south of the Thornton Rd. Property.

Greenway Context Map



Western Greenway Easement Images Key



Western Greenway Easement Images



Bottomland Forest



Ephemeral Pool



Red-bellied Water Snake
(*Nerodia erythrogaster*)



Eastern Box Turtle
(*Terrapene carolina carolina*)



Juvenile Spotted Salamander (*Ambystoma maculatum*)



Swamp Chestnut Oak Tree (*Quercus michauxii*)

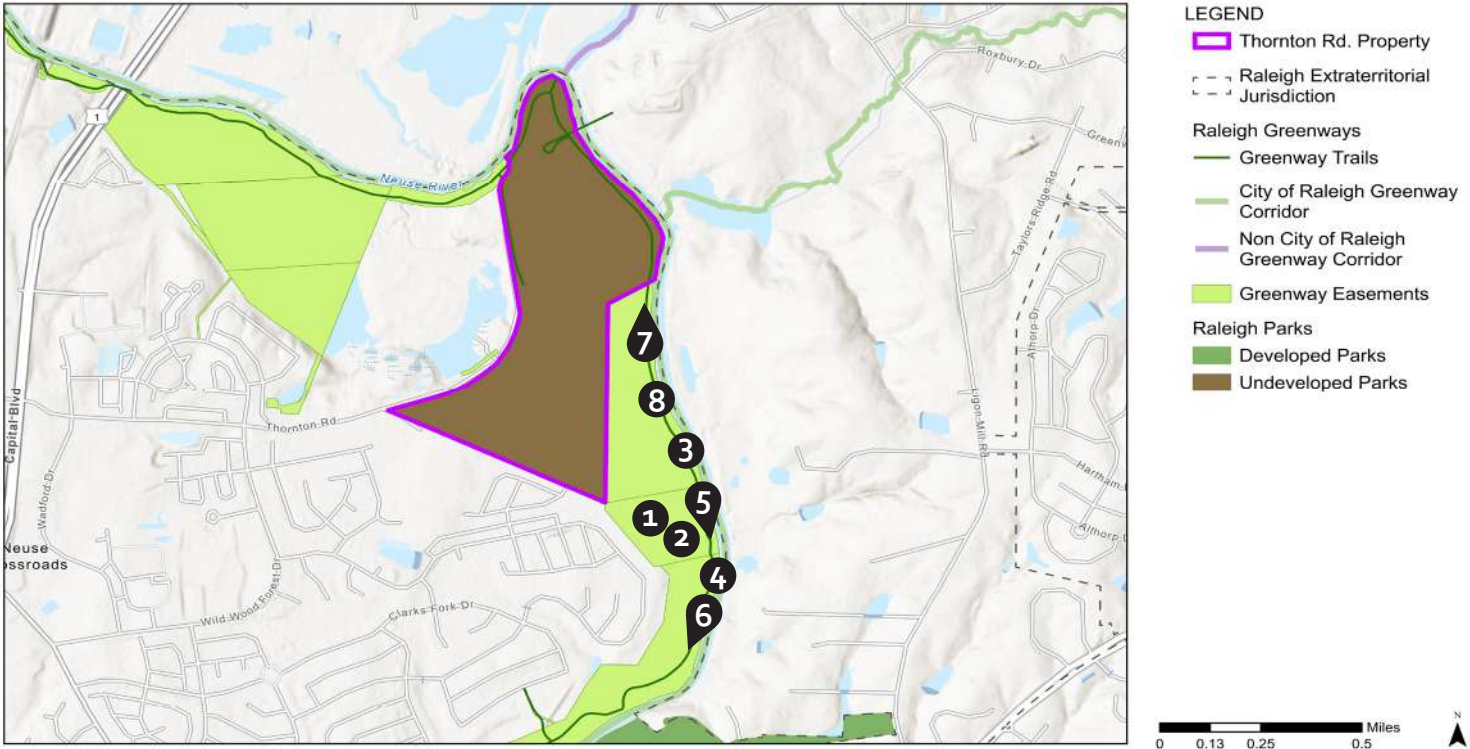


Semi-Permanent Water Body



Neuse River

Eastern Greenway Easement Images Key



Wetland



Wetland

Eastern Greenway Easement Images



Neuse River



Neuse River



Greenway Trail looking south



Greenway Trail looking south

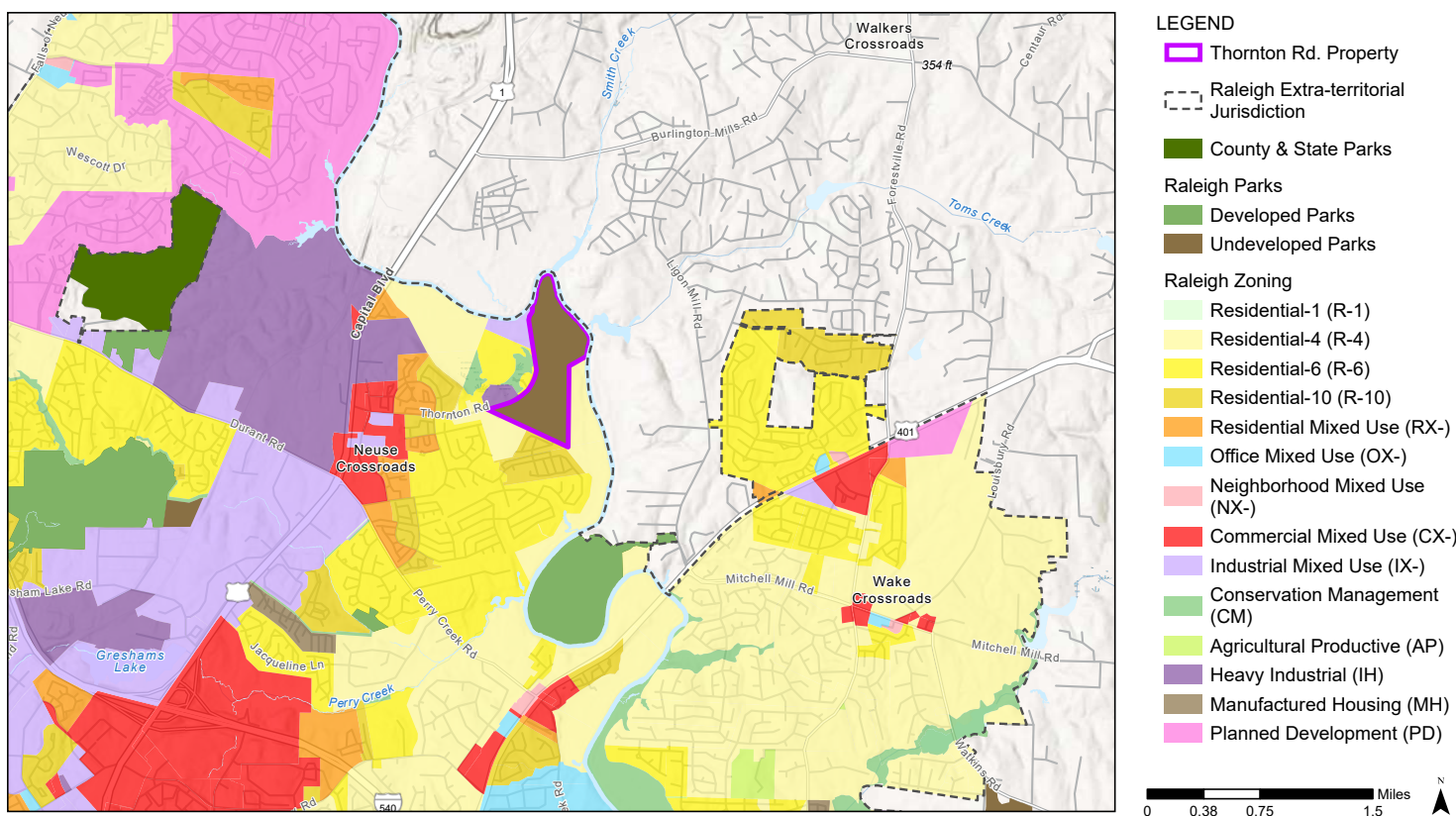


Greenway Trail looking north



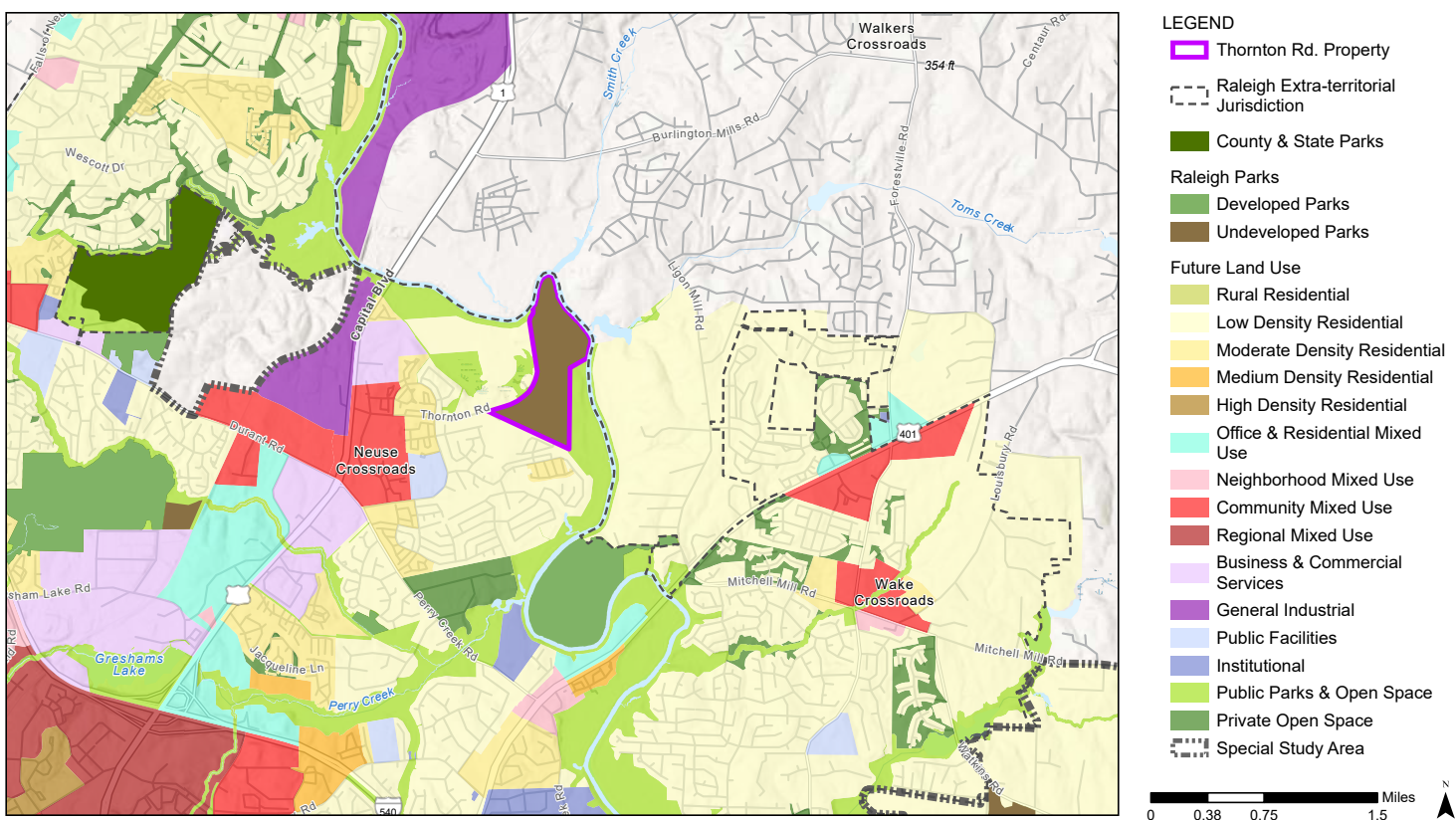
Greenway Trail with Lily

Current Zoning Map



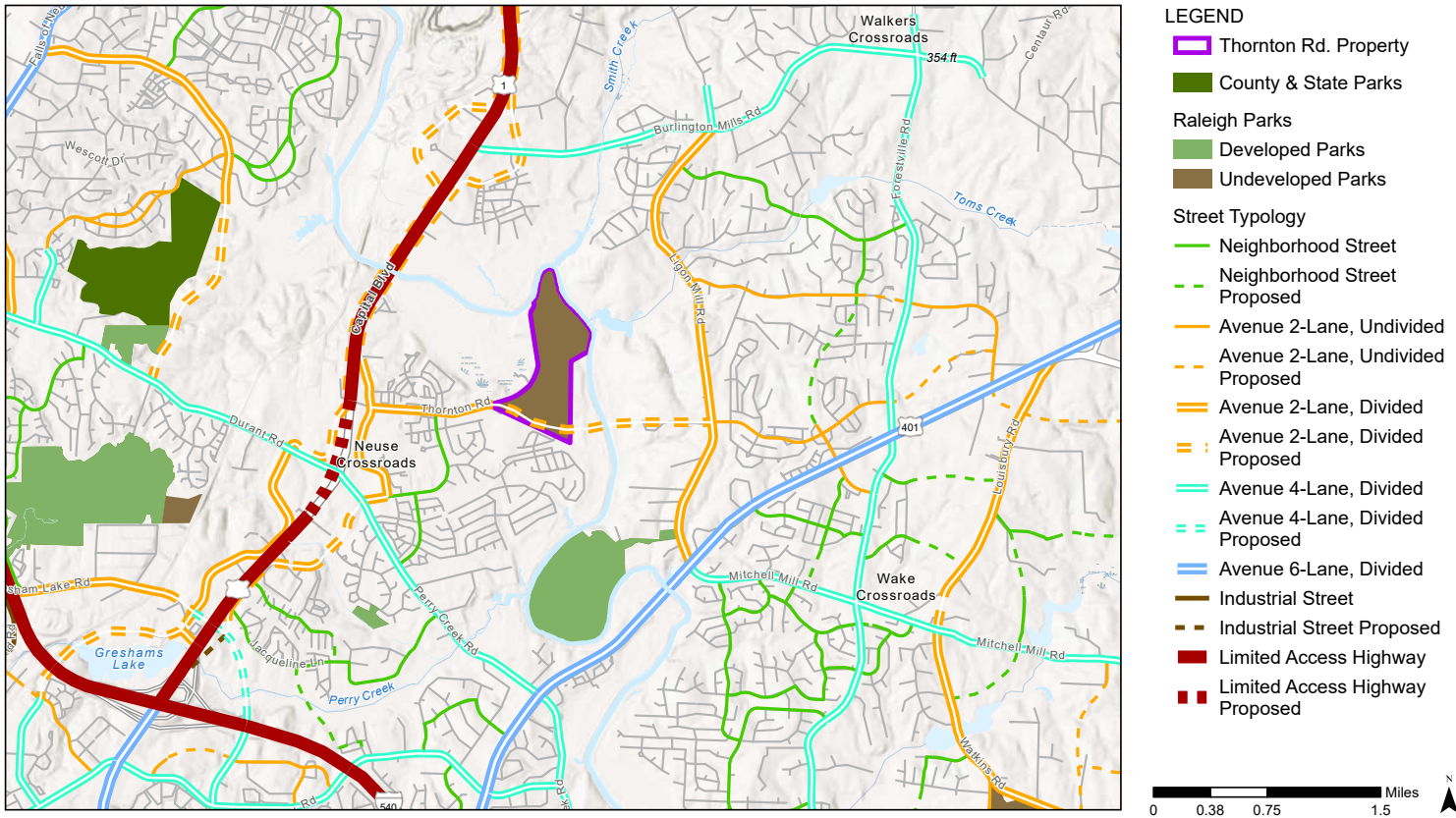
The current zoning surrounding the Thornton Rd. Property is primarily residential with a mixture of densities, but there are a few parcels zoned industrial or conservation management. At the nearby intersection of Perry Creek Rd. and Capital Blvd. the zoning is commercial mixed use. To the west of Capital Blvd. the zoning is primarily industrial mixed use and heavy industrial.

Future Land Use Map



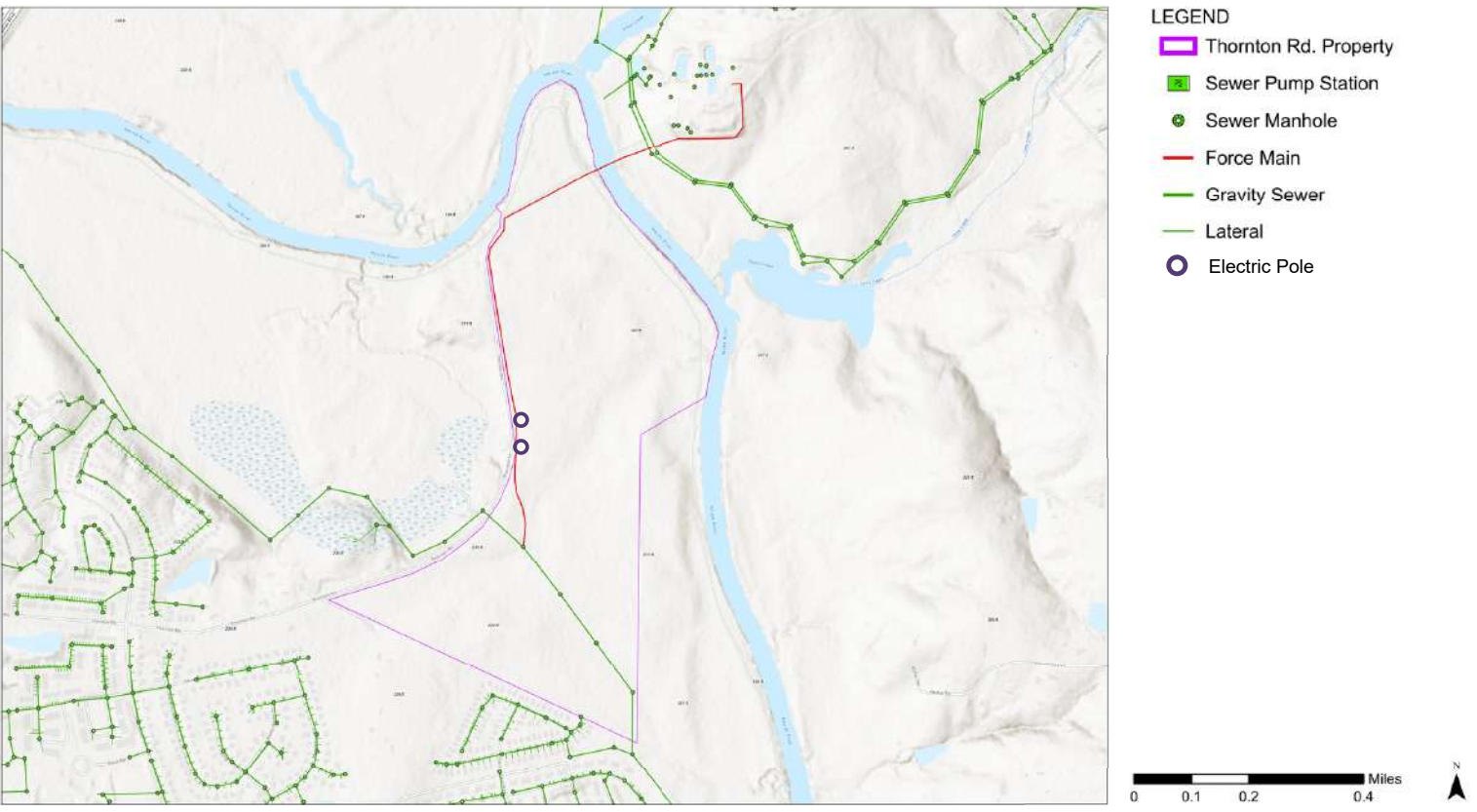
The future land use primarily reflects the current zoning with a few notable changes. The industrial uses adjacent to the Thornton Rd. Property are not included in the future land use. There is also a reduction in industrial uses to the west of Capital Blvd. which are replaced with office & residential mixed use as well as low density residential. The future land use also designates a special study area located between the Thornton Rd. Property and the Abbott's Creek Park. Any development of the Thornton Rd. Property should work in conjunction with the City of Raleigh Planning Dept. to incorporate any plans from the special study area.

Street Typology Map



The street typology map shows that there is a proposed 2-lane divided avenue that will traverse the southern end of the Thornton Rd. Property. This avenue will cross the Neuse River and connect Thornton Rd. with Ligon Mill Rd. The Transportation Dept. has no current plans for developing this avenue, but any development of the Thornton Rd. Property should keep in mind this future use. The City of Raleigh Transportation Dept. will be working closely with the Parks, Recreation and Cultural Resources Dept. when this street project moves into the design phase.

Utilities Map



A force main connects with the sewer line on the southern part of the parcel to the a wastewater treatment plant located across the Neuse River to the northeast. A small clearing in this area provides access for maintenance. It is recommended that any proposed projects involving disturbance in this area consult with the Public Utilities Dept.

There are two electric poles are at the entrance of the property near the parking lot. The remainder of the site does not contain electric lines.



There is a large gravel parking area at the entrance of the property with approximately 60 spaces. Two of the spaces are already paved and striped for handicap access next to the greenway trail connection.

The greenway near the entrance of the park is approximately .25 miles in length and connects the parking lot to the Neuse River Greenway Trail. There is a large open meadow to the right of the greenway connector. The Neuse River Greenway trail borders the northern part of the site for approximately .7 miles.

The landscape at Thornton Rd. Property is mostly forested, has gently sloping topography and is located within the floodplain.

On the northern point of the property, a wooden boardwalk leads to the Neuse River and a small sandy beach area. As the boardwalk approaches the river, there is a seating area with picnic tables and benches which provides park patrons with a place to sit and enjoy the scenery. The beach is primarily used by paddlers to take out their equipment. The distance from Falls Dam Canoe Launch to the Thornton Rd. Property provides an excellent opportunity for a 2-3 hour paddle trip down the Neuse River, making this property an excellent location for a proposed boat launch.

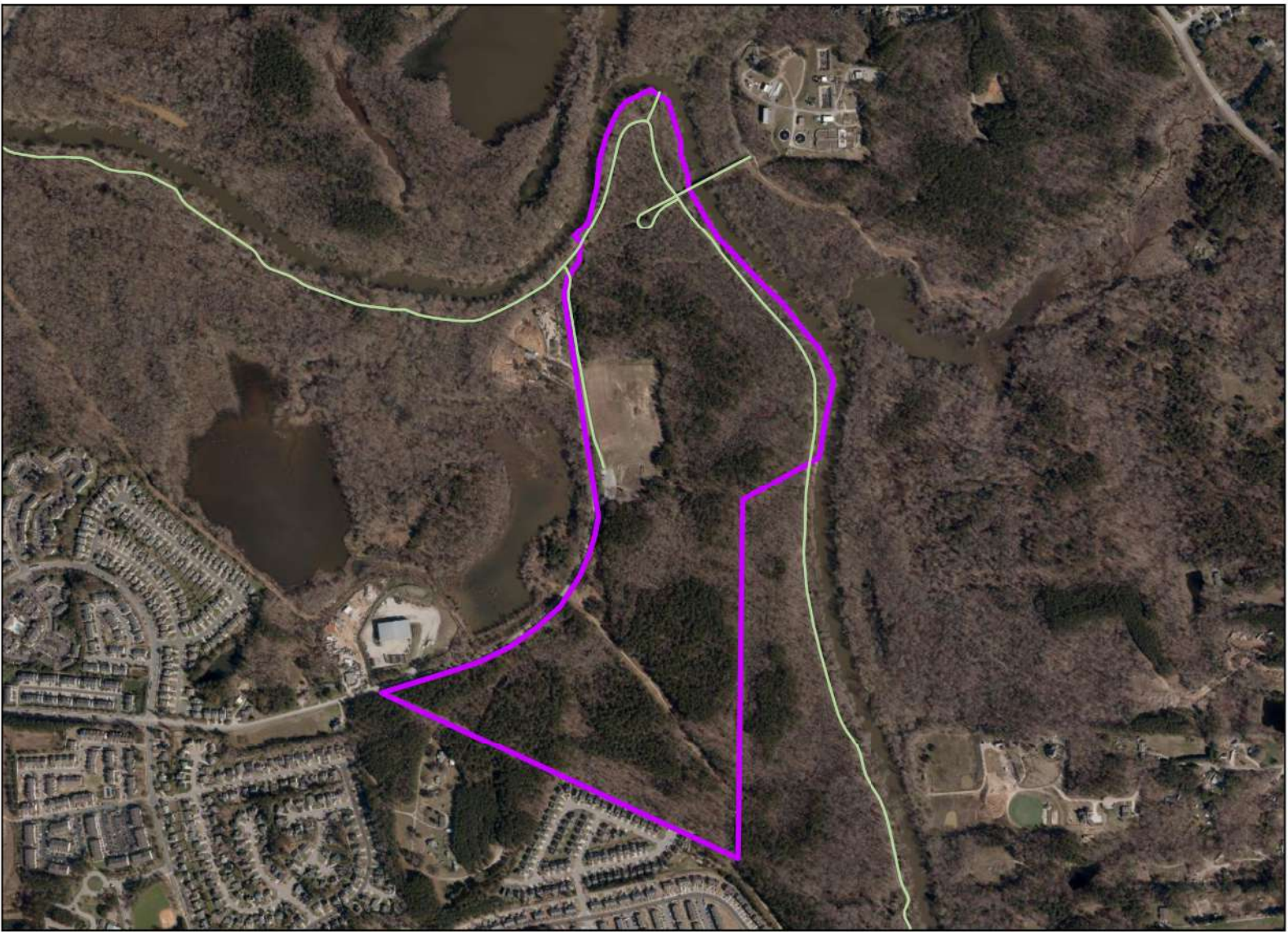
There are opportunities on site such as existing infrastructure that will be useful for future design. Site images on page 15 highlight these aspects:

- Electrical Pole
- Parking Lot
- Handicapped Parking
- Beach Access with bench
- Greenway Connector
- Greenway Trail
- Greenway Bridge

There is also evidence of several site constraints including unsanctioned activities, tree damage, and ROW pooling that should be addressed in the interim management plan. Site images on page 16 demonstrate these activities:

- Illegal dumping
- Evidence of vehicular traffic
- Social Trails
- Evidence of Emerald Ash Borer Damage
- ROW pooling

Existing Conditions



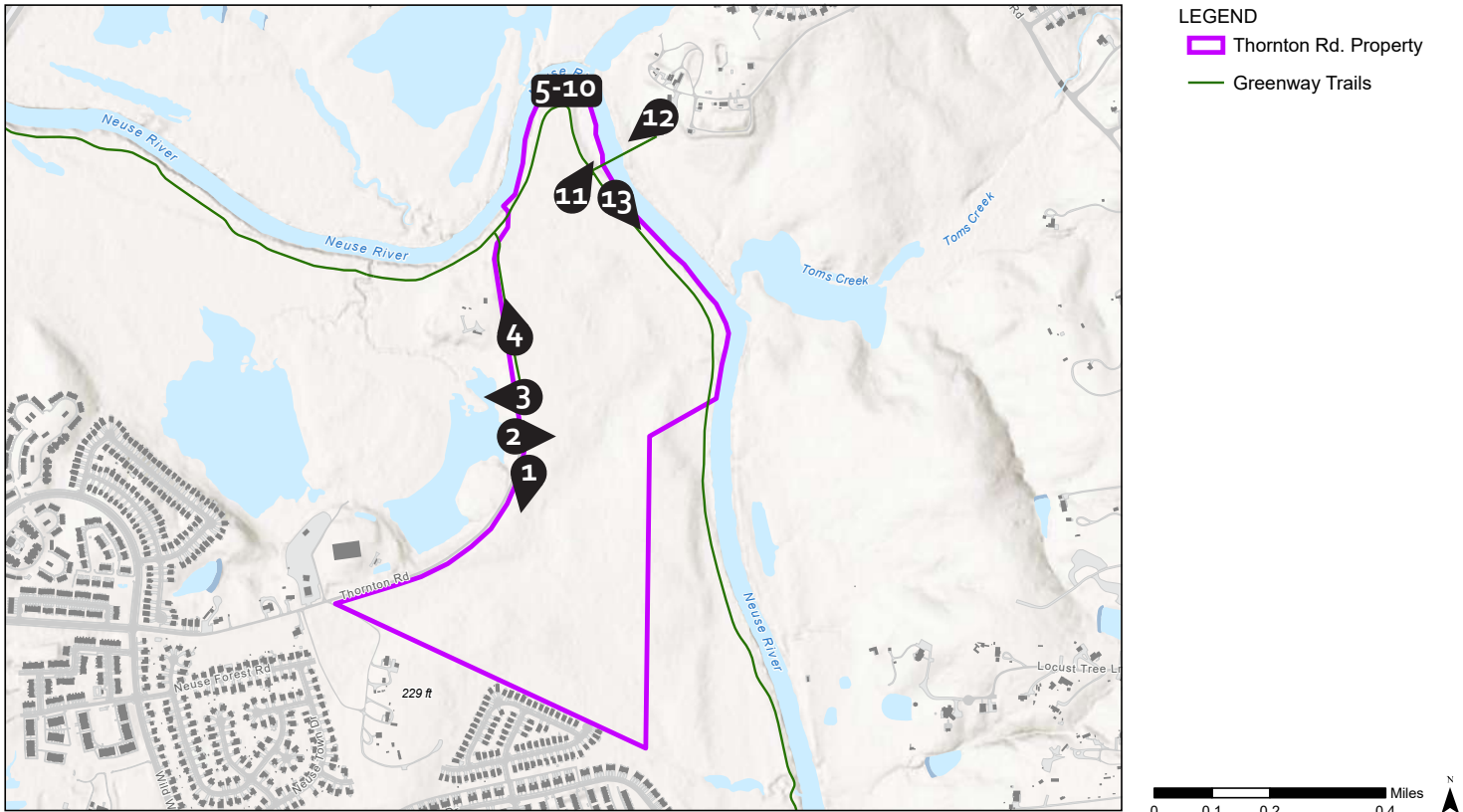
LEGEND

█ Thornton Rd. Property

█ Greenway Trails



Site Opportunities - Images Key



Electrical Pole by Entrance



Parking Lot



Handicapped Parking

Site Opportunities - Images



Beach Access Bridge



Beach Access Bench



Greenway Connector looking North



Beach Access Stairs



Beach Access looking East



Greenway Trail looking Southeast



Beach Access looking West



Kayakers by Beach Access

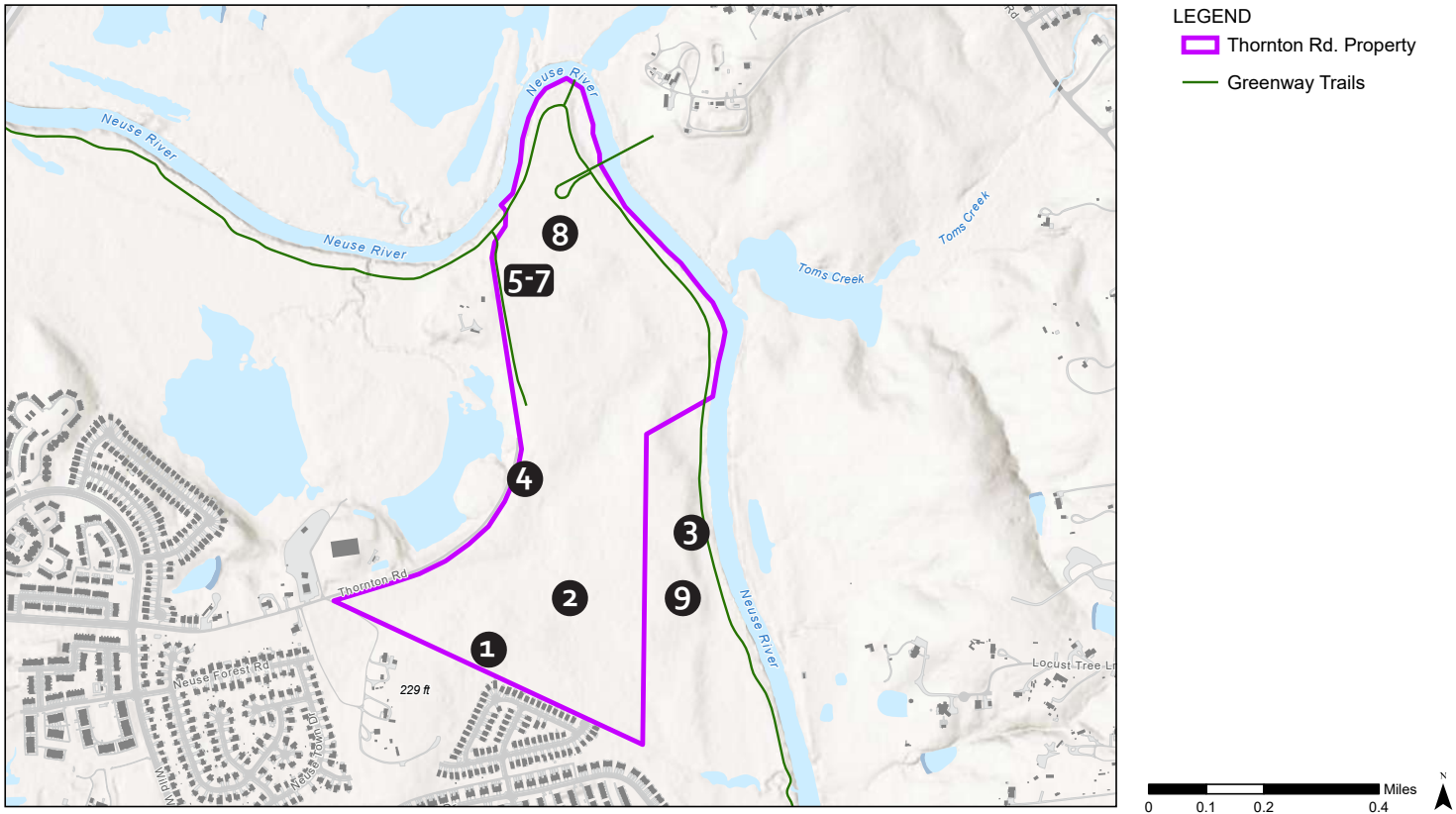


Greenway Bridge looking West



Greenway Bridge looking Northeast

Site Constraints - Images Key



Site Constraints - Images



Unsanctioned dumping on site



Unsanctioned dumping on site



Unsanctioned dumping on site



Unsanctioned dumping on site



Social Trail



Pools along Right of Way



Emerald Ash Borer damage



Evidence of vehicular traffic



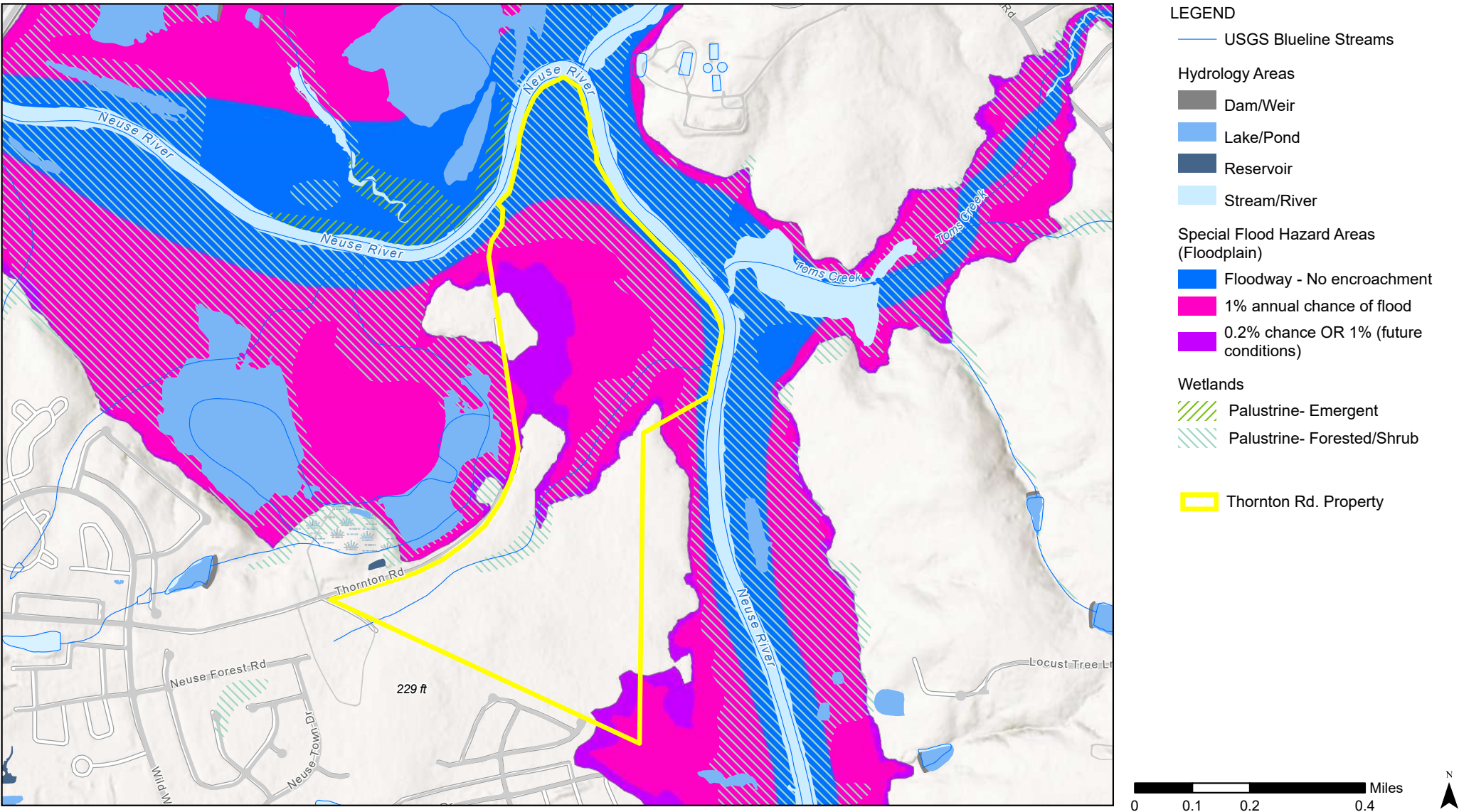
Evidence of vehicular traffic

This Property exhibits hydrological characteristics that are typical of Piedmont sites adjacent to major rivers. Upland portions of the site are well-drained with little flooding, while the bottomland portions of the site are poorly drained and intermittently flooded. There is a single USGS classified blue-line stream that flows through the central portion of the Property, from the southwest to the northeast. This stream is subject to dynamic discharge and flow levels, driven primarily by precipitation events. The origin of this stream is located on private land that adjoins the southwest corner of the Property. Stream mapping indicates that the origin is the delineation point between ephemeral and intermittent stream classifications. The primary stream channel flows beneath a gravel roadbed that divides private property and City of Raleigh property. Water passes through a culvert that appears to have collapsed on the downstream side (City property). The stream then becomes significantly channelized for much of the remaining upland stretch, likely the result of past agricultural land use. As the stream descends into lower elevation areas within the 100-year floodplain, it becomes much less channelized and exhibits slower and broader surface flow. This stream then channelizes again briefly before passing beneath the Greenway via a large culvert and then emptying into the Neuse River on the eastern edge of the Property.



Floodplain Wetland

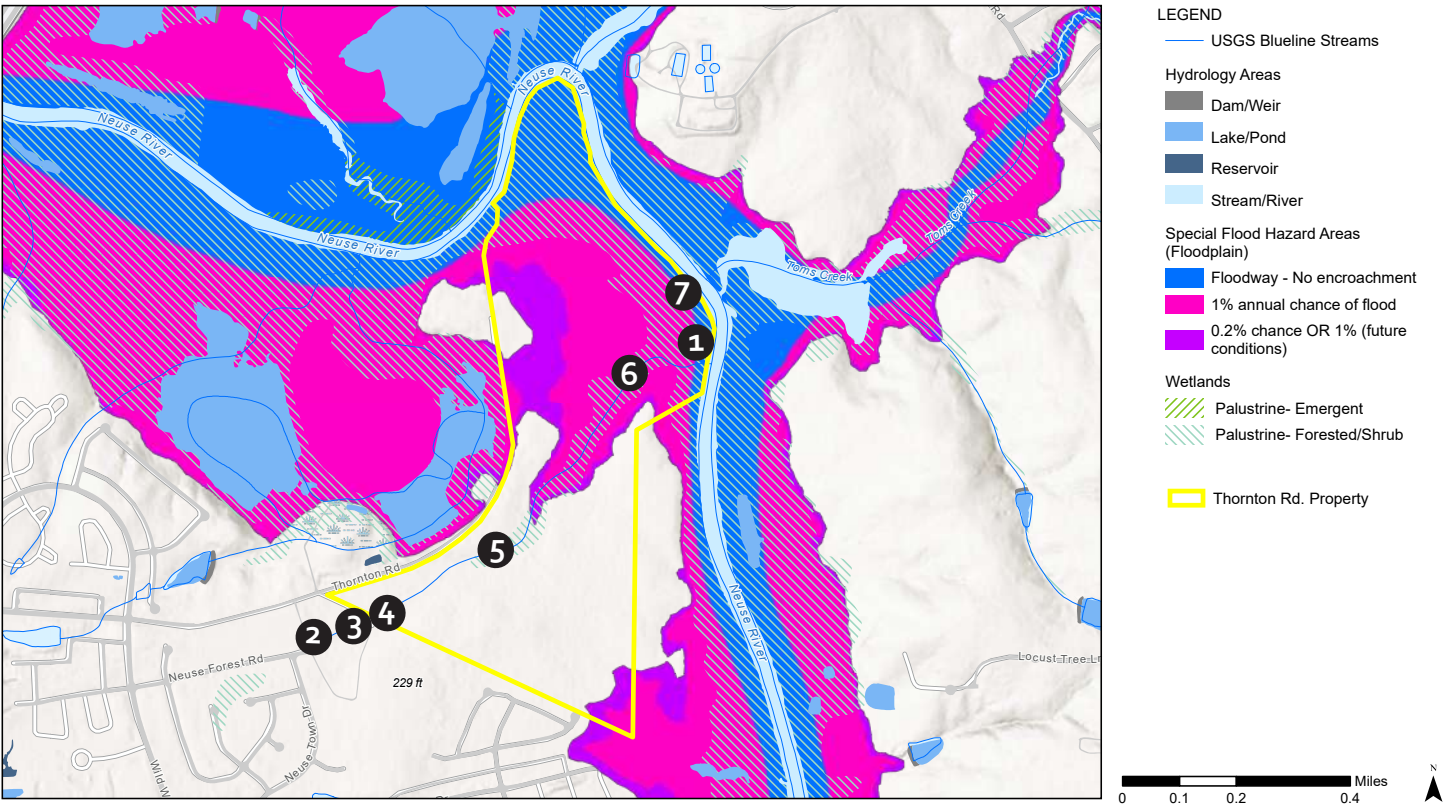
Hydrology Map



A second culvert, located approximately 150 feet north of the blue-line stream discharge point, passes beneath the Greenway and collects stormwater surface run-off from the northern section of the Property. There are no USGS classified blue-line streams in this section of the Property, but some evidence of channelization and concentrated flow can be observed. This is primarily the result of stormwater run-off that has created erosional channels along topographical gradients. The majority of this drainage system lies within the 100-year floodplain and exhibits slow, sprawling surface flow with frequent pooling.

The 100-year floodplain encompasses a large portion of the Property, primarily in the northern and eastern sections. Much of the land within the floodplain is classified by the National Wetlands Inventory as Freshwater Forested/Shrub wetland, characterized by tall vegetation, poor drainage, hydric and partially hydric soils, and occasional-to-frequent flooding from the Neuse River that adjoins the property on the northern and eastern boundaries. These wetlands are extremely valuable, providing beneficial environmental services such as flood control and water filtration, as well as critical habitat for a wide variety of significant/rare plant and animal species. The ecological and physical site characteristics of these wetlands make them unsuitable for most types of development, and efforts should be made to protect these sensitive areas to the greatest extent possible.

Hydrology Images Key



Hydrology Images



Stream Origin



Culvert on Private Property



Culvert on City Property (collapsed)



Stream Channelization



Stream losing channelization



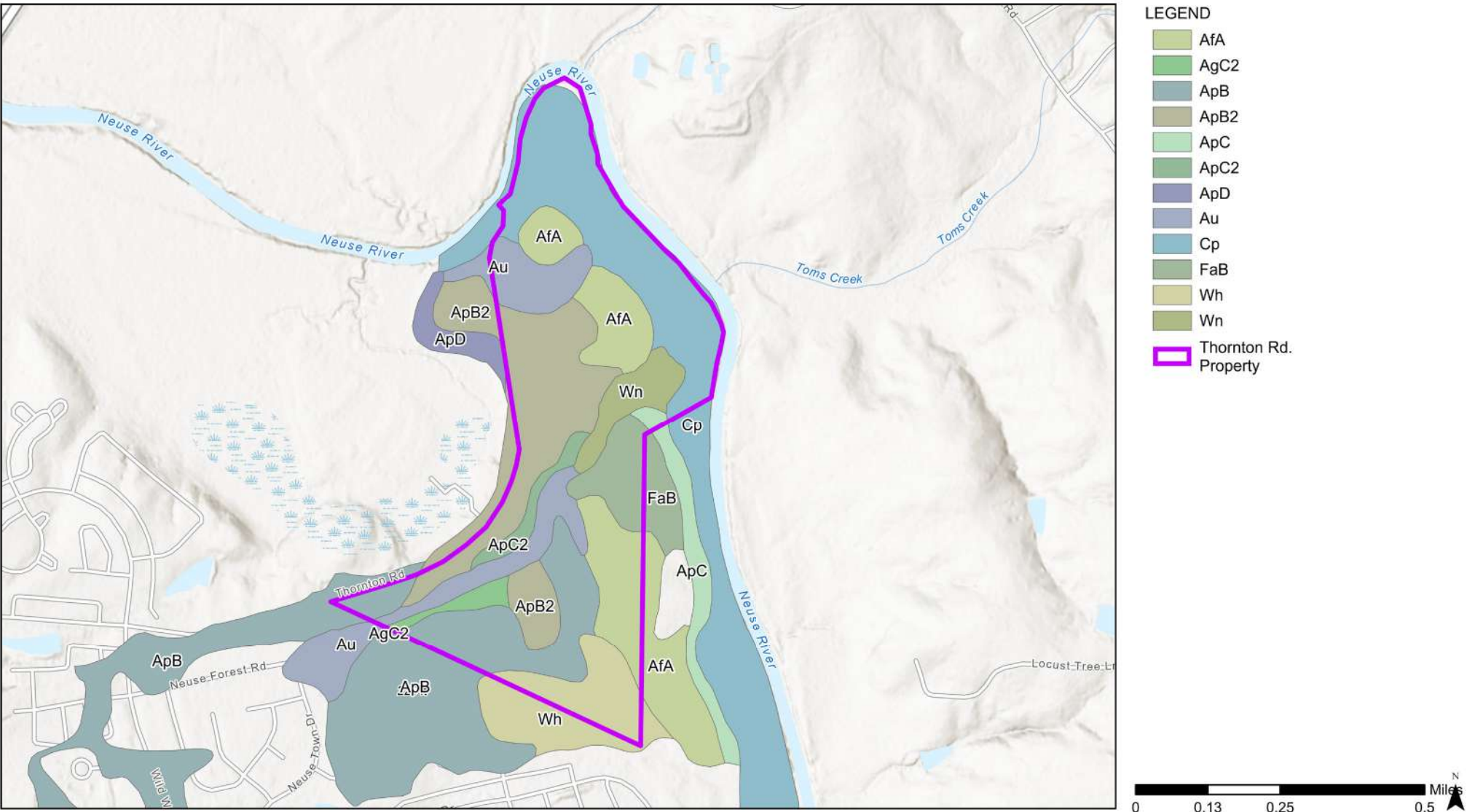
Culvert underneath Greenway

The soils found on the higher-elevation upland areas of the Property consist primarily of sandy loam textured soils that are well-drained, providing the most suitable sites for future development. Many of these soils have been eroded through previous land use activities and lack of vegetation, and these soils remain the most prone to problematic erosion. As the topography descends into the lower lying areas within the 100-year floodplain, soil types characterized by loamy and silt textures with poorer drainage become more dominant. Most of the soil types in these sites can be considered predominantly-nonhydric, with less than 33% of the mapped soil unit classified as hydric. The poorly drained Wehadkee soils are considered partially-hydric, with 33% to 66% of the mapped soil unit classified as hydric. The most poorly drained soils, found in the lowest elevations on the Property, are subject to intermittent flooding from the Neuse River.

Table of Soils Found Within or Adjacent to Thornton Rd. Property Boundaries			
Soil Abbreviation*	Soil Type Name	Drainage Class	Hydric Rating
Af	Altavista fine sandy loam	Moderately well drained	Predominantly non-hydric
Ag	Appling gravelly sandy loam	Well drained	Non-hydric
Ap	Appling sandy loam	Well drained	Non-hydric
Au	Augusta fine sandy loam	Somewhat poorly drained	Predominantly non-hydric
Cp	Congaree silt loam	Moderately well drained	Predominantly non-hydric
Fa	Faceville sandy loam	Well drained	Non-hydric
Wh	Wehadkee silt loam	Poorly drained	Partially hydric

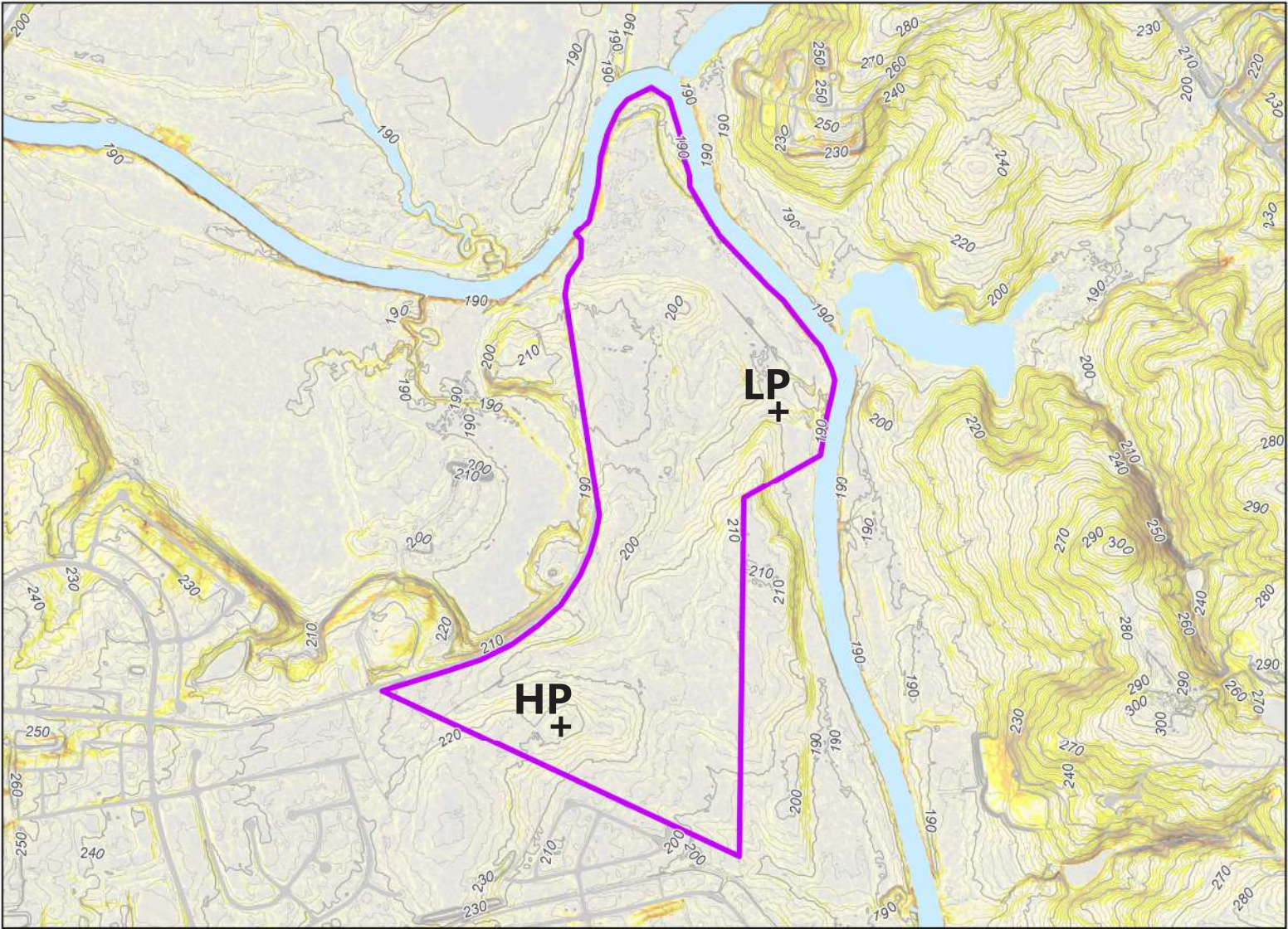
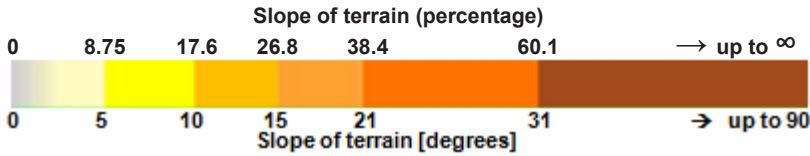
*Percent-slope indicated by A, B, and C ratings in increasing order. Soils that have been heavily eroded are denoted with "2" after the soil type abbreviation.

Soils Map



The terrain gently slopes to the northeast part of the Thornton Rd. Property toward the Neuse River. The high point (HP) is noted on southwest area of the property and the low point (LP) is found in the northeast area. Steeper slopes (17.6-38.4%%) are found near the river bank where there is erosion due to the rapid change in water volume of the Neuse River, but the majority of site is classified as nearly level to gently sloping (0-8.75%).

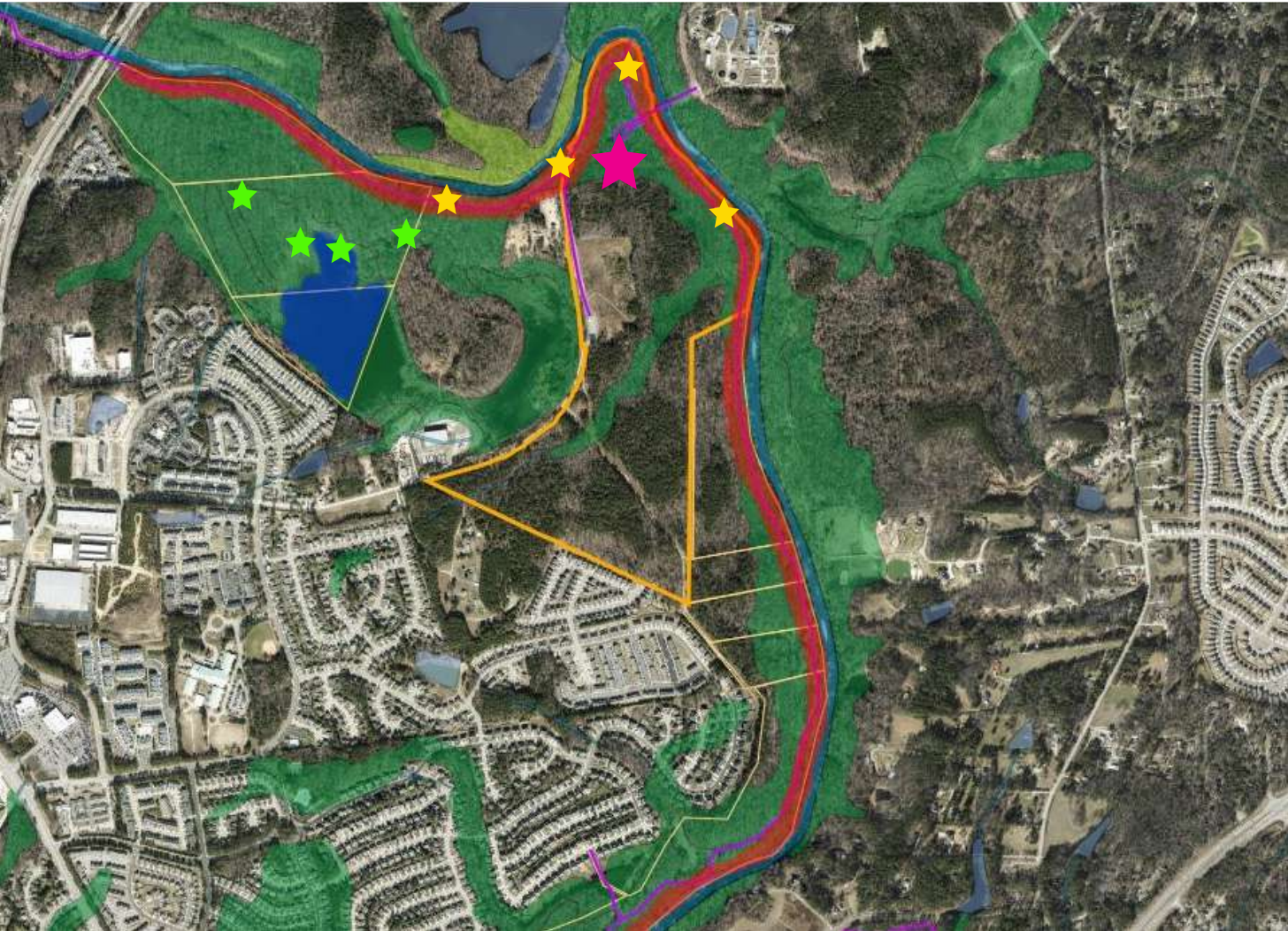
Slope & Topography Map



- LEGEND
- Thornton Rd. Property
 - Raleigh 2 Foot Contours
 - Intermediate
 - Index
 - Terrain: Slope Map
 - Flat
 - Nearly level
 - Gently level
 - Gently sloping
 - Strongly sloping
 - Gently steep
 - Moderately Steep
 - Steep
 - Very steep



Habitat Map



There are four habitats found on the Thornton Rd. Property including Piedmont Levee Forest, Piedmont Bottomland Forest, Mesic or Dry-Mesic Forests, and Floodplain Pool Community. The map above shows where these habitats can be found.

Piedmont Levee Forest

The red shaded area indicates the area of Piedmont Levee Forest, a habitat restricted to the river frontage, and an area classified as a significant “Natural Heritage Area” by the NC Natural History Program. In addition to the defining species of this community (*Acer negundo*, *Platanus occidentalis*, *Betula nigra*, *Celtus smallii*, *Chasmanthium latifolium*), the example at Thornton supports some very large examples of several regionally uncommon trees, such as White Basswood (*Tilia americana* var. *heterophylla*) and Sweetleaf (*Symplocos tinctoria*), as well as patches of Giant Cane (*Arundinaria gigantea*), Pawpaw (*Asimina triloba*) and diverse wildflowers, such as White Heart-leaved Aster (*Eurybia divaricata*). Areas with particularly rich botanical diversity within the Levee Forest zone are marked on the map with orange stars.

Many bird species were detected in the Levee Forest zone, including Acadian Flycatchers, Prothonotary Warblers and Yellow-throated Warblers - all species classified as “Species of Greatest Conservation Need” in the current NC Wildlife Action Plan (produced by the NC Wildlife Resources Commission).



Acadian Flycatcher
(*Empidonax virescens*)



Sweetleaf
(*Symplocos tinctoria*)



Prothonotary Warbler
(*Protonotaria citrea*)



River Oats
(*Chasmanthium latifolium*)



River Birch
(*Betula nigra*)



White Heart-leaved Aster
(*Eurybia divaricata*)



Pawpaw
(*Asimina tirloba*)

Piedmont Bottomland Forest

Moving away from the river, much of the area behind the Levee Forest is Piedmont Bottomland Forest of various subtypes, shaded in dark green on the map. This area is characterized by seasonal flooding and acts as a breeding habitat for many amphibian species including Spotted Salamanders, Narrow-mouth Frogs and other species. Some of this area has experienced disturbance and currently displays limited botanical diversity but particularly in the western area (noted with small light green stars). There are some large examples of floodplain tree species uncommon in our region such as Cherrybark Oak (*Quercus pagoda*), Overcup Oak (*Quercus lyrata*), Swamp Chestnut Oak (*Quercus michauxii*) and Parsley Hawthorn (*Crataegus marshallii*). In a small area within this zone, the NC State Endangered wildflower Bottomland Skullcap (*Scutellaria nervosa*) was recently found (noted with pink star). This species appears to prefer the upper margins of the floodplain zone, where it avoids long periods of deep submersion.



Bottomland Skullcap
(*Scutellaria nervosa*)



Narrow-mouthed Toad
(*Gastrophryne carolinensis*)



Spotted Salamander
(*Ambystoma maculatum*)



Parsley Hawthorn
(*Crataegus marshallii*)



Swamp Chestnut Oak
(*Quercus michauxii*)

Mesic or Dry-Mesic Forests

Moving farther away from the river, the upland areas above the floodplain forest, which do not experience regular seasonal flooding, would be classified as Mesic or Dry-Mesic Forests. These areas are not shaded on the map. The natural canopy of such forests would be mixed with abundant oaks and hickories, but due to past logging activity, much of this zone is currently forested with loblolly pine and many invasive species. Garbage dumping is also evident throughout this zone. Despite the disturbance, this upland forest area was observed to be providing habitat for some “Species of Greatest Conservation Need”, such as Eastern Box Turtles and Brown-headed Nuthatches.



Brown-headed Nuthatch
(*Sitta pusilla*)



Loblolly Pine
(*Pinus taeda*)

Floodplain Pool Community

A unique area found in the western parcels, is a large, semi-permanent water body supporting a Floodplain Pool community (shaded in blue on the map). Such habitats are valuable to many plant and animal species and often support species normally found in the Coastal Plain, but not expected in the Piedmont. The Great Egrets and Marsh Pennywort observed around this pool are examples. Further investigation of this habitat is recommended.



Swamp - Water Pennywort
(*Hydrocotyle vulgaris*)

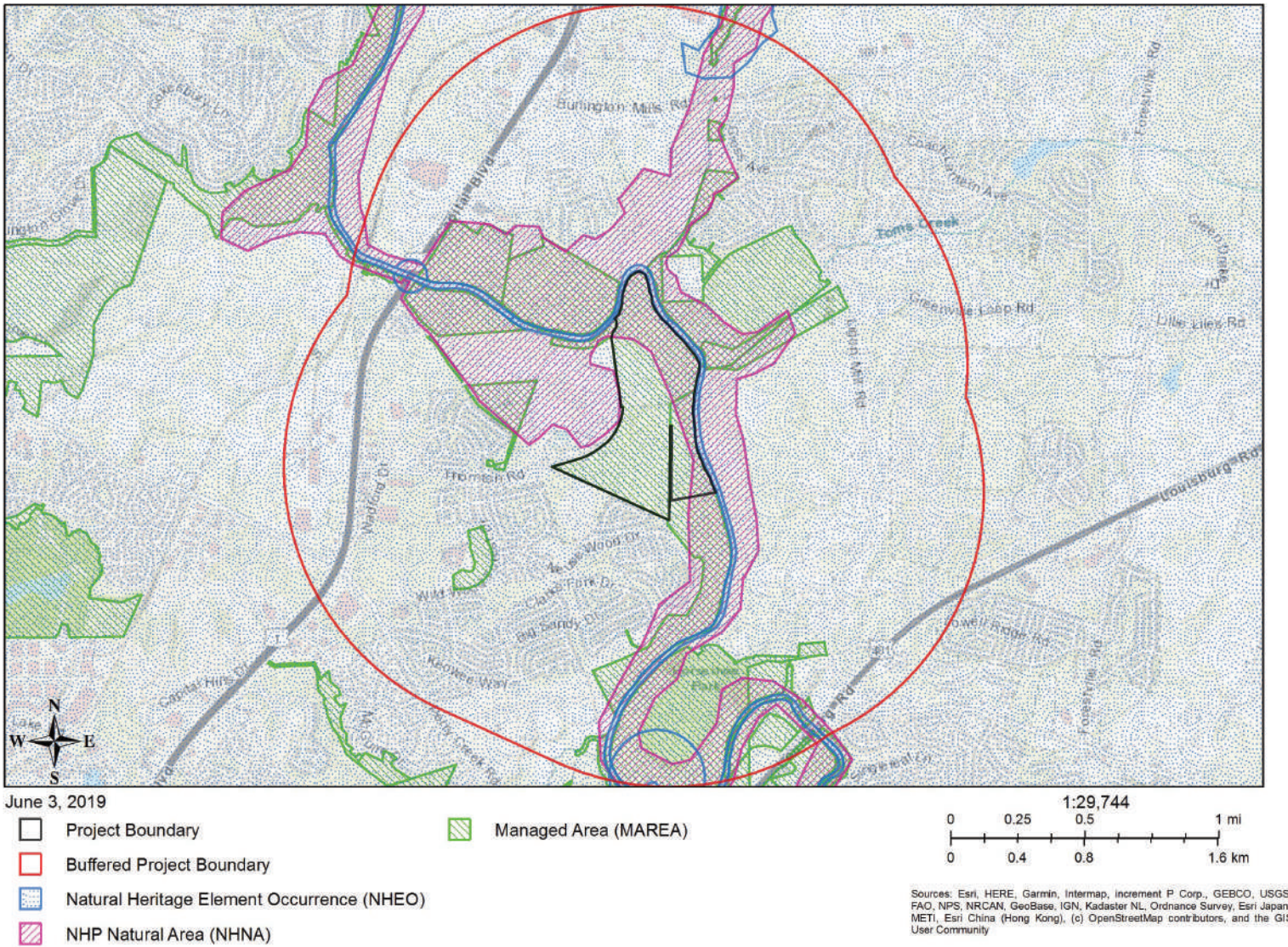


Great Egret (*Ardea alba*)

NC Natural Heritage Program

The North Carolina Natural Heritage Program (NHP) offers conservation planning tools and resources to local governments and agencies at no cost. The data collected is used to evaluate the ecological significance of species and conditions in order to determine if a site should be conserved or developed. The NHP collects information on occurrences of rare plants, animals, natural communities, and animal assemblages. Collectively, these are referred to as “elements of natural diversity” or simply as “elements.” Locations of these elements are referred to as “element occurrences.” Element occurrences documented within the project area include the Neuse River Waterdog, Triangle Floater, Roanoke Slabshell and Eastern Lampmussel.

Element occurrences within the project area and a one-mile radius are outlined in the Natural Heritage Program data query report on the following page.



Neuse River Waterdog (*Necturus lewisi*)



Roanoke Slabshell (*Elliptio roanokensis*) Exterior



Roanoke (*Elliptio roanokensis*) Slabshell Interior



Triangle Floater (*Alasmidonta undulata*)



Eastern Lampmussel (*Lampsilis radiata*)

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
City of Raleigh Thornton Road NHP data query
June 3, 2019
NCNHDE-9164

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	446	Necturus lewisi	Neuse River Waterdog	1980-07-11	H	3-Medium	---	Special Concern	G2	S2
Freshwater Bivalve	29256	Alasmidonta undulata	Triangle Floater	2017-10-30	E	3-Medium	---	Threatened	G4	S3
Freshwater Bivalve	36501	Elliptio roanokensis	Roanoke Slabshell	2016-07-27	E	3-Medium	---	Special Concern	G3	S3
Freshwater Bivalve	33429	Lampsilis radiata	Eastern Lampmussel	2017-09-26	E	3-Medium	---	Threatened	G5	S3

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Upper Neuse River Floodplain	R2 (Very High)	C4 (Moderate)

Managed Areas Documented Within Project Area

Managed Area Name	Owner	Owner Type
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
Wake County Open Space	Wake County: multiple local government	Local Government
City of Raleigh Open Space	City of Raleigh	Local Government
Town of Wake Forest Open Space	Town of Wake Forest	Local Government

* NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at <https://ncnhde.natureserve.org/content/help>. Data query generated on June 3, 2019; source: NCNHP, Q2 Apr 2019. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
City of Raleigh Thornton Road NHP data query
June 3, 2019
NCNHDE-9164

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	4373	Hemidactylum scutatum	Four-toed Salamander	1996?	E	3-Medium	---	Special Concern	G5	S3
Amphibian	446	Necturus lewisi	Neuse River Waterdog	1980-07-11	H	3-Medium	---	Special Concern	G2	S2
Dragonfly or Damselfly	32043	Coryphaeschna ingens	Regal Darner	2004-Pre	H?	5-Very Low	---	Significantly Rare	G5	S2?
Dragonfly or Damselfly	26060	Gomphurus septima	Septima's Clubtail	2012-05-03	BC	3-Medium	---	Significantly Rare	G2	S3
Freshwater Bivalve	29256	Alasmidonta undulata	Triangle Floater	2017-10-30	E	3-Medium	---	Threatened	G4	S3
Freshwater Bivalve	36501	Elliptio roanokensis	Roanoke Slabshell	2016-07-27	E	3-Medium	---	Special Concern	G3	S3
Freshwater Bivalve	33429	Lampsilis radiata	Eastern Lampmussel	2017-09-26	E	3-Medium	---	Threatened	G5	S3
Natural Community	1273	Floodplain Pool	---	1991-10-19	E	2-High	---	---	G3	S2
Natural Community	17443	Piedmont Levee Forest---	(Typic Subtype)	1991-10-19	B	3-Medium	---	---	G3G4	S3S4

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Upper Neuse River Floodplain	R2 (Very High)	C4 (Moderate)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Wake County Open Space	Wake County: multiple local government	Local Government
Wake County Open Space	Wake County	Local Government
City of Raleigh Open Space	City of Raleigh	Local Government
Town of Wake Forest Open Space	Town of Wake Forest	Local Government

The most prevalent historic land use activities on this Property were centered around agriculture, as illustrated by the series of archived aerial photographs. Most of the upland portions on the Property were used as farmland for decades prior to the acquisition by the City of Raleigh, and evidence of past agricultural practices is still visible today. The 8.5-acre open field that is centrally located on the Property represents the best example of the former agricultural footprint. Based on historical photographs, much of this field appears to have been maintained as farmland for nearly a century, possibly longer. Planting row furrows are still visible in this field, and the soils have undoubtedly been depleted of nutrients after decades of cultivation. A clay hardpan likely exists beneath the soil surface in this area and other former farmland sites on the Property, a common result of prolonged row cropping practices. This hardpan layer, as well as the depleted soil nutrients may need to be addressed before tree planting or landscape establishment can be successful.

Additional upland areas once utilized as farmland can be found in other locations on the Property. These areas are now forested, dominated by even-aged pine trees growing in crowded conditions. Mid-successional pine stands such as these can frequently be found where agricultural fields were taken out of production and allowed to revegetate naturally, a common occurrence in the Piedmont region. Previously disturbed sites such as these may be suitable for development given their upland locations and relative lack of valuable ecological features. Examples of these features include the availability of wildlife resources (habitat, forage, etc.) and the presence of diverse native vegetation, elements that have not yet reestablished on these sites.

The obvious ditching and channelization of the blue-line stream represents another lasting impact from previous agricultural land use, as farmers frequently employed these techniques to direct the flow of water and maximize growing conditions for their crops. Most of the low-lying areas that are occasionally-to-frequently flooded were not suitable for agricultural production. However, the historic aerial photo from 1988 shows evidence of logging activity in the eastern and southern sections of the Property. It appears that significant portions of mature bottomland forests were harvested during that time, although it is difficult to determine precisely how much of the Property was impacted.

Further evidence of human influence can be found throughout the Property, most notably by the presence of scattered trash piles. These areas were used by previous landowners and local citizens as dumping sites for a wide variety of refuse, including household garbage, appliances, furniture, tires, and even automobiles. Some of these dump sites may need to be addressed if visitor facilities are to be developed in close proximity.

Several structures once existed on the Thornton Rd. Property and remnants of these buildings can be found onsite. These buildings were likely associated with the past agricultural practices associated with the Property, but it is difficult to be certain. Some of these buildings and/or their remnants were demolished and removed after PRCR assumed ownership of the Property, while others may have been removed or degraded during the time prior to acquisition by PRCR.

Another significant relic of past land use is the series of earthen roads that traverse the interior of the Property. While many of these old road beds have been overgrown and are no longer passable, there are still several passable roads that are subject to unauthorized vehicular traffic. The unauthorized use of these roads by ATVs and other vehicles will need to be addressed to prevent the degradation of any potentially sensitive areas. The majority of these roads have not yet been mapped, and there may be a possibility to convert some of these roads to hiking/biking trails in the future.

Previous Land Use Maps



1950



1981



1988



1999



2010



2019

State Historic Preservation Office



North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office

Governor Roy Cooper
Secretary Susi H. Hamilton

Ramona M. Bartos, Administrator

Office of Archives and History
Deputy Secretary Kevin Cherry

September 25, 2020

Emma Liles
Park Planner
City of Raleigh
222 West Hargett Street
Raleigh, NC 27601

Emma.Liles@raleighnc.gov

Re: Thornton Road Property, Raleigh, Wake County, ER 20-1772

Dear Ms. Liles:

Thank you for your submission concerning the above-referenced project. We have reviewed the materials provided and offer the following comments.


Three Native American archaeological sites (31WA541, 31WA572, and 31WA573) were identified in the subject property as part of a municipal sewer line project. As most of the property has not been surveyed for purposes of identifying archaeological sites, and given its location on the Neuse River, it is likely that additional sites are present. For any ground disturbing activities planned in the project area in the future, please submit a description of the project to this office for review and comment. We may recommend that an archaeological survey be conducted by an experienced archaeologist prior to construction.

We have determined that the project as proposed will not have an effect on any historic structures.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.





Sincerely,


for Ramona Bartos,
Deputy State Historic Preservation Officer

Park Access, Social Equity, & Demographic Analysis

Park Access Analysis

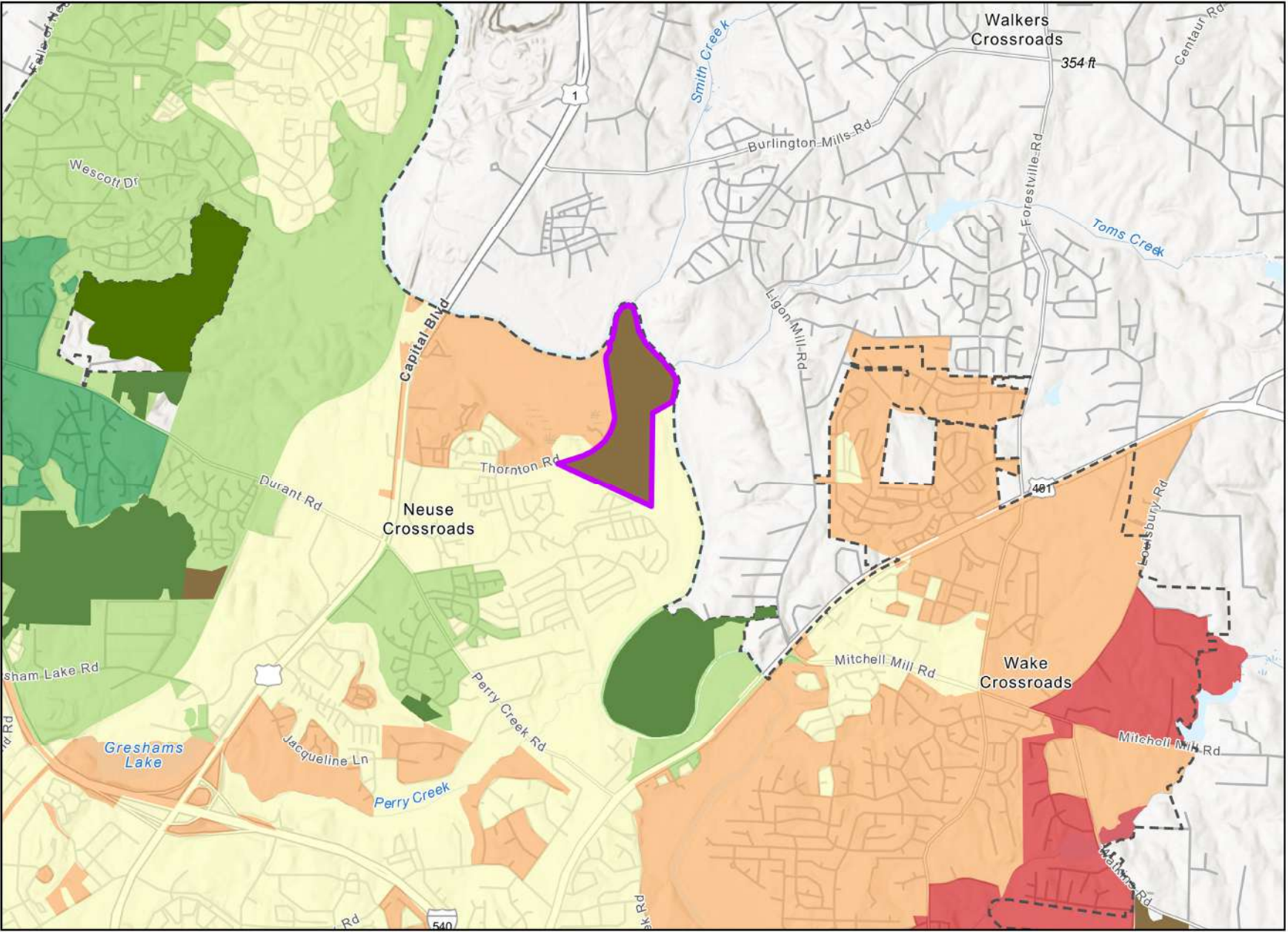
Park Access is a measure of how well different areas of the city are currently served by Raleigh’s system of parks and greenway trails. Each census block in the city is assigned a Park Access grade based on four factors:

-  **1. Distance to Nearest Park:** How far residents need to travel to reach the nearest public park;
-  **2. Distance to Nearest Greenway Trail:** How far residents need to travel to reach the nearest greenway trail;
-  **3. Acres of Open Space:** How many acres of park land are accessible nearby;
-  **4. Park Experiences:** The number and variety of park experiences available nearby;

Communities with an “A” letter grade have very good park access relative to other areas of the city. These neighborhoods are likely located within a 10-minute walk of a park, have access to many acres of open space, and can enjoy a wide variety of park experiences within a short distance of home.

Communities with a “D” or “F” letter grade have poor access to parks relative to other areas of the city. Residents in these areas may have to travel several miles to reach the nearest public park, and may only have access to a limited variety of park experiences.

Prioritizing investments in communities with low Park Access scores helps to promote Raleigh’s goal of providing every citizen with safe, convenient access to a park or greenway trail.








LEGEND

-  Thornton Rd. Property
-  Raleigh Extra-territorial Jurisdiction
- Raleigh Parks**
 -  Developed Parks
 -  Undeveloped Parks
 -  County & State Parks
- Park Access Grades**
 -  A
 -  B
 -  C
 -  D
 -  F



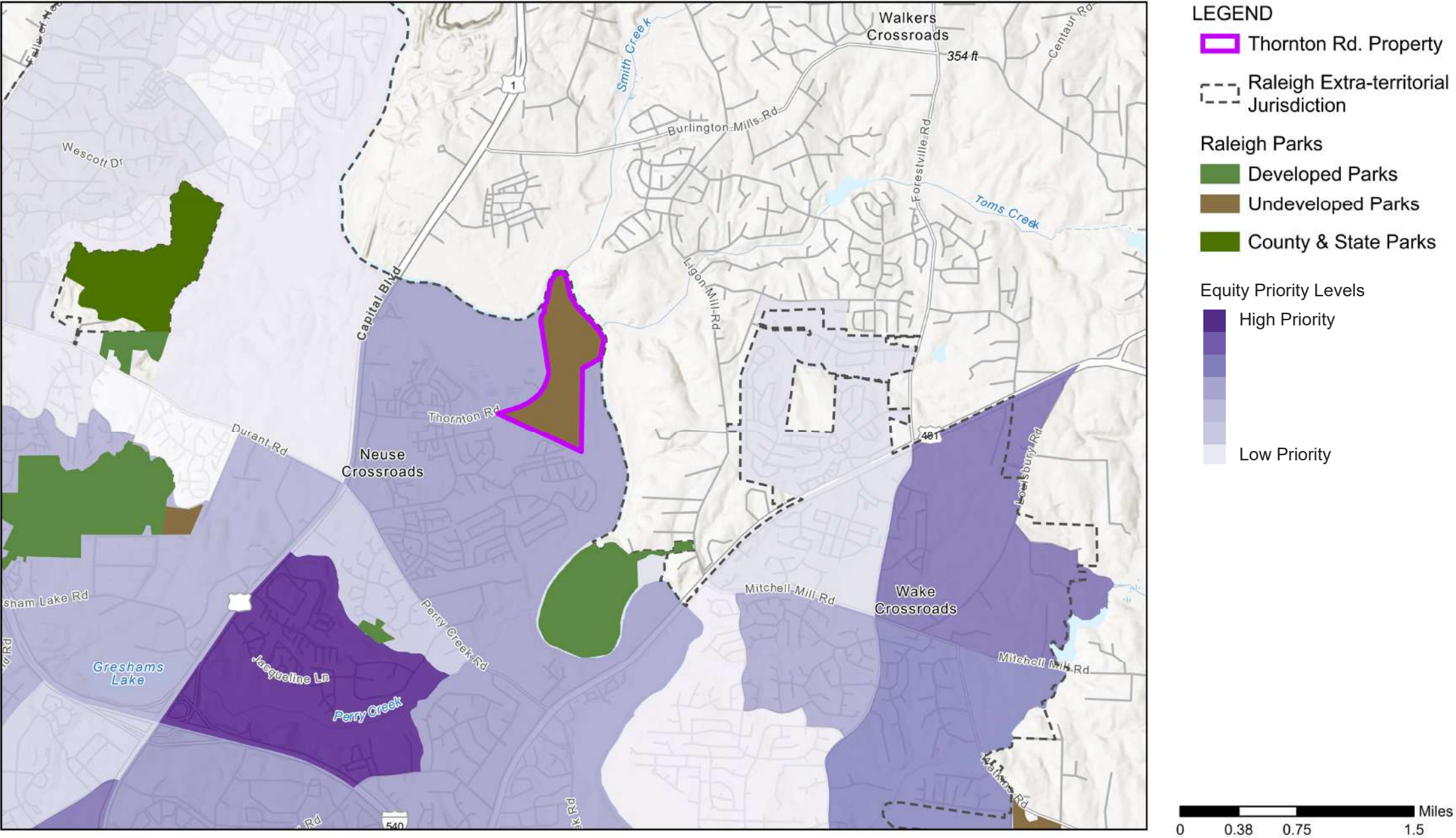
Equity Priority Analysis

Equity Priority can be determined by analyzing five key indicators of community health and well-being, as defined by Wake County Human Services' *Community Vulnerability Index*:

-  **1. Unemployment:** Population age 16 and over who are unemployed in the civilian labor force;
-  **2. Low Educational Attainment:** Population over age 25 who have less than a high school diploma;
-  **3. Age Dependency:** Population under the age of 18 and over the age of 64 combined;
-  **4. Housing Vacancy:** The total number of vacant or unoccupied housing units in a block group;
-  **5. Poverty Rate:** The population living below the federal poverty threshold in Wake County;

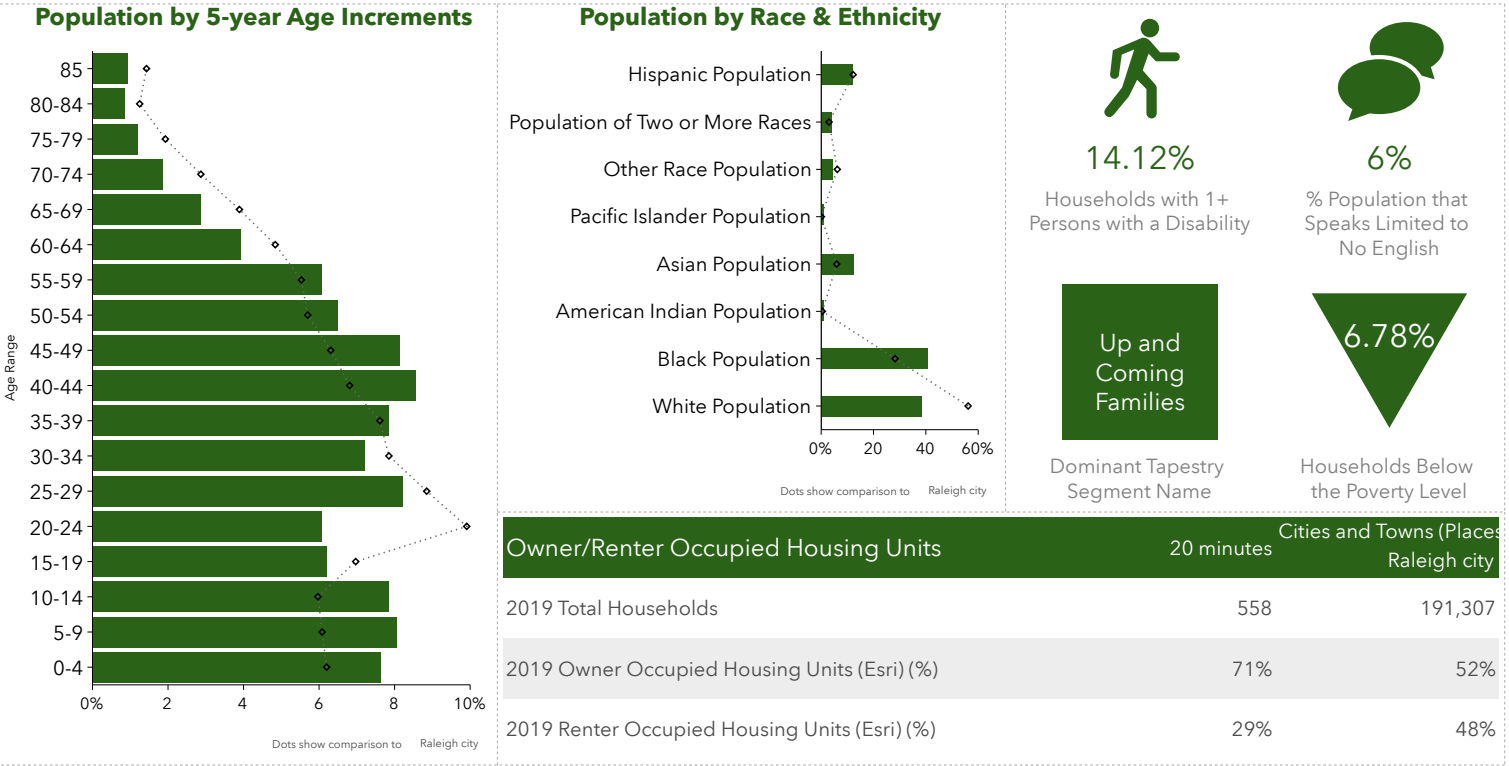
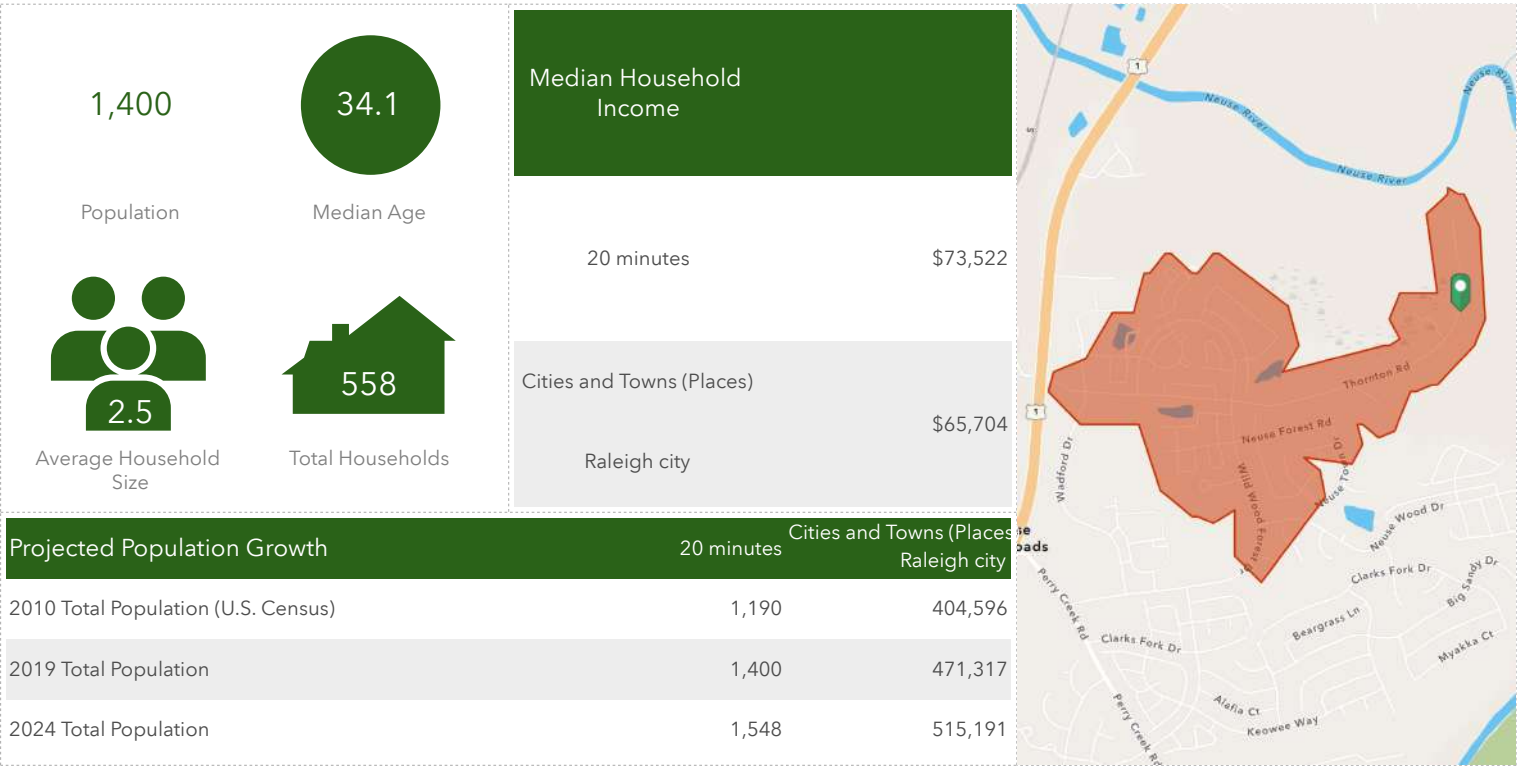
Communities exhibiting a high concentration of these five demographic and socioeconomic indicators are more likely to experience negative health outcomes such as heart disease, obesity, chronic stress, and depression—outcomes which can be mitigated with better access to high-quality open spaces, outdoor recreation, and safe places to play and exercise.

Prioritizing investments in these communities helps ensure that PRCR sites, facilities, and programs are more accessible to the communities that will benefit most from these public resources.



20-Minute Walk Demographics

Typically, an analysis of the demographics within a 10-minute walk of the site is conducted. This study includes a 20-minute walk analysis since there population within a 10-minute walk is zero. The population within the 20-minute walk service area of the Thornton Rd. Property is classified by the ESRI Tapestry Segment “Up and Coming Families.” Residents of these neighborhoods are young, affluent families with younger children.

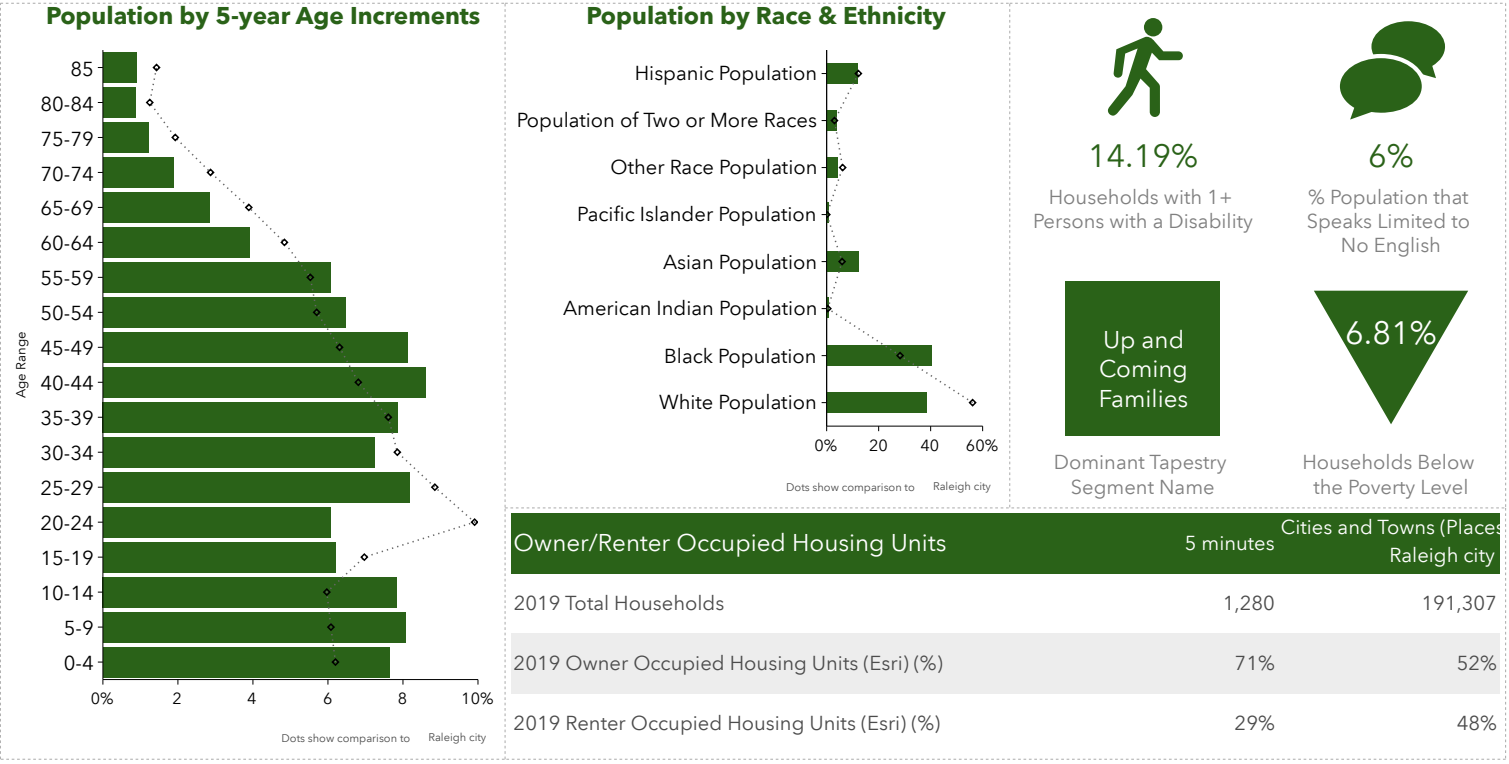
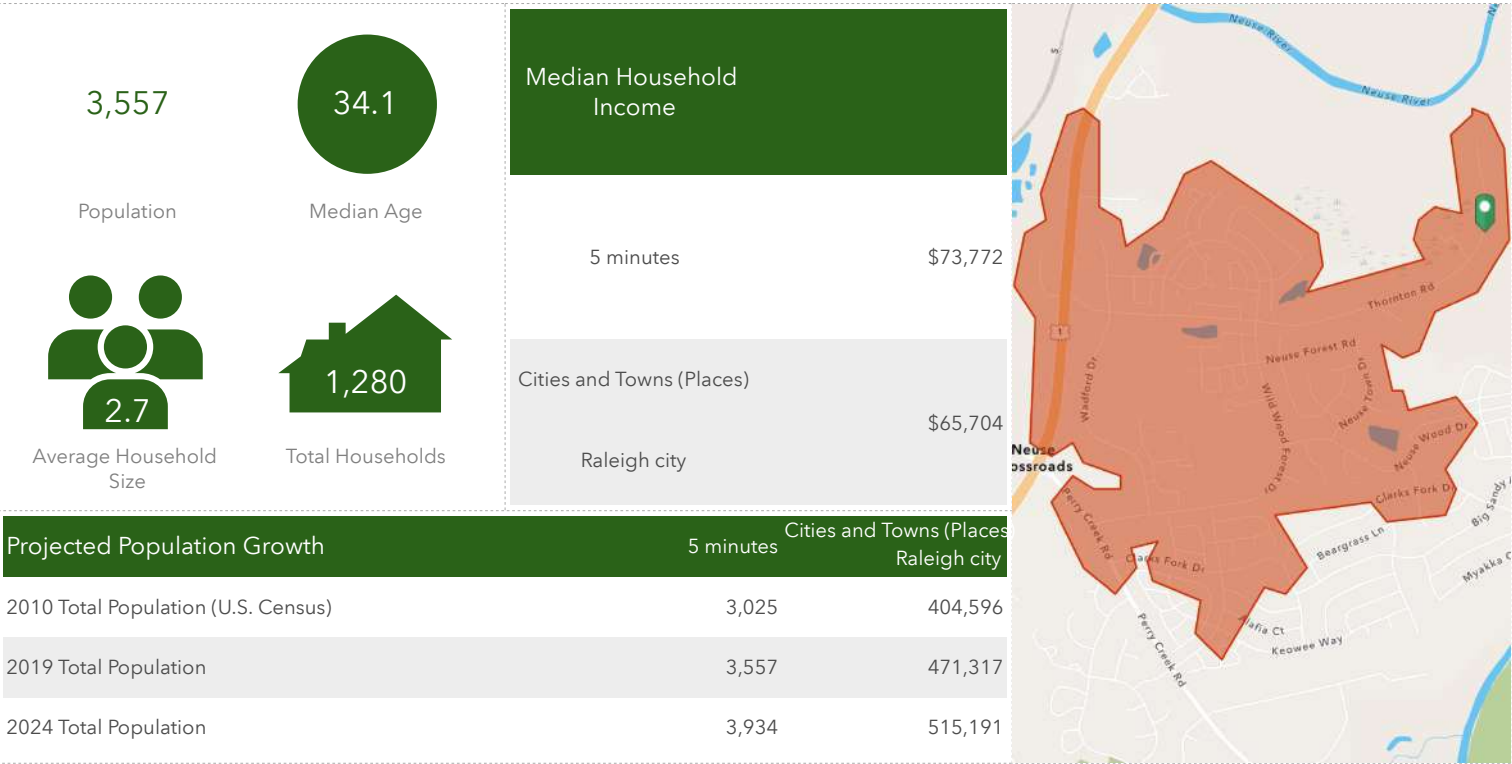


Data Source: ESRI Community Analyst

It should be noted that if an access point was located at the end of the culdesac of Brambleberry Way on the southeastern border of the Thornton Rd. Property, then a 10-minute walk would include approximately 450 people living in this neighborhood.

5-Minute Drive Demographics

The population within a 5-minute drive service area is very similar to the 20-minute walk population. An important thing to note about both of these sets of demographics is the racial diversity, percent of the population that speaks limited to no English, and households with 1+ person with a disability.



Data Source: ESRI Community Analyst

SUITABILITY ANALYSIS

Site & Context Analysis of the Thornton Rd. Property yielded many results that should be considered when deciding where on the site it is appropriate for development. The findings of from this analysis are summarized below:

Natural Resources

- The Levee Forest should have very limited disturbance because of it's status as a Natural Heritage Element Occurrence
- The Bottomland Forest should have limited disturbance because of the threatened and endangered species found with it
- The area where the NC State Endangered wildflower Bottomland Skullcap (*Scutellaria nervosa*) was found should have very limited disturbance

Existing Conditions

- The existing boat launch and greenway trails are suitable uses as low-impact development in the very limited disturbance areas.

Slope & Topography

- The steep slopes by the Neuse river should have very limited disturbance so as not to exasperate the erosion issues along the bank

Street Typology

- Development of the southern border of the property should be limited until construction of the proposed 2-lane divided avenue is finished

Soils & Geology

- Development in areas of the site with poorly drained & partially- hydric soils should be limited because of the frequency of inundation

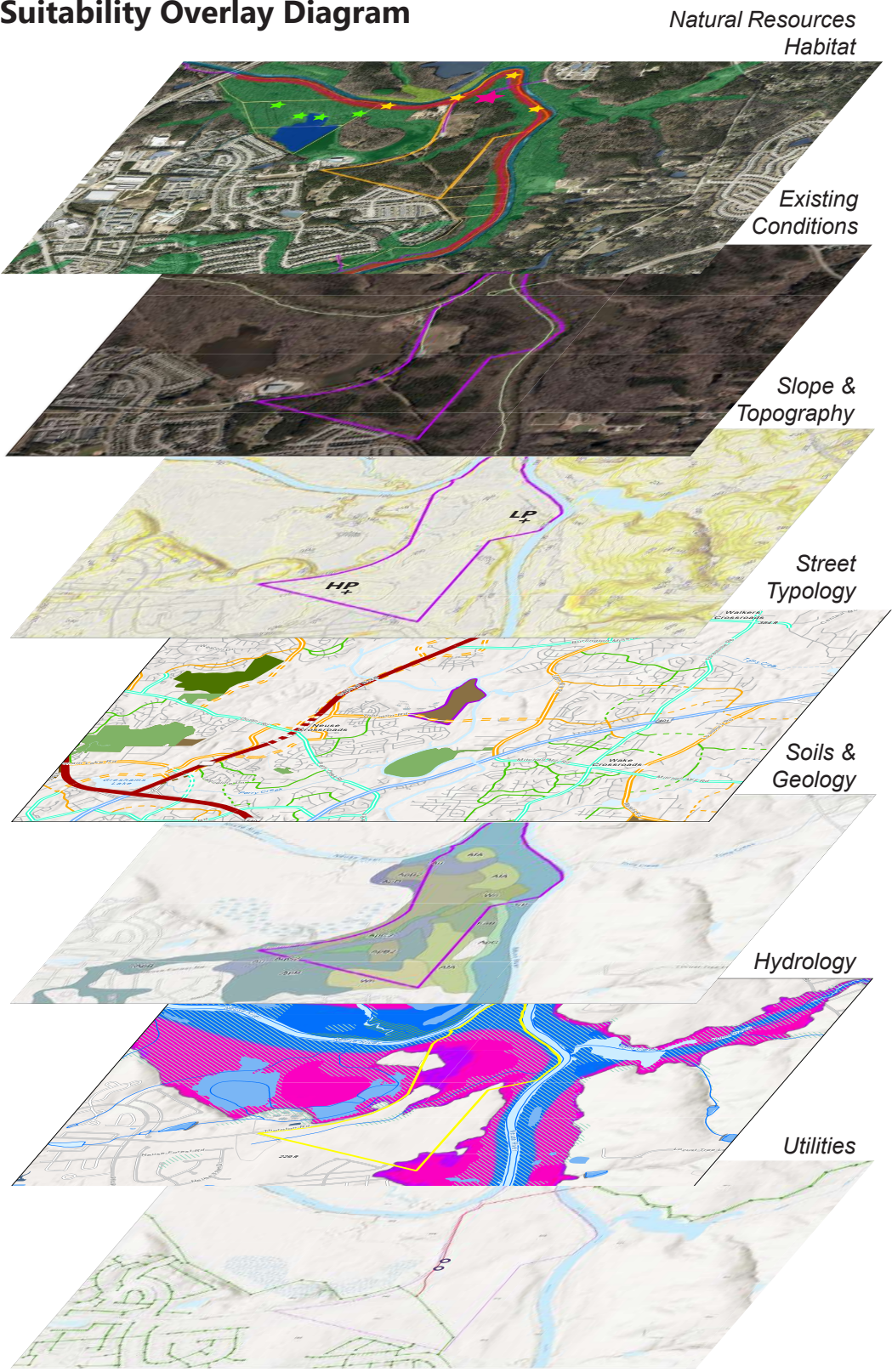
Hydrology

- Development within the 100-year floodplain should be very limited because of the frequency of inundation

Utilities

- Areas that overlap with the force main sewer or the lateral sewer should have limited development so regular maintenance can be conducted.

Suitability Overlay Diagram



There are other results from the PDAP beyond just what affects site suitability. When public engagement begins with the start of the site development process, the project manager should keep the following in mind:

Site Vicinity

- The Thornton Rd. Property has several Community & Homeowner Associations nearby as well as a few elementary schools and a university. Efforts should be made to include these communities in the park planning process.

Park & Greenway System Context

- The Thornton Rd. Property should be planned within the larger context of the surrounding parks and greenways. When the site is developed, the experiences it provides should compliment the park & greenway system in the area to help provide a broad range of activities for the community.

Zoning & Future Land Use

- The area surrounding the site will be changing from industrial use to low-density residential use.
- Any development of the Thornton Rd. Property should work in conjunction with the City of Raleigh Planning Dept. to incorporate any plans from the nearby special study area.

Park Access, Equity, & Demographics

- The area surrounding the property has C & D grades for park access. The development of this site should help improve these grades.
- There is an area near the property with a lower equity score than the surrounding census blocks. Public engagement should target outreach in this area.
- Public engagement should focus on outreach that recognizes the racial diversity of the area, as well as the populations who speak limited English, and the populations with disabilities.

Based on the analysis of the site suitability overlay, the following map delineates areas of the site that are recommended to have very limited, limited, or regular development.

Very Limited Development

- These areas are suitable for low impact uses such as natural surface trails, canoe/kayak launches, invasive removal, and river bank stabilization

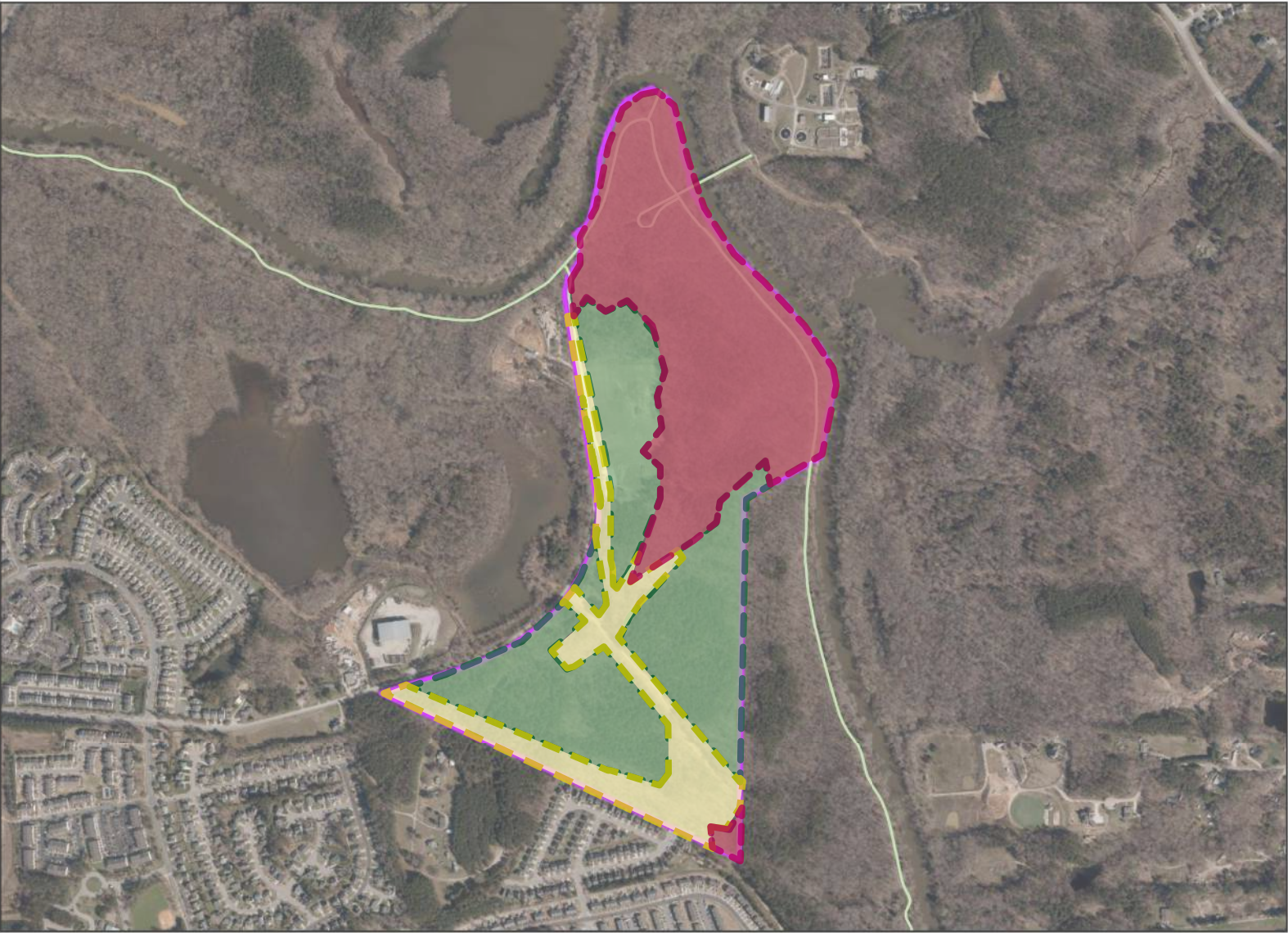
Limited Development

- Any development in these areas should be able to withstand frequent inundation, or be able to be relocated for maintenance or road construction.

Regular Development

- These areas have no limitations on development and are open to any design choices that will facilitate a versatile park property.

Site Suitability Map



LEGEND

- Thornton Rd. Property
- Greenway Trails
- Very Limited Development
- Limited Development
- Regular Development

INTERIM MANAGEMENT RECOMMENDATIONS

The Thornton Rd. Property contains many significant ecological features and the management of natural resources found on site should be a major priority. The following section identifies important interim management recommendations to be implemented until the time that this Property has a fully developed natural resource management plan.

Primary short-term goals for natural resource management on this Property include quality land stewardship practices and the protection of significant ecological elements. To accomplish these goals, six specific management objectives have been identified by PRCR Natural Resources staff, developed to address the most pressing and practical natural resource management needs.

Primary Short-term Goals

- 1. Implementation of coordinated monitoring and mapping efforts aiding in the development of comprehensive biological inventories
- 2. Nature Preserve Criteria
- 3. Prioritization and control of invasive plant species
- 4. Removal of trash and debris found in scattered dumping sites
- 5. Reduction of unauthorized vehicular & foot traffic to prevent illegal hunting and the degradation of sensitive ecological areas
- 6. Early successional habitat management in the open field

Long-term Goals

- 1. Implementation of additional ecological monitoring and mapping efforts
- 2. Retention and protection of documented significant plant and animal species
- 3. Improvement of wildlife habitat and natural plant communities through ecological restoration practices

These interim management recommendations will incorporate accepted best management practices as they pertain to the biotic and abiotic elements found on the Property. The following recommendations are also intended to be flexible, with the goal of supporting adaptive management as additional site characteristics, responses to development, and management challenges are identified. Resource availability will be an additional consideration when implementing management recommendations, as equipment, staffing, and expertise may limit management capabilities.

Site Monitoring and Mapping

The implementation of coordinated monitoring, sampling, and mapping techniques used to document the significant ecological features located on the Thornton Rd. Property is one of the most informative and beneficial short-term management activities PRCR can employ. Comprehensive monitoring strategies can be used to address a variety of natural resource and land use concerns. For example, monitoring efforts will be needed to document the presence and distribution of rare plants and animals in order to ensure their protection. The control of invasive plant species will be included as a primary interim management recommendation, and concentrated identification and mapping of invasive plant species will help inform control priorities, budgetary needs, and resource demands. Monitoring efforts can also be employed to gauge the extent of unauthorized access and illegal dumping on site.

Current Management

In May 2019, a BioBlitz was held at the Thornton Rd. Property and the adjoining Greenway easements. A BioBlitz is a single day event where biologists, naturalists, and other environmental scientists and volunteers try to document as many on site plant and animal species as possible. To date, the BioBlitz represents the most significant monitoring effort conducted at the Property. Additional plant and animal species have been observed and recorded by PRCR staff since the BioBlitz, including some significant and protected species, but a comprehensive inventory has not been compiled. Further monitoring is needed to gain a better understanding of the native flora and fauna found on site, the occurrence and prevalence of non-native invasive species, and the degree of unauthorized access/use.



Herpetologist group from the May 2019 Bioblitz



Botanist group from the May 2019 Bioblitz

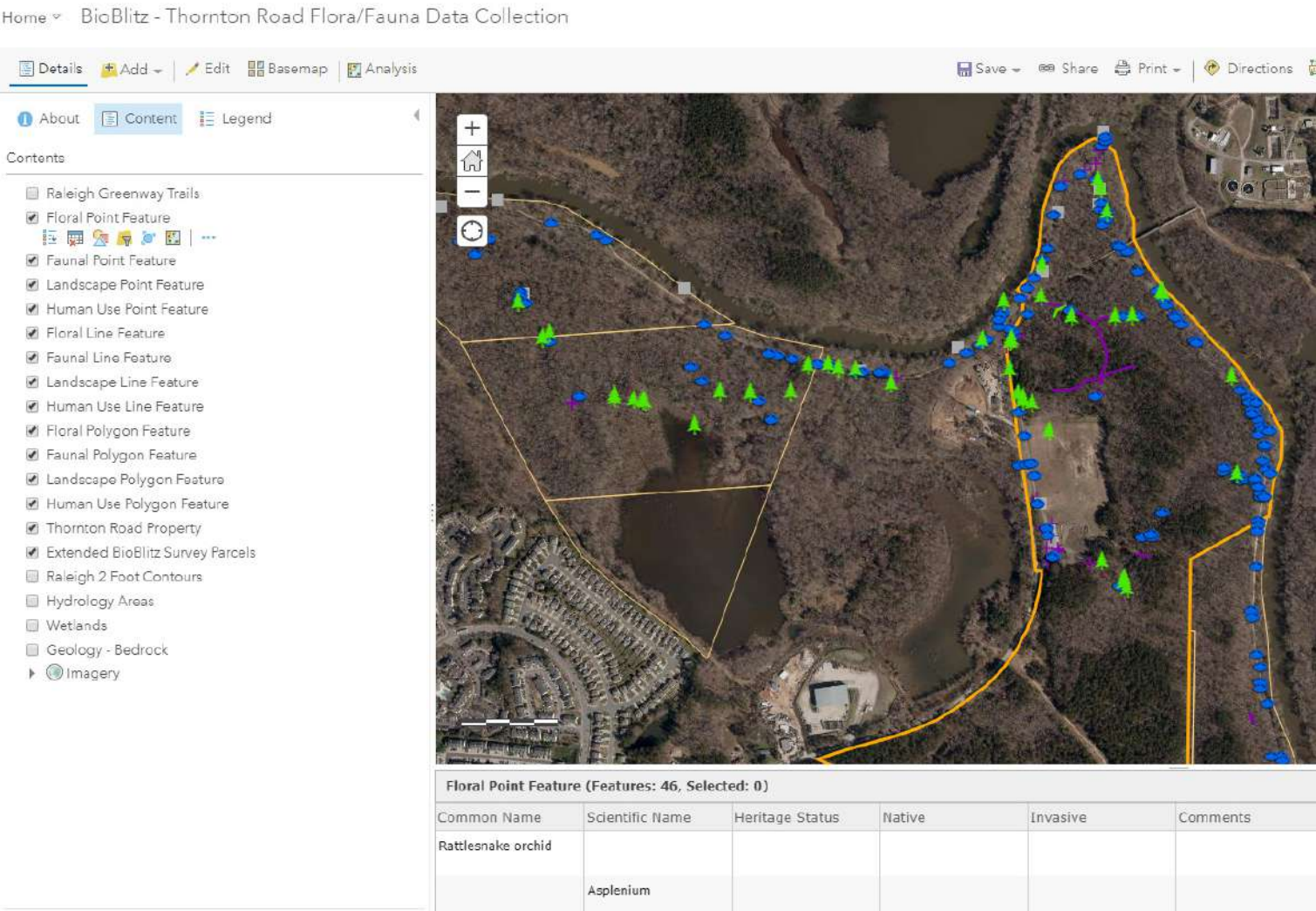
Recommended Management

Creation of centralized biological inventory

- PRCR staff should create a centralized biological inventory for the site that will include all species records documented during the May 2019 BioBlitz, as well as any additional species records that have been confirmed by PRCR staff. This inventory should be accessible to relevant PRCR staff involved in the planning process and should be kept up-to-date as new observations are submitted. This inventory should include the locations of each record whenever possible, although the location data associated with significant/rare/protected species may be redacted. PRCR staff will dictate the most appropriate platform to house the inventory data, such as a specialized folder stored on shared server-based drives, or within a cloud-based information sharing service.
- PRCR staff should document the occurrence of invasive plant species found on site, along with the approximate locations and levels of infestation whenever possible. These records should be included in the centralized biological inventory mentioned above, as well as within a separate data set. Maintaining invasive plant species records separately will help simplify information sharing and future planning efforts.

Expansion of monitoring efforts and capabilities

- PRCR staff will closely observe and manage for previously documented significant/rare/protected species. Past monitoring has uncovered examples of unique plant and animal species, including some species listed as threatened in the state of NC - the bottomland skullcap (*Scutellaria nervosa*) and the American bald eagle (*Haliaeetus leucocephalus*). Specific management recommendations for these protected species can be developed once the locations and prevalence are better understood.
- PRCR staff should engage with state and local government agencies for monitoring assistance. Agencies such as the NC Forest Service, NC Wildlife Resources Commission, NC Natural Heritage Program, NC Dept. of Agriculture and Consumer Services, NC Dept. of Environmental Quality, and others may be able to provide input and expertise that could help bolster monitoring efforts.
- PRCR staff should engage with local volunteers through community outreach and education in order to encourage Citizen Science monitoring efforts. The organization of single-day or multi-day group monitoring events designed to address specific concerns may prove helpful. Some observations gained through volunteer efforts may need to be verified by qualified PRCR staff, depending on the level of expertise demonstrated by the participants.



Current ArcGIS Online Database with Bioblitz Data

Evaluate site characteristics and ecology using Raleigh PRCR Nature Preserves/Protected Natural Areas criteria

Once more information is gathered through further site-assessment and ecological monitoring, the Thornton Rd. Property can be better evaluated using established criteria to help gauge options for future use. The PRCR Nature Preserves/Protected Natural Areas criteria was defined in 2011 by the Nature Preserves Task Force. The Task Force was created to develop criteria that the City could use to determine which properties should be designated as Nature Parks, Nature Preserves, and Protected Natural Areas. A variety of biotic and abiotic elements were considered when developing these criteria with the goal of selecting the parks that possess high-quality habitat and natural communities, significant plant and animal species, and other natural resources that would merit a special designation. Once the Thornton Rd. Property has been adequately evaluated using these criteria, a formal recommendation for a special designation can be issued.

NATURE PRESERVE AND PROTECTED NATURAL AREA CRITERIA

This table should be used to evalute park units and parcels acquired for future parks. Each park unit/parcel should be evaluated in the larger context to the quality of the property's natural resources. Each park unit/parcel should be considered within the context of all 13 criteria. Source data may change as data evolves. The City of Raleigh will continue to seek and use the most current and respected available data.*

OBJECTIVE CRITERIA Step 1: GIS Evaluation			
CRITERIA		CONSIDERATIONS	SOURCE
Environmental and Open Space Features			
1	Parcel/Park Unit contains species or natural communities that are endangered, threatened or rare, identified by the NC Natural Heritage Program as Natural Heritage Element Occurrences (NHEO).	Natural Heritage Element Occurrences (NHEO) that have a status of Extant and a Priority of Medium or Higher.	Natural Heritage Element Occurences (NHEO) - NC Natural Heritage Program
2	Parcel/Park Unit contains existing areas or species identified by the NC Natural Heritage Program as Significant Natural Heritage Areas (SNHA).	All significance levels (National, State, Regional, Local Significance)	Significant Natural Heritage Areas (SNHA) - NC Natural Heritage Program
3	Parcel/Park Unit is in close proximity to or provides connection between other properties that are currently protected.	The property adjoins already protected open space or greenway corridor. Property includes land owned by City of Raleigh, Wake County, Army Corp, State, and non-profit oraanizations.	NCCGIA - State level data for lands managed for conservation and open space
4	Parcel/Park Unit contains appreciable water features in the landscape, such as wetlands, lakes, ponds, perennial stream systems, or floodplains.	Water resources, particularly bluelines, must be field verified	NWI, FEMA, planimetric hydrology data
5	Parcel/Park Unit contains hydric soils which may be indicative of wetlands and floodplains.	Wake County Hydric Soils: AfB, AuA, CmA, CnA, CoA, CpA, EnB, EnB2, GoA, HeB, HeB2, LyA, MeA, NoA, NoB, NoB2, OrB2, OrC2, PsA, RaA, RoA, WaA, WaB, WhA, WnA, WoA, WyA, WpA.	USDA NRCS Soils Map; NRCS Hydric Soils listing (http://soils.usda.gov/use/hydric/)
6	Parcel/Park Unit contains slopes near streams or river.	>8% slope	Parks & Recreation GIS-based Neighborhood Park Suitability Analysis model

Current Management

The results of the preliminary evaluation of Nature Preserve criteria show that criteria 1, 2, 3, 4, 5, 6, 7, 10, 11, and 12 could be met at the Thornton Rd. Property.

Recommended Management

A more in-depth evaluation of the Thornton Rd. Property and the Nature Preserve Criteria should occur once 1-2 more years of monitoring and mapping occurs.

ADDITIONAL CRITERIA Step 2: Site Visit			
CRITERIA		CONSIDERATIONS	SOURCE
Environmental & Open Space Features			
7	Parcel/Park Unit contains species that are uncommon as identified and mapped by staff.		internally collected data or data from cooperative agencies
8	Parcel/Park Unit contains outstanding geologic characteristics, such as cave, waterfall, cliffs, granite outcrop etc. as identified and mapped by staff.		internally collected data or data from cooperative agencies
Stewardship & Management			
9	Expense of stewarding the Parcel/Park Unit due to location, maintenance of structures, resource management (invasives), liability, multiple owners, trespassing concerns, irreparable contamination, cost-prohibitive cleanup, or other factors outweighs the balance of benefits between designation as a Nature Preserve versus another park classification.	Percentage of parcel covered in invasives, Number of neighbors, Adjacent activities	orthophotographs; internally collected data; maintenance budget data
10	Parcel/Park Unit is of sufficient size and shape that its conservation resources are likely to remain intact, even if adjacent properties are developed; or sufficient neighboring property is either already protected or to be included as to achieve the same result.	Large blocks are preferred to long, linear tracts or tracts with lots of edges Appropriate size and shape are determined by species habitat requirements.	parcel data; aerial photograhs
11	The area can be sufficiently buffered.	Size of habitat and distribution of resource	
12	Compatibility of existing use or condition, in whole or part, is conducive to being a Nature Preserve		
13	The Nature Preserve classification for new properties should be considered within the larger context of system-wide park planning as outlined in the Raleigh Comprehensive Plan. Designation of Protected Natural Areas should be a function of individual site planning (System Integration and Master Planning processes).		Comprehensive Plan, Park Plan, Citywide Strategic Plans, Individual Site Planning

* Language added 1/3/14.

Evaluation and Control of Invasive Plant Species

A variety of problematic invasive plant species have been observed on site at the Thornton Rd. property, including wisteria (*Wisteria* sp.), Japanese stiltgrass (*Microstegium vimineum*), non-native olive (*Elaeagnus* spp.), privet (*Ligustrum* spp.), Japanese honeysuckle (*Lonicera japonica*), oxeye daisy (*Leucanthemum vulgare*), hop trefoil (*Trifolium campestre*), chickweed (*Cerastium* sp. & *Stellaria* sp.), ground ivy (*Glechoma hederacea*), oriental false hawksbeard (*Youngia japonica*), and sweet vernal grass (*Anthoxanthum odoratum*). This list of invasive plant species is not comprehensive and was compiled only after limited field observations. There are undoubtedly additional invasive plants species currently occurring on site. As previously mentioned, monitoring efforts focused on the documentation of invasive plant species will be needed to inform the most effective and appropriate management strategies. PRCR should prioritize invasive species control efforts in order to address those species that pose the most significant ecological risks.

Current Management

Japanese stilt grass is currently being controlled in locations where the state-threatened bottomland skullcap is found. Herbicide has been used by PRCR staff to prevent the encroachment of stiltgrass in these areas. No other controls for invasive plant species are being conducted on site.



Japanese Stiltgrass (*Microstegium vimineum*) encroaching on state-threatened Bottomland Skullcap (*Scutellaria nervosa*)

Recommended Management

Identification and prioritization of invasive species control

- PRCR staff should identify and prioritize invasive species control efforts based on the level of ecological threat posed by those species found on site. Resource allocation and the feasibility of control will need to be considered when developing plans for invasive species management.
- The Japanese wisteria located along Thornton Rd. and the adjacent powerline easement is still at a level where treatments may be successful. The wisteria is primarily confined to the road shoulder and right-of-way but has started to encroach into the forested stands nearby. Wisteria poses a significant ecological risk and timely action is needed to keep the wisteria in this area at a manageable level.
- Japanese stiltgrass is pervasive and widespread on the Property. Treatment would only be feasible in areas where the stiltgrass presents an acute ecological threat, namely in areas around significant/rare/protected plants like the bottomland skullcaps. PRCR staff should continue the management of stiltgrass and other invasive plant species in these sensitive areas.
- PRCR staff should address the control of additional invasive plant species found on site once a comprehensive invasive species



Location of Wisteria (*Wisteria* sp.) on Thornton Rd. Property

management plan has been created.

Development of a comprehensive site-wide invasive species management plan

- PRCR staff should develop a comprehensive site-wide invasive species management plan that includes the prevalence, locations, and treatment strategies for individual invasive plant species. A combination of chemical and mechanical control methods will be employed to reduce or eliminate invasive plant species, and the resources that will be required to complete these management activities should be included in the comprehensive plan.
- PRCR staff will use herbicides to control invasive plant species. All herbicide applications on PRCR properties should follow the City of Raleigh Pesticide Policy and be approved by appropriate PRCR staff.
- The comprehensive invasive species management plan should provide estimates for time and labor required to implement prescribed management strategies so that any deficiency in resource allocation can be addressed.
- PRCR staff from the Natural Resources Section and from the Parks Division will work together closely to coordinate resources



Wisteria (*Wisteria* sp.) along Thornton Rd.



Wisteria (*Wisteria* sp.) along Thornton Rd. Right-of Way

Evaluation and Restriction of Unauthorized Access and Use
– Social trails, illegal hunting, and ATV/other vehicles

Unauthorized access to the Thornton Rd. Property has been observed in multiple areas, however the level of unauthorized use is unclear. Social trails connecting neighboring residential properties can be found along the southern boundary line, but there seems to be little ecological impact in these areas as a result of this activity. More problematic is the evidence of unauthorized ATV and other vehicular traffic along the utility right-of-ways and earthen roads that traverse the Property. In the past, it has been demonstrated that vehicular traffic can create erosion issues, threaten the survival of significant/rare/protected plant species, and degrade sensitive ecological areas. Additionally, the safety of the riders and drivers cannot be guaranteed, creating a potential liability risk for the City of Raleigh. Illegal hunting has also been documented at the Thornton Rd. Property, which can pose a serious risk to users in the park or on the Greenway. Any evidence of illegal hunting or poaching activities should be reported to the Raleigh Police Dept. and the NC Wildlife Resources Commission. Photographic or video evidence of illegal hunting should be collected when possible to aid in investigation efforts. The level of unauthorized access needs to be evaluated and deterrents should be put in place to prevent the most egregious examples.

Current Management

Past efforts to restrict unauthorized access and hunting on the Thornton Rd. property have been unsuccessful. The proximity of the property to the Greenway and adjacent residential areas makes regulating access difficult. Signage and physical barriers have been utilized; however, these solutions are limited in their effectiveness. The Raleigh Police Dept. has been notified of the unauthorized vehicular access and illegal hunting, and will occasionally patrol the parking area.

Recommended Management

Evaluation of unauthorized access severity, access points, and potential damage

- PRCR staff should take steps to gauge the level of unauthorized access to the property and to identify the illegal points of access. The impacts created by unauthorized vehicular and foot traffic should be evaluated, with a focus on the most environmentally sensitive areas or locations where significant plants or animals have been documented. The prevalence of illegal hunting onsite should be evaluated, and efforts should be made to engage the Raleigh Police Dept. and the NC Wildlife Resources Commission for support. Trail cameras may prove useful for monitoring unauthorized use. Once the prevalence and impacts from unauthorized access and use are better understood, PRCR can develop management strategies to address these issues.

Creation of access deterrents

- PRCR staff should address the most problematic access points first, with the addition of signage and physical barriers to discourage illegal access and use. While signage may prove to be minimally effective, the establishment of cable gates, iron gates, and even felled trees or debris piles may act as physical barriers to access

Evaluation and Mitigation of Debris Piles/Dump Sites

Trash and debris piles of various sizes can be found scattered throughout the property where previous landowners and local citizens disposed of a variety of refuse materials, including household garbage, appliances, furniture, tires, and more. These sites pose a small ecological risk given their prolonged presence on site and the likely absence/ degradation of hazardous material. However, the impact on the aesthetic appearance of the Property and the potential for physical injury may require the removal of trash and debris if visitor facilities are to be developed nearby.

Current Management

There are currently no known removal or clean-up efforts being employed at the Thornton Rd. Property.

Recommended Management

Identification and removal of most problematic/dangerous trash and debris piles

- PRCR staff should document the size and location of large, concentrated piles of trash and debris. The sites that pose the greatest risk to park visitors and PRCR staff should be prioritized for removal.
- NC Dept. of Environmental Quality may need to assess the potential hazards found within these dumping sites prior to removal.
- As facility planning progresses, it may become necessary to remove the trash and debris from dump locations near planned development.

Early-successional Habitat and Open Field Management

An 8.5-acre former agricultural field, located in the central portion of the property, has been maintained in a predominantly herbaceous open-condition setting by frequent mowing and bush hogging. These vegetation control practices promote an early-successional habitat type which can provide unique wildlife resources not available elsewhere on the Property. Approximately 0.5-acre of this field is used as visitor parking, while another 0.6-acre is used by the City of Raleigh as a storage site for mulch. Varying levels of vegetation management are employed on the remaining 7.4-acres, including the disking and seeding of native groundcover species in a 2-acre patch. PRCR staff will need to determine the development potential and desired future condition for this field before long-term management strategies can be developed. Until then, vegetation control efforts needed to maintain the field in the current state should continue as it represents the largest and most contiguous example of early-successional habitat found on the Property.

Current Management

Approximately 5.4-acres of this field is maintained in an open-condition setting by mowing and bush hogging performed by PRCR staff. A smaller area, roughly 2-acres, has been managed more intensively by implementing disking rotations and the planting of native groundcover. The PRCR Parks Division has been responsible for managing this section of the field and will continue to do so with support from the Natural Resources Section. The portions of the open field that lie outside of the flood plain have been designated as a City of Raleigh - FEMA storm debris disposal site. This area is reserved for the City of Raleigh to dispose of storm debris including logs, limbs, mulch, and leaf litter that may accumulate suddenly as a result of significant weather events. Hurricanes, ice storms, and other weather events create a need for debris disposal sites, and the Thornton Rd. Property is one of many sites that the City of Raleigh has designated for that purpose. Therefore, management activities in these areas should be limited to mowing and bush hogging when necessary in order to avoid any impediments to this designated use, as well as to avoid wasted management efforts.

Recommended Management

Evaluate and implement additional vegetation controls and supplement native vegetation

- PRCR staff should continue the scheduled mowing and bush hogging to maintain an open-condition setting that will provide valuable wildlife habitat while also satisfying the FEMA storm debris disposal site requirements. Woody vegetation will become established in these fields without control efforts, making future management more difficult.
- Previous efforts to reintroduce native vegetation should be evaluated, and strategy improvements should be made where necessary. Parks Division staff have identified a native seed mix and plan to maintain wildflower and pollinator habitat on this site.
- Additional opportunities to reintroduce native plants species should be explored, including the planting of site-appropriate native trees to provide additional wildlife benefits and aesthetic enhancements – provided these trees are planted outside of the area designated for the FEMA storm debris disposal site.
- Invasive plant species should be evaluated and documented. Invasive species control strategies will need to consider the presence of existing desirable native vegetation.



Mulch storage area at Thornton Rd.



Delineation of open field management areas

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