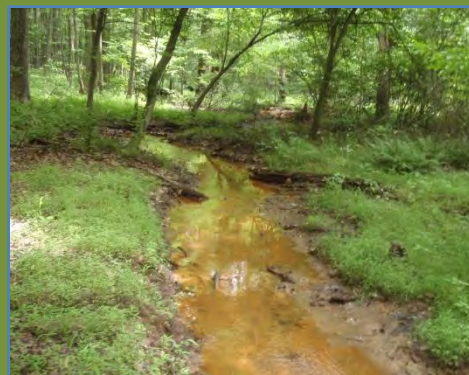




Monroe Township Bicycle and Pedestrian Planning Study



Trail Network Development Plan *FINAL*

March 2010

Prepared For:
**The Township of Monroe and
The New Jersey Department of Transportation**



Prepared by:
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Baker



TABLE OF CONTENTS

I. INTRODUCTION..... 1

II. TOWNSHIP EXISTING AND PROPOSED TRAILS..... 2

III. ENVIRONMENTAL SCREENING..... 8

IV. TRAIL ROUTING AND ANALYSIS..... 10

V. TRAIL NETWORK DEVELOPMENT PLAN..... 13

A. Short-Term Trails..... 15

 a. Union Valley Road..... 16

 b. Community Center Connector Trail #1..... 18

 c. Community Center Connector Trail #2..... 20

 d. Manalapan Brook Nature Trail..... 23

 e. Rocky Brook Estates Trail..... 25

B. Long-Term Trails: 27

 a. East-West Trail #1..... 28

 b. East-West Trail #2..... 30

 c. Butterfly and Wildlife Park Walking Path..... 32

 d. Millstone River Nature Trail..... 33

 e. PSE&G ROW Trail..... 35

 f. Equestrian Trail #1..... 37

 g. Equestrian Trail #2..... 39

 h. Softball Fields Walking Trail..... 41

 i. Garfield Avenue Trail..... 43

VI. TRAIL DEVELOPMENT CONSIDERATIONS..... 45

A. Trail Amenities..... 45

B. Trail Blazing..... 45

C. Stream Crossings 46

D. Roadway Crossings..... 46

E. Senior Residents..... 47





F. Parking..... 47

G. Trail Maintenance..... 48

H. Compaction in Wetlands..... 48

I. Design Flood..... 49

J. Topography..... 49

VII. TRAIL DEVELOPMENT PLAN IMPLEMENTATION RESOURCES..... 50

A. Trail Development Resources..... 50

B. Trail Funding Resources..... 52

VIII. CONCLUSION..... 53

Tables

- Table 1: Monroe Township Existing Trails
- Table 2: Monroe Township Proposed Trails
- Table 3: Additional Monroe Township Proposed Trails
- Table 4: Matrix of Potential Environmental Constraints

Figures

- Figure 1: Monroe Township Existing and Proposed Trails
- Figure 2: Environmental Constraints Map
- Figure 3: Trail Network Development Plan

Appendices

- Appendix A: Environmental Assessment Memorandum
- Appendix B: Trail Routing and Analysis
- Appendix C: Monroe Township Trail Map

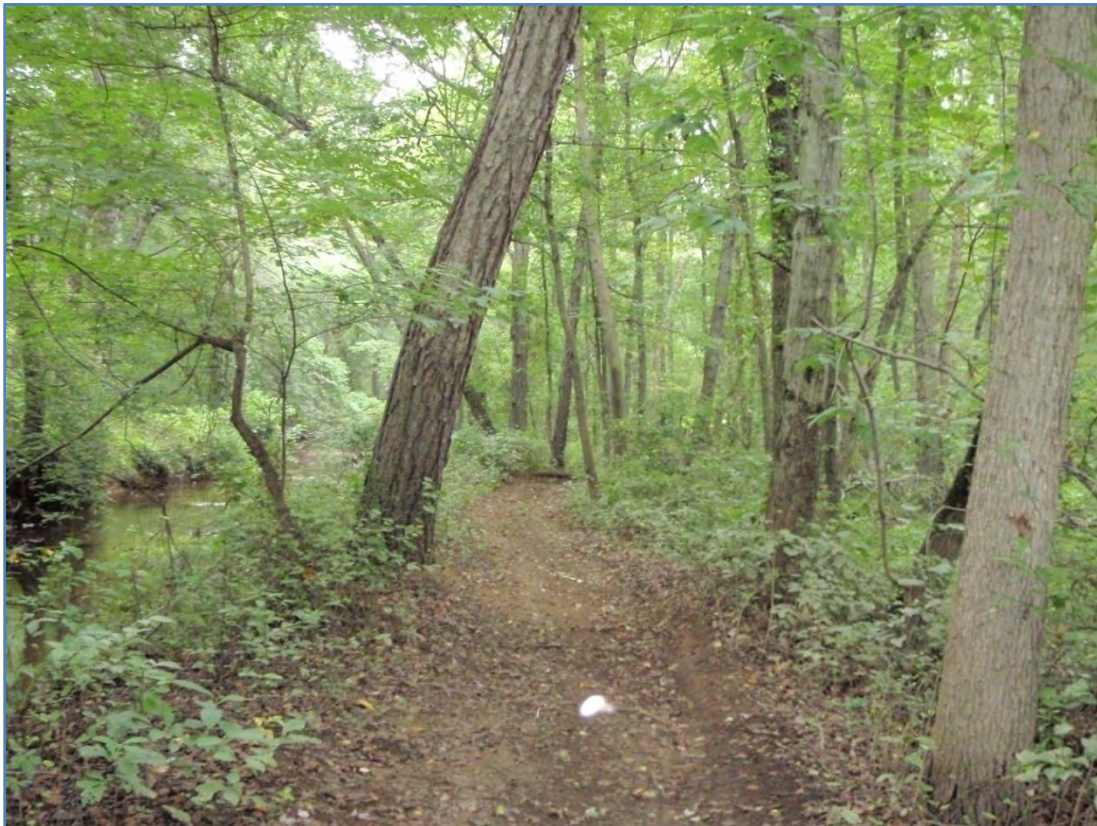
For additional resources see Appendices in Monroe Township Roadway Network Improvement Guide





I. INTRODUCTION

Monroe Township identified the goal of developing a trail network that would provide a system of routes for residents and visitors, and that would improve the health, natural environment and connections among communities in the Township. To advance this goal, a Trails and Bikeway Development Plan was created by the Township, which describes a trail system with connections to local destinations (e.g., schools, commercial centers, recreational areas and civic uses) and to regional trails planned in adjacent towns (e.g., Boroughs of Helmetta and Jamesburg). The plan also notes that the trail routes are intended to provide access for hikers, bicyclists and equestrians.



Section of an off-road trail in Monroe

The Trail Network Development Plan was developed to further advance proposed trails in the Township's Trail and Bikeway Development Plan, and to assist in the implementation of the township's trail network. The [Trail Network Development Plan](#) provides an overview of existing and proposed trails in the township, a review and assessment of environmental features related to the trail alignments, and a recommended framework to build the trail network with Monroe.





II. TOWNSHIP EXISTING AND PROPOSED TRAILS

In the Township Trails and Bikeway Development Plan, township officials identified trail routes, including on-road bicycle facilities and off-road trails. The off-road trails are included as part of this plan, and the on-road bicycle facilities were assessed in a companion document, the *Roadway Network Improvement Guide*.

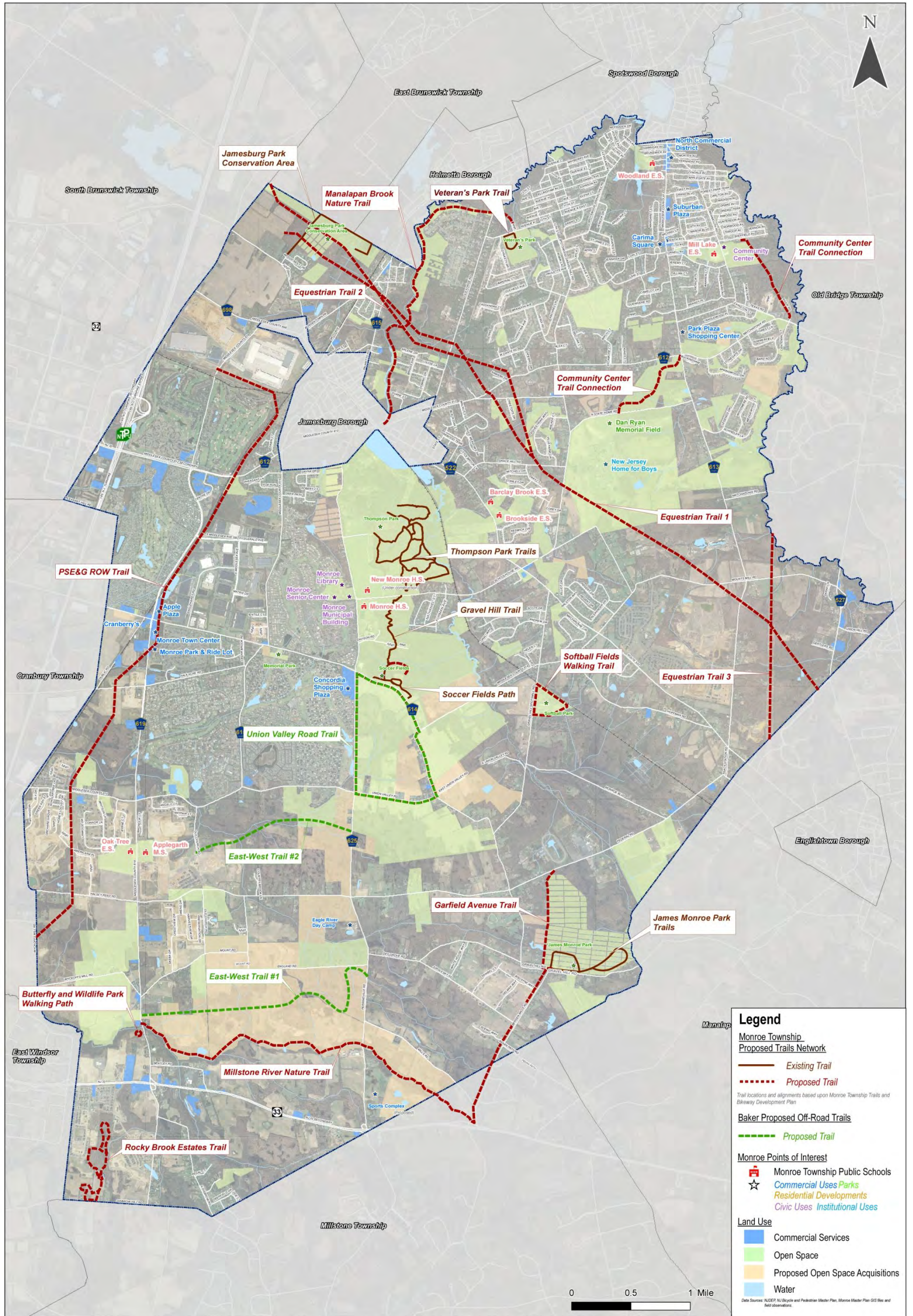
Monroe identified fifteen (15) off-road trails throughout the township. These alignments included both existing and proposed trails. The existing and proposed trails are illustrated in **Figure 1. Monroe Township Existing and Proposed Trails**.

Existing trails are detailed in **Table 1**.

Table 1. Monroe Township Existing Trails

Trail Name	Description
James Monroe Park Trails	A set of two (2) separate, unpaved loop trails that begin at the parking lot for the park
Veteran’s Park Trail	A single, unpaved loop trail in the northwest corner of the park that is the initial route in a larger planned park trail network.
Thompson Park Trails	A trail network in the park composed of multiple unpaved loop trails and paved roadways that connect to the new Monroe High School (under construction) and Schoolhouse Road.
Gravel Hill Trail	A extension of the park trails that connects from Schoolhouse Road, behind the existing Monroe High School, south to Prospect Plains Road at the Monroe Township Soccer Complex.
Soccer Field Trail	A linear, asphalt-paved shared use trail, with loop segment, along the Monroe Township Soccer Complex.
Jamesburg Park Conservation Area Trails	A network of branching, unpaved trails in the park, which straddles the borders of Monroe, South Brunswick and East Brunswick Townships.

Figure 1. Monroe Township Existing and Proposed Trails





Recently completed section of the Soccer Field Trail



Access point for the Veteran's Park Trail

Proposed trails are detailed in **Table 2**.

Table 2. Monroe Township Proposed Trails

Trail Name	Description
<u>Equestrian Trail #1</u>	A trail that would extend from Jamesburg Park Conservation Area in the west to its eastern border with Manalapan Township. The trail follows a Public Service Electric and Gas (PSE&G) utility corridor diagonally across the township.
<u>Equestrian Trail #2</u>	A trail similar to Equestrian Trail #1, but would begin farther west at the township border with South Brunswick and terminates at Equestrian Trail #1 in the vicinity of Grace Hill Road.
<u>Equestrian Trail #3</u>	A trail that would follow Jersey Central Power and Light (JCP&L) utility corridor, which is located in the eastern section of the township. The trail would extend north-south in Monroe between the Old Bridge and Manalapan Townships.



Trail Name	Description
<u>Public Service Electric and Gas (PSE&G) ROW Trail</u>	A trail that would follow a PSE&G utility corridor that is located in the western section of the township. The trail would begin at the township southern border with East Windsor Township and ends at Route 619 in the north. After the trail crosses Route 614, it parallels and then crosses an existing freight rail line.
<u>Millstone River Nature Trail</u>	A trail that would parallel the Millstone River, which is in the southern section of the township, on the north side of the river. It would extend south from the James Monroe Park, cross into Millstone Township and then head east across Monroe into East Windsor Township.
<u>Manalapan Brook Nature Trail</u>	A trail that would parallel the Manalapan Brook on its eastern bank. The trail would connect between Veteran’s Park in the north to the Center of Jamesburg in the south.
<u>Butterfly Park Trail</u>	A trail that would be a loop trail included as part of the site development for the Village at Millstone River. The trail would be adjacent to the southern edge of the Millstone River.
<u>Community Center Connector Trail #1</u>	A north-south trail that would connect from the Community Center on Monmouth Road in the north to Texas Road in the south. The trail would utilize a paved section of River Road.
<u>Community Center Connector Trail #2</u>	A trail that would connect from the intersection of Matchaponix Road and Route 613 to the Dan Ryan Memorial Field. The trail would extend diagonally from the intersection in a southwesterly direction.
<u>Rocky Brook Estates Trail</u>	A set of loop trails included as part of the Rocky Brook Estates residential development. The trails extend north-south between Disbrow Hill Road the Renaissance residential development.



Trail Name	Description
<u>Softball Fields Walking Trail</u>	A loop trail that would connect around the perimeter of the Monroe Township Softball Complex on Gravel Hill Road.
<u>Garfield Avenue Trail</u>	A linear trail that would connect between Gravel Hill Road, adjacent to James Monroe Park, and Federal Road. The trail would follow Garfield Avenue and then continue along the western edge of the park.

Through field observations, limited worn sections of proposed trails were observed. Specifically, small, discontinuous worn sections of the Manalapan Brook Nature Trail, Community Center Trail #1 and Equestrian Trail #1 were observed in the field.



Existing section of Equestrian Trail #1



Existing section of Manalapan Brook Nature Trail

Three (3) additional trail routes were proposed to complement the township proposed trail network. Two (2) of these trails propose east-west connections following observed worn paths in the township and one (1) is a loop trail proposed as a southern connection to the Soccer Field Trail and Gravel Hill Trail. These trails are described in **Table 3**.

Table 3. Additional Monroe Township Proposed Trails

Trail Name	Description
<u>East-West Trail #1</u>	This trail would start at Perrineville Road, just south of England Road, and extend in a westerly direction to Route 619.



Trail Name	Description
<u>East-West Trail #2</u>	This trail would start at Perrineville Road, between Federal Road and Union Valley Road, and extend to Old Church Road in the west. The western end connects to Old Church Road at its southern end, since the remainder of the roadway was discontinued as part of the Stonebridge residential development.
<u>Union Valley Road Trail</u>	This trail would create a loop that begins at Route 613 across from the soccer complex, follows Perrineville Road south, then turns east and north paralleling Union Valley Road and Bergen Mills Road, and ends back at the soccer complex.





III. Environmental Screening

An environmental assessment was performed to identify potential constraints within the township and potential permitting requirements that may pertain to the proposed trail network. Environmental features were investigated through spatial mapping data, requests to regulating agencies and field reconnaissance on publicly accessible lands and rights-of-way.

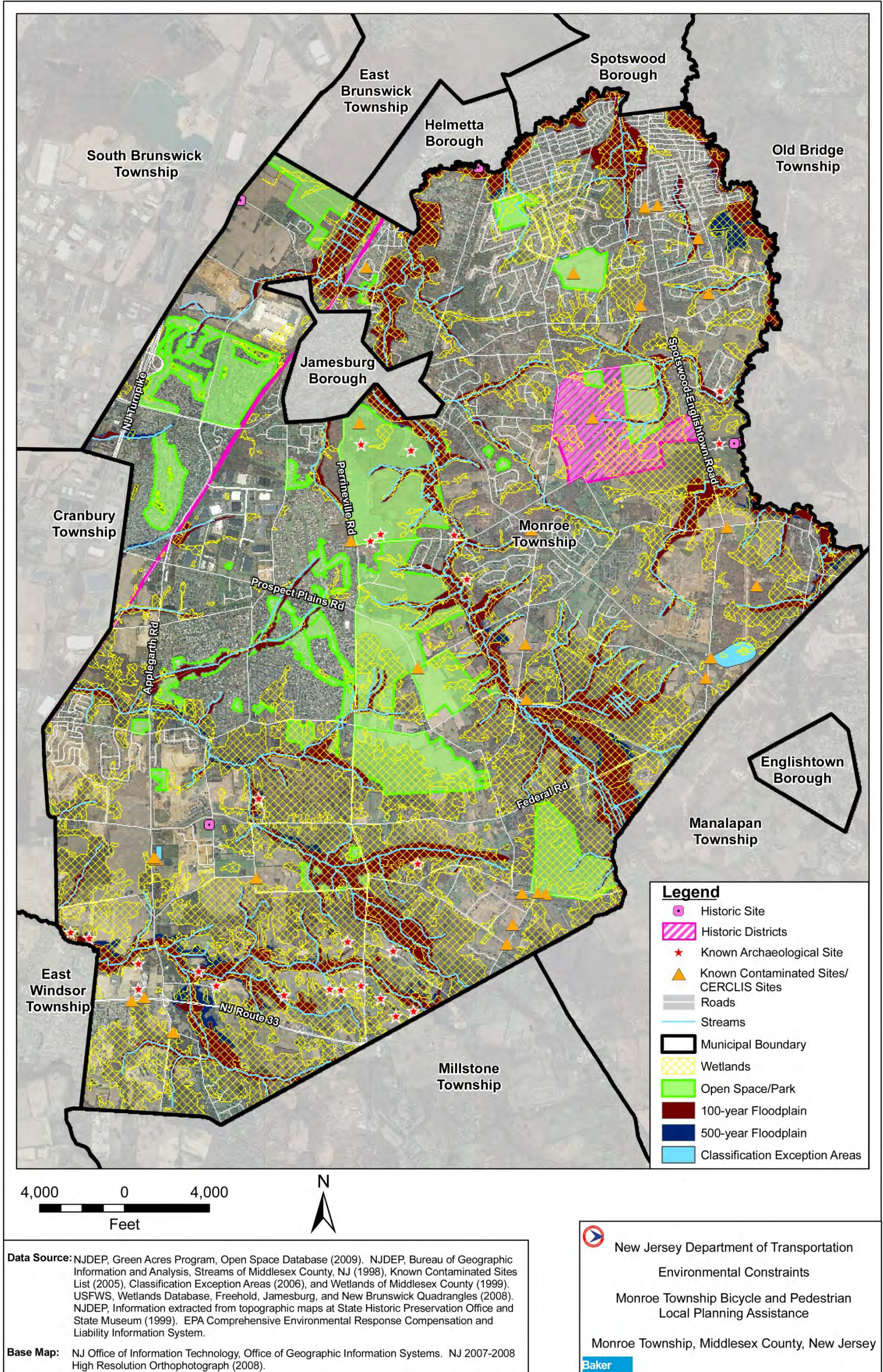
Features investigated included freshwater wetlands, surface water resources, floodplains, potential contaminated sites, cultural resources, and threatened and endangered species habitat. Specifically the following were reviewed:

- National Environmental Policy Act/NJ Executive Order 215
- Section 106 of the National Historic Preservation Act/NJ Register of Historic Places Act
- Section 4(f) of the US Department of Transportation Act
- Section 7 of the Endangered Species Act
- New Jersey Department of Environmental Protection (NJDEP) Freshwater Wetlands Protection Act
- NJDEP Flood Hazard Area Control Act
- NJDEP Stormwater Management Rules
- New Jersey No Net Loss Reforestation Act
- Soil Erosion and Sediment Control Plan Act, Chapter 251, Public Law 1975
- Delaware and Raritan Canal Commission Authorization

The environmental features described above were combined into a single map to display the cumulative environmental constraints for Monroe. This map is illustrated in **Figure 2**.

More detailed explanations and maps illustrating each environmental feature reviewed are included in **Appendix A. Environmental Assessment Memorandum**.

Figure 2. Monroe Township Environmental Constraints Map





IV. Trail Routing and Analysis

The environmental screening provided the background for performing a preliminary analysis of proposed trail routes in Monroe. Route analysis was based upon review of trail alignments relative to the environmental features as well as aerial photography, Geographic Information System (GIS) data, and where possible, field reviews of trails that were publicly accessible. Trails on private land were not investigated.

Eight (8) trail alignments were selected for analysis. Each alignment was selected based on its characteristics (e.g., length, location within the township, etc.) to be individually evaluated and to serve as a potential example for analysis of other trail alignments. These trails were:

1. Union Valley Road
2. Community Center Connector Trail #1
3. Community Center Connector Trail #2
4. East-West Trail #1
5. East-West Trail #2
6. Butterfly and Wildlife Park Walking Path
7. Manalapan Brook Nature Trail
8. PSE&G ROW Trail

The resulting matrix summarizing potential environmental constraints identified in the routing analysis is provided (**Table 4**) following this discussion. Using the matrix, several observations can be made relative to the environmental constraints in developing the trails. The observations are:

- a. Wetlands:** Each alignment reviewed has potential impacts to wetlands. It is recommended that wetland delineations be performed and trails shifted, where possible, to avoid wetland areas.
- b. Floodplain and Riparian Zone:** All but one (1) alignment (Community Connector Trail #1) has likely impacts to floodplains or riparian zones. These features limit the amount of vegetation that can be removed and the amount of fill used in trail development.
- c. Review Zone B:** Trails routed in the southern section of the township (e.g., East-West Trail #1, Butterfly and Wildlife Park Walking Path), and especially by the Millstone River, will potentially require review by the D&R Canal Commission. Review Zone B is review established zone for the commission to assess projects that may adversely impact the ecology of the D&R Canal Park.
- d. Cultural Resources:** Three (3) trails have potential impacts to cultural resources (e.g., historic properties, archaeological sites). As with the wetlands, trails should be shifted, where possible, to avoid impacts to cultural resources and reduce review related to the trails.

- e. **Other Features:** Through input and discussions with stakeholders, some additional features were identified for consideration. One of these is open space protected through farmland preservation mechanisms. It will be important to review the protection for open spaces on which trails are routed. There may be limitations as the type and/or placement of the trail based on how the land was protected. Another feature was the potential location of state park by Union Valley Road and Perrineville Road. The location of the park could not be identified in the environmental screening or routing analysis, but a final check should be performed before the trail is developed.

A more detailed description of the routing analysis the eight (8) trail alignments is included in **Appendix B. Trail Routing and Analysis.**



Section of a utility corridor included as part of proposed PSE&G ROW trail, near Route 612



Table 4. Matrix of Potential Environmental Constraints

Trail Name	Wetlands	Floodplain & Riparian Zone	Parks	Section 4(f) Cultural Resources	Contaminated Sites	Listed Species ¹	Review Zone B D&R Canal Commission	Other Potential Issues
Union Valley Road								
Community Center Connector Trail #1								
Community Center Connector Trail #2					*			*County-owned open space is undergoing a remediation project
East-West Trail #1								
East-West Trail #2								
Butterfly and Wildlife Park Walking Path								
Manalapan Brook Nature Trail								
PSE&G ROW Trail								

No impact anticipated
 Potential impact anticipated
 Likely impact anticipated

¹ According to the United States Fish and Wildlife (USFWS) NJ Field Office *Federally Listed and Candidate Species Occurrences in New Jersey by County and Municipality* document (April 2009), there is a potential for the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened swamp pink to be present in Monroe. Coordination with the USFWS may be required to determine if either species is present and if the proposed project activities will have adverse effects.





V. Trail Development Plan

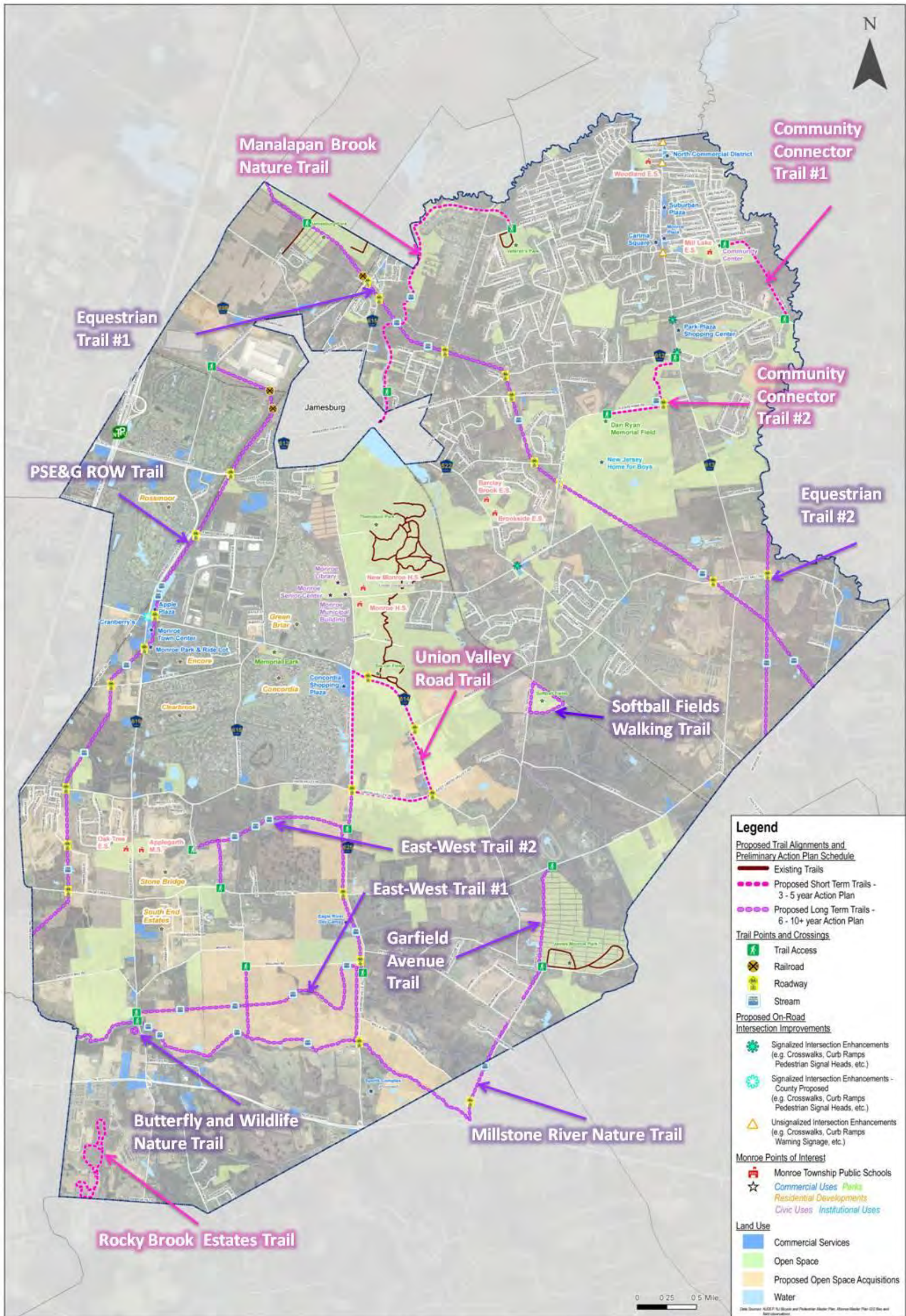
The Trail Network Development Plan is based on study findings, field investigations, environmental screening, trail routing analysis and public input provided by residents, local and county officials, and stakeholders. The plan is separated into **Short-Term Trails** and **Long-Term Trails**. The short-term trails are trails that could be potentially developed over a 3 – 5 year time frame and are shorter in length than many of the long-term trails. Although field investigations were limited due to access restrictions to private land, it is anticipated that the short-term trails would encounter or could be routed to reduce possible environmental impacts. However, the environmental controls and related regulatory actions will need to be determined on a case-by-case basis once the final routing and trail type is established. The proposed trail network is illustrated in **Figure 3. Trail Network Development Map**. In addition, an **Existing and Proposed Trails Map** handout was prepared to assist in communicating the development plan. A copy of this map is included in **Appendix C**.

Trails proposed by Monroe Township and those identified during the conduct of this study are detailed in the following section according its categorization as a short- or long-term trail. The trail is accompanied by a description, overview of connections, potential constraints, length and characteristics relating to that specific trail alignment. Although each trail is treated in a standalone manner to assist in trail development based upon township priorities (e.g., funding, technical assistance, etc.), trail development should occur in the context of building a township-wide network with regional connections. Cost estimates for the trails could not be determined due to limited access for most trails and since final costs will be based on final alignments, desired amenities and environmental constraints encountered.

Trail recommendations identified in this plan were developed with guidance from the Federal Highway Administration (FHWA) and US Forest Service (USFS) *Trail Construction and Maintenance Notebook* and *Equestrian Design Guidebook for Trails, Trailheads and Campgrounds*, and the FHWA *Designing Sidewalks and Trails for Access*.

A listing of general trail development considerations are included in **Section VI** and a directory of technical assistance resources and funding sources for trail improvements are contained in **Section IX**.

Figure 3. Trail Network Development Map



A. Short Term Trails

Five (5) trails are identified as **Short-Term Trails**. These trails are anticipated to be shorter in length and have fewer potential environmental impacts. They also have the opportunity to connect to existing trails, community destinations, existing and proposed on-road bicycle and pedestrian improvements, and within new developments. These trails are:

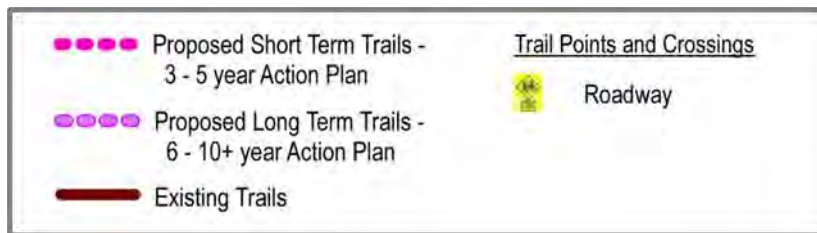
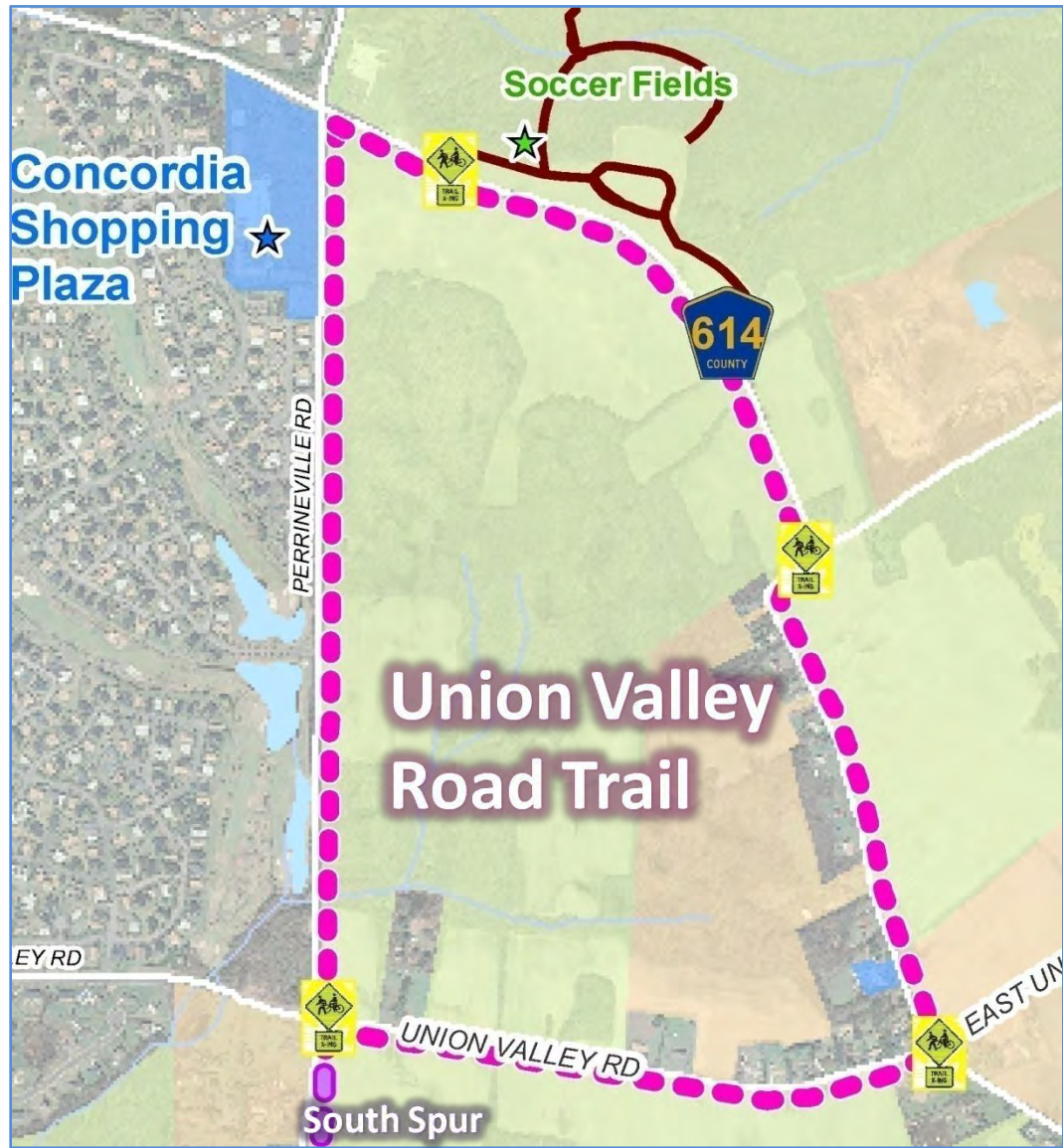
1. Union Valley Road Trail
2. Community Center Connector Trail #1
3. Community Center Connector Trail #2
4. Manalapan Brook Nature Trail
5. Rocky Brook Estates Trail

Each short-term trail alignment is illustrated and described according to trail characteristics (e.g., length, tread width, etc.) on the following pages.



Mill Lake Elementary School and the Monroe Township Community Center

a. Union Valley Road Trail





Trail Description:	<ul style="list-style-type: none"> • Loop trail located in the central section of Monroe. • Begins and terminates on Route 614 across from the Monroe Township Soccer Complex • South of Route 614, the trail parallels Perrineville Road, Union Valley Road and Bergen Mills Road • Located on existing open space and proposed open space acquisitions
Access Points:	<ul style="list-style-type: none"> • Major access point on Route 614 by the soccer fields • Trail roadway crossing locations on Union Valley Road and Bergen Mills Road
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Soccer complex paved trails, with link to the Gravel Hill Trail • South to proposed East-West Trail #2
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 3 miles • South Spur: 0.3 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Parks • Contaminated Sites <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Four (4) roadway crossings included on the proposed trail • Crosses private land at the intersection of Union Valley Road and Bergen Mills Road that would require an easement • Portions of existing open space along Perrineville Road may be a state park



b. Community Center Connector Trail #1





Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the northeast section of the township • Begins at the rear of the Monroe Township Community Center and extends south to Texas Road • Located on existing open space and private property, and is partially located along River Road
Access Points:	<ul style="list-style-type: none"> • Monroe Township Community Center • Intersection of Texas Road and River Road
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Existing sidewalk on Texas Road and on Matchaponix Road • Proposed pedestrian improvements at the intersection of Texas Road and River Road • Proposed 'Share the Road' bicycle improvement on Texas Road and Matchaponix Road, between River Road and Route 613
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural, with an existing paved surface along River Road.
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 6' – 10' (width of existing sections)
Approximate Trail Length:	<ul style="list-style-type: none"> • 1 mile
Potential Constraints:	<ul style="list-style-type: none"> • Wetlands <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Reported there ATV use along existing sections of this trail • The use of bollards at access points could limit the entrance of ATV's on to the trail • Patrols by township police can be used to enforce township and NJDEP regulations to reduce ATV use in this area



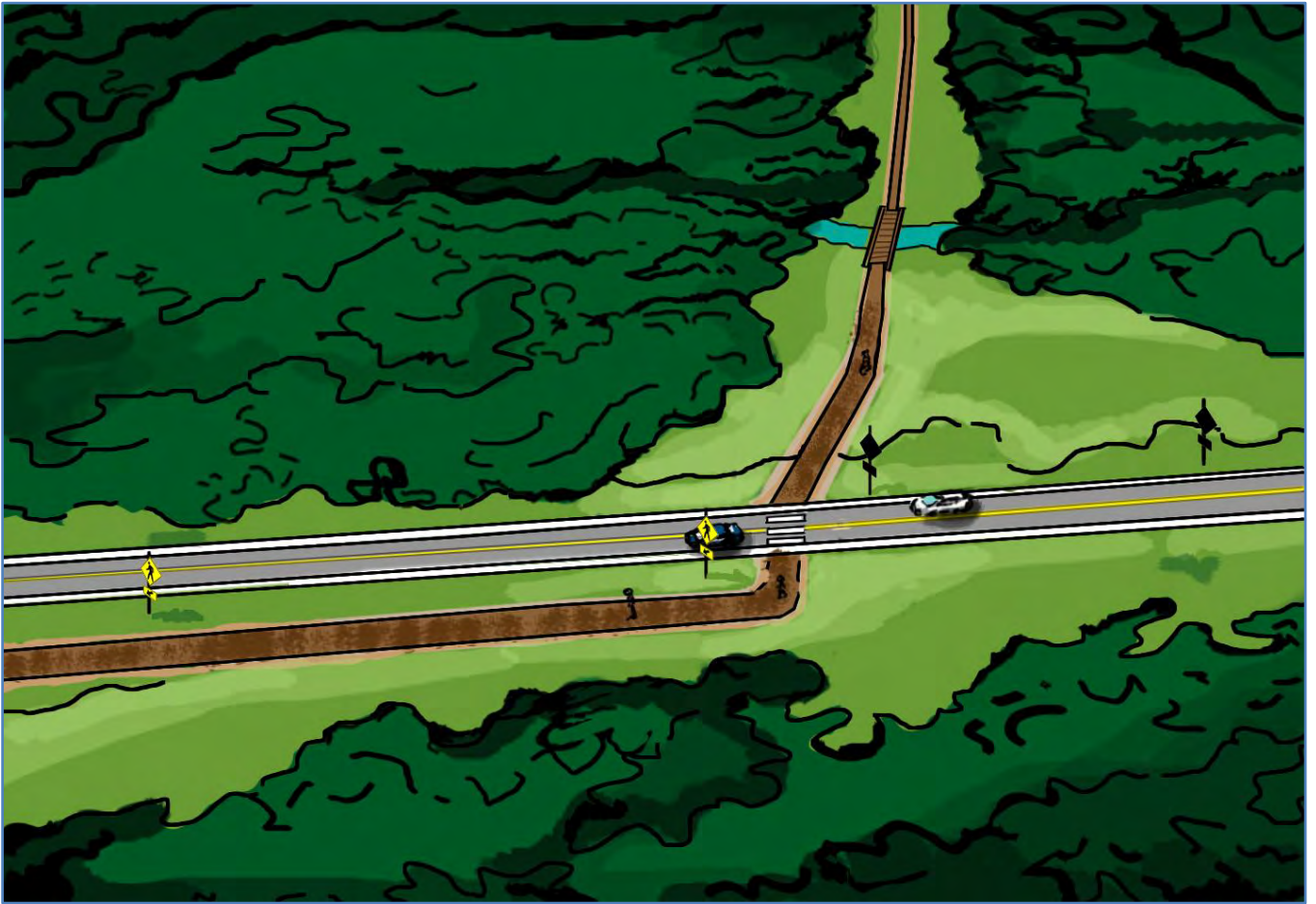
c. Community Center Connector Trail #2





Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the northeast section of the township • Begins at the intersection of Route 613 and Matchaponix Road, and extends southwesterly to State Home Road and the Dan Ryan Memorial Field complex • Located on existing open space and on state land
Access Points:	<ul style="list-style-type: none"> • This trail would be accessible from intersection of Route 613 and Matchaponix Road and from the Dan Ryan Memorial Field complex
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Existing sidewalk on Route 613 and on Matchaponix Road • Community Center Connector Trail #1 via proposed bicycle facility improvements on Matchaponix Road and proposed intersection pedestrian improvements at Texas Road and River Road
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 1 mile
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Site undergoing remediation <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • One (1) stream crossing included on the proposed trail • One (1) roadway crossing included on the proposed trail • Partially routed on state land (NJ State Home for Boys) and will require coordination with state officials • Coordination for access to and use of County open space as remediation plans are advanced

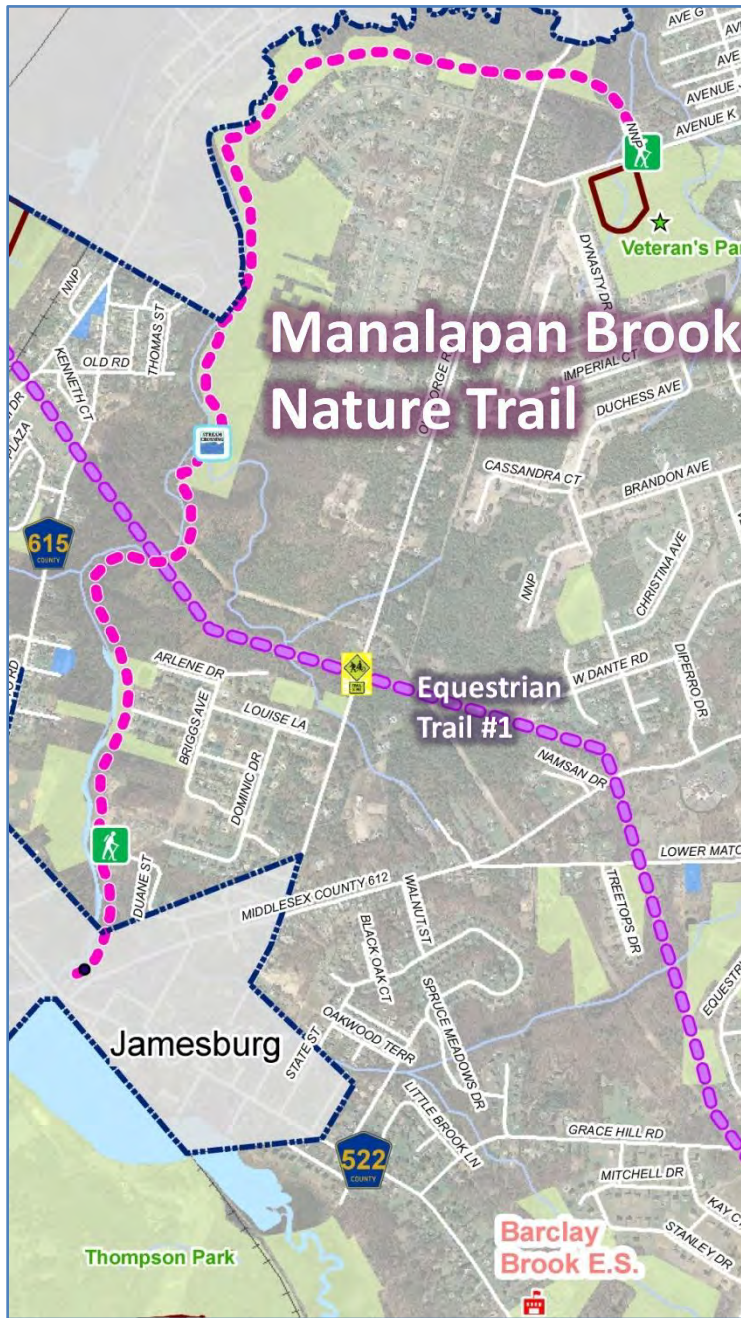




**Conceptual sketch of Community Center Connector Trail
at crossing on North State Home Road**



d. Manalapan Brook Nature Trail

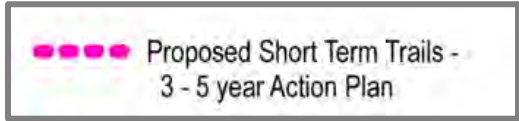




Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the north central section of the township • Begins at Veteran’s Park and ends at the township border with the Borough of Jamesburg • Parallels the Manalapan Brook on the brook’s eastern bank • Located on public open space and private land
Access Points:	<ul style="list-style-type: none"> • Veteran’s Park on Avenue K • Duane Street off Route 612 (Pergola Avenue) • Potential access to the trail is located in Jamesburg at the intersection of Route 522 (East Railroad Avenue) and Route 612 (Forsgate Drive)
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Existing loop trail at Veteran’s Park • Thompson Park trail network, via Jamesburg • Proposed long-term Equestrian Trail #1
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3’ – 6’
Approximate Trail Length:	<ul style="list-style-type: none"> • 3 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located along the embankment of a waterway • Crosses private land that would likely require easements or acquisition to continue the proposed routing • One (1) stream crossing included on the trail



e. Rocky Brook Estates Trail





Trail Description:	<ul style="list-style-type: none"> • A set of loop trails located in the southwestern section of the township • Loop trails are internal to site • Located on private land as part of new residential development, Rocky Brook Estates
Access Points:	<ul style="list-style-type: none"> • Access through Rocky Brook Estates residential development
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • None
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 2 miles (<i>for total length of loop trails; shorter trail lengths are possible using an individual loop</i>)
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located on private land that may require easement or allowance for public access



B. Long Term Trails

Nine (9) trails are identified as **Long-Term Trails**. These trails are primarily longer distance trails, have more potential environmental impacts, have connections to proposed trails and on-road bicycle and pedestrian improvements, and have less direct connections to community destinations. These trails are:

1. East-West Trail #1
2. East-West Trail #2
3. Butterfly and Wildlife Park Walking Path
4. Millstone River Nature Trail
5. PSE&G ROW Trail
6. Equestrian Trail #1
7. Equestrian Trail #2
8. Softball Fields Walking Trail
9. Garfield Avenue Trail

Each long-term trail alignment is illustrated and described according to trail characteristics on the following pages.



Equestrian Crossing Sign on Spotswood-Gravel Hill Road



a. East-West Trail #1

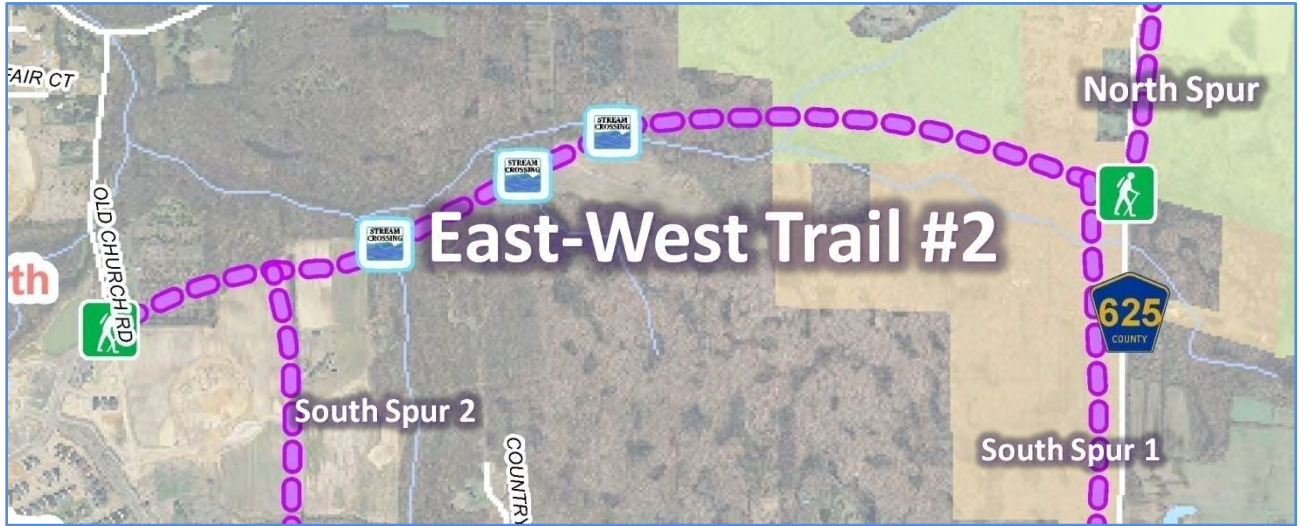




Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the southern central section of the township • Extends between Perrineville Road and Route 619 • Two (2) spurs proposed off the trail: the north spur connects to England Road and the south spur connects to the proposed Millstone River Nature Trail. • Located on proposed open space acquisitions and private land
Access Points:	<ul style="list-style-type: none"> • Perrineville Road • Route 619 • England Road via north spur
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • South to the proposed Millstone River Nature Trail • North to proposed East-West Trail #2 • North to England Road, which is an unimproved right-of-way that could serve a future shared use facility
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 2.5 miles • North Spur 1: 1.2 miles • South Spur 1: 0.6 miles • North Spur 2 and South Spur 2: 0.3 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Review Zone B D&R Canal Commission <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Crosses private land that would likely require easements or acquisition to continue the proposed routing • Four (4) stream crossings included on the proposed trail



b. East-West Trail #2

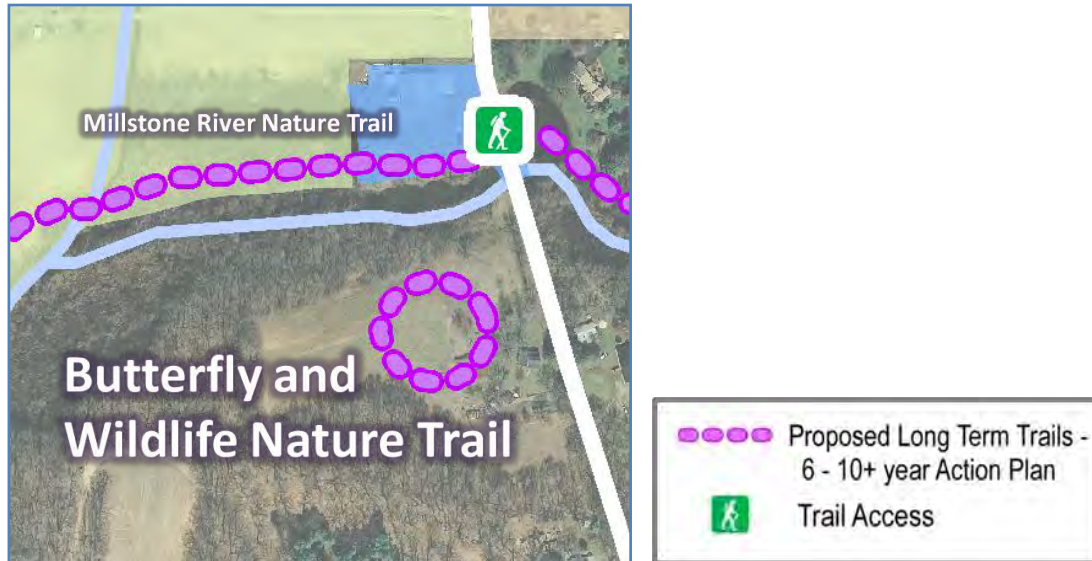




Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the southern central section of the township • Extends between Perrineville Road and Old Church Road • Located on existing open space, proposed open space acquisitions and private land
Access Points:	<ul style="list-style-type: none"> • Perrineville Road • Old Church
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Church Road, which would link to a proposed ‘Share the Road’ bicycle facility on Union Valley Road. • South to Federal Road, which has existing sidewalk and 6’ wide shoulders between Route 619 and the proposed trail end • South to proposed East-West Trail #1 • North to proposed Union Valley Road Trail
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3’ – 6’
Approximate Trail Length:	<ul style="list-style-type: none"> • 2.5 miles • North Spur: 0.3 miles • South Spur 1: 0.4 miles • South Spur 2: 1.2 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Review Zone B D&R Canal Commission <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • The trails cross private land that would likely require easements or acquisition to continue the proposed routing • There are three (3) stream crossings included on the proposed trail alignment



a. Butterfly and Wildlife Park Walking Path



Trail Description:	<ul style="list-style-type: none"> • Loop trail located in the southwestern section of the township • Stand-alone trail included as part of a proposed commercial development
Access Points:	<ul style="list-style-type: none"> • Proposed commercial development site.
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • None • Possible future north connection with the Millstone River Nature Trail
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 0.1 Mile
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Cultural Resources <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • This trail is part of development site • The trail may require an easement or developer agreement to allow public access

d. Millstone River Nature Trail

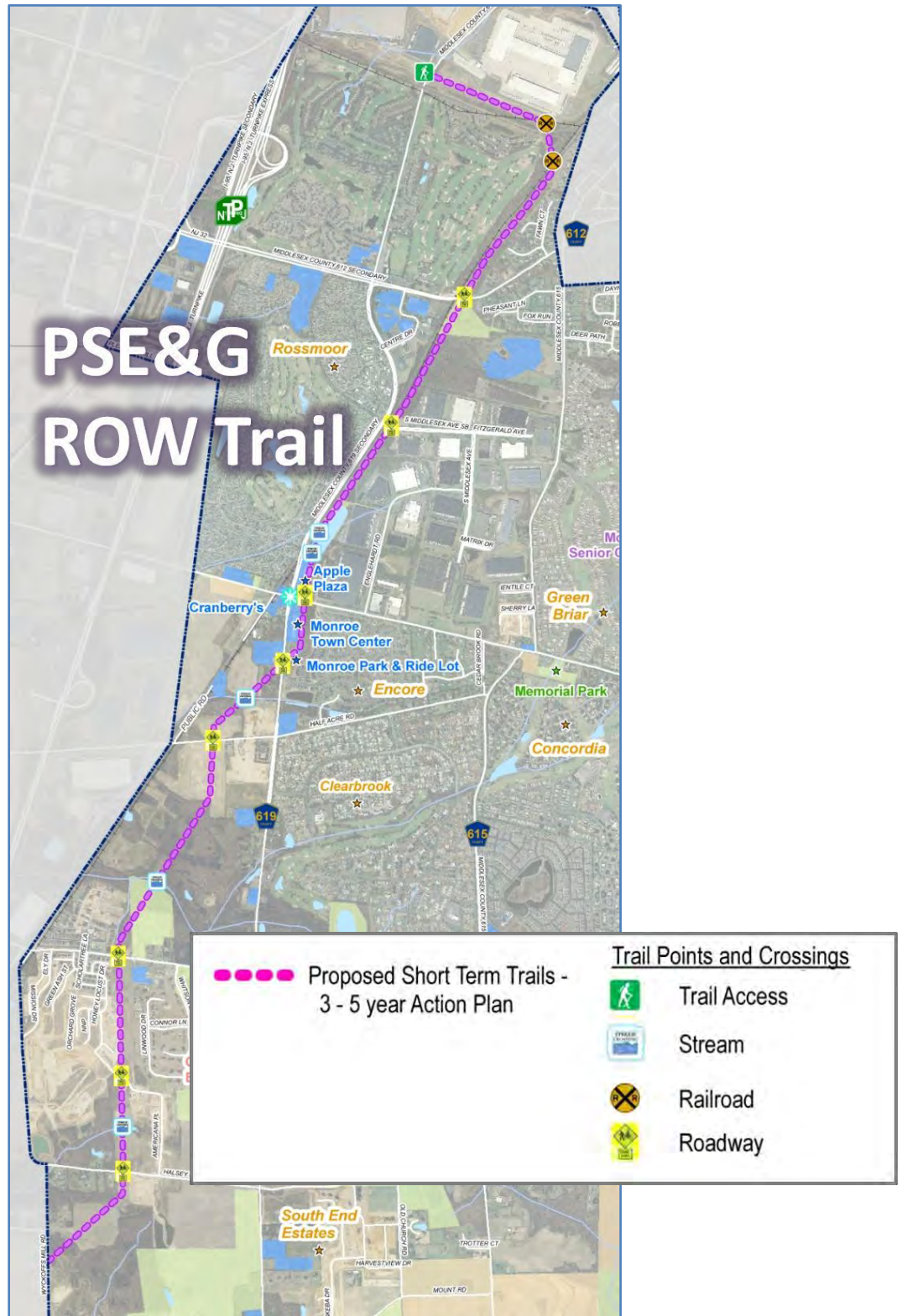




Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the southern section of the township • Extends between the township border with East Windsor and James Monroe Park • Parallels the Millstone River on the river’s northern bank • Located on public open space, proposed open space acquisitions, private land and within Millstone Township
Access Points:	<ul style="list-style-type: none"> • James Monroe Park • Route 619 • Potential access within Millstone Township
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Millstone Township • East Windsor Township • South spur 1 and 2 of East-West Trail #1 • Garfield Avenue Trail
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3’ – 6’
Approximate Trail Length:	<ul style="list-style-type: none"> • 5.5 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Review Zone B D&R Canal Commission <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located along the embankment of a waterway • Crosses private land and would likely require easements or acquisitions to continue the proposed routing • Would likely require coordination with Millstone Township officials and/or trail representatives • Five (5) stream crossings included on the proposed trail



e. PSE&G ROW Trail

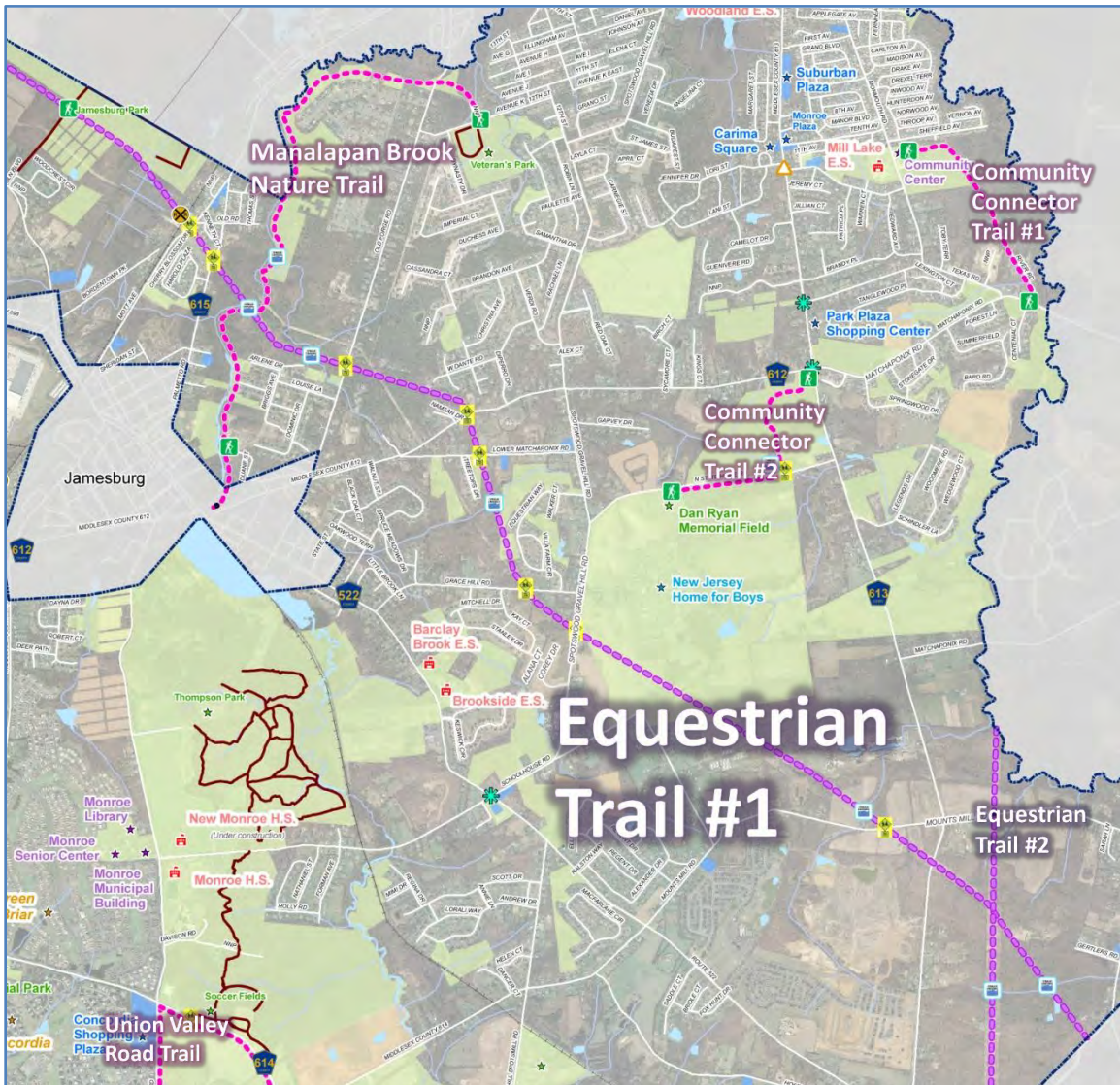




Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the western section of the township • Extends between East Windsor Township and Route 619, north of Route 612 (Forsgate Road) • Located on provide land under overhead utility structures
Access Points:	<ul style="list-style-type: none"> • Route 619 • Route 612 • South Middlesex Avenue • Route 614 • Cranbury-Half Acre Road • Route 615 • Halsey Reed Road • Potential access from East Windsor
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Existing sidewalk on Route 615 • Proposed Route 615 'Share the Road' bicycle facility improvements • Proposed sidewalk improvements along Route 614
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 6 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • Cultural Resources <p><i>For more information see Section IV. Trail Routing and Analysis</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located along a utility corridor and would require coordination and/or approval from utility provider(s) to allow access and use • North of Route 614, the trail parallels an active freight rail line • Crosses private land and would likely require easements or acquisition to continue the proposed routing • Five (5) stream crossing included on the proposed trail • Two (2) rail line crossings on the proposed trail



f. Equestrian Trail #1



	Proposed Long Term Trails - 6 - 10+ year Action Plan		Trail Access
	Proposed Short Term Trails - 3 - 5 year Action Plan		Stream
	Signalized Intersection Enhancements (e.g. Crosswalks, Curb Ramps)		Roadway
			Unsignalized Intersection Enhancements (e.g. Crosswalks, Curb Ramps Warning Signage, etc.)

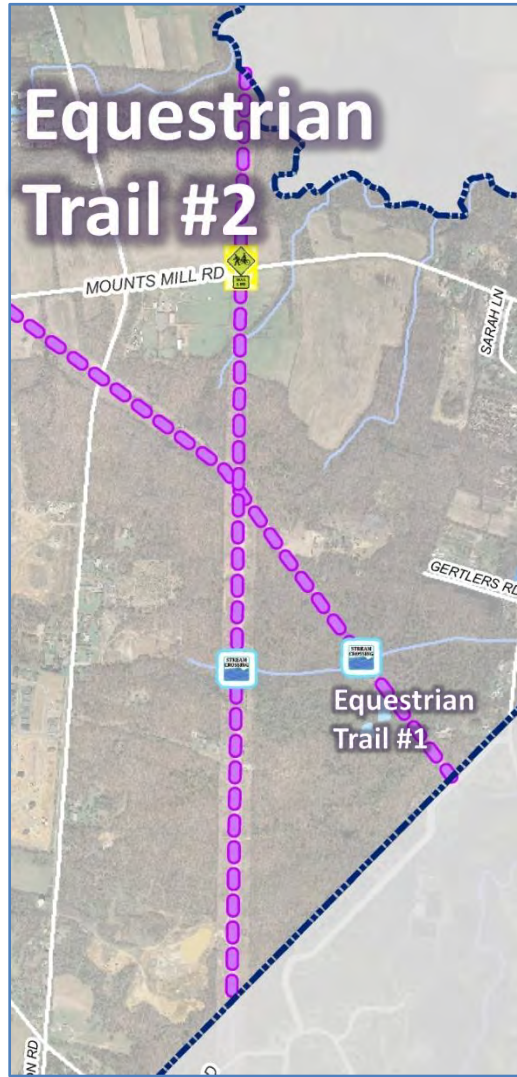


Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the northern section of the township • Extends between the Jamesburg Park Conservation Area and township boundary with Manalapan Township to the east • Located on public land, state land and private land, including sections under overhead utility structures
Access Points:	<ul style="list-style-type: none"> • Jamesburg Park Conservation Area (on Lincoln Boulevard) • Mott Avenue • Route 615 • Old Forge Road • Route 612 • Lower Matchaponix Road • State Home Road • Spotswood-Gravel Hill Road • Mounts Mill Road • Potential future access from South Brunswick, East Brunswick and Manalapan Townships adjacent to Jamesburg Park Conservation Area
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Proposed Manalapan Brook Trail • Proposed Equestrian Trail #2
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 6' – 10'
Approximate Trail Length:	<ul style="list-style-type: none"> • 6.6 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • D&R Canal Commission Review Zone B <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located along a utility corridor and would require coordination and/or approval from utility provider(s) to allow access and use • Crosses private land and would likely require easements or acquisition to continue the proposed routing • Four (4) stream crossings included on the proposed trail • Explore connections to horse farms in the township





g. Equestrian Trail #2





Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the eastern section of the township • Extends between the township boundaries with Old Bridge and Manalapan • Located on private land under overhead utility structures
Access Points:	<ul style="list-style-type: none"> • Mounts Mill Road • Potential future access from Old Bridge and Manalapan Townships • Potential future access from proposed Equestrian Trail #1
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • Proposed Equestrian Trail #2
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 6' – 10'
Approximate Trail Length:	<ul style="list-style-type: none"> • 1.7 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands • D&R Canal Commission Review Zone B • Cultural Resources <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Located along a utility corridor and would require coordination and/or approval from utility provider(s) to allow access and use • Crosses private land and would likely require easements or acquisition to continue the proposed routing • One (1) stream crossing included on the proposed trail • Explore connections to horse farms in the township





h. Softball Fields Walking Trail



Proposed Long Term Trails -
6 - 10+ year Action Plan



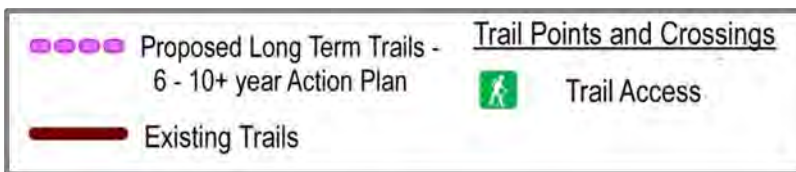
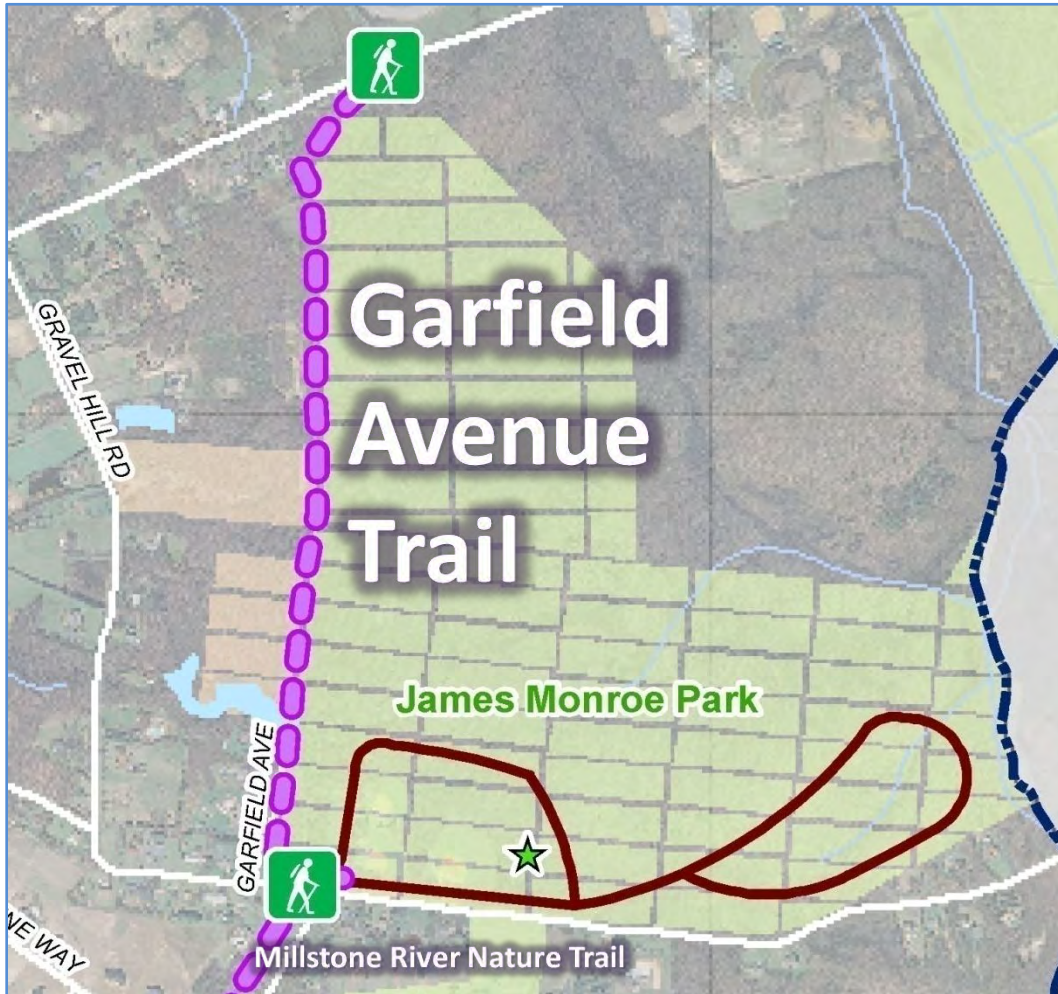


Trail Description:	<ul style="list-style-type: none"> • Loop trail located in the central section of the township • Trail loop follows a perimeter around the Monroe Softball Field Complex • Located on public space/recreational space
Access Points:	<ul style="list-style-type: none"> • Monroe Softball Field Complex on Gravel Hill Spotsmill Road
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • None
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 0.9 miles
Potential Constraints:	<ul style="list-style-type: none"> • Floodplain and Riparian Zone • Wetlands <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Routing of path around fields to avoid interference with softball games • Routing of path around utility area at southwestern corner of property





i. Garfield Avenue Trail





Trail Description:	<ul style="list-style-type: none"> • Linear trail located in the eastern section of the township • Extends between Gravel Hill Road and Federal Road • Located along partially along Garfield Avenue and follows western edge of James Monroe Park • Located primarily along public land
Access Points:	<ul style="list-style-type: none"> • Gravel Hill Road • Federal Road • Potential future access from proposed Millstone River Nature Trail
Trail Connections and Future Alignments:	<ul style="list-style-type: none"> • James Monroe Park • Proposed Millstone River Nature Trail
Proposed Trail Surface:	<ul style="list-style-type: none"> • Natural
Proposed Trail Tread Width:	<ul style="list-style-type: none"> • 3' – 6'
Approximate Trail Length:	<ul style="list-style-type: none"> • 0.9 miles
Potential Constraints:	<ul style="list-style-type: none"> • Wetlands <p><i>For more information see Section III. Environmental Screening</i></p>
Other Considerations:	<ul style="list-style-type: none"> • Crosses private land and would likely require easements or acquisition to continue the proposed routing • Explore connections to horse farms along Federal Road





VI. Trail Development Considerations

There are additional issues to be considered when developing trails. These issues should be investigated during the final design and routing of the trail and final determinations about intended trails users (e.g., equestrians, hikers, etc.).

A. Trail Surface

The identified trails are proposed as natural surface trails so existing surfaces (e.g., dirt, grass, etc.) would be maintained. If a different trail surface is desired, such as gravel or wood chips, it will be necessary to review environmental impacts and regulations. The installed surface will likely be assessed as a fill and could affect drainage on and around the trail. Also, it should be noted that trail surfaces will impact accessibility for people with disabilities. For trails identified for greater access, provide firm, stable surfaces are recommended.

B. Trail Amenities

Trail amenities need to be considered based upon the final alignment, type and trail user. Amenities can include maps, interpretative displays, benches, and rest areas. Amenities can also include water fountains and restrooms, but these have additional requirements for installation and maintenance. Signage at access points for trails, displaying the trail route and the trail system throughout the municipality, provides valuable information to the user.



Signage for Veteran's Park



Trail benches with interpretative signage

C. Trail Blazing

Denoting the path of the trail by using blazes or other markers is a valuable tool for users to navigate the route. Trail blazing is especially important to indicate changes in routing when multiple trails are present and to mark locations where trails intersect. Blazes can be as simple as a painted marking or more formalized through the use markers, signs or posts. Middlesex County uses a 1.25" x 2.5" paint blaze for trails on County lands. The painted blazes were developed to be consistent with the trail marking used by the Appalachian Trail Conference.

A system of blazes and a predetermined interval for installation should be considered as each trail is developed. In particular, the county painted blaze system should be utilized on trail or trail segments crossing county-owned land.



Trail blazing for Drexel Wood trail in Lawrence, NJ



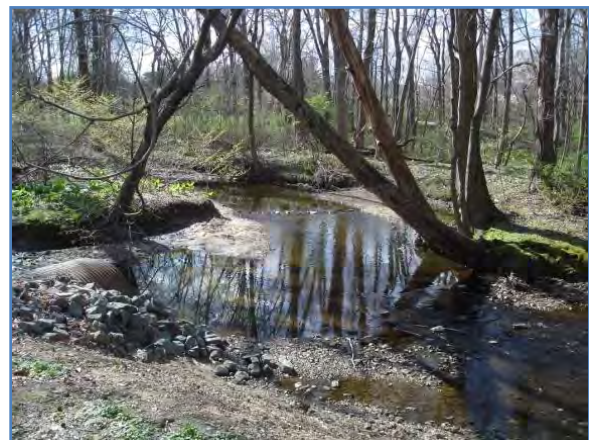
Trail blazing for the Patriots Path in Morristown, NJ

D. Stream Crossings

Although most trails in the plan encounter at least one (1) stream crossing, it is recommended that stream crossing be limited to a minimum as final alignments are determined. When a stream crossing is necessary, fords, culverts and bridges are three (3) treatments that can be utilized. Fords and culverts work for trails that cross narrow and shallow streams; fords specifically work well in locations where streams have stable banks and gentle slopes and where streams are shallow enough for flat-topped stones to be used in facilitating the crossing. Bridges work better for streams that are wide, have steep banks or have deep or fast moving water. Bridges, which can range from logs to prefabricated structures, should always be located above the high water mark of the stream.



Pedestrian bridge stream crossing



Fording location where stream is narrow and shallow

E. Roadway Crossings

Many of the proposed trails cross roadways in the township. At intersection crossing locations, trail users need to be informed through signage in advance of crossings and

provided with accommodations at the actual crossing location. Similarly, motorists and other roadway users need to be alerted to the crossing movement of the trail. Recommendations for facilitating roadway crossings at signalized and unsignalized crossing locations (e.g., high visibility crosswalk markings, warning signage, etc.) are detailed in the *Roadway Network Improvement Plan*.



High visibility crosswalk at roadway crossing for the D&R Canal towpath



Gate prior to roadway crossing for the D&R Canal towpath

F. Senior Residents

Over 40% of Monroe Township residents are 60 years of age or older. Trail planning should consider these residents during development of final alignments and identification of trail amenities. For example, on trails near senior communities or near senior venues, the use of trail links to form loops, the frequent use of benches and level, stable trail surfaces are important considerations.

G. Parking

Trail access points can be reached through a variety of modes. As part of a trail's development, the potential need for designated parking areas should be considered. In locations where an access point is along a road that lacks pedestrian or bicycle facilities, parking will likely be a factor. Moreover, on equestrian trails, consideration is necessary regarding parking spaces for trucks with horse trailers and the loading and unloading needs of the horses.



Truck with horse trailer

(Source: *Designing Shared-Use Trails to Include Equestrians*, Anne O'Dell)

H. Trail Maintenance

Trail maintenance is an essential activity for a trail network and should be considered as final trail alignments are determined. There will be natural occurrences, such as erosion and seasonal damage from freezing and thawing, that affect trails over time, but choices in alignment can minimize these occurrences such as erosion. The maintenance program for trails should anticipate routine activities for litter removal, trail sweeping and trimming of overgrowth as well as more intensive repairs to address issues such as erosion, stabilization of trail surfaces and clearing blowdowns (e.g., fallen trees and tree limbs).

I. Compaction in Wetlands

Compaction of soils to create trails may adversely affect wetland hydrology. As such, the use of boardwalks could be considered for trails that cannot be routed around wetlands. However, boardwalk is relatively expensive to incorporate into trail systems. Additionally, wood boardwalks can rot because of the wet conditions and require frequent maintenance. Recycled plastic as decking material has become more prevalent on boardwalk trails and should be evaluated as trail details are determined.



Boardwalk along trail in Cape May, NJ

J. Design Flood

When proposed trails are located in close proximity to bodies of water and in flood hazard areas, the level of effort to maintain these paths after a storm event, and the expected frequency of storm events, should be considered. One way to balance the desire for the trail and the potential maintenance is to compare the floodplain of several storm events with the location proposed trail alignment. To do this, the floodplain elevation for several storm events, such as the 50% (2-year), 10% (10-year), 5% (20-year), and 2% (50-year) storms, should be calculated and spatially identified. The

elevation of the proposed trail can then be compared with the storm event elevations and relocated to limit exposure.

K. Topography

Proposed trail alignments should be evaluated for existing topography. Where there are steep slopes, which are often present near waterways, permanent soil erosion and sediment control measures may be required to stabilize the slopes. A common practice for trails with steep slopes is referred to as the half-rule, which states the grade of trail should not be greater than half of the slope of the landscape being traversed. If the trail grade is steeper, then fall-lines can occur, channelizing water across the trail and causing erosion. Additionally, for trails adjacent to drainage ditches, the existing roadway drainage should be reviewed and assessed for changes as the trail may alter the amount and type of drainage at these locations.

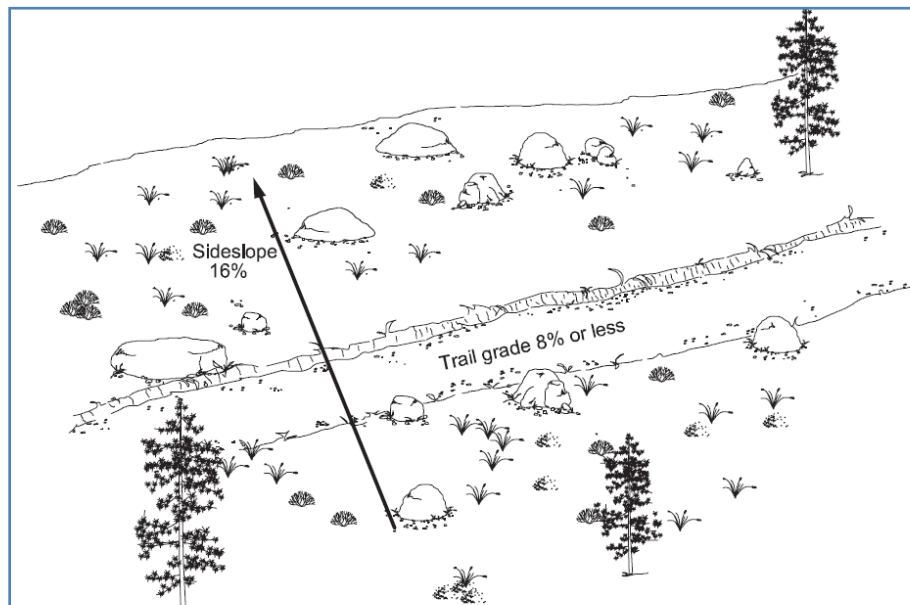


Illustration of the 'half rule'

(Source: FHWA/USFS Trail Construction and Maintenance Notebook)



VII. Trail Development Plan Implementation Resources

Development of the trail network will require support and resources, including trail walks to determine final alignments and physical conditions of the terrain, coordination with public and private landowners, and follow-up work to mark and clear the trails. Additional capital resources to fund trail construction, roadway crossing treatments, and stream crossings will be part of process as well.

Presented below are resources to assist in trail development and funding in Monroe. This information should be referenced along with the plan to guide implementation of the proposed trail network.

A. Trail Development Resources

Numerous documents and guides have been developed to assist in trail development, building and maintenance. The following table has been compiled to provide information on these materials.

TRAIL BUILDING	<p>Federal Highway Administration (FHWA) and US Forest Service (USFS) <i>Trail Construction and Maintenance Notebook</i> www.fhwa.dot.gov/environment/fspubs/00232839/</p>
	<p>USFS <i>National Trail Drawings and Specifications</i> http://www.fs.fed.us/database/acad/dev/trails/trails.htm</p>
	<p>USFS <i>Trail Bridge Catalog</i> www.fs.fed.us/na/wit/WITPages/bridgecatalog/</p>
	<p>USFS <i>Accessibility Guidebook on Outdoor Recreation and Trails</i> http://www.fs.fed.us/recreation/programs/accessibility/</p>
	<p>FHWA <i>Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice</i> http://www.fhwa.dot.gov/environment/conflicts/index.htm</p>
	<p>FHWA <i>Bicycle & Pedestrian Program, Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide</i> http://www.fhwa.dot.gov/environment/sidewalk2/index.htm</p>





TRAIL BUILDING (continued)	American Trails <i>Trailbuilding Resources and Library</i> http://www.americantrails.org/resources/trailbuilding/index.html
	American Association of State Highway And Transportation Officials (AASHTO) <i>Guide for the Development of Bicycle Facilities, 3rd Edition</i>
RAILS-WITH-TRAILS	Federal Highway Administration <i>Rails-with-Trails: Lessons Learned - Literature Review, Current Practices, Conclusions</i> http://www.fhwa.dot.gov/environment/rectrails/rwt/
EQUESTRIAN TRAILS	FHWA <i>Equestrian Design Guidebook for Trails, Trailheads and Campgrounds</i> http://www.fhwa.dot.gov/environment/fspubs/07232816/toc.htm
	FHWA <i>Designing Shared-Use Trails to Include Equestrians</i> http://www.fhwa.dot.gov/environment/bikeped/allow_uses_eqnm.htm
	Equestrian Land Conservation Resource (ELCR) <i>Trails, Access and other Issues</i> http://www.elcr.org/index_resc_D.php
	Anne M. O'Dell <i>Equestrian and Other Nonmotorized Use on Bicycle and Pedestrian Facilities</i> http://atfiles.org/files/pdf/ODellEquesTrails.pdf
NEW JERSEY TRAILS	New Jersey Trails Plan <i>New Jersey Trails Plan 2008 Update</i> www.njtrailsplan.org/
	New York-New Jersey Trail Conference http://www.nynjtc.org/
	New Jersey Trails Association http://www.njtrails.org/





B. Trail Development Funding

Funding sources identified to support design and implementation of trails are included below. These trail funding sources supplement the funding sources for bicycle and pedestrian improvements identified in **Appendix B: “Funding Pedestrian and Bicycle Planning, Programs and Projects”** and **Appendix C: “Transportation Enhancements (TE) funding”** of the *Roadway Network Improvement Plan*.

TRAIL FUNDING SOURCES

- **National Park Service (NPS)**
Rivers, Trails, and Conservation Assistance Program
<http://www.nps.gov/ncrc/programs/rtca/>
- **New Jersey Department of Environmental Protection (NJDEP)**
New Jersey Trails Program Grants
http://www.state.nj.us/dep/parksandforests/natural/trail_grants.htm
- **Redwood Creek Wines**
Redwood Creek Greater Outdoors Project
<http://www.blazethetrail.com/greatoutdoors/>
- **Equestrian Land Conservation Resource (ELCR) and Breyer Animal Creations**
Land Conservation Grants
http://www.elcr.org/index_breyer.php
- **American Hiking Society**
National Trails Fund
<http://www.americanhiking.org/NTF2010application.aspx>
- **National Trails Training Partnership**
Funding for Trails and Greenways: How To Do It
<http://www.americantrails.org/resources/funding/Funding.html>
- **Eastman Kodak Company, the National Geographic Society, and The Conservation Fund**
Kodak American Greenways Program
http://www.conservationfund.org/kodak_awards

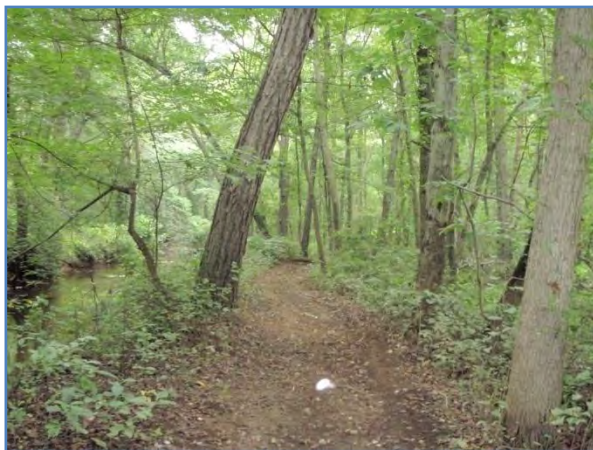




VIII. Conclusion

Monroe Township is building the framework for a trail network that will link residents and enhance the health and natural environment of the community. This trail network will provide opportunities for transportation and recreation, and connect Monroe to its neighboring towns and boroughs.

The **Trail Network Development Plan** was developed to advance the township trail network by providing guidance on the overall network, final alignments and implementation of the individual trails. This plan is a dynamic document that will serve as reference and starting point for the township. Together with the **Roadway Network Improvement Guide**, Monroe Township has established the groundwork for community with improved access and mobility for bicyclists and pedestrians and equestrians.





**Monroe Township
Bicycle and Pedestrian Planning Study**

***Appendix
A***

***ENVIRONMENTAL
SCREENING***

Trail Network Development Plan

I. Introduction

As part of the trail planning work, an environmental assessment was performed to determine key environmental parameters within the township and to identify potential permitting requirements that may pertain to the proposed trail network. Environmental parameters examined include freshwater wetlands, surface water resources, floodplains, potential contaminated sites, cultural resources, and threatened and endangered species habitat.

Brief descriptions are included below for these parameters and potentially applicable reviews. Figures illustrating the environmental parameters in Monroe are included at the end of this appendix.

A. National Environmental Policy Act/NJ Executive Order 215

Depending on the funding source, projects may be subject to environmental review under the National Environmental Policy Act (NEPA) or NJ Executive Order 215 (NJ EO 215). If the project receives federal funding, the project would require review under NEPA. If the project is not federally funded, but receives at least 20% funding from the State of New Jersey, review would be required under NJ EO 215.

a. NEPA

Under NEPA, there are three levels of analysis depending on whether or not the undertaking could significantly affect the environment. These levels include Environmental Impact Statements (EIS) for projects that result in significant impacts to the environment, Environmental Assessments (EA) for projects in which it has not been determined whether or not the project will result in significant impacts, and Categorical Exclusions (CE) for projects that have been determined by a federal agency as having no significant environmental impact.

In 23 Code of Federal Regulations (CFR) §771.117, the Federal Highway Administration (FHWA) lists project types that are categorically excluded from environmental evaluation under their NEPA regulations. The project types are further divided into those that do not require review by the FHWA, which are considered to be NJDOT self-certifying, and those that do. Based on the project types described in 23 CFR §771.117(c), the construction of bicycle and pedestrian lanes, paths, and facilities typically qualifies as self-certifying. As such, it is anticipated that NEPA documentation requirements can be met with a CE. However, as the project progresses, if it is determined that the project will result in significant adverse impacts or the project becomes publically controversial, then more in depth documentation may be required.

b. NJ EO 215

Since NEPA only applies to undertakings by federal agencies, if no federal funding is obtained for the project and only state funding is used, then the project must document environmental impacts through the EO 215 process. As stated in EO 215, “projects classified as CEs pursuant to regulations promulgated in accordance with NEPA” are exempt from the executive order. Additionally, it should be noted that projects that require a full EIS pursuant to NEPA are also exempt. As discussed above, it is likely that the proposed project would qualify for a CE and as such, would be exempt from EO 215.

B. Section 106 of the National Historic Preservation Act/NJ Register of Historic Places Act

Section 106 of the National Historic Preservation act requires all projects with federal oversight to be reviewed by the Advisory Council on Historic Preservation prior to the approval of the expenditure of federal funds. In New Jersey, the project must be submitted to the State Historic Preservation Officer (SHPO) for review. To initiate consultation, a letter is typically sent identifying consulting parties, describing public outreach efforts, delineating an Area of Potential Effect (APE), identifying historic properties, and discussing effects on the identifying historic properties. Depending on whether or not the project will have an effect on the historic properties, additional coordination and potential mitigation may be required.

The NJ Register of Historic Places Act requires that project that will have an effect on a state registered historic place be reviewed and authorized by the Historic Sites Council. Based on the preliminary cultural resources screening, the only state registered historic site within Monroe Township is the Holmes-Tallman House (SR: 7/5/1979 NR: 9/12/1979). The Holmes-Tallman House is located on the corner of South River Cranbury and Brown’s Corner Road. The project does not propose new trails in this area and therefore, will not have an effect on the Holmes-Tallman House.

Please refer to the figure titled “Historic and Cultural Resources” at the end of this section for a map of the identified cultural resources in Monroe Township.

C. Section 4(f) of the US Department of Transportation Act

Section 4(f) of the US Department of Transportation Act stipulates that the FHWA and other US Department of Transportation (USDOT) agencies cannot approve a project that uses the land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible and prudent alternative and that the project includes all possible planning to minimize harm to the property resulting from use. Since the nature of trails is recreational, it is unlikely that authorization for use of parks and recreational areas would be required; however, historic places and documented archeological sites in Monroe could require Section 4(f) authorization if a trail project results in a use.

D. Section 7 of the Endangered Species Act

Section 7 of the Endangered Species Act guides activities to conserve threatened and endangered species and ensures protection against actions that could impact listed species or destroy or adversely modify critical habitat. Section 7 applies to management of Federal lands as well as other Federal actions that may affect listed species. According to the United States Fish and Wildlife (USFWS) NJ Field Office *Federally Listed and Candidate Species Occurrences in New Jersey by County and Municipality* document (April 2009), there is a potential for the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened swamp pink to be present in Monroe.

During the summer, Indiana bats roost in colonies under loose bark of dead or dying trees within riparian, floodplain, and upland forests. Forested areas that the trail alignments pass through may provide habitat for Indiana bat. Coordination with the USFWS may be required to determine if the proposed project activities will adversely affect Indiana bat habitat, particularly if the project will result in the removal of trees. If it is determined that Indiana bat is present within a project area, timing restrictions on project activities will likely be imposed. However, it is likely that a trail can be designed to avoid or greatly minimize potential adverse effect.

Swamp pink is an herbaceous plant found primarily in palustrine forested wetlands including swampy forested wetlands, meandering streamlets, headwater wetlands, and spring seepage areas. According to the USFWS, swamp pink requires areas to be perennially saturated, but not inundated, by floodwater. The water table must be at or near the surface, fluctuating only slightly during spring and summer months. The suitability for swamp pink should be evaluated during wetland delineations to determine the need for coordination with USFWS.

E. New Jersey Department of Environmental Protection Freshwater Wetlands Protection Act

The Freshwater Wetlands Protection Act (N.J.S.A.¹ 13:9B) establishes State jurisdiction over regulated activities occurring within freshwater wetlands, their transition areas, and State open waters. General Permit (GP) 17 (N.J.A.C.² 7:7A-5.17) authorizes activities in freshwater wetlands, transitions areas, and/or State open waters necessary for construction of a trail and/or boardwalk for use by pedestrians, bicycles, and other non-motorized methods of transport. In order to qualify for this GP 17, disturbance cannot exceed one quarter acre unless the site is publically own, in which case, there is no area threshold. Additionally, the width of the path cannot exceed 6 feet unless dictated by the Barrier Free Subcode of the Standard Uniform Construction Code (N.J.A.C. 5:23-7). GP 17 also requires that the trail be configured to minimize adverse environmental impact and incorporate features to educate the user about the importance of wetland resources. If the proposed project cannot meet the

¹ New Jersey Statutes Annotated

² New Jersey Administrative Code

criteria set forth by GP 17, it is likely that an Individual Freshwater Wetlands Permit will be necessary. Compensatory mitigation is required for Individual Freshwater Wetland Permits. Based on available mapping from the New Jersey Department of Environmental Protection (NJDEP), all of the proposed trails traverse through wetlands and depending on the proposed project activities, they will likely require authorization under the Freshwater Wetland Protection Act Rules.

Based on available geospatial mapping and limited field reconnaissance, trail activities in Monroe will likely occur within resources regulated under the Freshwater Wetland Protection Act Rules (N.J.A.C. 7:7A). Please refer to figures titled “NJDEP Freshwater Wetlands” and “USFWS National Wetlands Inventory” at the end of this section for maps of the potential wetland areas in the township.

F. New Jersey Department of Environmental Protection Flood Hazard Area Control Act

The Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) regulates activities in flood hazard areas and riparian zones. Based on available geospatial mapping from the Federal Emergency Management Agency (FEMA) and the NJDEP, there are several surface waters and 1% annual chance floodplains in Monroe Township. Please refer to the figures titled “Surface Water Resources” and “Floodplains” at the end of this section for maps of the surface water resources and floodplains within Monroe Township.

Based on the proposed trail alignments, it is likely that regulated activities will occur within the floodplain and/or riparian zone.

G. New Jersey Department of Environmental Protection Stormwater Management Rules

The NJDEP Stormwater Management Rules (N.J.A.C. 7:8) require that projects classified as major developments meet certain standards for water quality, water quantity, and groundwater recharge. A major development is defined as a development that disturbs one (1) or more acres of land or increases impervious surface by 0.25 acre or more. Projects that qualify as a major development must implement Best Management Practices (BMPs) to reduce adverse affects to water quality, water quantity, and groundwater recharge. To meet water quality standards, post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality storm must be reduced by 80% and all stormwater flowing over existing impervious surface must be treated to remove 50% TSS. To meet water quantity standards, the project must maintain the pre-construction runoff hydrographs for the same storm events or demonstrate that there is no increase in the peak runoff rates of stormwater leaving the project site. To meet groundwater recharge requirements, the project must maintain 100% of the average annual pre-construction groundwater recharge volume for the

site. The applicability of the Stormwater Management Rules should be evaluated for each trail as the trail material surface is selected and ground disturbance quantities are calculated.

Depending on the material selected for a trail and the construction methodologies, a project may qualify as a major development and have to adhere to the NJDEP Stormwater Management Rules.

H. New Jersey No Net Loss Reforestation Act

The New Jersey No Net Loss Reforestation Act (N.J.S.A. 13:1L-14.1 et seq.) requires that for a state project or project constructed on state land removing 0.5 acre or more of contiguous forest, the state agency must develop and execute a reforestation plan. The New Jersey No Net Loss Reforestation Act is not applicable to projects proposed in private land conducted by local municipalities or counties.

The reforestation requirement may be met through either on-site or off-site plantings or a monetary payment. In order to develop a compensatory mitigation plan, the characteristics of the existing forest including the size, health, and species of trees to be removed should be documented. The reforestation plan must include the number of each species to be planted, the types of trees, and the size of the replacement trees as well as landscape drawings, a planting diagram depicting the proposed method of planting, and tree planting specifications. A public forum must be conducted within the affected municipality at least 180 days prior to deforestation activity to collect written and oral comments on the reforestation plan.

Methods to avoid the removal of trees should be implemented in developing a trail or network of trails. The need to develop a reforestation plan should be evaluated as trail alignments are finalized and projects progress.

I. Soil Erosion and Sediment Control Plan Act, Chapter 251, Public Law 1975

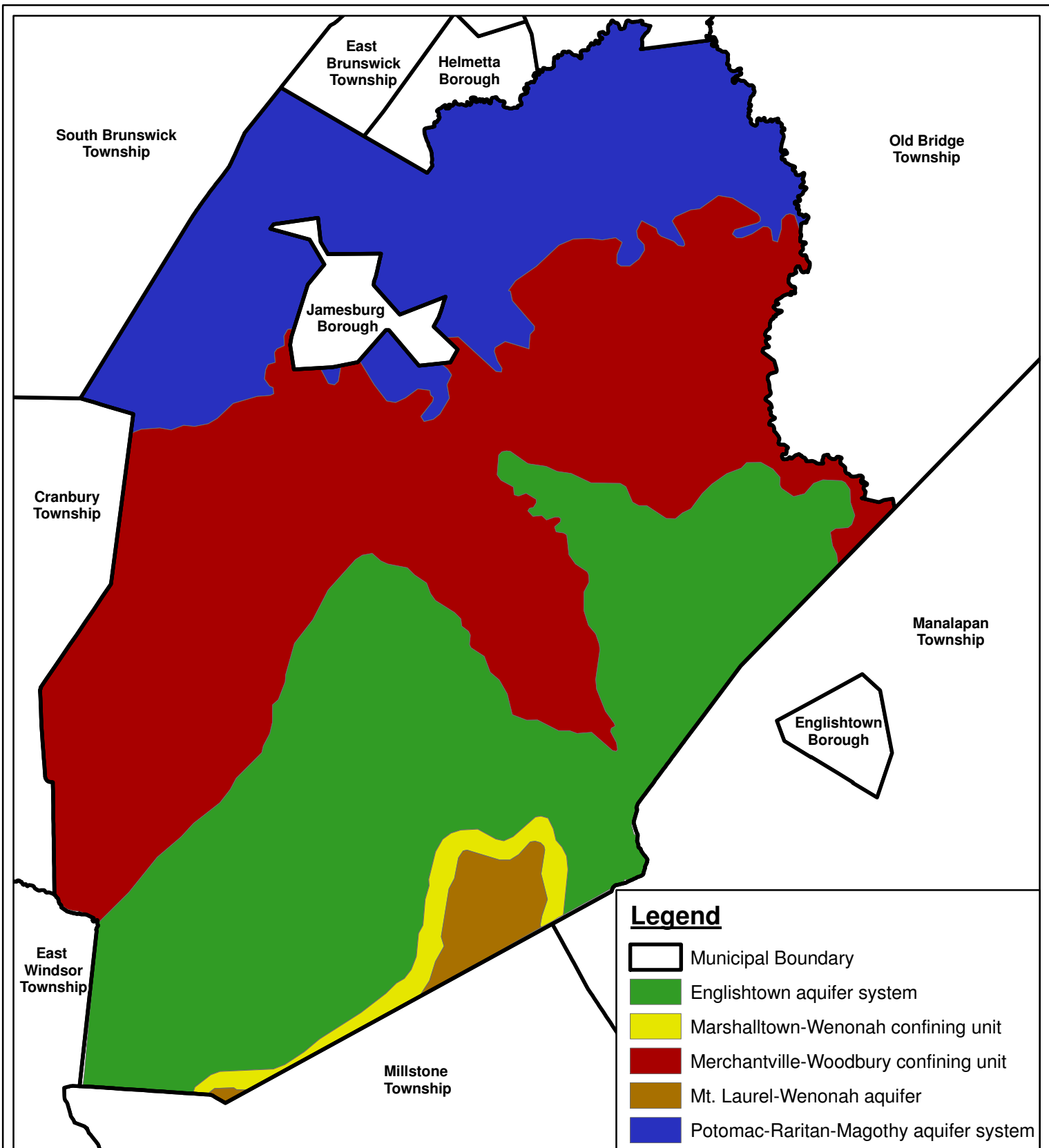
The Soil Erosion and Sediment Control Plan Act, Chapter 251, P.L. 1975 as amended (N.J.S.A. 4:24-39 et seq.) regulates construction and land disturbing projects to reduce the adverse impacts from storm water runoff, to retard non point source pollution from sediment and to conserve and protect the environment. Projects that result in more than 5,000 square feet (SF) of ground disturbance must include measures to protect the environment from soil erosion and sediment transport. The proposed soil erosion and sediment control plan must be reviewed and receive a Certification of Soil Erosion and Sediment Control. Certification is granted by the jurisdictional Soil Conservation District, which in Monroe is the Freehold Soil Conservation District. The NJDOT is considered a self-certifying agency, in that the NJDOT will certify to the Soil Conservation District that the appropriate standards are included in each project and will be used and maintained during construction. The need to obtain the Certification should be evaluated for each trail as the design progresses.

J. Delaware and Raritan Canal Commission Authorization







The Delaware and Raritan Canal Commission has established review zones in which proposed projects may cause an adverse drainage, aesthetic or other ecological impact on the Delaware and Raritan Canal Park. The Commission defines a major project as a project that results in one or more of the following:

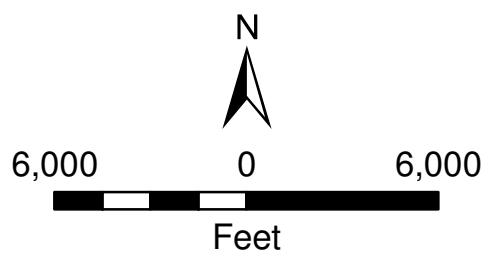
1. Introduces 0.25 acre or greater of impervious surface;
2. Disturbs one acre of land or more;
3. Disturbs 0.5 acre or more of existing impervious surface or significantly disturbed areas, for the purposes of construction, if the project site either drains into the Delaware and Raritan Canal or is located within a drainage area of a water course that discharge into the Delaware and Raritan Canal up to the point at which the water course drains less than 50 acres, including drainage areas of a tributary to those water courses up to the point at which the tributary drains less than 50 acres; or
4. In Zone A, a structure with a height greater than 40 feet above existing grade.

Based on the Commission Review Zone Map, the southwestern portion of Monroe Township is located within Zone B. Only major projects require authorization in Review Zone B.




Legend

-  Municipal Boundary
-  Englishtown aquifer system
-  Marshalltown-Wenonah confining unit
-  Merchantville-Woodbury confining unit
-  Mt. Laurel-Wenonah aquifer
-  Potomac-Raritan-Magothy aquifer system




Data Source: New Jersey Geological Survey, Aquifers of New Jersey (1999).

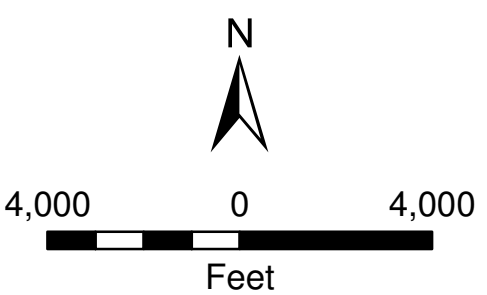
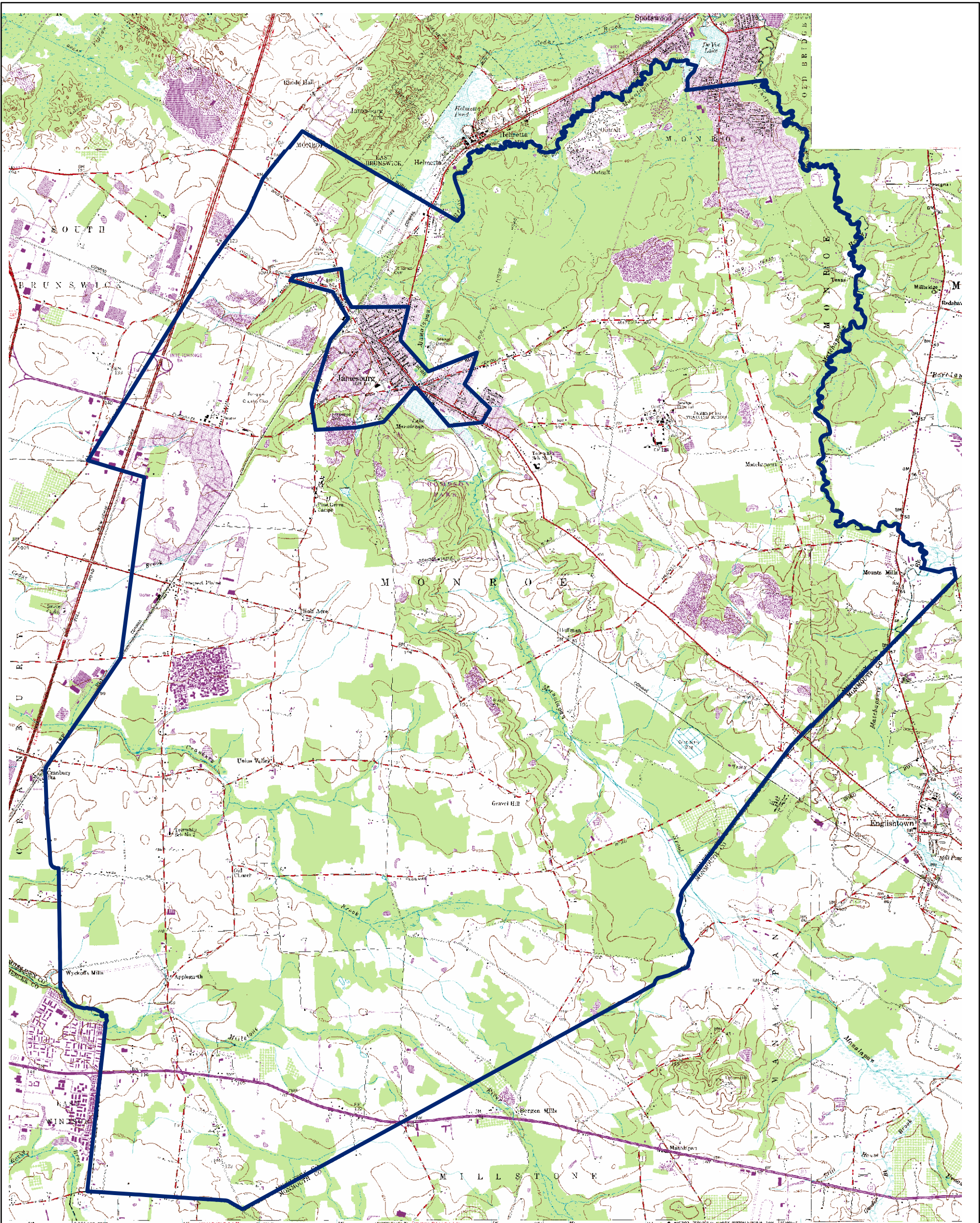
 New Jersey Department of Transportation



Aquifers of New Jersey

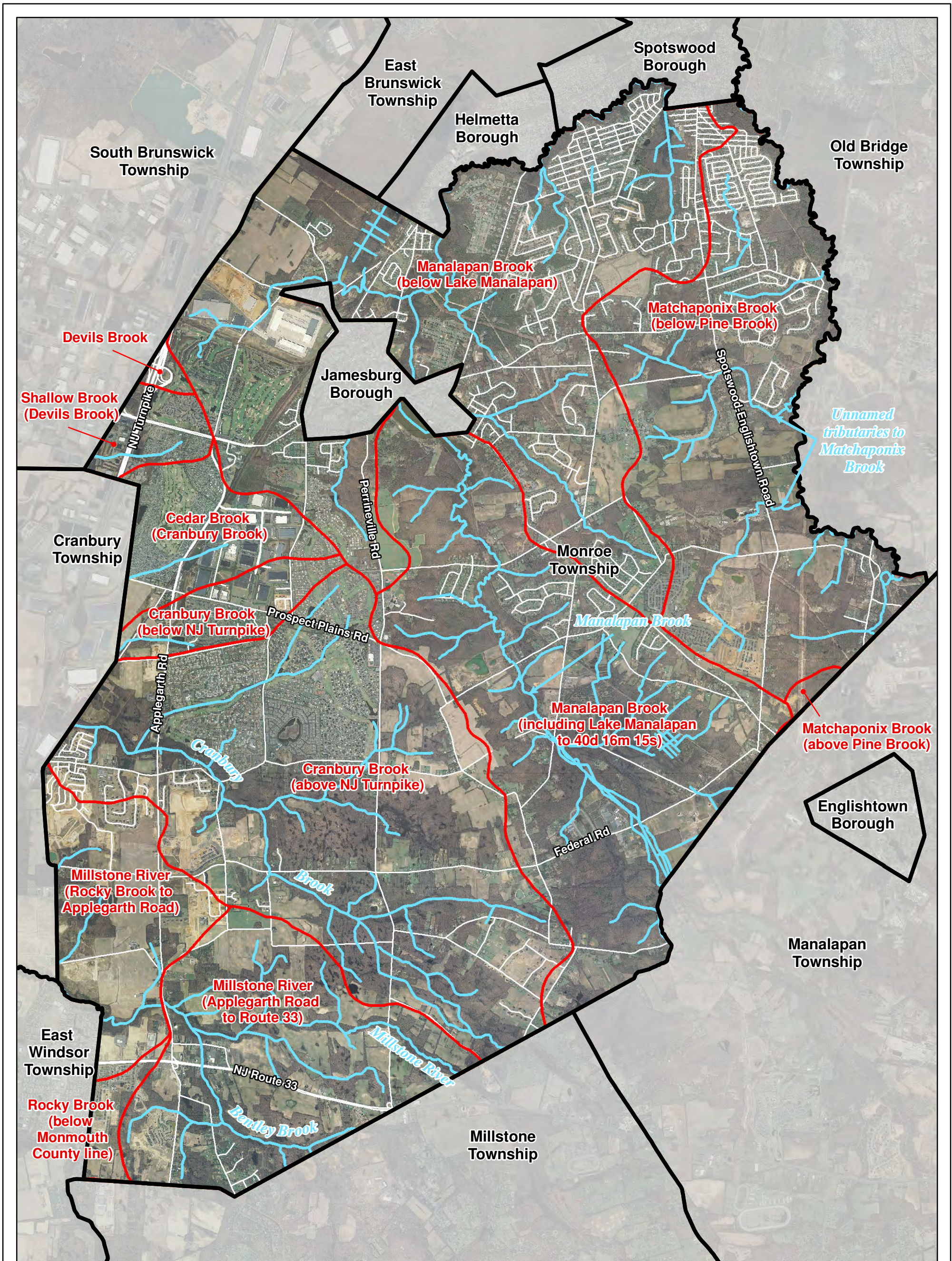
Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Township of Monroe
Middlesex County, New Jersey

 Baker



 New Jersey Department of Transportation
USGS 7.5' Topographic Map
New Brunswick, Jamesburg, and Freehold Quadrangles
Monroe Township Bicycle and Pedestrian
Local Planning Assistance
Monroe Township, Middlesex County, New Jersey









4,000 0 4,000 Feet


Data Source: NJDEP, Bureau of Geographic Information and Analysis, Streams of Middlesex County, NJ (1998). NJDEP, New Jersey Geological Survey, NJDEP 14 Digit Hydrologic Unit Code delineations for NJ (1996).


Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).

Legend


-  Roads
-  Streams
-  Subwatershed
-  Municipal Boundary

 New Jersey Department of Transportation

 Surface Water Resources

 Monroe Township Bicycle and Pedestrian Local Planning Assistance

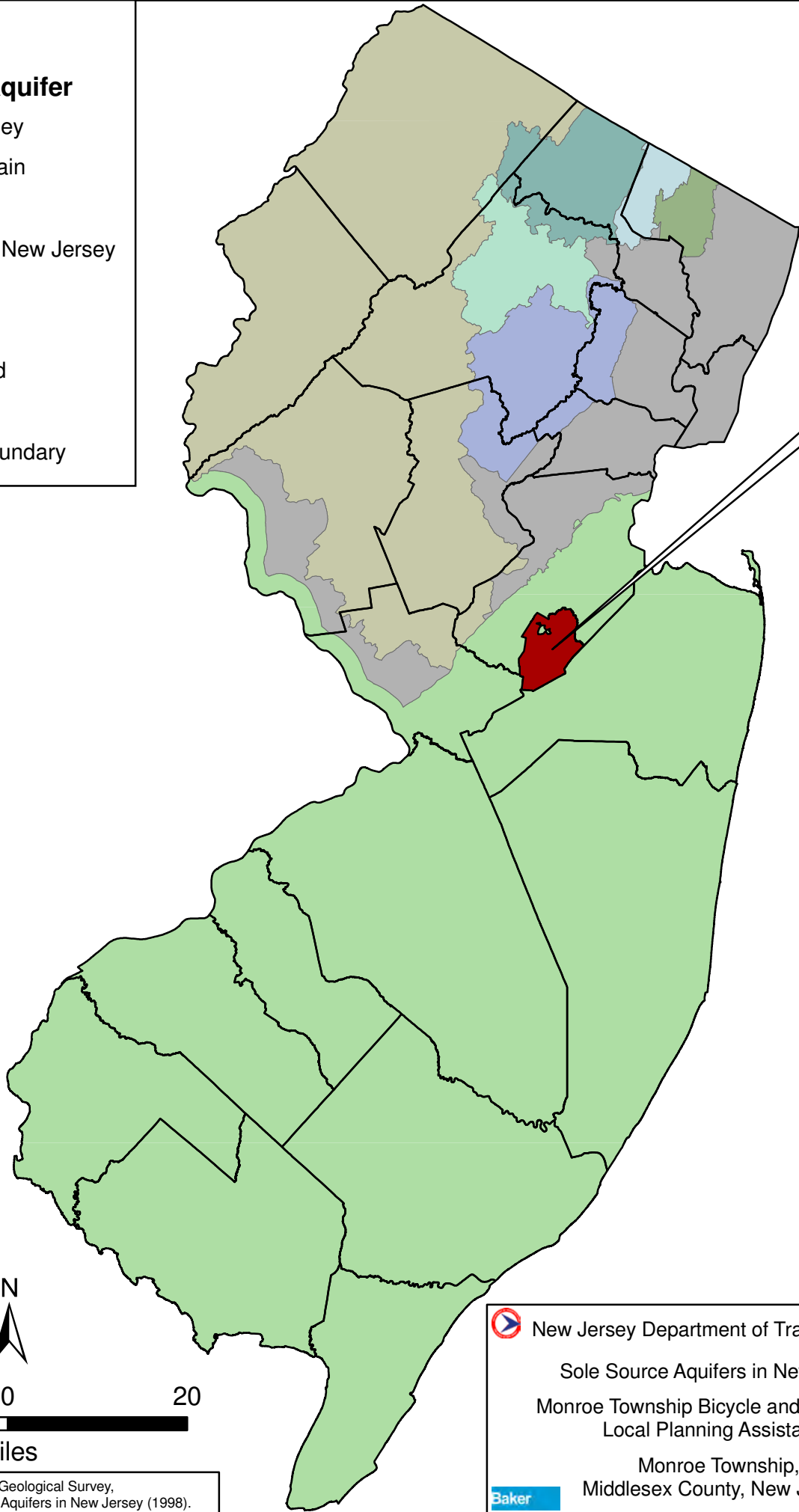
Monroe Township, Middlesex County, New Jersey

 Baker

Legend

Sole Source Aquifer

- Buried Valley
- Coastal Plain
- Highlands
- Northwest New Jersey
- Not a SSA
- Ramapo
- Ridgewood
- Rockaway
- County Boundary




Monroe Township



20 0 20

Miles

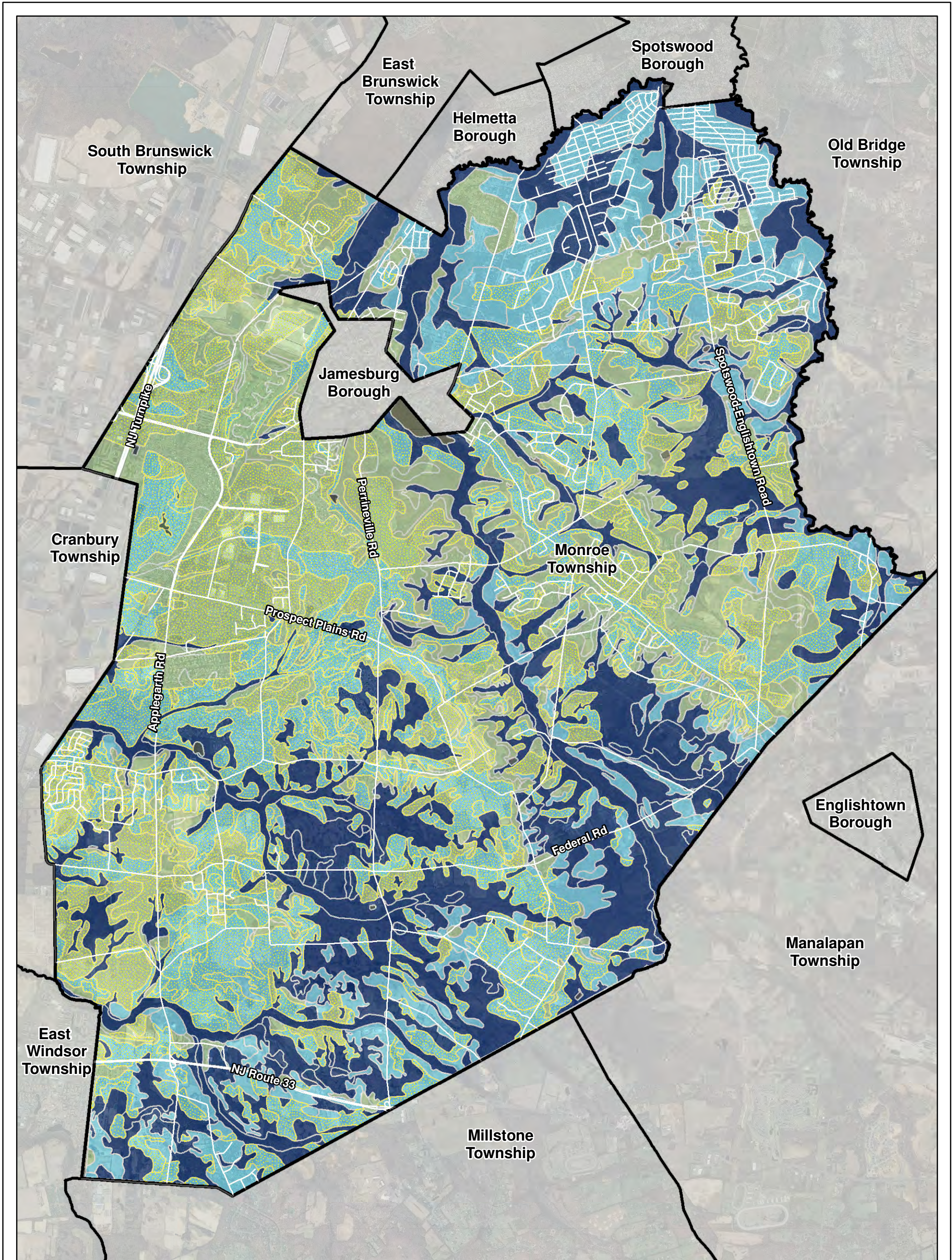
 New Jersey Department of Transportation

Sole Source Aquifers in New Jersey
Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Monroe Township,
Middlesex County, New Jersey




Data Source: New Jersey Geological Survey,
Sole Source Aquifers in New Jersey (1998).



4,000 0 4,000 Feet


Legend

-  Roads
-  Municipal Boundary
-  Prime Farmland
-  Hydric Soil
-  Contains components of hydric soil
-  Nonhydric Soil

 New Jersey Department of Transportation
Soils

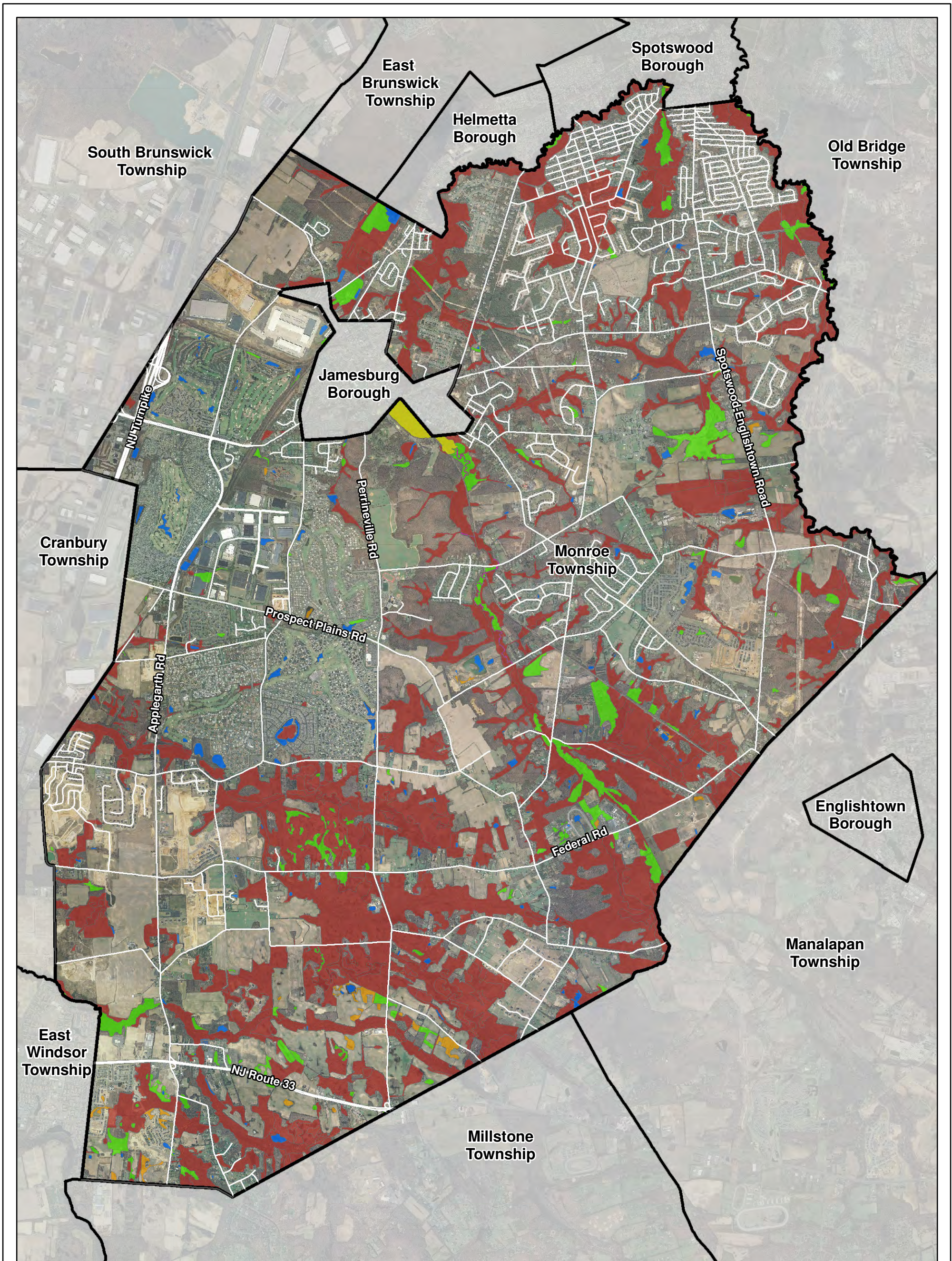
Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Monroe Township, Middlesex County, New Jersey

 Baker


Data Source: USDA, Natural Resources Conservation Service, Soil Survey Geographic 2005 Database for Middlesex County, NJ (2004).

Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).




Legend

-  Roads
-  Municipal Boundary
-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub Wetland
-  Freshwater Pond
-  Lake
-  Other
-  Riverine



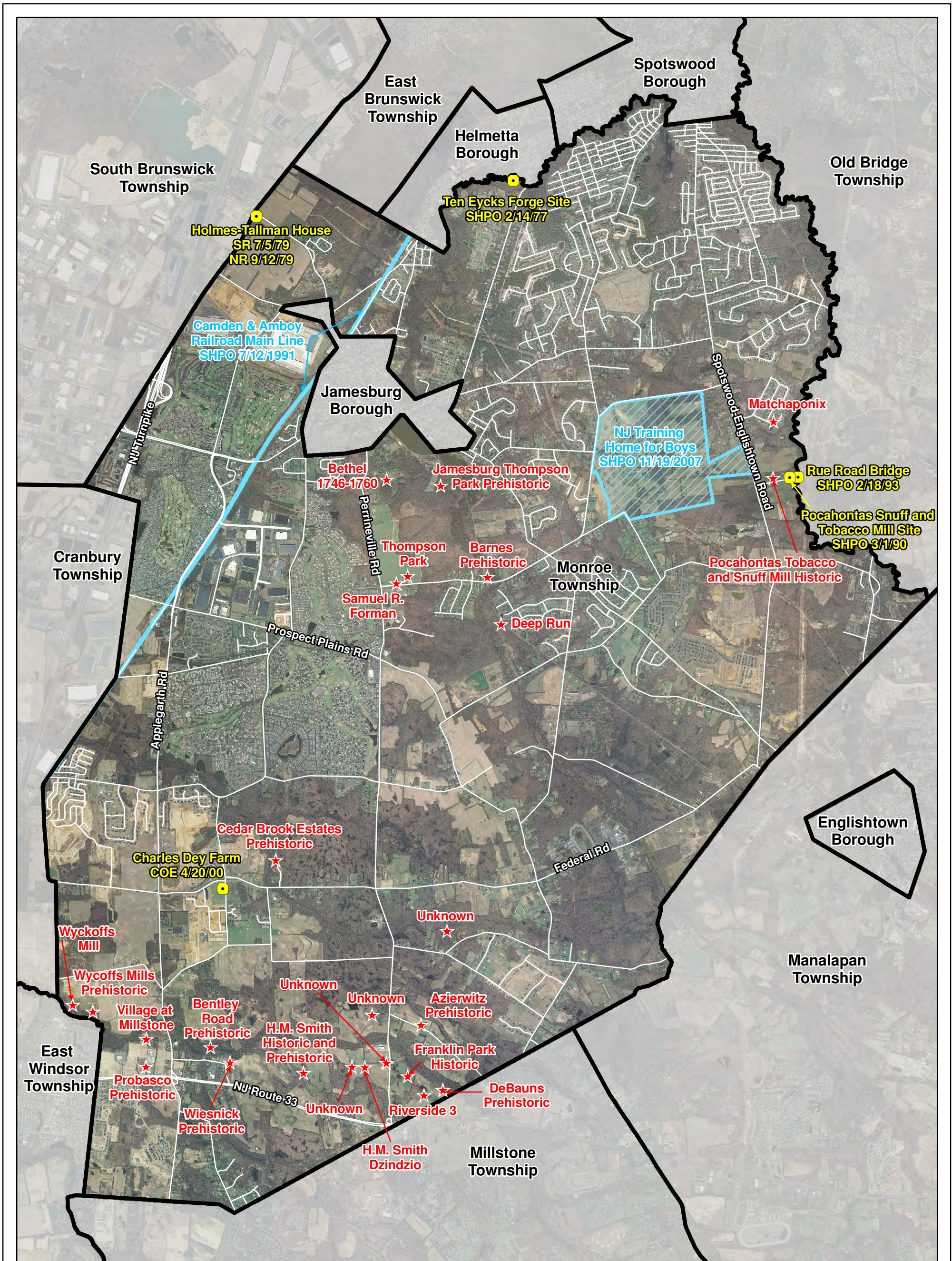
New Jersey Department of Transportation
 USFWS National Wetlands Inventory
 Monroe Township Bicycle and Pedestrian
 Local Planning Assistance

Monroe Township, Middlesex County, New Jersey



Data Source: USFWS, Wetlands Database, Freehold, Jamesburg, and New Brunswick Quadrangles (2008).

Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).



4,000 0 4,000 Feet

Legend

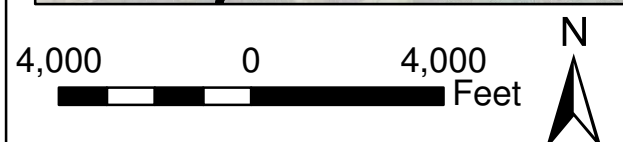
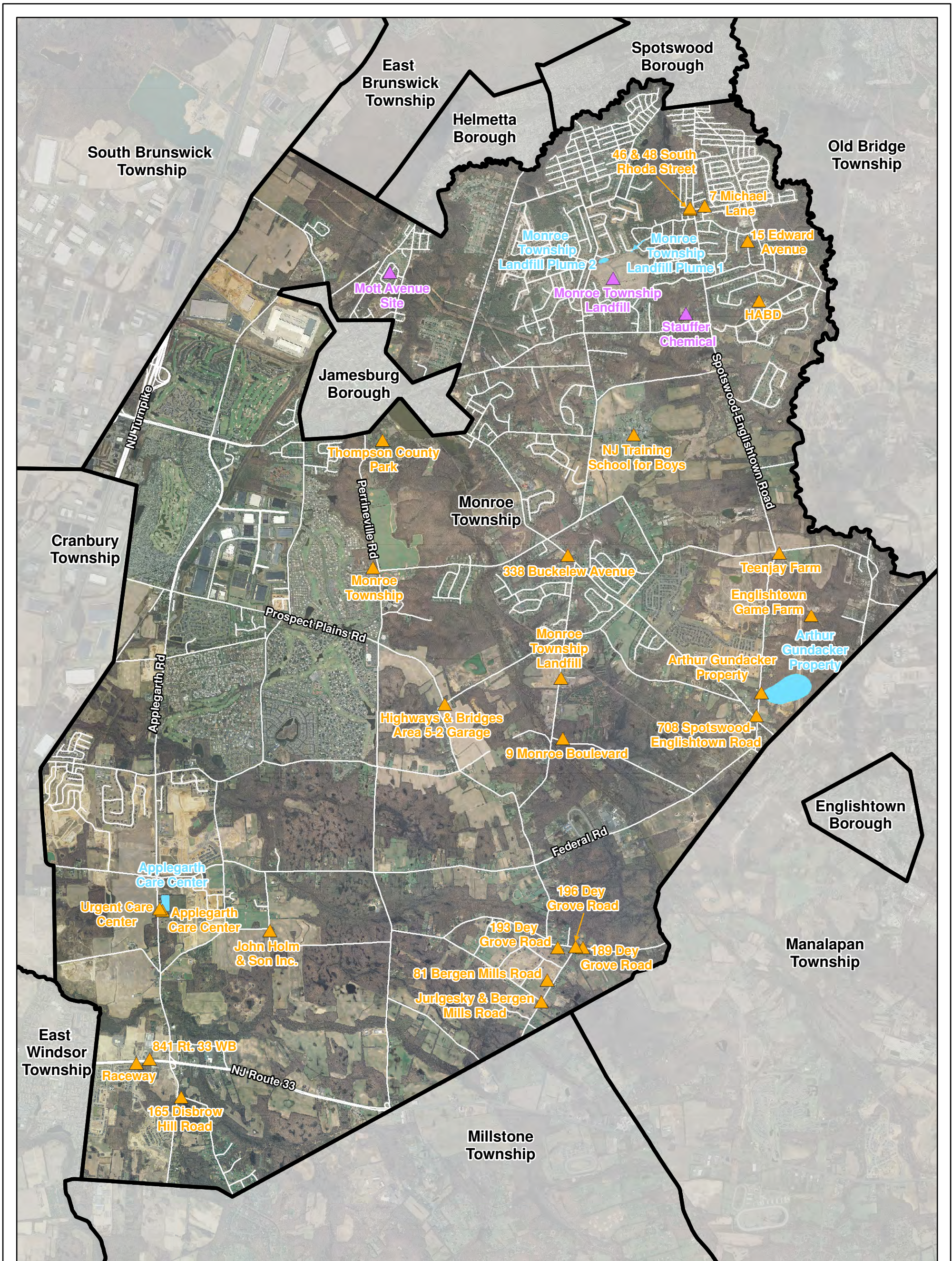
- Historic Site
- ★ Known Archaeological Site
- Roads
- Municipal Boundary
- Historic District

New Jersey Department of Transportation
Historic and Cultural Resources
Monroe Township Bicycle and Pedestrian
Local Planning Assistance
Monroe Township, Middlesex County, New Jersey

Baker

Data Source: NJDEP, Information extracted from topographic maps at State Historic Preservation Office and State Museum (2009).

Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).



Data Source: NJDEP, Bureau of Geographic Information Systems, Known Contaminated Sites List (2005) and Classification Exception Areas (2006). EPA Comprehensive Environmental Response Compensation and Liability Information System.

Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).

Legend






- Roads
- Known Contaminated Site
- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) Site
- Classification Exception Area
- Municipal Boundary

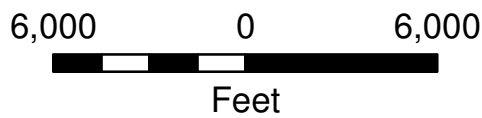
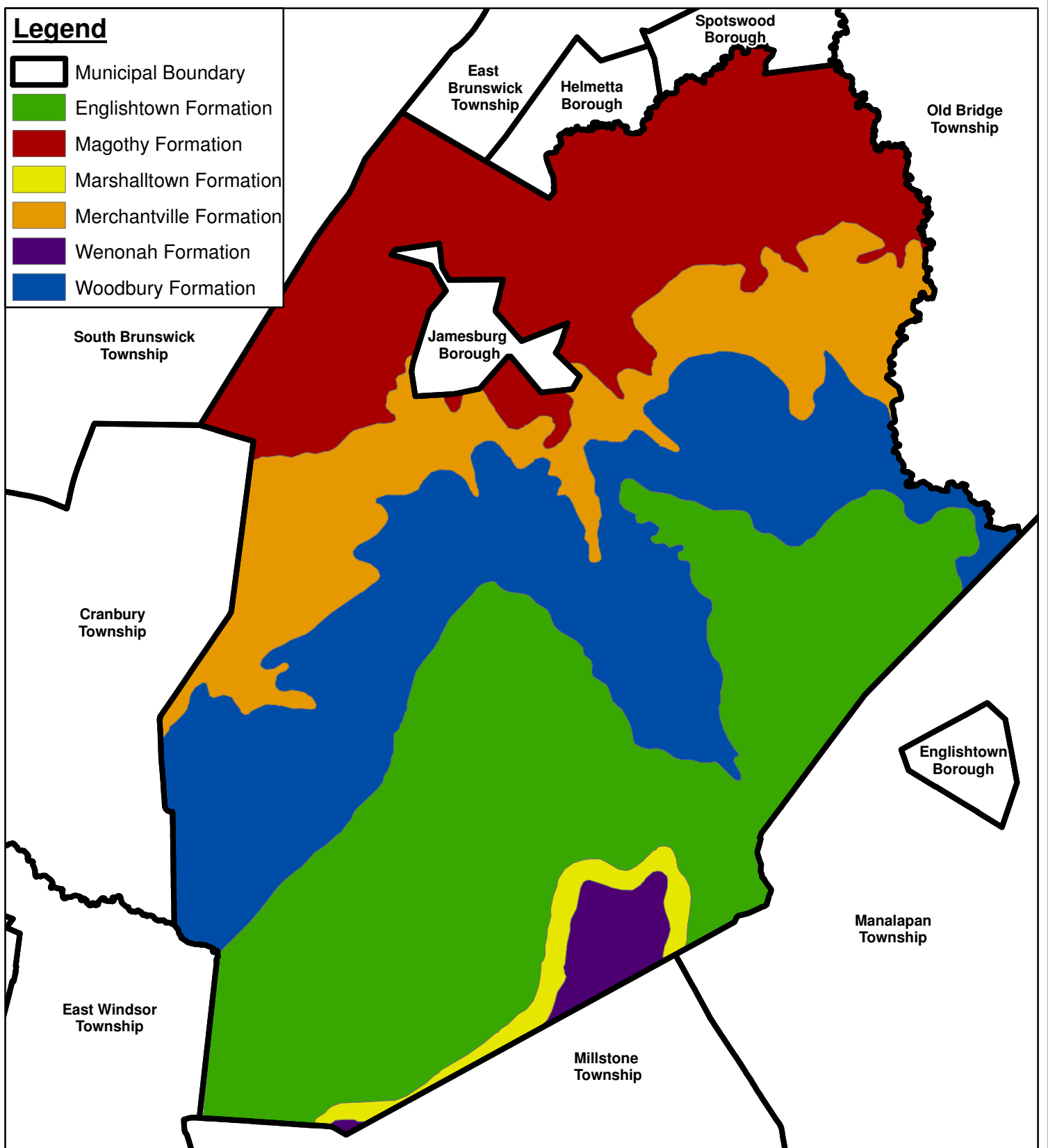
- New Jersey Department of Transportation Potential Contaminated Sites
- Monroe Township Bicycle and Pedestrian Local Planning Assistance

Monroe Township, Middlesex County, New Jersey

Baker

Legend

-  Municipal Boundary
-  Englishtown Formation
-  Magothy Formation
-  Marshalltown Formation
-  Merchantville Formation
-  Wenonah Formation
-  Woodbury Formation



Data Source: NJDEP, Bureau of Information Geographic Systems, NJGS Bedrock Geology for New Jersey (1999).



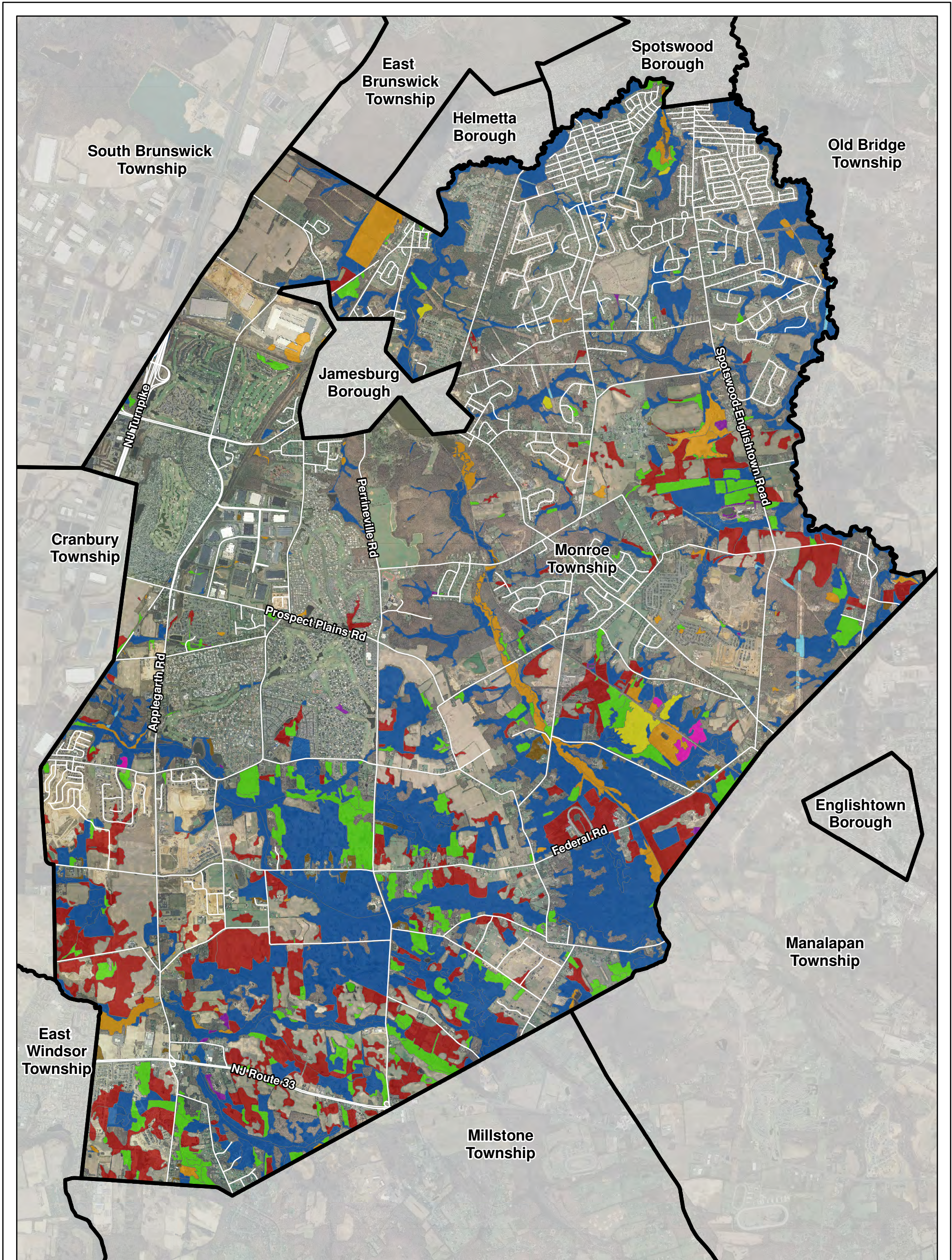
New Jersey Department of Transportation

Bedrock Geology of New Jersey

Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Township of Monroe
Middlesex County, New Jersey

Baker



4,000 0 4,000
Feet

Legend

-  Roads
-  Municipal Boundary
-  Agricultural Wetlands (Modified)
-  Coniferous Wooded Wetlands
-  Deciduous Scrub/Shrub Wetlands
-  Deciduous Wooded Wetlands
-  Disturbed Wetlands (Modified)
-  Herbaceous Wetlands
-  Managed Wetlands (Modified)
-  Mixed Forested Wetlands (Deciduous Dom.)
-  Wetland Rights-of-Way (Modified)



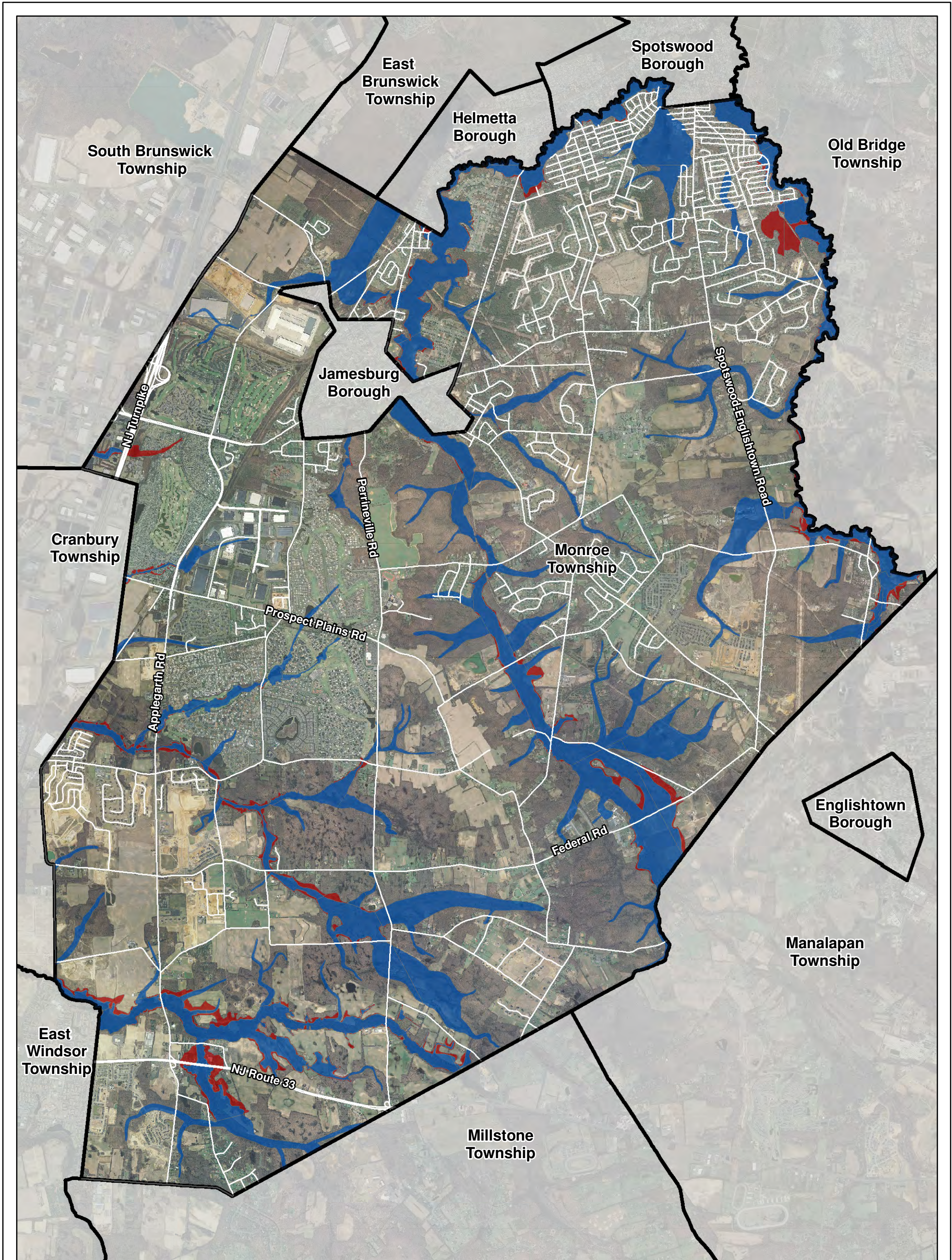
New Jersey Department of Transportation
NJDEP Freshwater Wetlands
Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Monroe Township, Middlesex County, New Jersey

Baker

Data Source: NJDEP, Bureau of Geographic Information and Analysis, Wetlands of Middlesex County (1999).


Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).



4,000 0 4,000 Feet


Legend

-  Roads
-  100-year Floodplain
-  500-year Floodplain
-  Municipal Boundary

 New Jersey Department of Transportation
Floodplains

Monroe Township Bicycle and Pedestrian
Local Planning Assistance

Monroe Township, Middlesex County, New Jersey

 Baker

Data Source: Federal Emergency Management Agency, National Flood Insurance Program, Q3 Flood Data, September 1998.

Base Map: NJ Office of Information Technology, Office of Geographic Information Systems. NJ 2007-2008 High Resolution Orthophotograph (2008).



Monroe Township

Bicycle and Pedestrian Planning Study

***Appendix
B***

***TRAIL ROUTING
AND ANALYSIS***

Trail Network Development Plan

I. Trail Routing and Analysis

An routing analysis was performed for each proposed trail alignment. Numerous environmental parameters were examined including wetlands, watercourses, floodplains, cultural resources, potential contaminated sites, open space, and threatened and endangered species habitat. Available information, which included spatial data, publications, and inquiries made to various government agencies, was assessed for each proposed trail alignment. Baker also conducted field reconnaissance of trail routes proposed on publicly owned land to verify the information from these sources and to identify any additional environmental constraints.

A. Union Valley Road

The proposed Union Valley Road trail spans an unnamed tributary to Cranbury Brook. The Flood Hazard Area Control Act Rules establishes a regulatory riparian zone based on the attributes of the stream and surrounding landscape including the water quality classification, the presence of listed species habitat, and the potential for acid-producing soils. The NJDEP classifies the unnamed tributary to Cranbury Brook as a Category 2 FW2-non trout stream. Available NJDEP Landscape Mapping was reviewed to determine if there are any records of occurrence for listed species within the proposed trail route. No records of occurrence were identified. Based on available data from the New Jersey Geological Survey, the proposed trail is underlain by the Merchantville bedrock formation, which is associated with acid-producing soils. Since the unnamed tributary to Cranbury Brook is not a Category 1 stream, but is associated with acid-producing soils, it would likely have a 150-foot wide riparian zone. As currently proposed, it is likely that the trail would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available geospatial data from the NJDEP and FEMA, the proposed trail route may traverse forested and agricultural freshwater wetlands, an unnamed tributary to Cranbury Brook, and its associated 1% annual floodplain and riparian zone. Field reconnaissance was performed to confirm the presence of wetlands along Perrineville Road. Forested wetlands dominated by red maple (*Acer rubrum*_FAC) and areas of wet agricultural land were observed along Perrineville Road in the location identified by NJDEP Freshwater Wetland spatial data. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

In addition to the water resources identified above, a potentially contaminated site was identified within the vicinity of the proposed trail. Highways and Bridges Area 5-2 Garage is located on the corner of Hoffman Station Road and Prospect Road and is included on the NJDEP Known Contaminated Sites List (2005) as a source of groundwater pollution. Once the limit and extent of the project impacts are known, it may be necessary to perform additional hazardous material studies. If the property is acquired and demolished or disturbed by construction activities, hazardous material containment, cleanup, and removal measures may be required. Measures should also be implemented to minimize and contain any potential hazardous spills during construction activities.

The proposed trail is located within the Review Zone B of the Delaware and Raritan Canal Commission. If the project meets the definition of a major development, authorization by the Commission will be required. Please refer to **Appendix A** for a discussion on the Delaware and Raritan Canal Commission Authorization.

B. Community Center Connector Trail #1

The proposed Community Center Connector Trail #1 utilizes an existing path. Based on available mapping from the NJDEP, the proposed trail is located within a forested wetland complex. However, available aerial photography suggests that the path does not support vegetation and is likely compacted. A wetland delineation should be performed as the project progresses to identify any potential wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act. The FEMA FIRM panel indicates that the trail is located above the regulated floodplain. Since the majority of the proposed trail is located on private land, field reconnaissance was not performed at this site.

C. Community Center Connector Trail #2

Community Center Connector Trail #2 is within the immediate vicinity of the Matchaponix Brook. The Flood Hazard Area Control Act Rules establishes a regulatory riparian zone based on the attributes of the stream and surrounding landscape including the water quality classification, the presence of listed species habitat, and the potential for acid-producing soils. The NJDEP classifies the Matchaponix Brook as a Category 2 FW2-non trout stream. Available NJDEP Landscape Mapping was reviewed to determine if there are any records of occurrence for listed species within the proposed trail route. No records of occurrence were identified. Based on available data from the New Jersey Geological Survey, the proposed trail is underlain by the Merchantville bedrock formation, which is associated with acid-producing soils. Since the Matchaponix Brook is not a Category 1 stream, but is associated with acid-producing soils, it would likely have a 150-foot wide riparian zone. As currently proposed, it is likely that the trail

would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Additionally, there is a large forested wetland complex in the vicinity of the proposed trail. Typical wetland hydrophytic vegetation was identified during field reconnaissance including skunk cabbage (*Symphlocarpus foetidus* OBL), spicebush (*Lindera benzoin* FACW-), arrowwood (*Viburnum dentatum* FAC), sedges (*Carex* sp) and red maple (*Acer rubrum*, FAC) among others. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

D. East-West Trail #1

The Baker East-West Trail #1 crosses an unnamed tributary to the Cranbury Brook. As discussed in **Appendix A**, the unnamed tributary to the Cranbury Brook would likely have a riparian zone of 150 feet. As currently proposed, it is likely that the trail would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available NJDEP freshwater wetlands spatial data, the majority of the proposed trail traverses through a large forested wetland complex. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

The proposed trail is located within the Review Zone B of the Delaware and Raritan Canal Commission. If the project meets the definition of a major development, authorization by the Commission will be required. Please refer to **Appendix A** for a discussion on the Delaware and Raritan Canal Commission Authorization.

No additional environmental resources were identified. Since the majority of the proposed trail is located on private land, field reconnaissance was not performed at this site.

E. East-West Trail #2

The Baker East-West Trail #2 crosses several unnamed tributaries to the Millstone River. The Flood Hazard Area Control Act Rules establishes a regulatory riparian zone based on the

attributes of the stream and surrounding landscape including the water quality classification, the presence of listed species habitat, and the potential for acid-producing soils. The NJDEP classifies the Millstone River as a Category 2 FW2-non trout stream. Available NJDEP Landscape Mapping was reviewed to determine if there are any records of occurrence for listed species within the proposed trail route. No records of occurrence were identified. Based on available data from the New Jersey Geological Survey, the proposed trail is underlain by the Englishtown bedrock formation, which is associated with acid-producing soils. Since the Matchaponix Brook is not a Category 1 stream, but is associated with acid-producing soils, it would likely have a 150-foot wide riparian zone. As currently proposed, it is likely that the trail would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available NJDEP freshwater wetlands spatial data, the majority of the proposed trail traverses through a large forested wetland complex. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

There is a high potential for archeological sites to be present within the corridor of streams. An unnamed prehistoric site is located within the vicinity of the proposed project. An archeological investigation may be required to determine that the project will not affect any known or unknown archeological sites. Please refer to **Appendix A** for a discussion of regulations pertaining to cultural resources.

The proposed trail is located within the Review Zone B of the Delaware and Raritan Canal Commission. If the project meets the definition of a major development, authorization by the Commission will be required. Please refer to **Appendix A** for a discussion on the Delaware and Raritan Canal Commission Authorization.

No additional environmental resources were identified. Since the majority of the proposed trail is located on private land, field reconnaissance was not performed at this site.

F. Butterfly and Wildlife Park Walking Path

The Butterfly and Wildlife Park Walking path crosses the Millstone River. The Flood Hazard Area Control Act Rules establishes a regulatory riparian zone based on the attributes of the stream and surrounding landscape including the water quality classification, the presence of listed species habitat, and the presence of acid-producing soils. As discussed in **Appendix A**, the Millstone River would likely have a 150' wide riparian zone. As currently proposed, it is

likely that the trail would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available NJDEP freshwater wetlands spatial data, the majority of the proposed trail traverses through a large forested wetland complex. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

There is a high potential for archeological sites to be present within the corridor of streams. Several known archeological sites are present within the immediate vicinity of the proposed trail including the Bentley Road Prehistoric Site, Wiesnick Prehistoric Site, and several unnamed prehistoric sites. An archeological investigation may be required to determine that the project will not affect any known or unknown archeological sites. Please refer to **Appendix A** for a discussion of regulations pertaining to cultural resources.

The proposed trail is located within the Review Zone B of the Delaware and Raritan Canal Commission. If the project meets the definition of a major development, authorization by the Commission will be required. Please refer to **Appendix A** for a discussion on the Delaware and Raritan Canal Commission Authorization.

No additional environmental resources were identified. Since the majority of the proposed trail is located on private land, field reconnaissance was not performed at this site.

G. Manalapan Brook Nature Trail

The Manalapan Brook Nature Trail is proposed along the South Branch of the Manalapan Brook. The Flood Hazard Area Control Act Rules establishes a regulatory riparian zone based on the attributes of the stream and surrounding landscape including the water quality classification, the presence of listed species habitat, and the potential for acid-producing soils. The NJDEP classifies the South Branch of the Manalapan Brook as a Category 2 FW2-non trout stream. Available NJDEP Landscape Mapping was reviewed to determine if there are any records of occurrence for listed species within the proposed trail route. No records of occurrence were identified. Based on available data from the New Jersey Geological Survey, the proposed trail is underlain by the Magothy bedrock formation, which is associated with acid-producing soils. Since the South Branch of the Manalapan Brook is not a Category 1 stream, but is associated with acid-producing soils, it would likely have a 150-foot wide riparian zone. As currently proposed, it is likely that the trail would require authorization under the Flood Hazard Area

Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available NJDEP freshwater wetlands spatial data, the majority of the proposed trail traverses through a large forested wetland complex. The proposed trail alignment was accessed from public property in the vicinity of Nicholas Avenue and Boxwood Drive. A large wetland complex was identified east and adjacent to the stream. In the area of Nicholas Drive, hydrophytic plants observed include cinnamon fern (*Osmunda cinnamomea*, FACW), skunk cabbage, and red maple. The wetland area near Boxwood Drive was more saturated than the wetland near Nicholas Drive and exhibited mucky soils. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

H. PSE&G ROW Trail

The PSE&G ROW Trail crosses the Cranbury Brook, an unnamed tributary to the Cranbury Brook, and the Cedar Brook. As discussed in **Appendix A**, the Cranbury Brook and the unnamed tributary to the Cranbury Brook would likely have a riparian zone of 150 feet because of their association with acid-producing soils. The NJDEP classifies the Cedar Brook as a Category 2 FW2-non trout stream. Available NJDEP Landscape Mapping was reviewed to determine if there are any records of occurrence for listed species within the proposed trail route. No records of occurrence were identified. Based on available data from the New Jersey Geological Survey, the proposed trail is underlain by the Merchantville bedrock formation, which is associated with acid-producing soils. Since the Cedar Brook is not a Category 1 stream, but is associated with acid-producing soils, it would likely have a 150-foot wide riparian zone. As currently proposed, it is likely that the trail would require authorization under the Flood Hazard Area Control Act Rules for impacts to vegetation in the riparian zone and potential fill in the 1% annual chance floodplain. Please refer to **Appendix A** for a discussion of the Flood Hazard Area Control Act Rules.

Based on available NJDEP freshwater wetlands spatial data, there are several areas of wetlands along the proposed trail route. These areas are primarily associated with the stream crossings. A wetland delineation should be performed as the project progresses to determine the boundary of any present wetlands and establish transition areas. Any impact to the wetland habitat or its associated regulatory transition area will require authorization under the NJDEP Freshwater Wetland Protection Act Rules. Please refer to **Appendix A** for a discussion of the Freshwater Wetland Protection Act.

The proposed trail is located in the vicinity of Camden and Amboy Railroad Main Line Historic District (SHPO 7/12/1991). As such coordination with SHPO may be required to determine if the project will affect the historic district. Additionally, any project activity that would result in a use of the historic district will require authorization under Section 1(f). Please refer to **Appendix A** for a discussion of regulations pertaining to cultural resources.



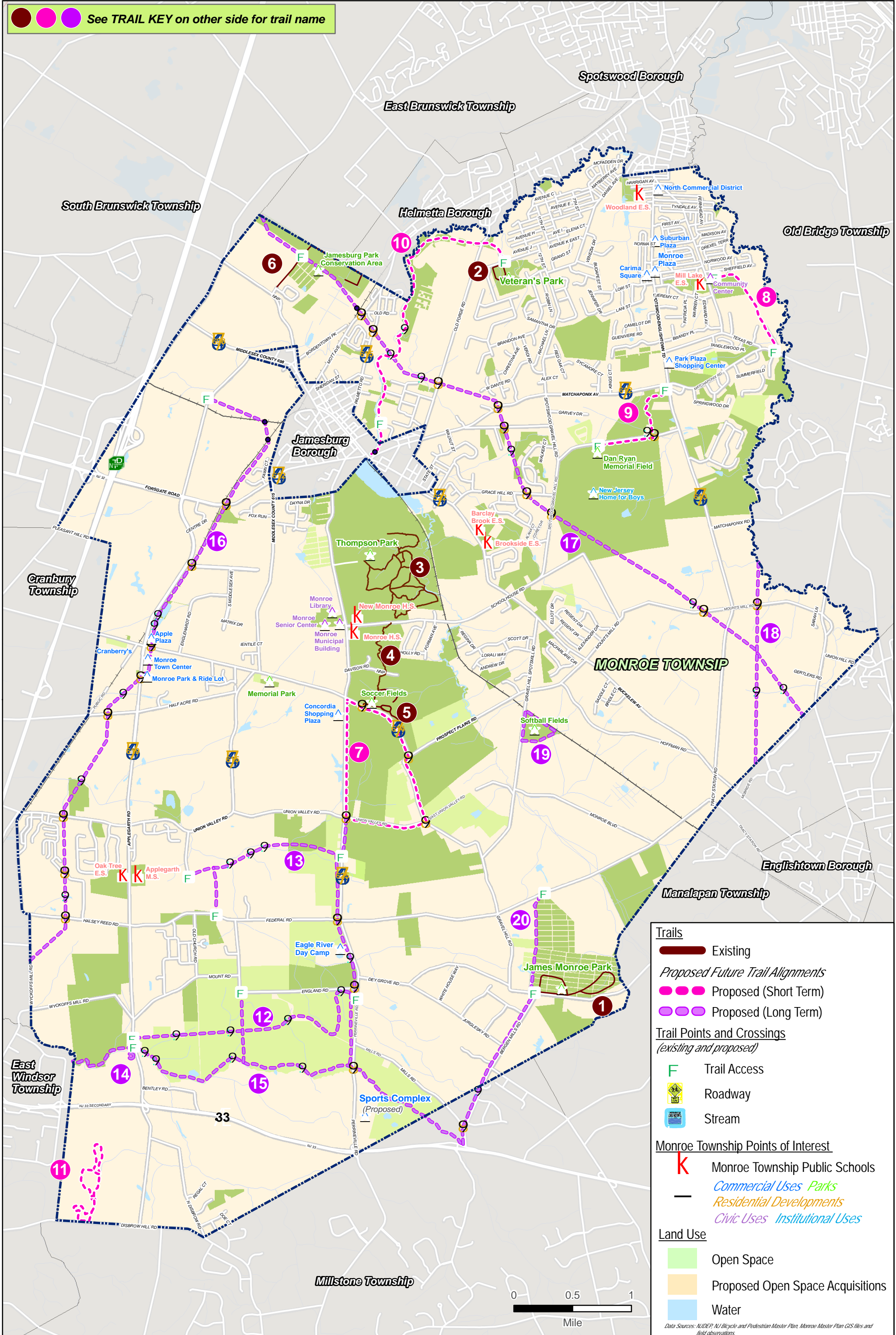
**Monroe Township
Bicycle and Pedestrian Planning Study**

***Appendix
C***

***MONROE TOWNSHIP
TRAIL MAP***

Trail Network Development Plan

See TRAIL KEY on other side for trail name



Trails

- Existing
- Proposed Future Trail Alignments
 - Proposed (Short Term)
 - Proposed (Long Term)

Trail Points and Crossings (existing and proposed)

- F Trail Access
- Roadway
- Stream

Monroe Township Points of Interest

- Monroe Township Public Schools
- Commercial Uses
- Parks
- Residential Developments
- Civic Uses
- Institutional Uses

Land Use

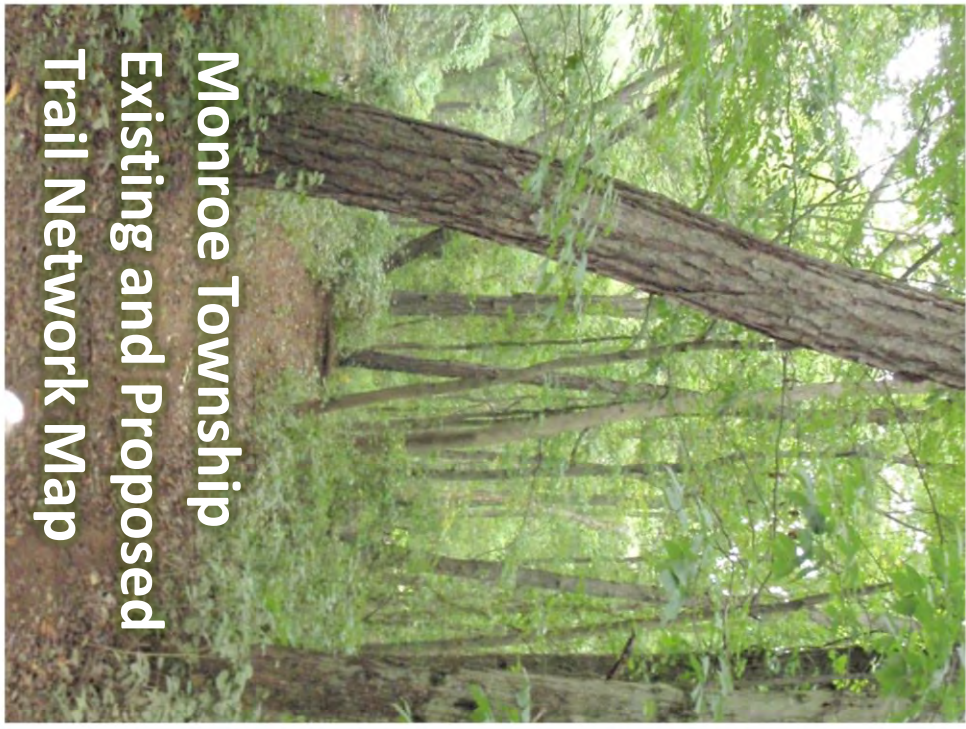
- Open Space
- Proposed Open Space Acquisitions
- Water

0 0.5 1
Mile

Data Sources: NJDEP, NJ Bicycle and Pedestrian Master Plan, Monroe Master Plan GIS files and field observations.

Monroe Township Existing and Proposed Trail Network Map
March 2010

Monroe Township Existing and Proposed Trail Network Map



Monroe Township has identified the goal of developing a trail network that would provide a system of routes for residents and visitors, and that would improve the health, natural environment and connections among communities in the Township. To advance this goal, a Trails and Bikeway Development Plan was created by the Township, which describes a trail system with connections to local destinations (e.g., schools, commercial centers, recreational areas and civic uses) and to regional trails planned in adjacent towns (e.g., Boroughs of Helmetta and Jamesburg). The plan also notes that the trail routes are intended to provide access for hikers, bicyclists and equestrians.

A Trail Network Development Plan was developed to further advance proposed trails in the Township's Trail and Bikeway Development Plan, and to assist in the implementation of the township's trail network. This Trail Map provides an overview of existing and proposed trails in the township and their alignments as a recommended framework to build the trail network with Monroe.



Recently completed section of the Soccer Field Trail

The existing trails in the township, such as in Thompson Park and Veteran's Park, are currently available for hiking, jogging, and other recreational activities. The proposed trails on this map are still in development, and final alignments are being determined based on environmental conditions. It is recommended that the proposed trails be referenced for planning purposes only until the township opens them for public use.

Monroe Township Trails

Funding for the design of this guide was made possible by The New Jersey Department of Transportation under the Local Bicycle and Pedestrian Planning Assistance Program



On behalf of The NJDOT and the Township of Monroe, enjoy your travels through this historic and ecologically rich township.

Please use this map for informational purposes, but do not substitute it for your own common sense based on weather conditions and other factors.

This map was prepared by Michael Baker Jr., Inc.

Trail Key

- 1 James Monroe Park Trails
- 2 Veteran's Park Trail
- 3 Thompson Park Trails
- 4 Gravel Hill Trail
- 5 Soccer Field Trail
- 6 Jamesburg Park Conservation Area Trails
- 7 Union Valley Road Trail

- 8 Community Center Connector Trail #1
- 9 Community Center Connector Trail #2
- 10 Manalapan Brook Nature Trail
- 11 Rocky Brook Estates Trail
- 12 East-West Trail #1
- 13 East-West Trail #2

- 14 Butterfly and Wildlife Park Walking Path
- 15 Millstone River Nature Trail
- 16 PSE&G ROW Trail
- 17 Equestrian Trail #1
- 18 Equestrian Trail #2
- 19 Softball Fields Walking Trail
- 20 Garfield Avenue Trail

Trail Tips

- Stay on the Trail. Staying on the trail will reduce the likelihood of getting lost and will also help to preserve the surrounding environment.
- Buddy up or let someone know in advance where you are going.
- Avoid weather related health issues like heat exhaustion, heat stroke and hypothermia by wearing appropriate clothing and bringing water and/or food.
- Avoid insect pests by wearing protective clothing, avoiding perfumes, and covering exposed areas of your body with insect repellent.
- Check the weather before your hike, bike or ride, and take cover in advance of a storm.
- Avoid poisonous plants. Familiarize yourself with what poison ivy, poison oak, and poison sumac look like.
- Be aware of your surroundings and avoid tripping hazards, such as roots, washouts and fallen trees.
- Share the trail and be courteous to other trail users.