



Hamilton Township Conservation Element

December, 2011

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Introduction

The Conservation Element, which is optional, is nevertheless a very important part of a municipal master plan. The Conservation Element standards of the New Jersey Municipal Land Use Law (N.J.S.A. 40:55D-28b (8)) establish an environmental framework for every master plan element. These standards call for:

- ❖. Appropriate information on energy, open space, water supply, forests, soil, marshes, wetlands, harbors, rivers, and other waters, fisheries, endangered or threatened species wildlife, and other resources;
- ❖ Systematic analysis of the impact of each master plan element on the present and future preservation, conservation, and utilization of those resources.

This means that every master plan element should complement the Conservation Element and reinforce justifications for natural resource protection now and in the future. The Conservation Element offers an opportunity to raise awareness of the municipality's important natural resources and to establish appropriate protection policies. And it provides a mechanism for setting up responsible resource management and sustainability over the years.

The analysis and recommendations in the Conservation Element derive from the Hamilton Township Environmental Resource Inventory, which was developed immediately prior to the Conservation Element. The description of a municipality's natural resources, functions, and values found in both the Environmental Resource Inventory and the Conservation Element establishes the environmental framework of the master plan. This information forms the basis for the required systematic analysis of the impact of all the other plan elements on the preservation, conservation, and utilization of natural resources.

Goal 1: Enhance Natural Habitats, Open Space, and Tree Canopy

Objective 1A: Ensure funding for open space

Open space can provide many valuable environmental benefits, including recreation, groundwater recharge, stormwater management, and improved quality of life. Hamilton Township continues to preserve significant open space resources that benefit residents and the overall environment. With limited funding available for land acquisition, continued township financial support is necessary to leverage state funding options.

The Hamilton Township Council voted in June 2001 to establish a trust fund to be used for the acquisition and preservation of open space. This fund has been supported through previous developer contributions and payments from other outside sources. In addition, a \$5 million bond was approved by the Township Council in June 2002 to be used for open space acquisition. This bond, however, has been expended entirely. Hamilton Township does not have an open space tax to support preservation.

The practice of requiring developer contributions into open space funding was invalidated by the New Jersey Supreme Court in 2009. Although currently there is adequate funding in the municipal open trust fund, the township can **consider establishing an open space tax** to support future acquisition. Such a tax would likely amount to less than \$30 per household. The feasibility of enacting such a tax warrants evaluation. In order to qualify for 50 percent matching contributions from the New Jersey Green Acres program, Hamilton Township is required to have either an open space tax or an alternative funding source equivalent to an annual tax levy. The enactment of a modest open space tax would ensure continued statewide funding for the protection of vital environmental, park, and farmland resources in the township. The Hamilton Township Environmental Commission (“Environmental Commission”) is currently in talks with the Trust for Public Land, which offers a number of services to communities seeking help with new parks and land conservation.

Objective 1B: Create a greenway system along streams

A greenway is generally defined as a linear open space that connects natural, recreational, and cultural points of interest. Greenways are beneficial to both humans and the environment, as they provide open space for recreation, habitat for flora and fauna, and, when located along streams, provide stream buffers and natural stormwater management. A greenway system along the streams of Hamilton would provide these benefits and would help achieve other goals, such as stormwater management.

Plans for a number of proposed greenways have been completed, and Hamilton Township and Mercer County have been very successful in preserving important parcels

in the riparian corridors, particularly along the Crosswicks Creek. However, more can be done to implement these plans and to make the greenways a reality.

Action: Support existing trails and greenways

Hamilton contains a number of existing trails and greenways that could benefit greatly from increased public awareness and education. There are walking trails in John A. Roebling Memorial Park, Veterans Park, the Van Nest Refuge, and Mercer County Park. Hamilton Township contains a section of the Delaware and Raritan (D & R) Canal towpath located along Duck Creek. There are plans to extend this portion of the D & R trail to the south by connecting it to a railroad bridge to cross Crosswicks Creek.

In addition, the vast majority of parcels along Hamilton's southern border with Crosswicks Creek are publically owned by the municipality or the state. Although a formal trail has not been established and much of the land is wetlands, accessible areas on public lands should be identified and promoted. In addition, many areas along Hamilton's northern border with Assunpink Creek have also been preserved by the municipality, county, and state.

With raised public consciousness about the existing trails and publicly owned greenways, support for the creation of additional trails is more likely. The Environmental Commission should collaborate with the Crosswicks Creek/Doctors Creek Watershed Association, the D & R Greenway Land Trust, and the Friends for the Marsh (of the Hamilton-Trenton-Bordentown Marsh) to **increase the awareness, appreciation, and maintenance of trails and greenways** in Hamilton. Depending on the needs, resources, and interests of those involved, this could be done in any number of ways. For example, the Environmental Commission should help promote the educational and recreational programs and activities held at the Marsh Nature and Interpretive Center. The Environmental Commission should also work with nonprofit organizations, community groups, and local schools to help with trail maintenance. The Hamilton Township Department of Public Works will continue to work toward enhancing the usefulness and condition of these trails when possible.

Action: Pursue expansion of greenways and trails

As identified in the 2009 *Open Space and Recreation Plan Update*, Hamilton has set a goal of obtaining an additional 23 miles of open space along its riparian corridors. The Environmental Commission should identify the priority segments to add to the township's inventory. Segments should ideally fill the gaps in existing greenways, as identified in the proposals and plans discussed below.

A number of proposed greenway plans exist that include Hamilton, as described below. The Environmental Commission should **review the documents** and their individual proposals, and continue to implement the greenway plans through **targeted preservation**. The existing and potential greenway trails are illustrated on **Map 1: Greenway Trails**.

There has been much planning and preservation to enable a potential Crosswicks Creek/Doctors Creek Greenway. The Crosswicks Creek/Doctors Creek Greenway Planning Group (a predecessor of the Crosswicks Creek/Doctors Creek Watershed Association) conducted two planning studies for a greenway along the Crosswicks and Doctors creeks. In 2004, the *Crosswicks Creek/Doctors Creek Watershed Greenway Plan* was released, which proposed a greenway along the streams that would protect the riparian corridors and provide recreational trails. As of 2008, only Allentown Borough and Millstone Township had formally adopted the plan. In 2007, the Crosswicks Creek/Doctors Creek Watershed Association released a *Doctors Creek/Assunpink Creek Trail Feasibility Study*, which proposed the creation of a multiuse trail that would connect Doctors Creek in Hamilton to Assunpink Creek in Millstone and Washington townships. The plan identified three trail alternatives along Doctors Creek, and the trail alternative on the south side of Doctors Creek was selected as the preferred alternative. As shown on **Map 1**, the majority of the land in Hamilton Township adjacent to the Crosswicks Creek and Doctors Creek has already been preserved, primarily through the Mercer County open space preservation program. The County is committed to preserving a continuous Crosswicks Creek Greenway, although there are some unpreserved segments remaining in Hamilton Township.

There is much work needed to create an Assunpink Creek Greenway in Hamilton Township, which would connect Mercer County Park with the Trenton Assunpink Greenway. In 2000, DVRPC published *Closing the Missing Link on the Assunpink Creek Greenway*, which refers to the segment of unpreserved land adjacent to the creek in both Hamilton and Lawrence townships. Farther east, preserved lands along the creek have created a continuous greenway from the Assunpink Wildlife Management Area in Monmouth County to Mercer County Park on Hamilton's border. Protecting land and creating a greenway along the creek in Hamilton would leverage the investment being made in Trenton to create an Assunpink Creek Greenway in a former industrial area. Through collaboration between federal, state, county, and local entities, a brownfield site along the Assunpink Creek in Trenton is currently being redeveloped into a 99-acre urban park.

The Environmental Commission should work to identify and recommend future expansions of the township greenways system and to identify potential funding sources for land acquisition where needed. The Environmental Commission should also conduct a **feasibility study of greenways along Miry Run and Pond Run** to identify potential trail alternatives and access points. Like the Crosswicks, the existence of large areas of preserved lands adjacent to both streams facilitates the development of greenways.

An essential first step in greenways implementation is **landowner education** to inform residents about the ecological, economic, and community benefits of greenways. The Environmental Commission should develop informational materials on greenways and their use and importance for Hamilton.

Hamilton Township already has ordinances in place to enable these greenways. The Stream Buffer Conservation Zone ordinance allows unpaved trails, provided they are

stabilized with pervious materials. This ordinance also mandates that conservation easements or deed restrictions be placed on the properties within the zone that would prohibit the clearing of vegetation within the buffer.

To facilitate the completion of greenways, the Hamilton Township Environmental Commission should organize a subcommittee dedicated to the implementation of greenways. It would be essential for this subcommittee to coordinate and collaborate with other municipalities and local organizations, including the Crosswicks Creek/Doctors Creek Watershed Association, (D & R) Greenway Land Trust, and the Friends for the Marsh (of the Hamilton-Trenton-Bordentown Marsh).

Objective 1C: Protect important habitats and open space

There are many areas across Hamilton with exceptional significance for the conservation of rare species and ecological communities. These include three locations that have been identified as being high priority habitats: the Hamilton-Trenton-Bordentown Marsh, the Walnford Floodplain Natural Heritage Priority site, and the Van Nest Refuge Fish and Wildlife Management Area. These three sites are shown on **Map 2: Conservation Areas**. In addition, many areas of upland forest, wetlands, and grasslands have been identified by the Landscape Project as critical or suitable habitat for rare species. The preservation of these areas will ensure that the valuable environmental resources and the natural habitat they provide do not disappear from the landscape.

Action: Preserve and enhance land in identified conservation areas

Of the three high priority habitat areas in Hamilton, only the Van Nest Refuge is currently entirely preserved. This area is owned by the State of New Jersey and is adjacent to the county-owned Mercer County Park.

Most of the Hamilton-Trenton-Bordentown Marsh is preserved, although there are some privately held parcels. The former landfill on Duck Island has been undergoing a remediation by the New Jersey Department of Transportation to be capped, contained, and vegetated. After remediation actions are complete, this area can become a valuable aspect of the protected open space of the marsh. The PSEG Fossil LLC Mercer Generating Station is the largest unpreserved area of the marsh. The Marsh Nature and Interpretive Center at Roebling Park, operated by Mercer County, is an educational hub that offers activities, programs, and nature walks. The Environmental Commission can **collaborate with the Marsh Center** to enhance the awareness and enjoyment of this significant natural resource.

The Walnford Floodplain Natural Heritage Priority site is located on both sides of a portion of Crosswicks Creek in Burlington, Mercer, and Monmouth counties. Within Hamilton, there is a small portion of the floodplain located in the south-easternmost corner of the township. In early 2011, the Mercer County Open Space Preservation Board voted to preserve the Hamilton property that contains the Walnford Floodplain. This property, the Rock Hill Farm, is being preserved through county and state open

space funds. The stream corridor area will be preserved as part of the Crosswicks Creek Greenway, and the remainder of the parcel will be deed restricted for use as farmland.

Action: Preserve Landscape Project habitats

The Landscape Project is an initiative of the Endangered and Nongame Species Program of the NJDEP Division of Fish and Wildlife to document the habitats within New Jersey that are essential for the survival of rare species. It distinguishes between areas considered Suitable Habitat and those that are Critical Habitat of the highest importance. Critical Habitat areas have both a documented occurrence of a threatened or endangered species and a sufficient amount of habitat to sustain these species.

Map 3: Landscape Project Critical Habitat shows the unpreserved and undeveloped (based on tax class) parcels in Hamilton with the highest priority for rare plant and animal habitat. The Critical Habitat areas have documented and sufficient habitat for the cliff swallow, grasshopper sparrow, eastern meadowlark, Fowler's toad, Cooper's hawk, eastern box turtle, or great blue heron. Other areas have been identified by the Landscape Project as Wood Turtle habitat or Bald Eagle foraging areas. The **preservation of these critical habitat areas** will help ensure the survival of rare species in New Jersey. Areas identified as Landscape Project Priority Habitats should be identified as part of any Environmental Impact Statement submitted for a potential development as required by Section 154 of the Hamilton Township Municipal Code. Further potential steps to better protect threatened and endangered species in Hamilton Township should be evaluated and pursued by the Environmental Commission.

Action: Pursue certification of vernal pools

A vernal pool is a depressed area in the landscape that is a pond during part of the year. These ponds are formed by the rising water table of fall or winter, or by the runoff or melting of precipitation. Many vernal pools may be covered with ice during the winter. However, vernal pools tend to be dry by the end of summer. Vernal pools can be found in a variety of landscapes, including meadows, riparian areas, upland forests, wetlands, and coastal areas.

There are some species that depend upon vernal pools for various parts of their life cycle. These are called obligate vernal pool species, and their presence in a body of water indicates that that area is a vernal pool. The spotted salamander is one obligate species that has been identified in Hamilton.

There are seven vernal pool habitats that have been certified in Hamilton, and there are another 78 potential vernal habitats. There may be additional vernal pools that have not been identified yet.

The Endangered and Nongame Species Program of the NJDEP initiated the Vernal Pool Survey Project in 2000 to identify and protect these critical habitats. This project depends upon data collection from volunteers who report data to the NJDEP. After identifying a potential vernal pool location, a volunteer can collect data at the site and submit a vernal pool data form to the NJDEP. These reports are verified by NJDEP staff through a site

visit. Data collected can include a list of species seen or heard, as well as photographic or recorded documentation. The vernal pool must not have a permanent outlet or inlet that would enable fish to populate the pool. A single pool needs to be visited two or three times during the year to record herpetological activity and document the pool's ephemeral nature. These observations are essential for the certification of vernal pools.

Once a vernal pool is certified, state regulations mandate that a 75-foot buffer be maintained around the pool. The **certification of vernal pools** in Hamilton can protect these sensitive habitats and the vulnerable species that depend upon them. The Environmental Commission should work to certify some of the 78 potential vernal pool (depicted in the Hamilton Township Environmental Resource Inventory), particularly those in locations that may be subject to development pressures.

Action: Encourage native plant species

Native plant species are those that are indigenous to a particular region. Native plants are well adapted to the climate, soils, and weather patterns of an area. Native plants require less watering than non-native species, thereby protecting drinking water supply by reducing demand for irrigation. Native plants also require less (or no) fertilizers or pesticides, which are known to have an adverse impact on water quality and public health.

On the other hand, an invasive plant is a non-indigenous species that is known to adversely affect the habitat that it occupies. Over 200 invasive plant species have been identified in Mercer County. Invasive species threaten the biodiversity of Hamilton, as they crowd out native species and subsequently create a ripple effect throughout the township's ecosystems. Invasive species may also release toxins that inhibit the growth of other plants, as well as alter the chemistry of local soils, with long-term consequences for water quality and the health of native species. Some of the more prevalent invasive species found in Hamilton include Japanese knotweed, Japanese stiltgrass (also known as Nepalese browntop), English ivy, and purple loosestrife.

In 2004, NJDEP released a report outlining the issues and concerns surrounding invasive species within the state, as well as recommending control and management techniques. Following the recommendations of this report, the Environmental Commission and the Shade Tree Commission, in collaboration with the Department of Public Works, should **consider the establishment of a municipal invasive species removal program** in Hamilton to help preserve native species and natural habitat integrity. Such a program would serve to coordinate municipal actions against nonindigenous and invasive species within the township. The program should work to identify and eradicate invasive species on all municipally owned open space, and to revegetate these spaces with native flora.

A first step of the program should be an **annual survey of invasive plants**, which would detect problems at a preliminary stage. The Shade Tree Commission, Environmental Commission, and interested volunteers from the community should work together to perform the survey. The survey should include lists of nonindigenous species found, identifications of which species are considered invasive, maps of their locations, and

other related information. A systematic approach to eradicating invasive populations is necessary. Small, new populations should be targeted as the first priority, while established and widespread populations can be targeted over the course of years.

Control and management methods vary greatly depending on the plant species; therefore, it is important that the Township invest in a strong educational component of their invasive species program in order to ensure that the correct methods are employed. In general, the best method to control invasive species populations is prevention, primarily by locating and identifying small communities before they are large enough to become established. Small populations can often be removed manually and do not require the extensive use of herbicides. The Shade Tree Commission and Environmental Commission should seek to **educate local residents to identify invasive plant species** so that populations can be identified and brought to the attention of the Township.

Lastly, certain sections of the **Hamilton Township Municipal Code should be amended** to discourage the planting of invasive species. For example, Section 160:130(a)(13) describes landscaping of parking lots and lists English ivy as an appropriate species to plant, when it is in fact an invasive species. This section could be altered to explicitly discourage the planting of invasive species and to encourage the planting of native species. Applicants can be referred to the Planning Department or the Shade Tree Commission for lists of both invasive species and native species. The Shade Tree Commission has developed a list of appropriate street tree species that will not damage sidewalks. The Shade Tree Commission should review the appropriate sections of the Municipal Code and make recommendations to the Hamilton Township Planning Board (“Planning Board”) concerning native plants.

A **Township policy to promote the use of native plants** on all Township lands would set an example for Hamilton residents. Such a policy would state the preference of the Township for the use of native plants.

Objective 1D: Enhance the urban tree canopy

Trees in a community provide shade, natural cooling, and beauty. Trees have been shown to reduce stress, fatigue, and aggression in humans. The presence of street trees has also been proven to have an economic benefit in increasing property values. Street trees also serve to slow, or “calm,” traffic. The environmental aspects of trees are incalculable, as they improve air quality, manage stormwater, and provide habitat for animals. Community and urban forestry programs have proven beneficial to the economy, environment, and social well-being of their local communities, and it is important that Hamilton Township continue to develop and improve its urban forestry program.

Action: Implement and strengthen the Community Forestry Management Plan

Hamilton Township has already taken a number of steps to enhance the urban tree canopy through municipal action. It has an active Shade Tree Commission and the

township has been designated both a Tree City USA and Green Town USA. The commission developed a *Community Forestry Management Plan, 2009-2014*, which will be updated every five years. The Shade Tree Commission operates a Residential Tree Planting Initiative to increase the number of trees on residential properties.

The Shade Tree Commission and the Environmental Commission, with the support of the Township administration, should work together to **strengthen the membership and responsibility of the Shade Tree Commission**. While much progress has been made, the Shade Tree Commission would benefit greatly from an increased volunteer base, including greater public participation in its membership. One of the recommendations of the *Community Forestry Management Plan* is to evaluate a streamlining of the shade tree management program. Although it is currently an advisory body, with enhanced membership, the Shade Tree Commission can evaluate ways to better focus resources and provide management of Hamilton's tree resources.

The Shade Tree Commission intends to develop a **township-wide street tree inventory** to document all curbside trees within the right-of-way. Included within the inventory will be the number of street trees, as well as their species and general health. The inventory should also note the locations of particularly large and/or historic trees within the township. This inventory, once completed, can be used as a tool in assessing the existing urban forest and strengthening the urban tree canopy program in the future. Tree inventories are especially useful when developing a Tree Preservation Ordinance. The Township is currently seeking grant funding from the NJDEP Division of Parks and Forestry to begin the street tree inventory. The Shade Tree Commission may want to use i-Tree, developed by the U.S. Forest Service, to create its tree inventory. This free software program is designed to help urban foresters measure, understand, and manage their forest resources, and it provides methods to identify hazardous trees, as well as to calculate the monetary worth of each tree.

Action: Strengthen ordinance to encourage tree preservation

One of the goals of the *Community Forestry Management Plan* is to develop new ordinance guidelines and standards to address current trends. The Shade Tree Commission is currently exploring how to revise and improve the existing tree-related ordinances. Trees in the township are primarily discussed in Section 160-117: Natural Features and Tree Preservation of the Municipal Code. This section requires that a conscious effort be made to preserve all worthwhile trees and shrubs, and it issues rules for the replacement of trees lost to development. This section can and should be strengthened to further articulate the goals of the urban forestry plan for Hamilton Township.

Currently, the tree preservation ordinance requires the planting of 20 trees for every acre of woodland lost, or four trees per lot (whichever is greater). A **revised Tree Preservation ordinance** could do more to encourage the preservation of existing trees and the sufficient replacement of those lost to development.

Hamilton Township should update Section 160-117 to include **Specimen (or Heritage) Tree Preservation**. This ordinance would identify trees of significance to the local community, which are designated as “specimen trees” once their nomination has been approved. Nominations for Specimen Trees are a good way to involve the community in the urban forestry program, as well as to employ local knowledge. Once designated, special protection status is provided for these trees by requiring that permits be obtained before they can be removed or altered.

Action: Promote education for residents on tree health and importance

Another goal of the municipal *Community Forestry Management Plan* is to implement a public awareness program in order to encourage public participation in the protection of public trees, as well as to encourage proper tree care on private property. In order to encourage proper tree care protection on private property, the Shade Tree Commission should **host educational events on proper tree care**. Topics can include mulching, tree watering, tree pruning, and identifying pests and diseases. If taught in concurrence with Shade Tree Commission meetings, these events may help to spur volunteer involvement in the commission.

The Shade Tree Commission can expand education to residents by **enhancing its website to include more information** for interested volunteers and private land owners. The new website could provide free downloadable information guides on a variety of topics, such as tree selection, tree maintenance, and Integrated Pest Management (IPM) for trees. A number of these guides are available through the Arbor Day Foundation and NJDEP Community Forestry websites. Information could also be made available on upcoming events, commission agendas, volunteer opportunities, and links to other urban forestry websites.

Goal 2: Protect Water Resources, Improve Water Quality, and Reduce Flooding

Objective 2A: Plan for watershed restoration

A watershed is defined as the land that drains to a particular body of water. Hamilton Township is located within two different watershed systems: the northern portion of the township falls within the Assunpink Creek watershed and the southern portion is within the Crosswicks Creek/Doctors Creek watershed. The State of New Jersey is divided into 20 Watershed Management Areas (WMAs). Assunpink Creek is within WMA 11: Central Delaware, while Crosswicks Creek and Doctors Creek are within WMA 20: Assiscunk, Crosswicks, Doctors.

A watershed management plan is designed to maintain and improve the overall ecological integrity of a watershed. There are expert sources that can help in the creation of a watershed management plan, including the Rutgers Cooperative Extension Water Resources Program.

The watershed management planning process first involves the creation of a coordinating committee of stakeholders. The plan analyzes the watershed in terms of its land uses, water quality, and environmentally sensitive areas. Water quality monitoring and assessment data is collected and evaluated. Stormwater management practices, needs, and opportunities are evaluated. Current and potential open space resources are identified. Streams are evaluated based on visual assessments, aquatic life, and chemical monitoring.

A watershed management plan can be the foundation for steps to improve water quality. As a result of a watershed management plan, environmental ordinances can be passed to address sources of impairments. Information and education about the watershed can be shared to raise public awareness and facilitate change, and funds can be sought for environmental restoration projects.

Through the work of the Crosswicks Creek/Doctors Creek Watershed Association, a Watershed Greenway Plan was developed in 2004. This plan addressed not only the creation of a greenway trail, but also identified objectives to protect the cultural and environmental resources of the watershed. These objectives included protecting stream corridors, headwaters, scenic views, and historic resources, as well as creating recreational trails.

The Assunpink Creek watershed does not have a watershed management plan. However, the larger WMA 11 does have an Action Plan—completed in 2003 by Plan Smart NJ—which could be used as a basis for a more detailed Assunpink Creek plan. It is recommended that the Township and the Environmental Commission pursue the **development of a watershed management plan** for the Assunpink Creek watershed

with the collaboration of other stakeholders in the watershed, including municipalities, counties, environmental advocates, soil conservation districts, and other partners. There is currently no Assunpink Creek watershed association, although there is an Assunpink Greenway Plan prepared by DVRPC in 2000.

The Township Engineer and the Department of Water Pollution Control plan to work with the Rutgers Cooperative Extension Water Resources Program in conducting a **Municipal Hydrological Assessment**. The Environmental Commission will be consulted as necessary and will review all documents. It is anticipated that this study will analyze the current state of the stormwater collection system in Hamilton, including an assessment of the flood-prone areas of the township. The study will evaluate what measures might be implemented to protect the water resources (both surface waters and groundwater), improve water quality, and reduce flooding throughout Hamilton.

The study will initially evaluate the condition of the existing infrastructure and determine the extent of GIS coverage. In order to optimize the system operations, potential improvements to existing basins and other collection system infrastructure will be evaluated to determine needs and cost effectiveness. The Township's GIS system and Viewworks (the Township's selected software for asset management) will be utilized to properly define the condition and extent of the storm water collection and control system. The use of New Jersey Stormwater Best Management Practices will be incorporated where possible and modifications to current municipal ordinances relating to stormwater will be made as necessary.

Once the improvements that have been identified in the Municipal Hydrological Assessment have been implemented and the components of the collection system have been optimized, the system will be further evaluated to determine what additional infrastructure might be needed to reduce flooding and improve water quality. All available and relevant studies will be reviewed, including:

- ❖ Recommendations of the Delaware River Basin Commission Flood Advisory Committee for More Effective Floodplain Regulations in the Delaware River Basin
- ❖ Multi-Jurisdictional Flood Mitigation Plan for the Non-tidal, New Jersey Section of the Delaware River Basin

Ultimately, a township-wide stormwater model should be developed that would allow the Township Engineer and Planning staff to evaluate proposed changes to the system prior to implementation.

Objective 2B: Protect drinking water found in groundwater

Precipitation falling on the land that infiltrates the surface and seeps into the earth forms groundwater. The water moves downward through soil, sand, or rocks until it reaches an impermeable layer. This underground water fills the spaces between gravel, rocks, and other materials. When these gaps and pores are connected, or permeable, then

groundwater can flow easily. These permeable underground formations filled with water are called aquifers.

Many residents in Hamilton depend upon groundwater for their drinking water supply. Aqua NJ provides drinking water to Mercerville, Hamilton Square, and surrounding areas by use of five screened wells that tap the Potomac Raritan Magothy (PRM) aquifer. Four of these wells tap the middle PRM and one taps the lower PRM. The Bordentown Water Department also operates four screened wells located in southern Hamilton, which all tap the middle PRM. This aquifer is classified as a leaky confined aquifer with discontinuous layers of clay between the land surface and the well screens (intakes). This means that surface waters (and pollutants) can find a path to the aquifer. In addition, the agricultural area of southeastern Hamilton Township relies upon groundwater for irrigation and other uses.

Protecting groundwater means both ensuring adequate recharge quantity as well as preventing contamination from entering into aquifers. Hamilton Township can work to ensure the supply and safety of its drinking water by properly managing development throughout the township, particularly in potential groundwater recharge areas.

Action: Maintain groundwater recharge

If the amount of water being pumped from an aquifer is greater than the amount of water recharging that aquifer, then the area can experience groundwater depletion. Some devastating impacts of groundwater depletion include the drying up of wells and the reduction of the quality and quantity of water in streams and lakes.

The amount of water that is able to infiltrate the earth and recharge the groundwater depends on a number of factors, including surface water connectivity, soil permeability, presence of wetlands, and degree of impervious coverage (paved or developed areas). Areas with the highest rates of groundwater recharge tend to be undeveloped areas with porous upland soils. Fortunately, well capacity in Hamilton Township has remained relatively constant, and there has been no significant decline in groundwater levels since the 1970s.

Map 4: Aquifer Recharge Potential shows the areas in Hamilton Township with the greatest potential for recharging the aquifers. The pink areas show the outcrops of high-yield aquifers; the PRM aquifer outcrops in a diagonal band across the center of the township and the Englishtown aquifer outcrops in the southeastern corner. The green area shows the outcrop of the Merchantville-Woodbury confining unit, which is not an aquifer. The blue areas show low-yield bedrock formations. Within each color, darker shades indicate areas with higher potential for groundwater recharge.

Both Aqua NJ and the Bordentown Water Department consider aquifer capacity sufficient and stable. Aqua NJ is currently seeking approval to increase well withdrawal rates, and the Bordentown Water Department is evaluating the feasibility for drilling an additional well. However, in order to protect the quantity and quality of drinking water drawn from groundwater sources for future generations, **all developments in areas with high**

groundwater recharge potential should follow the New Jersey Stormwater Management rules.

Developments regulated by the New Jersey Stormwater Management Rules are those that are greater than one acre, or which increase impervious coverage by a quarter of an acre or more. One of the nine goals of the Stormwater Management Rules is to “maintain groundwater recharge.” For regulated developments, the design engineer is required to demonstrate that preconstruction groundwater recharge volume is maintained, or that the increased stormwater runoff from the two-year storm is infiltrated. Understanding the nature and locations of high recharge areas in Hamilton can help the Environmental Commission and the Planning Board ensure that groundwater resources are not depleted.

The wells operated by Aqua NJ and the Bordentown Water Department do not currently face capacity problems. However, the Environmental Commission should establish a program of monitoring water levels within this aquifer by periodically reviewing water-level information submitted by both water utilities. In the event that a significant change in water level is detected, the Township Engineer, Director of Water Pollution Control, and the Environmental Commission shall then evaluate the feasibility of developing a **Groundwater Recharge Ordinance**. This ordinance would complement and supplement the Statewide Stormwater Management Rules (NJAC 7:8).

Action: Protect Wellhead Protection Areas (WHPAs)

Wellhead protection areas (WHPAs) are delineated areas surrounding public wells where land uses should be regulated to protect water supply from contamination. Potential sources of groundwater contamination include fuels, oils, chemicals, road salts, fertilizers, pesticides, and waste. **Map 5: Wellhead Protection Areas** depicts the public water supply wells and the WHPAs in Hamilton. The WHPAs are concentric rings indicating the two-, five-, and 12-year times of travel to the wells, meaning that pollution within those areas can potentially infiltrate and reach the public well within those time periods. The radius of the WHPA depends on a number of factors related to the well and the underlying hydrogeology.

The five drinking water supply wells operated by Aqua NJ are screened at a depth of 136 to 243 feet below the land surface. Just north of Crosswicks Creek, the Bordentown Water Department operates four wells that are screened at a depth of between 114 and 138 feet below the land surface. Both the Aqua NJ and Bordentown Water Department wells are screened within the middle PRM Aquifer, which is a leaky confined aquifer. There are discontinuous clay layers between this formation and the land surface. Since the confining layers are not continuous, the middle PRM is not completely isolated from surface recharge within Hamilton Township, and pollutants can eventually reach this formation.

Over 9,600 parcels, or over one-fourth of all parcels in Hamilton, are located at least partially within a WHPA. The vast majority of these parcels are residential in use, and none are industrial. All of the WHPAs are also located in the approved sewer service

area, so leaking septic tanks are not an issue. However, there are some uses and activities likely to occur in these residential areas that can pollute groundwater, such as spilling automotive fluids, excessive use of fertilizers and pesticides, leaking underground storage tanks or pipes, and excessive use of road salt. In commercial areas of the WHPAs, illegal or accidental discharges of chemicals or fuels from dry cleaning establishments or auto-related businesses can also threaten drinking water wells.

According to Source Water Assessments conducted by NJDEP, both the Aqua NJ and the Bordentown Water Department wells overall have a medium to high susceptibility to contamination. All wells in both systems have a high susceptibility to contamination by nutrients (such as fertilizers) and VOCs (found in gasoline, solvents, and degreasers). Other high risks for some wells include inorganics (like asbestos and lead) and radionuclides (radioactive substances, which may occur naturally).

The susceptibility rating is not an indicator of contamination, although it provides an assessment of potential risk. Currently, both Aqua NJ and the Bordentown Water Department are not experiencing any contamination problems and are within compliance for all regulated contaminants. One Aqua NJ well was impacted by a TCE discharge from an unknown source, although an air stripper is currently remediating this issue and the TCE levels are acceptable. The Bordentown Water Department system experienced a spike in naturally occurring radionuclides in February 2008, although these levels are currently below the maximum contaminant level (MCL) for all wells.

In order to monitor changes in drinking water quality found in groundwater, it is recommended that the Environmental Commission review the annual Consumer Confidence Report (drinking water quality report) issued by both Aqua NJ and the Bordentown Water Department. In the event that significant changes in water quality are detected, the Environmental Commission, Planning Division, Township Engineer, and Director of Water Pollution Control should review the need for instituting a **Wellhead Protection Area Ordinance**. Hamilton Township does not currently have such an ordinance, although many communities in New Jersey do. This ordinance would regulate certain uses and activities within defined WHPAs, including collection, storage, or disposal of materials that could cause groundwater contamination. Uses and activities with a high risk for contamination could be prohibited, strictly controlled, or considered a conditional use within the WHPA. However, the focus of such an ordinance should be on restricting specific contaminants, rather than on the particular land uses. Certain particular uses can be exempted from the restrictions of the ordinance, such as the storage of fuel used for vehicles.

Remediation of known contaminated sites within WHPAs should be monitored to assess the progress of the remediation and to help ensure that contamination does not reach the drinking water supply wells. There are 17 known contaminated sites (regulated by the NJDEP) that are located within WHPAs in Hamilton Township. As discussed in Objective 3B, the Environmental Commission should track the contamination and remediation status of these sites to assist the mayor and Director of Economic Development regarding potential rehabilitation and reuse of these properties.

Lastly, the Environmental Commission, Aqua NJ, and the Bordentown Water Department should work to **educate residents and property owners within WHPAs** about the nature and importance of these areas in terms of drinking water quality. Informational resources are available through the NJDEP and the Association of New Jersey Environmental Commissions (ANJEC) to educate people on the potential for hazardous materials in these areas to contaminate drinking water supplies.

Objective 2C: Improve water quality and natural stormwater management

The federal Clean Water Act regulates discharges of pollution into waters and regulates water quality standards of surface waters. The Act requires states to submit reports every two years that describe the water quality of their streams and rivers. The lakes and streams of Hamilton all show impairments to water quality, as identified in the *2008 New Jersey Integrated Water Quality Monitoring and Assessment Report* of the New Jersey Department of Environmental Protection (NJDEP), and summarized in the Hamilton Township Environmental Resource Inventory. These impairments are largely caused by excessive stormwater runoff.

Even in highly developed municipalities like Hamilton, stormwater can be managed using environmental features that retain rain water on-site and utilize processes of infiltration and biologic uptake found in nature. Stormwater runoff is the result of precipitation that is not infiltrated into the groundwater, but is instead drained into a nearby water body. With increased development and more impervious surfaces, less water percolates into the ground and more is carried into the surface waters, either through direct runoff or through stormwater outfalls. In addition to flooding, increased stormwater runoff causes water quality impairment for the following reasons:

- ❖ Pollutants on the land are carried to water bodies
- ❖ Groundwater (aquifers) are not recharged
- ❖ Flash-flooding destabilizes aquatic life of streams
- ❖ Stream banks are eroded, increasing siltation of water bodies
- ❖ Eroded stream banks are less able to filter further stormwater runoff
- ❖ Stream bank erosion can expose sewer infrastructure, making it more susceptible to damage and leaks

Using natural features to manage stormwater not only is far less expensive than structural interventions, but it also improves habitats, water quality, public health, and quality of life.

Action: Protect wetlands and floodplains

One way to manage stormwater naturally is to preserve and maintain wetlands and floodplains, which provide natural flood control protection. Wetlands are areas where the soils are saturated with water frequently enough to support vegetation that is adapted to wet soils. Floodplains are flat areas adjacent to waterbodies that are naturally subject to

frequent flooding. Both wetlands and floodplains retain stormwater naturally, and the development of these areas increases the frequency and severity of flooding problems.

State, federal, and local laws regulate development within wetlands and floodplains to a large extent. In order for wetlands to be protected, their presence must be established by a letter of interpretation (LOI) by the NJDEP. However, wetlands under one acre in size may be permitted to be developed. Wetlands greater than one acre can also be developed, provided that the loss of wetlands is compensated through mitigation activities. Regarding floodplains, New Jersey protects the flood hazard area, defined as the 100-year floodplain increased by 25 percent.

In the Hamilton Township Municipal Ordinance, Chapter 157: Flood Damage Prevention regulates development within special flood hazard areas in the township. The special flood hazard area is defined as the land in the floodplain subject to a 0.2 percent or greater chance of flooding in a given year. This area is also known as the 500-year flood. Most development activities within the special flood hazard area must be approved by the Township, which evaluates the impact of the proposed improvement to the public and the natural environment. This ordinance also prohibits hazardous uses and critical facilities from being located within the floodplain. **This ordinance should be reviewed by the Township Engineer** to confirm that it is in compliance with the most recent NJDEP regulations.

Map 6: Wetlands and Floodplains depicts areas containing wetlands and floodplains. By maintaining vegetated open space on these areas, stormwater can be retained and the amount of runoff entering streams will not increase. **Land preservation** is the most effective way to ensure that these natural stormwater management areas are maintained. Were these parcels to be developed, **low impact development** strategies should be utilized to concentrate development in non-sensitive areas, while keeping floodplains and wetlands free from development. The **North American Wetlands Conservation Act** provides matching grants to organizations and individuals to implement wetlands conservation projects that involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats.

Action: Protect stream buffers

The current Stream Buffer Conservation Zone of the Hamilton Township Municipal Ordinance of (Section 155-10) regulates development within 75 feet of surface waters, including streams (both intermittent and perennial), lakes, ponds, and reservoirs. This ordinance regulates the siting and engineering of developments within this defined zone. The stream buffer conservation zone adjacent to Category 1 streams is 150 feet in Hamilton Township.

The Flood Damage Prevention Ordinance of the Hamilton Township Municipal Code (Section 157-31) also notes that a state permit from NJDEP is required for developments within 50 feet of the channel bank of the following waterways: those containing acid-producing soils; those classified as Category 1, FW-1 trout associated, or FW-2 per NJDEP standards; and those that provide critical habitat supporting threatened or

endangered species at any time during their life cycle (including documented historic habitat).

However, state regulations require a 300-foot setback from streams, which supersedes the municipal standard. In Hamilton Township, the only Category 1 waterway is located within the Van Nest Refuge, which is already protected from development. **Map 7: Stream Buffers** shows the portion of Assunpink Creek that is defined as Category 1.

The stream buffer conservation zone adjacent to all other areas in the township is a minimum of 75 feet in width. However, the New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) require a buffer of 150 feet (measured from the stream centerline) adjacent to the following types of waterways:

- ❖ Trout-supporting streams (not applicable to Hamilton Township)
- ❖ Any segment of a water flowing through an area that contains documented habitat for a threatened or endangered species of plant or animal, which is critically dependent on the regulated water for survival, and all upstream waters (including tributaries) within one linear mile as measured along the length of the regulated water
- ❖ Watercourses that flow through areas that contain acid-producing soil deposits

The list of threatened and endangered species critically dependent on regulated waters for survival includes a number of species that are found in Hamilton Township. One species, the wood turtle (*Clemmys insculpta*), has critical habitat along much of Pond Run according to the Landscape Project. These areas are shown on **Map 7: Stream Buffers**. This list also includes the threatened and endangered plant species pawpaw (*Asimina triloba*), pale Indian plantain (*Cacalia atriplicifolia*), wafer-ash (*Ptelea trifoliata*), and the death-camus (*Ptelea trifoliata*). The Natural Heritage Program identifies locations of rare plants and ecological communities on grid maps that show a general area, but are not geographically precise enough to protect these sensitive populations. Each grid cell is between 358 and 372 acres in size. Portions of streams located in grid cells containing documented rare plant species as identified by the Natural Heritage Program are shown in **Map 7: Stream Buffers**.

Much of Hamilton Township also contains areas containing acid-producing soil deposits, as these types of soils underlie much of the Coastal Plain. The likelihood that acid-producing soils will be exposed is a function of the elevation of the landscape, with acid-producing soils being closer to the surface in lower elevations. In Hamilton, the following acid-producing formations are exposed in the southeastern half of the township: Magothy, Merchantville, Woodbury, and Englishtown. These and other geologic formations are depicted in the Hamilton Township Environmental Resource Inventory. The streams located where these acid-producing formations are exposed are shown in **Map 7: Stream Buffers**.

To ensure compliance with these statewide regulations, as well as to better manage stormwater and protect water quality, it is recommended that the Township Engineer **review the Stream Buffer Conservation Zone**, along with the Flood Damage

Prevention Ordinance, to ensure compliance with the most recent NJDEP regulations. **Map 7: Stream Buffers** shows all streams in Hamilton Township that require either a 300-foot buffer (Category 1) or a 150-foot buffer (wood turtle habitat, rare plant habitat, acid-producing soil deposits).

Action: Restore streambanks

The Environmental Commission should consider the potential for establishing a **streambank restoration program** to evaluate the stream conditions that currently exist, identify priority locations for restoration, and conduct ongoing monitoring of the health of the streams. Restoring waterways through natural stream design practices can strengthen and reinforce the stream banks, while maintaining habitat, vegetation, and ecological integrity.

The first step of a streambank restoration program is an evaluation of the current stream conditions through the township. There is a range of different stream restoration approaches, and it is important to select the appropriate practice based on the conditions of the channel and the surrounding area. The *USDA Stream Visual Assessment Protocol* can help in field assessments of stream impairment. Through this evaluation, stream segments can be individually identified and classified based on their level of degradation.

Restoring riparian corridors is most effective when the entire stream is the focus, rather than individual segments. However, restoration projects typically occur gradually over time. The Environmental Commission should conduct periodic walks along streambanks after heavy rain events to document where litter, runoff, and sediments accumulate. These recorded observations should then be used to identify locations where streambank restoration programs would be beneficial. Prioritizing stream segments for restoration can be based on three factors: level of degradation, public accessibility (with public lands prioritized), and location in basin (with headwater streams prioritized).

In addition to visual assessments, other factors of stream health should also be monitored as part of a streambank restoration program. This includes aquatic biota monitoring, which is typically measured by the population of benthic macroinvertebrates, as well as fish species. The health of the aquatic biota can be measured by the number of species present (richness), the abundance of individuals within each species (diversity), and their relationship in the stream continuum concept (trophic assemblage). Another element of this program would be water quality/chemical monitoring. Parameters to be evaluated include temperature, dissolved oxygen, pH, turbidity, conductivity, nitrates, nitrites, total phosphorus, total dissolved solids, total suspended solids, chemical oxygen demand, biological oxygen demand, fecal coliform, total copper, total lead, and total zinc. Continual monitoring of aquatic biota and chemicals over a period of years will show the impact of the stream restoration work in reestablishing natural stream ecology.

Once an evaluation is complete, the Environmental Commission can determine whether there are available sources of funding or volunteers for a streambank restoration program. Such programs offer an ideal opportunity to involve residents and local organizations in the environmental initiatives of the township. With some minimal training,

volunteers can conduct river assessments to note disturbances to the stream bank. Once the problems and solutions have been identified by the lead organization and/or trained volunteers, many existing streambank programs can rely on volunteer events to conduct the physical restoration of the streambanks, including re-vegetation and clean-ups. Streambank restoration groups often partner with scout groups, youth clubs, and associations, as well as local companies and educational institutions.

A municipally supported streambank restoration project can be an integral aspect of the Phase II Stormwater Program and other regulatory programs. The support to operate a monitoring and restoration program can come from a variety of sources. One major source of funding is the **Section 319(h) grant program**, established by the federal Clean Water Act. This funding can be used for technical assistance, financial assistance, education, training, technology transfer, demonstration projects, or monitoring in order to improve nonpoint source pollution. The Environmental Commission, with the support of the Hamilton Township administration, can consider applying for this program to restore the health and beauty of its streams.

The Environmental Commission can also consider listing priority streambank restoration projects on the **Partnership for the Delaware Estuary Regional Restoration Initiative Project Registry**. Hamilton Township is located entirely in the Upper Estuary Region of the Delaware Estuary, so restoration projects within the township can qualify for listing on the registry and other support and promotion by the Partnership for the Delaware Estuary. Projects can include traditional habitat restoration, enhancement, creation, or protection activities.

Another potential way to fund streambank restoration projects is to consider them as mitigation projects. The Planning Division, Township Engineer, Department of Water Pollution Control, and Environmental Commission can consider the feasibility of **amending the Mitigation Plan section of the Hamilton Township Stormwater Management Plan** to allow these projects to qualify as a mitigation project. A mitigation plan is required when a development is granted an exemption from the municipal stormwater design and performance standards. Currently, a mitigation project could involve the retrofitting or repair of an existing municipal stormwater facility, such as a basin, inlet, or outfall. Since streams have natural stormwater management functions, their restoration should be eligible as compensation for stormwater impacts due to development. Mitigation opportunities can also be addressed in the municipal hydrological assessment.

Other municipal streambank restoration programs have also relied on **funding from local corporate and business sponsors**. Donations could be accepted through a website donation link and could be collected for the overall program or for specific streambank projects. For example, a local Target sponsored a one-day volunteer streambank restoration event for one municipality. For this method of funding, it is helpful if the organization running the streambank restoration program is a certified nonprofit so that the donations are tax deductible.

Objective 2D: Improve stormwater management infrastructure

An important step in improving stormwater management in Hamilton Township is to develop a comprehensive inventory and evaluation of the current infrastructure. There may be many opportunities for improving the existing facilities to better manage stormwater quantity and quality.

Action: Evaluate status of current stormwater management infrastructure

As part of the proposed municipal hydrological assessment, areas that experience flooding and other stormwater problems will be identified. A **comprehensive inventory of stormwater management infrastructure** should be developed as part of the municipal hydrological assessment. This inventory should include basins, outfalls, inlets, and other facilities in the township. The exact locations can be mapped using GPS technology. Part of this inventory can include assessments of the conditions of the facilities to identify any problems that may exist. This inventory could also include water quality sampling at outfall locations. This database can be the foundation for future capital improvement priorities regarding stormwater. The Hamilton Township Division of Engineering has a preliminary inventory of outfalls in the township, as required by the statewide Stormwater Management Rules, which can be used as the basis for a more comprehensive inventory and GIS map.

In areas with flooding problems, the existing stormwater facilities should be especially examined and assessed. Where possible, these facilities should be modified to better manage stormwater and improve water quality. For example, existing basins may be able to be retrofitted to improve both ecological and stormwater functionality. Basins and outfalls may be able to be redesigned with added vegetation, re-grading, wetland components, and other improvements. These improvements would not only reduce flooding and improve water quality, but could also add to the economic and aesthetic value of the surrounding area.

Goal 3: Protect Public and Environmental Health from Pollution

Objective 3A: Foster sustainable practices for agriculture, gardens, and landscaping

In managed areas like farms, gardens, and landscaped areas, sustainable practices can ensure that the productivity and attractiveness of these lands do not have to conflict with environmental health. Every aspect of the growing process can be evaluated for its environmental impact regarding water conservation, stormwater runoff, fertilizers and pesticides, wildlife protection, and other issues. For example, the inherent suitability of the soils and climate should inform decisions on plant selection and irrigation need. All uses of pesticides and fertilizers should be scrutinized to reduce the amount of harmful chemicals and excessive nutrients entering the environment.

Although much of Hamilton is highly developed, the southeastern section of the township is still agricultural in nature. According to farmland assessment data collected by the Mercer County Board of Taxation, there is a variety of agricultural production being practiced in Hamilton, including field crops, vegetables, orchards, cattle, dairy, and horticulture (including Christmas trees). There are no certified organic farms in Hamilton, although nearby organic farms are located in Lawrenceville, Chesterfield, and Hopewell.

The Cooperative Extension of Mercer County offers programs and services to agricultural producers in the county, including home gardeners. One project of the Cooperative Extension is the Master Gardeners of Mercer County. The Master Gardeners is a volunteer organization that provides horticultural information through special programs, a helpline, and community events. Part of its mission is to encourage environmentally responsible gardening and pest management.

Managed areas like school grounds, parklands, residential lawns, and other landscaped open spaces are also part of the natural environment of Hamilton. Sustainable landscaping can include planting native and drought-resistant vegetation, attracting beneficial insects, utilizing compost, and seeking alternatives to traditional fertilizers and pesticides. Because native plants are naturally adapted to the local climate, they require fewer pesticides, fertilizers, or watering to maintain. Additional benefits include water-use reduction, increased habitat for native flora and fauna, a reduction in soil erosion, and increased stormwater absorption.

Action: Expand practice of Integrated Pest Management (IPM) on public lands, school grounds, and agriculture

The environmental and public health impacts of pesticides can be devastating. At elevated levels, pesticides have been shown to be toxic or harmful to all forms of plant and animal life. For humans, exposure to pesticides has been associated with asthma, cancer, development and learning disabilities, nerve and immune system damage, liver

or kidney damage, reproductive impairment, birth defects, and disruption of the endocrine system. The NJDEP Pesticide Control Program conducts a statewide agricultural pesticide survey every three years. The most recent available survey (2006) reported that Mercer County was in the middle-range of pesticide use levels.

An alternative to pesticides is Integrated Pest Management (IPM), which is a systematic approach to pest management that utilizes knowledge of the life cycles of pests and their interaction with the environment. IPM involves evaluating a site for identification of a pest problem and recognizing a threshold for when action is necessary. IPM takes into account biological, mechanical, physical, and chemical pest control methods before selecting the best alternative. The first action steps should be manual removal or nonchemical treatment of the pest. IPM is considered by the EPA and the NJDEP as the safest and most cost-effective option for pest management.

The Hamilton Township Council adopted an IPM policy in 2009 (Resolution #09-387), which stated that IPM is to be the pest control strategy for the maintenance of all public properties and facilities. This resolution encourages all citizens to make every effort to participate in this policy on their private properties. However, the policy specifies that only lands in the Hamilton Township Parks System are to be managed using IPM. Within municipal parks, "Ladybug Zones" have been designated where IPM is to be used. These zones are primarily areas used heavily by children and dogs, such as playgrounds. It is recommended that Hamilton Township **expand the use of IPM on lands owned by the municipality** where feasible. This includes all areas of Township parks, non-park Township-owned public properties, and the grounds of municipal facilities.

IPM is the preferred pest control management strategy for all schools in New Jersey, as outlined in the NJ School Integrated Pest Management Act signed into law by Governor McGreevey in 2002. The law requires that public, private, and charter schools with grades prekindergarten through 12 must develop IPM plans that combine pest control, building maintenance, and sanitation practices. This law encourages the use of low-impact pesticides and requires notification before applications. However, the 2002 act does not cover colleges, universities, or day care centers. Hamilton Township should take steps to ensure that all schools covered by the act are following IPM standards, and should also work with non-applicable facilities like day care centers to encourage the use of IPM. Hamilton Township can **encourage day care centers to use IPM and discourage the use of pesticides at all schools**. This is especially important considering that children are some of the most vulnerable to health risks from pesticides. The Rutgers Cooperative Extension Pest Management Office has a School IPM website that provides comprehensive information on policies, resources, training, and strategies for implementing an IPM approach at schools. The NJ Environmental Federation also promotes IPM Pesticide Free Zones through its Healthy Schools and Towns initiative, which has additional information and resources available. A bill proposed in the New Jersey Senate, "The Child Safe Playing Field Act," would prohibit the use of most lawn pesticides at public and private schools and day care centers, but this has not been passed at the time of this writing.

Agriculture is the largest user of pesticides, and farm workers can have a very high risk of exposure to pesticides. Many farmers in the U.S. are beginning to adopt “ecological pest management” tactics, which involve mimicking natural relationships among various species to control unwanted pests. The Cooperative Extension of Mercer County works to inform farmers on IPM practices on agricultural lands. The Rutgers Cooperative Extension Pest Management Office also provides IPM information targeted for different types of crop production, including fruits, vegetables, and horticulture. The New Jersey Information Network for Pesticides and Alternatives Strategies is a grant-funded network, run by the Rutgers Cooperative Extension, which disseminates information about current and transitional pest management strategies within the state. Two federal programs to encourage reduction in pesticide use on farms are the Strategic Agricultural Initiative and the Source Reduction Assistance Program. Grants are available for farmers transitioning to IPM through the Sustainable Agriculture Research and Education program, an initiative through the National Institute of Food and Agriculture. The Environmental Commission can **collaborate with the Cooperative Extension** to develop ways to better serve Hamilton farmers willing to pursue IPM or other sustainable agricultural management practices.

Action: Encourage environmental restoration on agricultural lands

Another aspect of sustainable growing is the conservation of streambanks, wetlands, and other natural areas, particularly on farms. Runoff of excessive nutrients, pesticides, soils, and animal waste from farms is one of the most serious threats to water quality in the country. In addition to reducing the risk of pollution at the source through modifying farm practices, restoring natural areas can help prevent the environmental damage caused by runoff and erosion.

There are numerous federal and state programs that provide financial and technical assistance to farmers to preserve and enhance riparian corridors, grasslands, wetlands, and other natural areas. These include the Conservation Reserve Enhancement Program, Wetlands Reserve Program, Grassland Reserve Program, Wildlife Habitat Incentives Program, Environmental Quality Incentives Program, Conservation Stewardship Program, Farm and Ranch Lands Protection Program, and the Partners for Fish and Wildlife Program. Most of these funding opportunities for ecological conservation are programs of the Natural Resources Conservation Service (NRCS), an agency within the United States Department of Agriculture (USDA). The NRCS has a service center in Freehold that serves municipalities in Mercer, Monmouth, and Middlesex counties. The Environmental Commission or other municipal or civic organizations can **collaborate with the Cooperative Extension and the NRCS office** to encourage utilization of these programs to preserve the environmental resources on agricultural lands.

Action: Encourage sustainable lawn care for residents

Encouraging IPM and natural landscaping methods for private residences begins with education. Residents can employ IPM through pest prevention, safely and correctly using pesticides in spot treatments, safely disposing of leftover pesticides, and other IPM

techniques. Natural landscaping should be encouraged by the Township as the preferred method for residential landscaping and gardening.

The Master Gardeners of Mercer County website offers a number of factsheets on topics ranging from weed management and pest control to using wildflowers and planting in the shade. Additionally, the Master Gardeners organization also offers educational outreach efforts and assists community groups in establishing local educational programs. Of the special educational programs offered by the Master Gardeners of Mercer County, many address IPM practices and how home gardeners can utilize them. The Environmental Commission or other municipal or citizen groups or individuals can coordinate with the Master Gardeners to **promote these IPM programs**. A collaboration could also encourage such programs and educational events to be held at facilities in Hamilton Township to make them more accessible for residents. The Master Gardeners also runs an Educational Garden in Pennington that features compost bins, native plants, and a weed identification garden. The Environmental Commission and the Department of Public Works could collaborate to explore **creating a similar demonstration project** in one of the Township's public parks or school grounds.

Objective 3B: Encourage awareness and remediation of known contaminated sites

Known contaminated sites are locations containing known or potential contamination affecting soils or groundwater. These sites are also known as brownfields. The impact of contamination can spread far beyond the designated site when pollution enters the air, groundwater, and surface waters.

As of August 2010, there were 99 known contaminated sites located in Hamilton. There are another 244 closed known contaminated sites in the township, where remediation activities have taken place. Remediation can involve a removal of contaminated material, capping and containment, or ongoing monitoring of the site.

Action: Increase awareness of known contaminated sites

The Environmental Commission should **track the status of known contaminated sites** in Hamilton in order to remain aware of these sites and any potential environmental impacts they may have. These sites can be tracked for their remediation status, monitoring and sampling data, and any potential risks they may pose.

Status information on known contaminated sites can be found on the NJDEP website within the Data Miner search tool for Open Public Records Act (OPRA) information. The site information available through this search tool includes enforcement actions, inspections, license status, permits, and violations. More detailed site information, including testing results and remediation activities, may be obtained by contacting the case manager for each site. The name and phone number of each case manager is available from Data Miner. The Environmental Commission could consider compiling detailed information on each site and making this public data available on the township

website. The Environmental Commission could also prepare semi-annual and event-driven reports to the mayor and Director of Economic Development on the status of all known contaminated sites.

Although the state has the authority for the listing and management of known contaminated sites, all remediation actions must now be reported to the clerk of the township in which the site is located. This reporting allows for local input and knowledge of actions pertaining to each site. Although the municipality lacks enforcement authority of contaminated sites, recent court decisions have tended to place liability on local government if an unremediated site is approved by local boards for reuse. In its review of development applications, the Environmental Commission should consider the presence and potential impacts of any known contaminated sites on or near the proposed development.

Action: Encourage rehabilitation and reuse of sites

Hamilton Township currently encourages the remediation and reuse of its known contaminated sites. The Hamilton Township Economic Development Advisory Commission and the Redevelopment Agency support redevelopment of existing sites instead of new construction on undeveloped land. These agencies should continue to be involved in **applying for remediation funding** on behalf of the municipality and **promoting incentives for redevelopment**.

One statewide source of funding is the Hazardous Discharge Site Remediation Fund, which offers grants and loans for the remediation of hazardous sites. The New Jersey Environmental Infrastructure Trust also offers low-interest loans for different types of environmental projects, including brownfields remediation.

The Brownfields Development Area Initiative is a project by the NJDEP to develop remediation and reuse plans for municipalities with multiple brownfields. Under the New Jersey Brownfield and Contaminated Site Remediation Act, a developer that enters a redevelopment agreement may potentially recoup up to 75 percent of the cleanup costs of the site. There are also certain liability protections available to individuals who wish to acquire contaminated properties.

Residents can address the pollution caused by antiquated underground storage tanks on their properties through the Petroleum Underground Storage Tank Remediation, Upgrade and Closure Fund. Currently, this program only funds unregulated tanks, which includes residential heating oil tanks.

Objective 3C: Encourage awareness and monitoring of local air pollution

The Clean Air Act was passed by Congress to protect public health and the environment from the dangers of air pollution. The Environmental Protection Agency (EPA) implements programs to address three types of air pollution:

- Ambient air pollution causing smog, haze, and acid rain

- Toxic air pollution known to cause or suspected of causing cancer and other problems
- Chemical air pollution destroying the ozone layer

All stationary sources with potential or actual emissions of air pollutants are required to obtain permits from the NJDEP. Title V of the Clean Air Act requires certain major facilities producing potentially harmful air emissions to obtain operating permits. There are over 300 such major facilities in New Jersey. In addition, there are over 17,000 non-major facilities in the state with preconstruction permits for new or modified sources of air pollution.

In addition to permit requirements, certain major facilities are required to submit annual emissions statements that report the amounts of air contaminants emitted every year.

Action: Track local sources of air pollution

There are over 150 facilities in Hamilton with air permits. All but two of these involve preconstruction permits for non-major new or modified sources of air pollution. Many of these are for gasoline dispensing, boilers or heaters, emergency generators, and dry cleaning. However, there are two major facilities with operating permits regulated under Title V of the Clean Air Act. These are the Congoleum Corporation (PI: 61055 and 61056) and the PSEG Fossil LLC Mercer Generating Station (PI: 61057). These two facilities, in addition to Consumers Oil Corporation (PI: 60029), are also required to submit annual emissions statements.

It is recommended that the Environmental Commission **monitor the status of operating permits and annual emissions statements** for the township and provide an annual report for the mayor. Relevant information on these facilities can be found through the NJDEP Data Miner search tool. Additional data may be available through the EPA's Enforcement and Compliance History Online (ECHO) search tool (www.epa-echo.gov/echo). ECHO provides Clean Air Act data, including Toxics Release Inventory and National Emissions Inventory data. The Mercer County Health Department handles air pollution issues under the County Environmental Health Act, and any complaints or concerns regarding air pollution can be addressed to that department.

Summary Tables

Goal 1: Enhance Natural Habitats, Open Space, and Tree Canopy			
Objective	Recommended Action	Potential Step	Municipal Leaders
Objective 1A: Ensure funding for open space	Consider establishing an open space tax		Environmental Commission; Planning Division; Municipal government
Objective 1B: Create a greenway system along streams	Support existing trails and greenways	Increase the awareness, appreciation, and maintenance of trails and greenways	Environmental Commission; Department of Public Works
	Pursue expansion of greenways and trails	Review existing plans and pursue land preservation or easements	Environmental Commission; Planning Division
		Conduct feasibility study of greenways for Miry Run and Pond Run	Environmental Commission; Planning Division
		Landowner education	Environmental Commission; Planning Division
Objective 1C: Protect important habitats and open space	Preserve and enhance land in identified conservation areas	Collaborate with the Marsh Center	Environmental Commission
	Protect critical habitat for rare species	Landscape Project habitats land preservation	Planning Division; Municipal government
	Protect vernal pools	Pursue certification	Environmental Commission
	Encourage native plant species	Consider the establishment of a municipal invasive species removal program	Environmental Commission; Shade Tree Commission; Department of Public Works
		Annual survey of invasive plants	Environmental Commission; Shade Tree Commission; Department of Public Works

		Educate local residents to identify invasive plant species	Environmental Commission; Shade Tree Commission
		Amend municipal code to discourage non-native plants	Environmental Commission; Shade Tree Commission; Planning Division; Municipal government
		Consider a municipal native plant policy	Environmental Commission; Shade Tree Commission; Municipal government
Objective 1D: Enhance the urban tree canopy	Implement and strengthen the Community Forestry Management Plan	Strengthen the membership and responsibility of the Shade Tree Commission	Shade Tree Commission
		Conduct township-wide street tree inventory	Shade Tree Commission
	Strengthen ordinance to encourage tree preservation	Consider revision of Tree Preservation ordinance	Shade Tree Commission; Environmental Commission; Planning Division; Municipal government
		Add Specimen (or Heritage) Tree Preservation	Shade Tree Commission; Environmental Commission; Planning Division; Municipal government
	Promote education for residents on tree health and importance	Host educational events on proper tree care	Shade Tree Commission
		Enhance the Shade Tree Commission website	Shade Tree Commission

Goal 2: Protect Water Resources, Improve Water Quality, and Reduce Flooding

Objective	Recommended Action	Potential Step	Municipal Leaders
Objective 2A: Plan for watershed restoration	Plan for watershed restoration	Develop Assunpink Creek watershed management plan	Environmental Commission; Planning Division
		Conduct municipal hydrological assessment	Township Engineer; Department of Water Pollution Control; Planning Division; Environmental Commission
Objective 2B: Protect drinking water found in groundwater	Maintain groundwater recharge	Ensure compliance with statewide rules regarding groundwater recharge	Township Engineer; Environmental Commission; Planning Division; Planning Board
		Consider feasibility of groundwater recharge ordinance	Environmental Commission; Planning Division; Township Engineer; Municipal government
	Protect Wellhead Protection Areas (WHPAs)	Consider Wellhead Protection Area ordinance	Environmental Commission; Planning Division; Municipal government
		Remediation of Known Contaminated Sites within WHPAs	Environmental Commission; Economic Development Advisory Commission; Redevelopment Agency
		Educate residents and property owners within WHPAs	Environmental Commission
Objective 2C: Improve water quality and natural stormwater management	Protect wetlands and floodplains management	Review Flood Damage Prevention Ordinance	Environmental Commission; Township Engineer; Planning Division; Municipal government
		Land preservation	Planning Division; Municipal government
		Low impact development	Planning Division; Township Engineer
		Conservation grants through North American Wetlands Conservation Act	Environmental Commission; Landowners

	Protect stream buffers	Review the Stream Buffer Conservation Zone ordinance	Environmental Commission; Township Engineer; Planning Division; Municipal government
	Restore streambanks	Consider development of streambank restoration program	Environmental Commission
		Obtain Section 319(h) grant for stream project	Environmental Commission
		List stream project on the Partnership for the Delaware Estuary Regional Restoration Initiative Project Registry	Environmental Commission
		Consider amending Mitigation Plan section of Hamilton Township Stormwater Management Plan	Environmental Commission; Planning Division; Township Engineer; Municipal government
		Solicit funding from local corporate and business sponsors	Environmental Commission
Objective 2D: Improve stormwater management infrastructure	Evaluate status of current stormwater management infrastructure	Develop a stormwater management infrastructure inventory	Township Engineer; Department of Water Pollution Control; Environmental Commission

Goal 3: Protect Public and Environmental Health from Pollution

Objective	Recommended Action	Potential Step	Municipal Leaders	
Objective 3A: Foster sustainable practices for agriculture, gardens, and landscaping		Expand the use of IPM on lands owned by the municipality	Department of Public Works; Environmental Commission	
	Expand practice of Integrated Pest Management (IPM) on public lands, school grounds, and agriculture	Encourage day care centers to use IPM and discourage the use of pesticides at all schools	Hamilton Township School District; Environmental Commission	
		Collaborate with the Cooperative Extension for agricultural IPM	Environmental Commission; agricultural landowners	
	Encourage environmental restoration on agricultural lands	Collaborate with the Cooperative Extension and the NRCS office to expand use of federal and state programs	Environmental Commission; agricultural landowners	
	Encourage sustainable lawn care for residents		Promote IPM educational programs	Environmental Commission
			Create sustainable landscaping demonstration project	Environmental Commission; Department of Public Works
Objective 3B: Encourage awareness and remediation of Known Contaminated Sites	Increase awareness of known contaminated sites	Track status of sites	Environmental Commission	
	Encourage rehabilitation and reuse of sites	Continue to apply for remediation funding and promote incentives for redevelopment	Economic Development Advisory Commission; Redevelopment Agency	
Objective 3C: Encourage awareness and monitoring of local air pollution	Track local sources of air pollution	Monitor the status of operating permits and annual emissions statements of regulated facilities	Environmental Commission	

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APPENDIX A: MAPS

Map 1: Greenway Trails

Map 2: Conservation Areas

Map 3: Landscape Project Critical Habitats

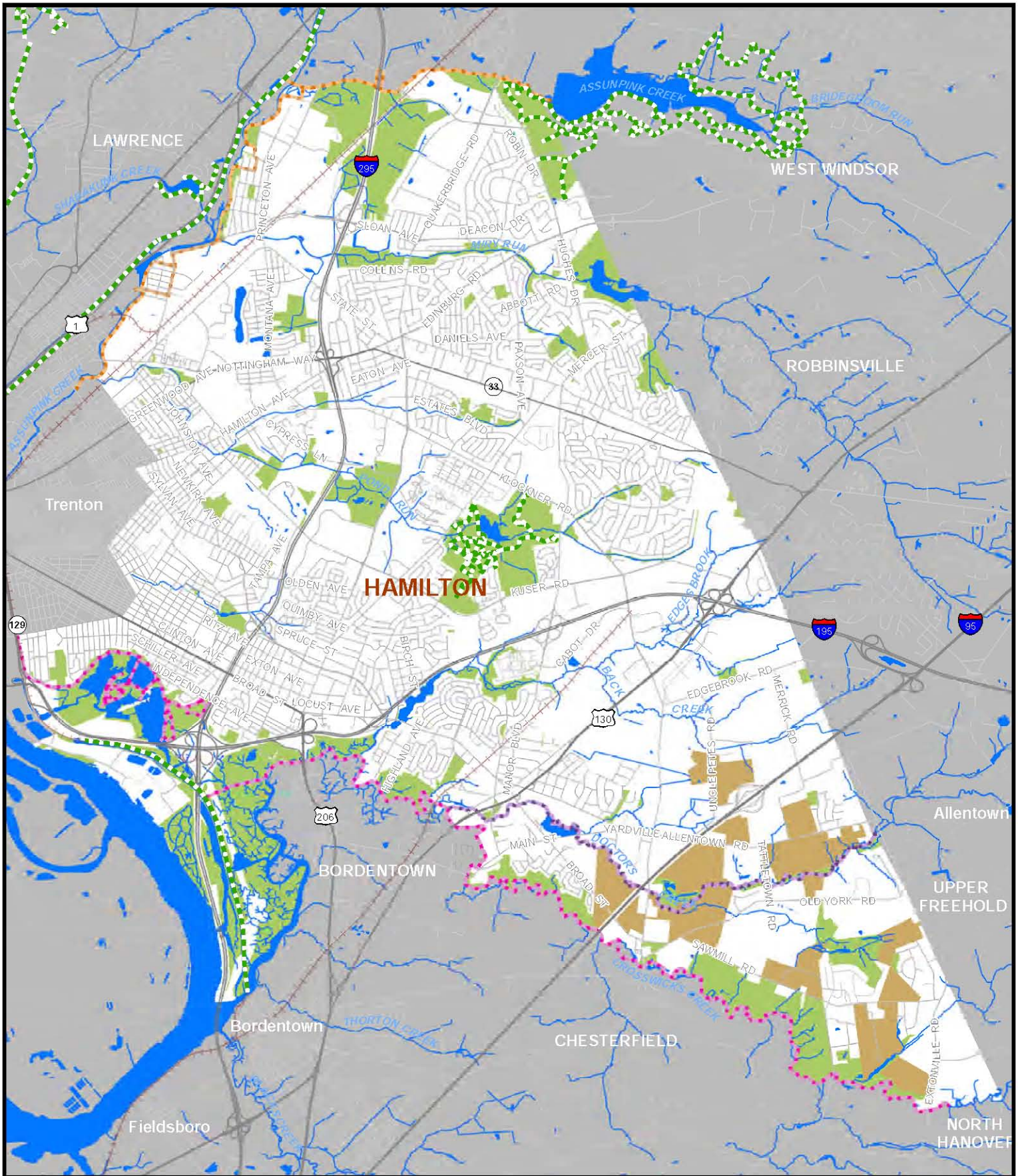
Map 4: Aquifer Recharge Potential

Map 5: Wellhead Protection Areas

Map 6: Wetlands and Floodplains

Map 7: Stream Buffers

Note: These maps are intended to serve as a resource and may be subject to more in-depth analysis and field inspection.



Source : NJDEP, NJDOT, DVRPC.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Potential Greenway Trails

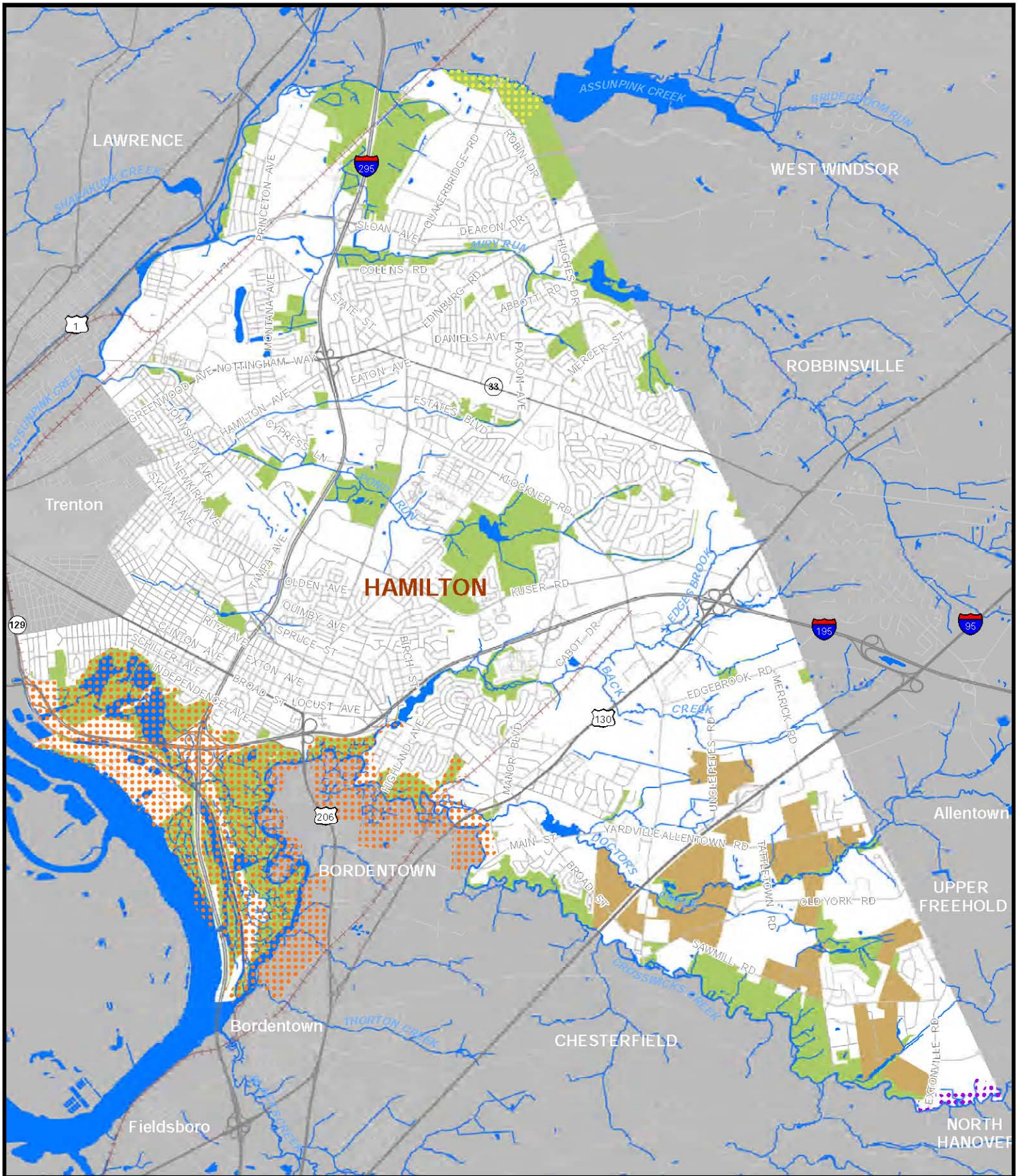
- - - - Doctors Creek
- - - - Crosswicks Creek
- - - - Assunpink Creek

- Preserved Open Space
- Preserved Farmland
- - - - Existing Trail

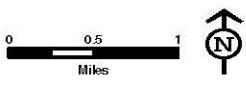



Map 1: Greenway Trails





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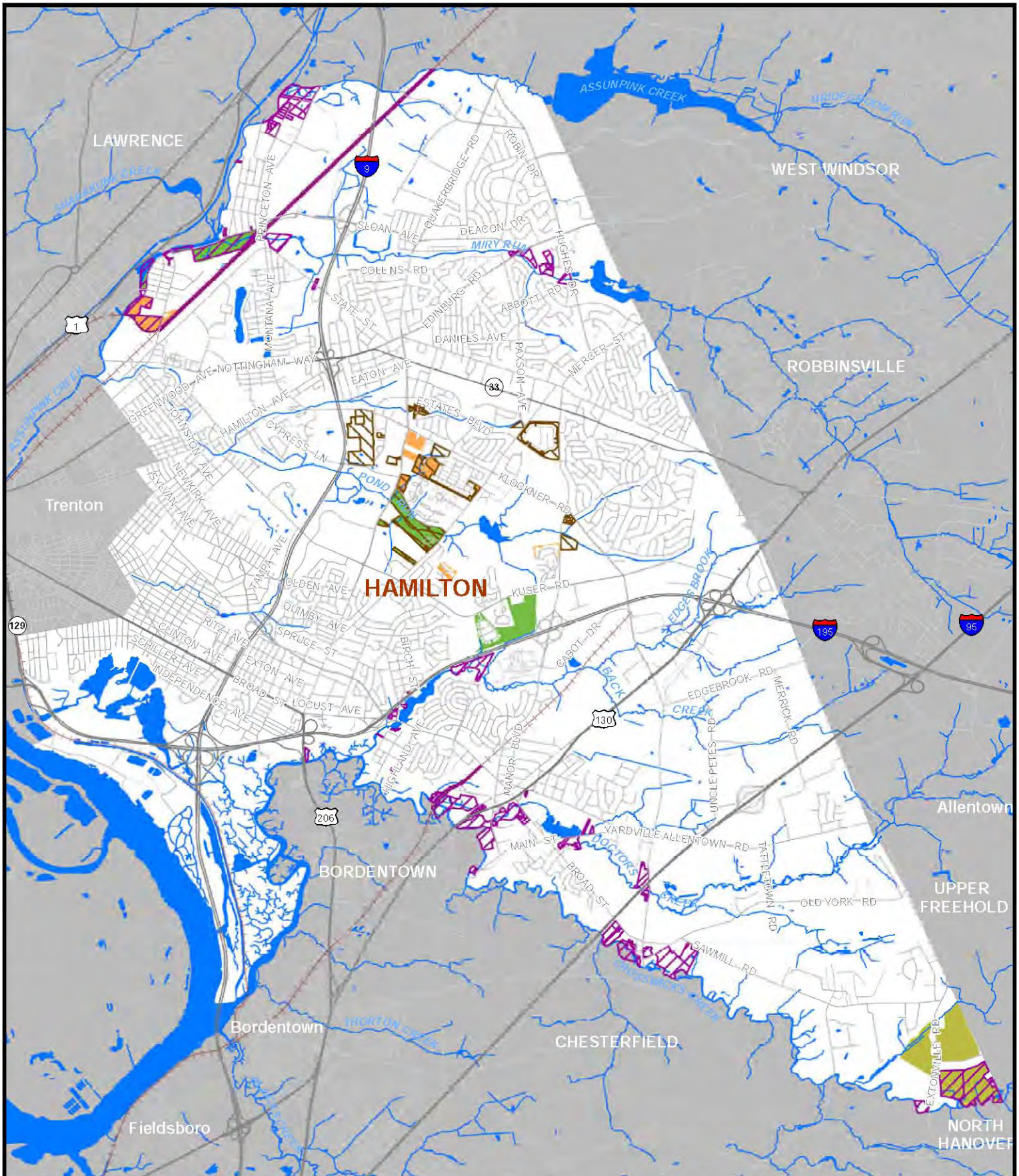


-  Hamilton-Trenton-Bordentown Marsh
-  Van Nest Refuge
-  Walnford Floodplain (Hamilton only)

-  Preserved Open Space
-  Preserved Farmland

Map 2: Conservation Areas





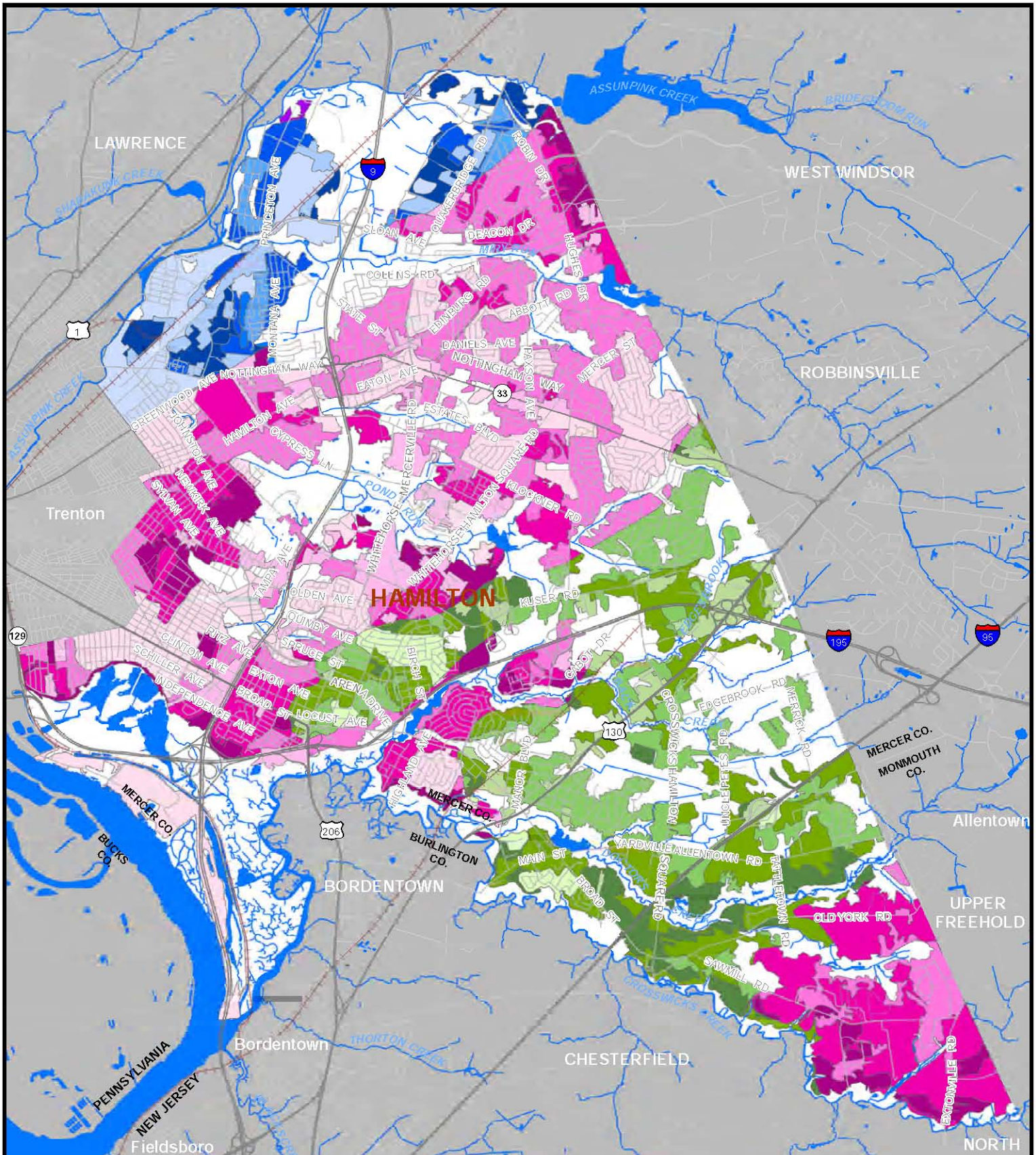
Map 3: Landscape Project Critical Habitats

Unpreserved and Undeveloped Parcels

- Wood Turtle Habitat
- Bald Eagle Foraging Area
- Critical Forested Wetlands
- Critical Upland Forest
- Critical Grasslands

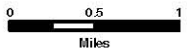
Source : NJDEP, NJDOT, DVRPC.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.





Map 4: Aquifer Recharge Potential

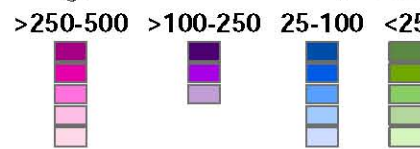
Source: NJDEP, NJDOT, DVRPC.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



Groundwater Recharge Rank
 Low ← High

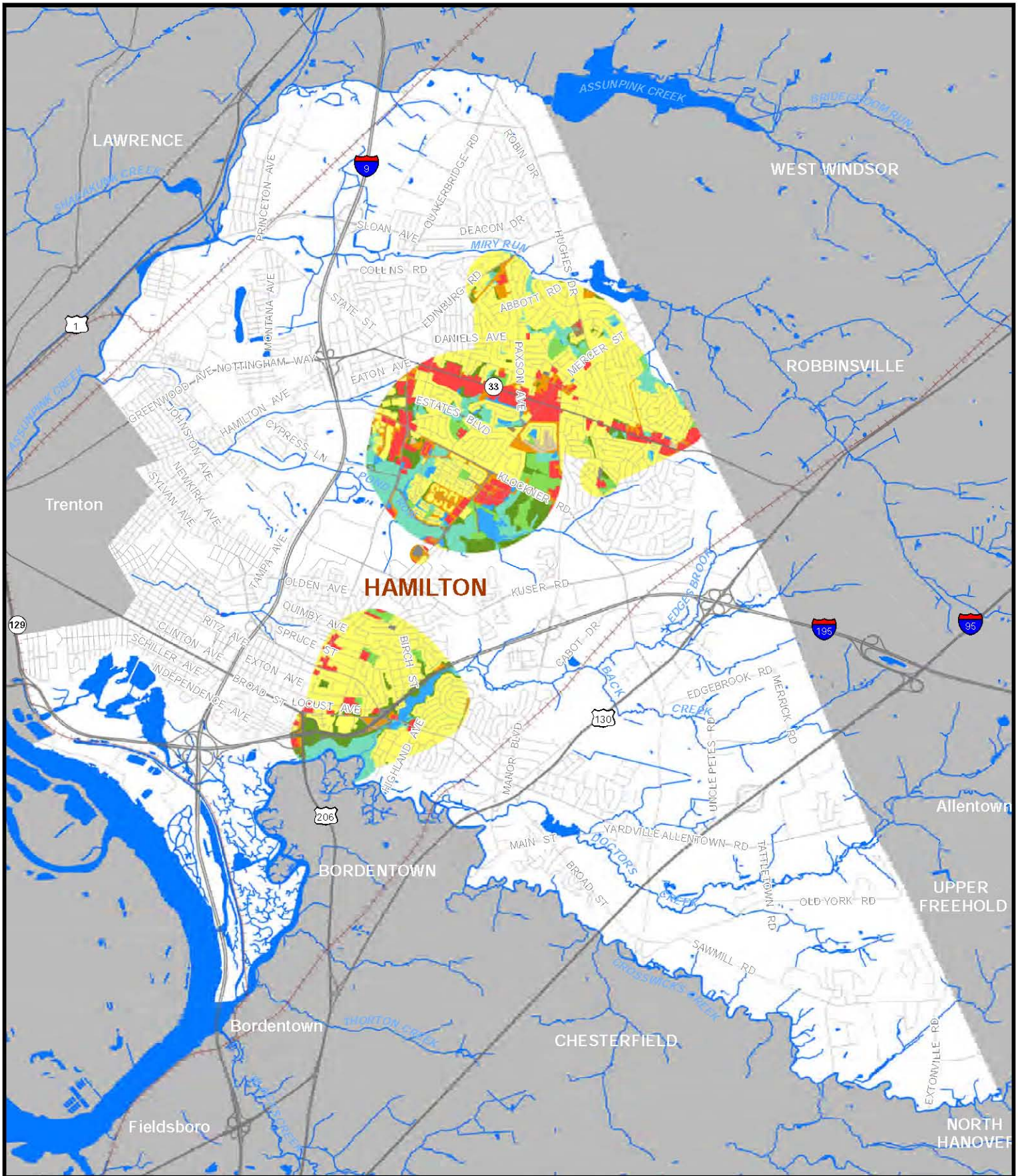
Median Well Yield Potential of Aquifer

High → Low













No Recharge Calculated (Wetlands, Open Water, and Hydric Soils)



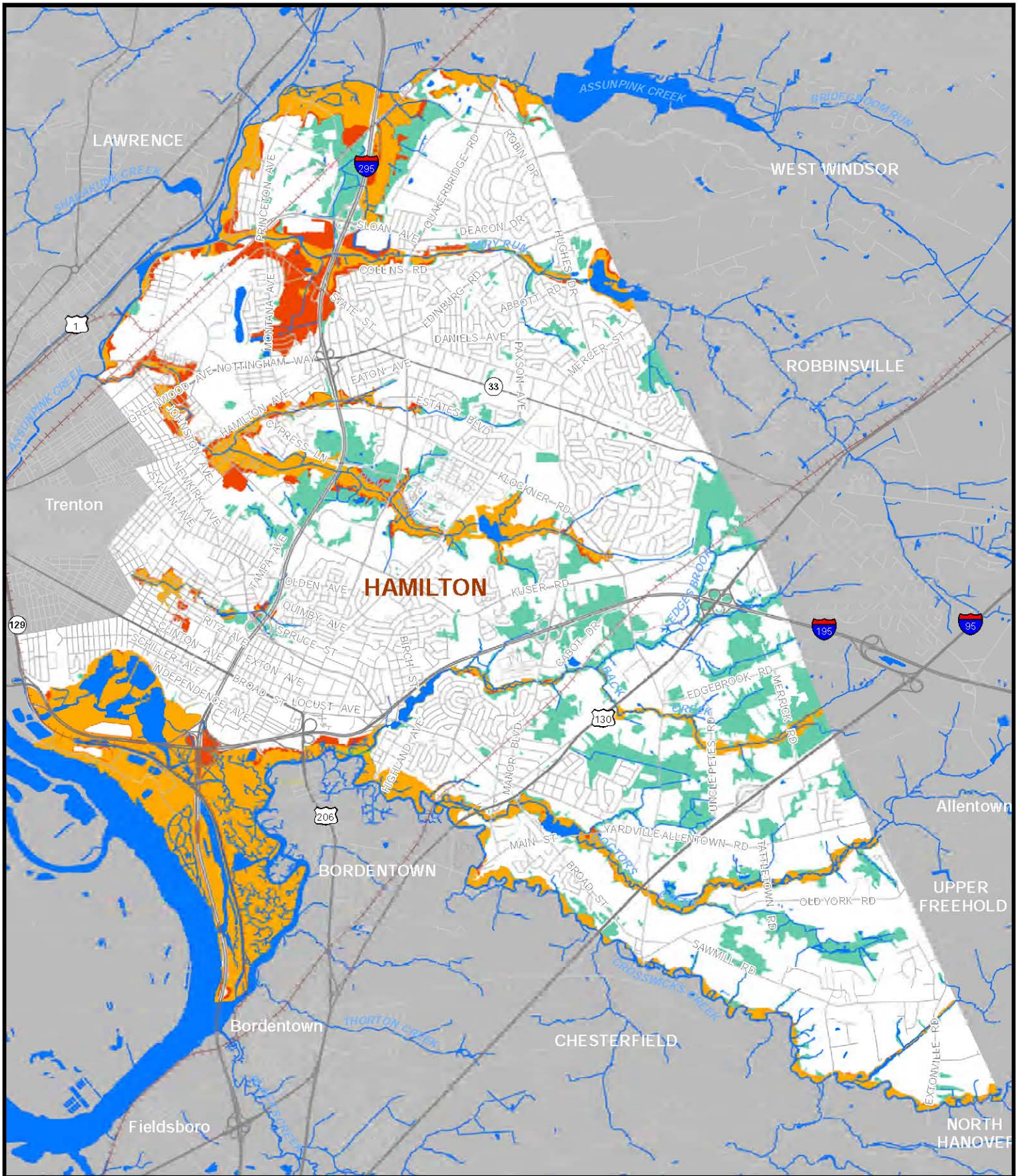


Map 5: Wellhead Protection Areas
NJDEP Land Use / Land Cover (2007)

Source : NJDEP, NJDOT, DVRPC.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

- | | | |
|---|---|---|
|  Agriculture |  Other Developed |  Transportation or Utility |
|  Barren Land |  Recreation |  Water |
|  Commercial |  Residential |  Wetlands |
|  Forest | | |





Source: NJDEP, NJDOT, DVRPC, FEMA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

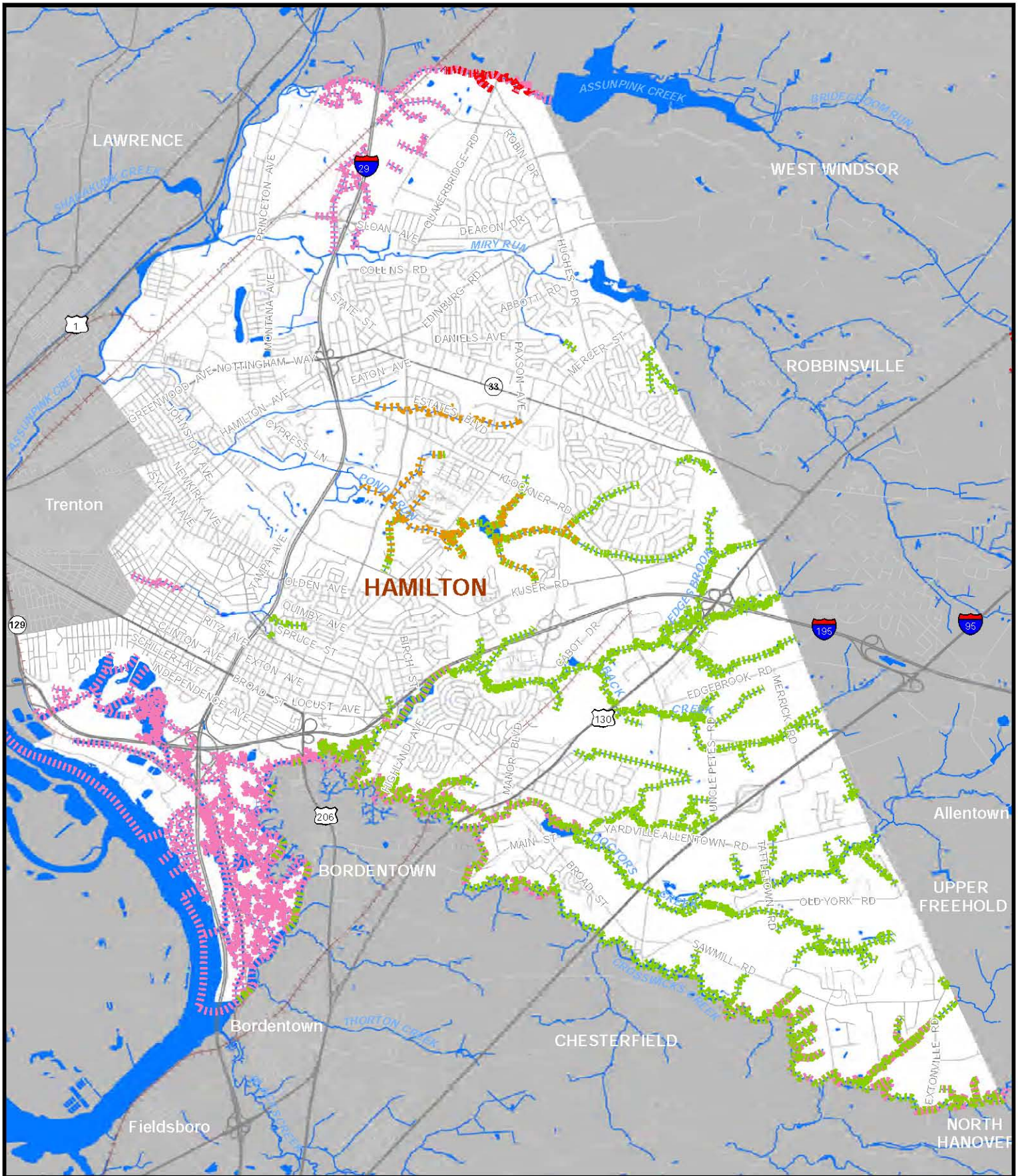
Map 6: Wetlands and Floodplains

- 100-Year Floodplain
- 500-Year Floodplain
- Wetlands



Note: Floodplains are shown on top of wetlands





Source : NJDEP, NJDOT, DVRPC.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



- ▬▬▬▬▬ Category 1 Stream
- ▬▬▬▬▬ Wood Turtle Habitat Stream
- ▬▬▬▬▬ Stream in Acid-Producing Formations
- ▬▬▬▬▬ Stream in Natural Heritage Priority Map Grids (Rare Plants)

Map 7: Stream Buffers



CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Division of Land Use Regulation, P.O. Box 439, Trenton, NJ 08625-0439.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program in order to map critical habitat for rare animal species. Natural Heritage Database response letters will also list all species (if any) found during a search of the Landscape Project. However, this office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.



NJ Department of Environmental Protection
Division of Parks and Forestry

Natural Lands Management

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Key Words: Agriculture, air pollution, floodplains, greenway, groundwater, habitat, invasive species, integrated pest management, known contaminated sites, stormwater, streams, sustainability, trees, water quality, watershed, wellhead protection areas, wetlands, vernal pools

Abstract: This publication offers analysis and recommendations for protecting and enhancing the environmental resources of Hamilton Township. Issues addressed include sustainably maintaining open space and landscapes, creating a greenway system, increasing the tree canopy, protecting drinking water, reducing flooding, protecting critical habitats, and protecting public and environmental health from contamination.

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