2018

Municipal Stormwater Management Plan

For the

Township of Hamilton

Table of Contents

List of Figures

Appendix A

Appendix B

Appendix C

Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Hamilton Township to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land and or increase the impervious surfaces by one quarter or greater of an acre. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A "build-out" analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

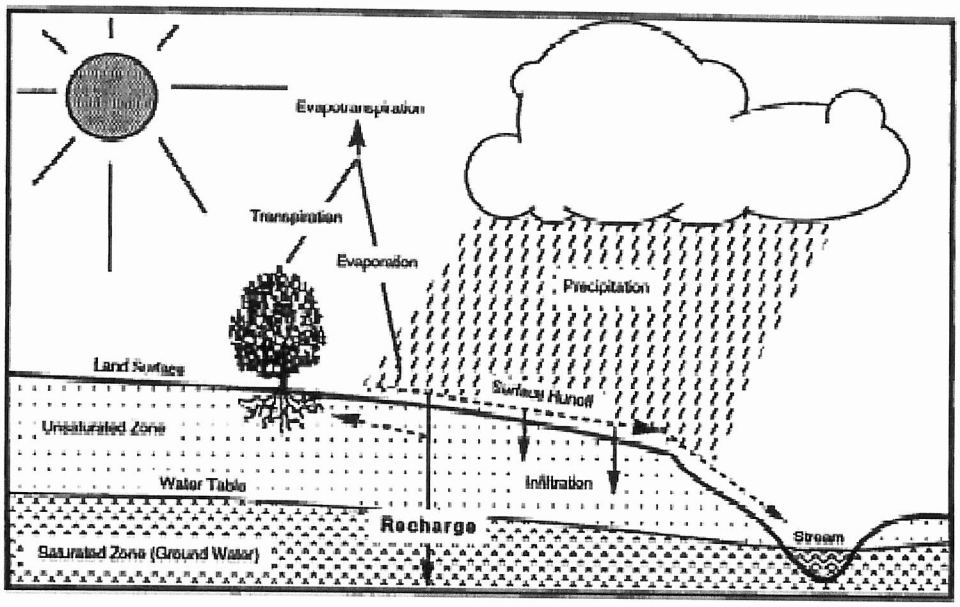
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint source pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration, which in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Figure 1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients. In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in subtler ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Background

The Township of Hamilton encompasses a 39.4 square mile area in Mercer County, New Jersey. In recent years, the Township has been under moderate development pressure. The population of the Township has increased from 82,801 in 1980, to 86,553 in 1990, to 87,109 in 2000, to 88,464 in 2010. This population increase has resulted in moderate demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure C-2 illustrates the waterways in the Township. Figure C-3 depicts the Township boundary on the USGS quadrangle maps.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics. The associated rivers and waterbodies that traverse the Township are the Assunpink Creek, Miry Run (Low Priority – Benthic Macroinvertebrates), Pond Run (Low Priority– Benthic Macroinvertebrates), Edges Brook, Back Creek (Low Priority – Benthic Macroinvertebrates) and Doctors Creek (Low Priority – Benthic Macroinvertebrates) and Crosswicks Creek (Low Priority – Benthic Macroinvertebrates).

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the in-stream total phosphorus concentration of the Assunpink Creek at Trenton frequently exceeds the state's criteria. This means that this river is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for this pollutant. According to the June 22, 2004 Integrated Water Quality monitoring and Assessment Report this TMDL or other responses to the Non-Attainment Parameter (Phosphorous) shall be completed by 2006.

Additionally, these data show that the benthic macroinvertebrates in Back Creek, Crosswicks Creek, Doctors Creek, Miry Run and Pond Run within the Township do not meet the state's criteria. The health of the population of benthic macroinvertebrates is an indication of stream water quality. Consequently, this means that each stream is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for each stream, however the NJDEP has assigned a low priority to each stream, therefore has not set a deadline for developing the TMDLs nor has it identified the pollutant or pollutants for which the TMDLs will be developed.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and

identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

In addition to moderate water quality problems, as land is developed, permeable soils are replaced by impermeable surfaces, which increase runoff volumes. All future development in Hamilton Township shall utilize the best available technology to minimize off-site stormwater runoff, increase on-site infiltration, simulate natural drainage systems and minimize off-site discharge of pollutants to ground or surface water and encourage natural filtration functions A map of the groundwater recharge areas are shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-5.

Design and Performance Standards

The Township adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins.

Non-structural measures to be considered first shall include site design and preventive source controls. To confirm the effectiveness of such measures, applicants must verify that control of stormwater quantity impacts as detailed in the Stormwater Management rules. The tests of assuring control of the quantity impacts as detailed in these rules have been incorporated into the Township's Stormwater Ordinance

The general standards for structural measures are specified in the Stormwater Management rules and have been incorporated into the Hamilton Township's Ordinance. These measures shall be incorporated as needed to meet the soil erosion, infiltration and runoff quantity standards included in the Township's Stormwater Ordinance. The design standards for the specific structural stormwater management measures as those included in the New Jersey Stormwater Best Management Practices Manual. Other designs or practices may be used if they are approved by the Soil Conservation District. The design and construction of such facilities must comply with the Soil Erosion and Sediment Control Standards as well as any other applicable state regulation including the Freshwater Wetland Protection Act rules, the Flood Hazard Control rules, the Surface Water Quality Standards and the Dam Safety rules. The requirement to be consistent with all other applicable rules has been included in the Township's Stormwater Ordinance. Stormwater runoff quality controls for total suspended solids and nutrient load shall meet the design and performance standards as specified in the Stormwater Management rules. The minimum design and performance standards for infiltration and groundwater recharge specified in the Stormwater Management Rules have been incorporated into the Township's Stormwater Ordinance and must be met for all

applicable development. Consistent with the Stormwater Management Rules, the Ordinance allows for an exemption from this requirement where the applicant can demonstrate that it is not practicable to meet the standards but has taken all possible steps to meet all stormwater management measures.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Adequate long term operation as well as preventative and corrective maintenance of the selected stormwater management measures will be ensured by requiring the design engineer to prepare a maintenance plan for its stormwater management facilities incorporated into the design of the major development. The maintenance plan shall have specific preventative maintenance tasks, schedules and cost estimates as well as the responsible party for corrective and preventative maintenance.

Where the Township assumes maintenance responsibility, preventative maintenance shall be performed on a regular basis and will be appropriate for the particular structural management measure being implemented. These maintenance measures shall be in accordance with N.J.A.C. 7:8-5 and may include: periodic inspections, vegetation management, sediment, debris and trash removal and mosquito control. Corrective maintenance shall be performed on an as needed basis for structure repairs or replacements, removal of outlet and pipe blockages, erosion restoration, snow and ice removal, etc. The person or persons responsible for maintenance shall keep a detailed log of all preventative and corrective maintenance for the structural management measures incorporated into the design of the development, including a record of all inspections and work orders.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

Stormwater Management Strategies

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 24 months of the effective date of the Municipal Stormwater General Permit or Effective Date of Permit Authorization (EFDPA). A copy will be sent to the Department of Environmental Protection at the time of submission. The Township has established as a milestone to amend the ordinances identified in this section within one year of the adoption of the Stormwater Management Plan by the Township of Hamilton Planning Board.

Article IV – General Regulations and Design Standards of the Township Code, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes were made to the Standards to incorporate these strategies.

§ 577-10 **Maintenance and repair.**

B. General maintenance.

(8) The person responsible for maintenance identified under Subsection **B(2)** above shall submit an annual inspection report prepared by a Professional Engineer licensed in New Jersey or New Jersey Certified Stormwater Inspector to the Township of Hamilton Department of CP & C, Engineering Division by June 30th of each year.

The inspection report and log shall include and not be limited to;

a. Detention Basin outflow structures, escape provision as outlined in R.S.I.S. 7:8-6.2 and all components;
b. Vegetation;
c. Trash racks and overflow grates;
d. Embankment erosion; and
e. Sediment removal and pond maintenance
f.

(9) The owner of the Stormwater management measure shall complete minor repairs of facility within 30 days from notice of maintenance issues.

(10) Each act of violation, and every day upon which any violation shall occur or continues to occur, shall constitute a separate offense.

(11) Failure to provide annual maintenance records: $100

(12) A person who has not complied with this ordinance and who, after notice, refuses to implement and maintain soil erosion control and stormwater runoff control measures and facilities in conformance with these regulations shall be subject to a fine of not more than $1,000.00 or ninety days in jail, or both, plus the cost of prosecution.

(13) The requirements of Subsection **B(3)** and **(4)** do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency. In all other cases where the Township does not take responsibility for repair and maintenance of any stormwater management resources, the applicant shall post a two-year maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

(14) In the event that the stormwater management facility becomes a danger to public safety or public health or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the municipal Engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality may immediately proceed to do so and shall bill the cost thereof to the responsible person.

C. Nothing in this section shall preclude the Township from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

Land Use/Build-Out Analysis

A detailed land use analysis for the Township was conducted assuming full build out under existing zoning for each HUC 14 drainage area in the Township. Figure C-6 illustrates the existing land use in the Township based on the 1995/1997 GIS information from NJDEP. Figure C-7 illustrates the HUC 14s within the Township. The Township zoning map is shown in conjunction with the HUC 14 zones in the Township in order to complete the build out calculations. Figure C-9 illustrates the constrained lands within the Township. The build-out calculations for impervious cover are shown in Table C-1. Table C-2 presents the pollutant loading loads a
t full build-out by multiplying the build out acreage of each land use for each HUC 14 by the appropriate pollutant loading coefficients by land cover.

Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards Township Ordinance 577-4D (5). Presented is a hierarchy of options. It shall be noted that the list is by no means exhaustive. The applicant may be required to do any of the following or a combination of them as mitigation against shortfalls in meeting the requirements of the SWMP. These include the following:

- Retrofit a number of storm drain inlets on a street or streets within the sub-watershed area of the project.
- Rehabilitate existing Township owned malfunctioning detention/retention basins or detention/retention basins, which are not performing to standards.

- Repair Township owned malfunctioning stormwater outfalls and sediment and erosion control facilities.
- Retrofit parking and adjoining recharge areas and upgrade to standards.
- Repair malfunctioning stormwater outfalls and sediment/erosion control devises.
- Rehabilitate existing privately owned malfunctioning detention/retention basins or detention/retention basins, which are not performing to standards.
- Repair Township owned malfunctioning stormwater outfalls and sediment and erosion control facilities

The applicant is required to propose a mitigation project that meets the requirement of item 1 below as the first option. If the applicant is unable to identify a suitable project that meets the requirements of item 1, as determined by the Township of Hamilton, then the applicant must propose a project that meets the requirements of either item 2 or item 3 below. All proposed mitigation projects must include a construction cost estimate and the cost of long-term maintenance. All mitigation projects proposed by an applicant must be approved by the Township of Hamilton prior to implementation. A stormwater mitigation plan prepared by Rutgers Cooperative Extension Water Resources Program, dated December 21, 2018 is available for reference.

Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

2. If a suitable site cannot be located in the same drainage area as the proposed development, the mitigation project may provide mitigation that does not necessarily have to be equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. (e.g. If mitigation is to make up a recharge shortfall the developer could retrofit stormwater inlets to meet the new standards.)

3. The Township may allow a developer to provide funding or partial funding for an environmental enhancement project. The funding must be equal to or greater than the cost to implement a proposed mitigation project, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

APPENDIX

A

Hamilton Township Build-Out Calculations

ID	HUC14 and Zone	Total Area (acres)	Existing Impervious (%)	Existing Impervious (acres)	Constraints [Wetlands,Water, FEMA 100-yr Floodplains] (acres)	Developable Area (acres)	Allowable Impervious (%)	Build-Out Impervious (acres)
	02040105230050 - Assunpink Creek (above Shipetaukin Ck)							
1	MULTIPLE FAMILY RESIDENTIAL (A/T)	8.44	100.00%	8.44	0.00	0.00		
2	CONSERVATION (C)	726.88	0.00%	0.00	535.16	191.72		
3	HIGHWAY COMMERCIAL (HC)	21.89	65.00%	14.23	7.66	0.00		
4	INDUSTRIAL (I)	435.58	65.00%	283.13	125.50	26.95		
5	MANUFACTURING (MFG)	140.90	20.00%	28.18	63.64	49.08		
6	SINGLE FAMILY RESIDENTIAL (R10)	45.11	98.20%	44.30	0.81	0.00		
7	SINGLE FAMILY RESIDENTIAL (R15)	231.79	97.60%	226.23	5.56	0.00		
8	RESEARCH ENGINEERING OFFICE (REO-2)	2.02	100.00%	2.02	0.00	0.00		
9	RESEARCH ENGINEERING OFFICE (REO-4)	48.25	100.00%	48.25	0.00	0.00		
TOTALS		1,660.86		654.77	738.33	267.76		
	02040105240030 - Assunpink Creek (below Shipetaukin Ck)							
10	MULTIPLE FAMILY RESIDENTIAL (A/T)	35.46	46.25%	16.40	19.06	0.00		
11	CONSERVATION (C)	10.43	25.00%	2.61	0.54	7.28		
12	COMMUNITY COMMERCIAL (CC)	17.98	100.00%	17.98	0.00	0.00		
13	HIGHWAY COMMERCIAL (HC)	107.67	58.00%	62.45	45.22	0.00		
14	INDUSTRIAL (I)	208.70	23.24%	48.50	160.20	0.00		
15	MANUFACTURING (MFG)	11.22	71.00%	7.97	3.25	0.00		
16	NEIGHBORHOOD COMMERCIAL (NC)	8.54	100.00%	8.54	0.00	0.00		
17	SINGLE FAMILY RESIDENTIAL (R10)	1,247.87	77.36%	965.35	282.44	0.08		
18	SINGLE FAMILY RESIDENTIAL (R15)	875.04	80.00%	700.03	173.94	1.07		
19	SINGLE FAMILY RESIDENTIAL (R7)	472.61	97.23%	459.52	13.05	0.04		
20	RESEARCH DEVELOPMENT (RD)	73.30	19.18%	14.06	59.24	0.00		
21	RESEARCH ENGINEERING OFFICE (REO-2)	7.77	100.00%	7.77	0.00	0.00		
22	RESEARCH ENGINEERING OFFICE (REO-4)	0.23	100.00%	0.23	0.00	0.00		
TOTALS		3,076.82		2,311.41	756.94	8.47		
	02040105240040 - Assunpink Creek (below Shipetaukin Ck)							
23	MULTIPLE FAMILY RESIDENTIAL (A/T)	367.21	67.57%	248.12	119.08	0.01		
24	CONSERVATION (C)	377.55	40.00%	151.02	101.73	124.80		
25	COMMUNITY COMMERCIAL (CC)	87.81	63.11%	55.42	32.39	0.00		
26	GENERAL COMMERCIAL (GC)	93.54	83.94%	78.52	15.02	0.00		
27	GOVERNMENT SERVICE CENTER (GSC)	290.36	48.33%	140.33	150.03	0.00		

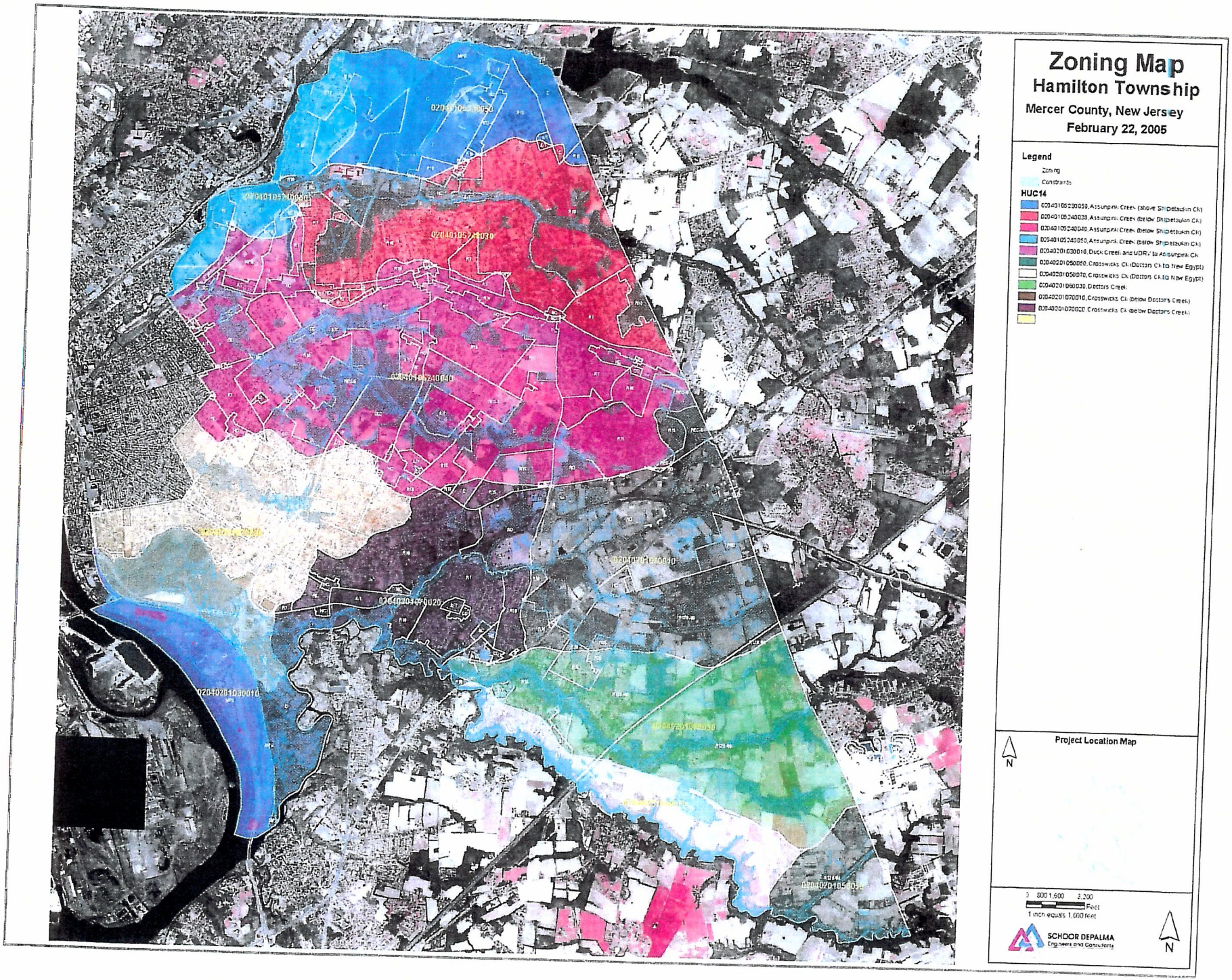
28	HIGHWAY COMMERCIAL (HC)	408.92	90.00%	368.03	16.61	24.28		
29	INDUSTRIAL (I)	207.37	86.76%	179.91	27.45	0.01		
30	MANUFACTURING (MFG)	89.11	95.00%	84.65	0.00	4.46		
31	NEIGHBORHOOD COMMERCIAL (NC)	35.07	87.24%	30.60	4.47	0.00		
32	SINGLE FAMILY RESIDENTIAL (R10)	1,163.20	82.22%	956.38	206.76	0.06		
33	SINGLE FAMILY RESIDENTIAL (R15)	650.37	85.43%	555.61	94.74	0.02		
34	SINGLE FAMILY RESIDENTIAL (R25)	116.80	50.00%	58.40	9.71	48.69		
35	SINGLE FAMILY RESIDENTIAL (R5)	323.09	78.31%	253.01	70.08	0.00		
36	SINGLE FAMILY RESIDENTIAL (R7)	799.18	90.00%	719.26	77.58	2.34		
37	RESEARCH DEVELOPMENT (RD)	99.36	40.00%	39.74	46.59	13.03		
38	RESEARCH ENGINEERING OFFICE (REO-5)	828.52	56.38%	467.12	361.38	0.02		
39	SPECIAL HOUSING ZONE 2 (S2)	6.74	100.00%	6.74	0.00	0.00		
40	SPECIAL HOUSING ZONE 2A (S2A)	10.31	80.00%	8.25	1.92	0.14		
TOTALS		5,954.51		4,401.12	1,335.54	217.85		
	02040105240050 - Assunpink Creek (below Shipetaukin Ck)							
41	CONSERVATION (C)	79.92	0.00%	0.00	78.94	0.98		
42	INDUSTRIAL (I)	438.12	80.00%	350.50	83.32	4.30		
43	MANUFACTURING (MFG)	24.79	100.00%	24.79	0.00	0.00		
44	NEIGHBORHOOD COMMERCIAL (NC)	1.77	100.00%	1.77	0.00	0.00		
45	SINGLE FAMILY RESIDENTIAL (R10)	121.62	91.67%	111.49	10.13	0.00		
46	SINGLE FAMILY RESIDENTIAL (R15)	93.57	86.05%	80.52	13.05	0.00		
47	SINGLE FAMILY RESIDENTIAL (R7)	38.28	74.63%	28.57	9.71	0.00		
TOTALS		798.07		597.63	195.15	5.29		
	02040201030010 - Duck Creek and UDRV to Assunpink Ck							
48	CONSERVATION (C)	41.18	0.00%	0.00	31.95	9.23		
49	COMMUNITY COMMERCIAL (CC)	1.07	0.00%	0.00	0.00	1.07		
50	MANUFACTURING (MFG)	868.49	4.84%	42.03	826.45	0.01		
51	SINGLE FAMILY RESIDENTIAL (R5)	2.59	100.00%	2.59	0.00	0.00		
TOTALS		913.33		44.62	858.40	10.31		
	02040201050050 - Crosswicks Ck (Doctors Ck to New Egypt)							
52	SINGLE FAMILY RESIDENTIAL (R120/80)	748.22	50.00%	374.11	112.56	261.55		
TOTALS		748.22		374.11	112.56	261.55		
	02040201050070 - Crosswicks Ck (Doctors Ck to New Egypt)							
53	MULTIPLE FAMILY RESIDENTIAL (A/T)	0.46	100.00%	0.46	0.00	0.00		
54	CONSERVATION (C)	43.21	0.00%	0.00	28.68	14.53		
55	SINGLE FAMILY RESIDENTIAL (R10)	136.25	79.07%	107.73	28.51	0.01		
56	SINGLE FAMILY RESIDENTIAL (R120/40)	28.77	0.00%	0.00	7.10	21.67		
57	SINGLE FAMILY RESIDENTIAL (R120/80)	751.78	20.00%	150.36	140.94	460.48		

58	SINGLE FAMILY RESIDENTIAL (R15)	84.02	60.00%	50.41	22.00	11.61		
59	RESEARCH DEVELOPMENT (RD)	8.22	32.80%	2.70	5.52	0.00		
60	SPECIAL HOUSING ZONE 1 (S1)	58.41	42.94%	25.08	33.33	0.00		
TOTALS		1,111.12		336.74	266.08	508.30		
	02040201060030 - Doctors Creek							
61	MULTIPLE FAMILY RESIDENTIAL (A/T)	20.24	95.12%	19.25	0.99	0.00		
62	COMMUNITY COMMERCIAL (CC)	0.09	100.00%	0.09	0.00	0.00		
63	INDUSTRIAL (I)	25.49	20.00%	5.10	17.11	3.28		
64	SINGLE FAMILY RESIDENTIAL (R10)	263.14	68.25%	179.59	83.54	0.01		
65	SINGLE FAMILY RESIDENTIAL (R120/40)	610.53	50.00%	305.27	184.10	121.17		
66	SINGLE FAMILY RESIDENTIAL (R120/80)	1,932.36	40.00%	772.94	443.97	715.45		
67	SINGLE FAMILY RESIDENTIAL (R15)	119.87	83.39%	99.96	19.91	0.00		
68	SINGLE FAMILY RESIDENTIAL (R25)	26.16	46.02%	12.04	14.12	0.00		
69	SPECIAL HOUSING ZONE 1 (S1)	14.59	90.00%	13.13	0.00	1.46		
TOTALS		3,012.47		1,407.37	763.74	841.36		
	02040201070010 - Crosswicks Ck (below Doctors Creek)							
70	COMMUNITY COMMERCIAL (CC)	3.09	100.00%	3.09	0.00	0.00		
71	HIGHWAY COMMERCIAL (HC)	39.81	60.00%	23.89	4.89	11.03		
72	PLANNED RETIREMENT DEVELOPMENT (PRD)	132.47	10.00%	13.25	50.36	68.86		
73	SINGLE FAMILY RESIDENTIAL (R10)	127.03	83.79%	106.44	20.59	0.00		
74	SINGLE FAMILY RESIDENTIAL (R120/40)	943.23	30.00%	282.97	488.52	171.74		
75	SINGLE FAMILY RESIDENTIAL (R120/80)	32.36	0.00%	0.00	0.00	32.36		
76	SINGLE FAMILY RESIDENTIAL (R15)	72.82	48.01%	34.96	37.86	0.00		
77	SINGLE FAMILY RESIDENTIAL (R25)	21.76	62.05%	13.50	8.26	0.00		
78	RESEARCH DEVELOPMENT (RD)	1,556.29	66.16%	1,029.64	526.59	0.06		
79	RESEARCH ENGINEERING OFFICE (REO-5)	78.41	29.02%	22.75	55.66	0.00		
TOTALS		3,007.27		1,530.49	1,192.73	284.05		
	02040201070020 - Crosswicks Ck (below Doctors Creek)							
80	MULTIPLE FAMILY RESIDENTIAL (A/T)	81.06	90.00%	72.95	2.99	5.12		
81	CONSERVATION (C)	720.84	0.00%	0.00	605.32	115.52		
82	COMMUNITY COMMERCIAL (CC)	25.74	98.30%	25.30	0.44	0.00		
83	HIGHWAY COMMERCIAL (HC)	39.33	90.00%	35.40	2.4	1.53		
84	INDUSTRIAL (I)	42.41	60.00%	25.45	12.61	4.35		
85	MANUFACTURING (MFG)	6.23	0.08%	0.00	6.23	0.00		
86	NEIGHBORHOOD COMMERCIAL (NC)	26.51	80.00%	21.21	3.93	1.37		
87	SINGLE FAMILY RESIDENTIAL (R10)	862.3	93.16%	803.32	58.98	0.00		
88	SINGLE FAMILY RESIDENTIAL (R15)	72.57	90.00%	65.31	2.24	5.02		
89	SINGLE FAMILY RESIDENTIAL (R5)	53.25	70.00%	37.28	0	15.98		

90	SINGLE FAMILY RESIDENTIAL (R7)	427.34	88.47%	378.07	49.25	0.02		
91	RESEARCH DEVELOPMENT (RD)	310.88	66.83%	207.76	103.10	0.02		
TOTALS		2,668.46		1,672.05	847.49	148.92		
	02040201030030 - Crosswicks Ck (below Doctors Creek)							
92	MULTIPLE FAMILY RESIDENTIAL (A/T)	162.02	92.09%	149.20	12.81	0.01		
93	CONSERVATION (C)	861.53	13.69%	117.94	743.53	0.06		
94	COMMUNITY COMMERCIAL (CC)	37.79	100.00%	37.79	0.00	0.00		
95	GENERAL COMMERCIAL (GC)	54.53	95.00%	51.80	0.00	2.73		
96	GOVERNMENT SERVICE CENTER (GSC)	0.08	100.00%	0.08	0.00	0.00		
97	HIGHWAY COMMERCIAL (HC)	116.04	99.83%	115.84	0.20	0.00		
98	SINGLE FAMILY RESIDENTIAL (R10)	304.68	95.00%	289.45	11.94	3.29		
99	SINGLE FAMILY RESIDENTIAL (R5)	619.47	90.00%	557.52	15.23	46.72		
100	SINGLE FAMILY RESIDENTIAL (R7)	668.27	86.87%	580.53	87.74	0.00		
TOTALS		2,824.41		1,900.16	871.45	52.80		

APPENDIX

B


Zoning Map
Hamilton Township
Mercer County, New Jersey
February 22, 2005
Legend
Zoning
Constraints
HUC14
02040105030050, Assunpink Creek (above Shipetaukin Ck)
02040105240030, Assunpink Creek (below Shipetaukin Ck)
02040105240040, Assunpink Creek (below Shipetaukin Ck)
02040105240050, Assunpink Creek (below Shipetaukin Ck)
02040201030010, Duck Creek and UDRV to Assunpink Ck
02040201050060, Crosswicks Ck (Doctors Ck to New Egypt)
02040201050070, Crosswicks Ck (Doctors Ck to New Egypt)
02040201060030, Doctors Creek
02040201070010, Crosswicks Ck (below Doctors Creek)
02040201070020, Crosswicks Ck (below Doctors Creek)
Project Location Map
N
0 800 1,600 3,200
Feet
1 inch equals 1,600 feet
SCHOOR DEPALMA
Engineers and Consultants
N

APPENDIX C

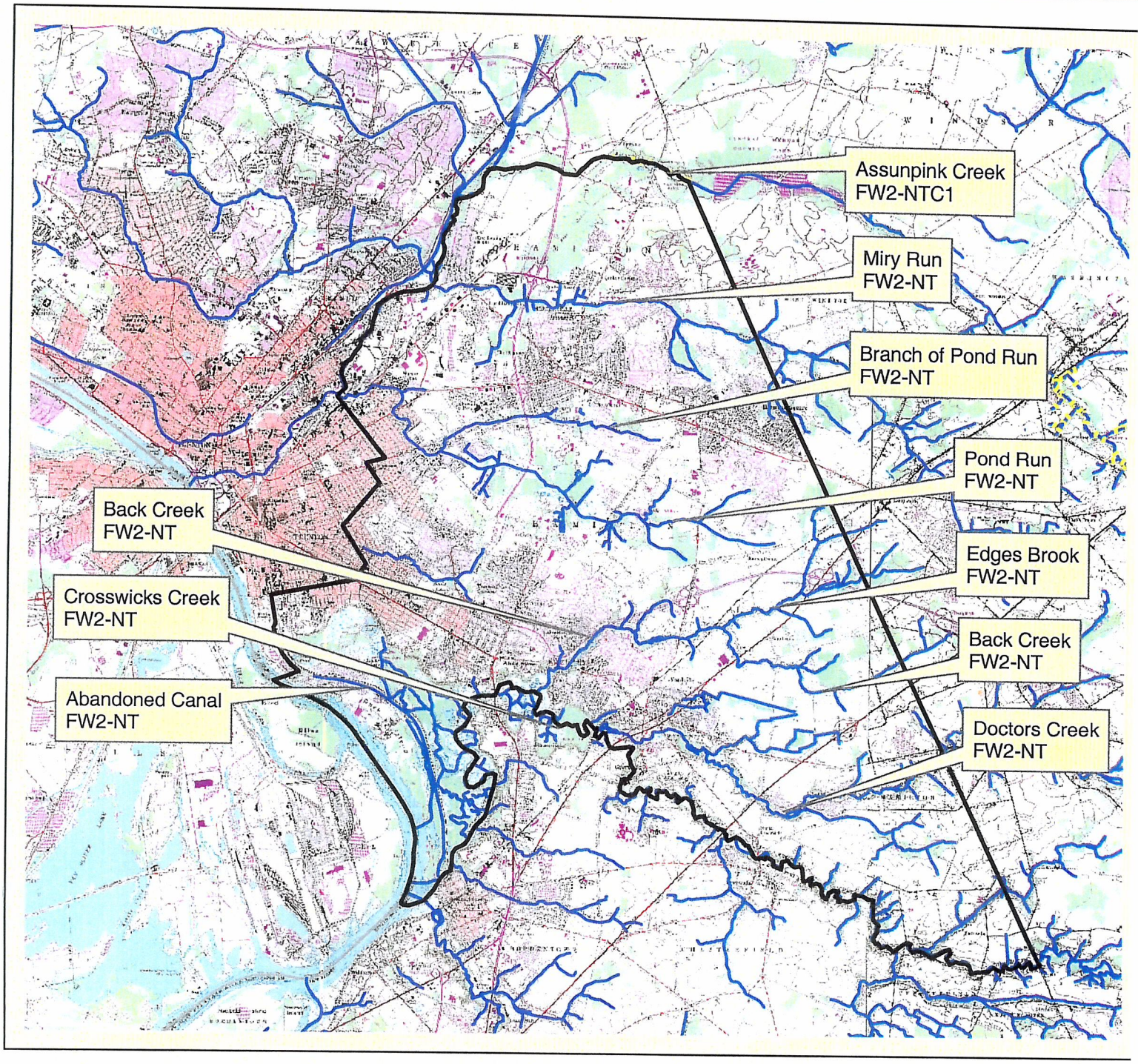


Figure C-2: Township and its Waterways
Hamilton Township
Mercer County, NJ

N
W E
S

Legend

- Hamilton Township Boundary
- DRBC-Zone-1C
- DRBC-Zone-1D
- DRBC-Zone-1E
- DRBC-Zone-2
- DRBC-Zone-3
- DRBC-Zone-4
- DRBC-Zone-5
- FW1
- FW1-TM
- FW1-TP
- FW2-NT
- FW2-NT/SE1
- FW2-NT/SE2
- FW2-NT/SE3
- FW2-NTC1
- FW2-NTC1/SE1
- FW2-NTC1/SE1/SC
- FW2-TM
- FW2-TM/SE1
- FW2-TMC1
- FW2-TP
- FW2-TPC1
- PL
- PL-TM
- SE1
- SE1C1
- SE2
- SE3

SCHOOR DEPALMA
Engineers and Consultants

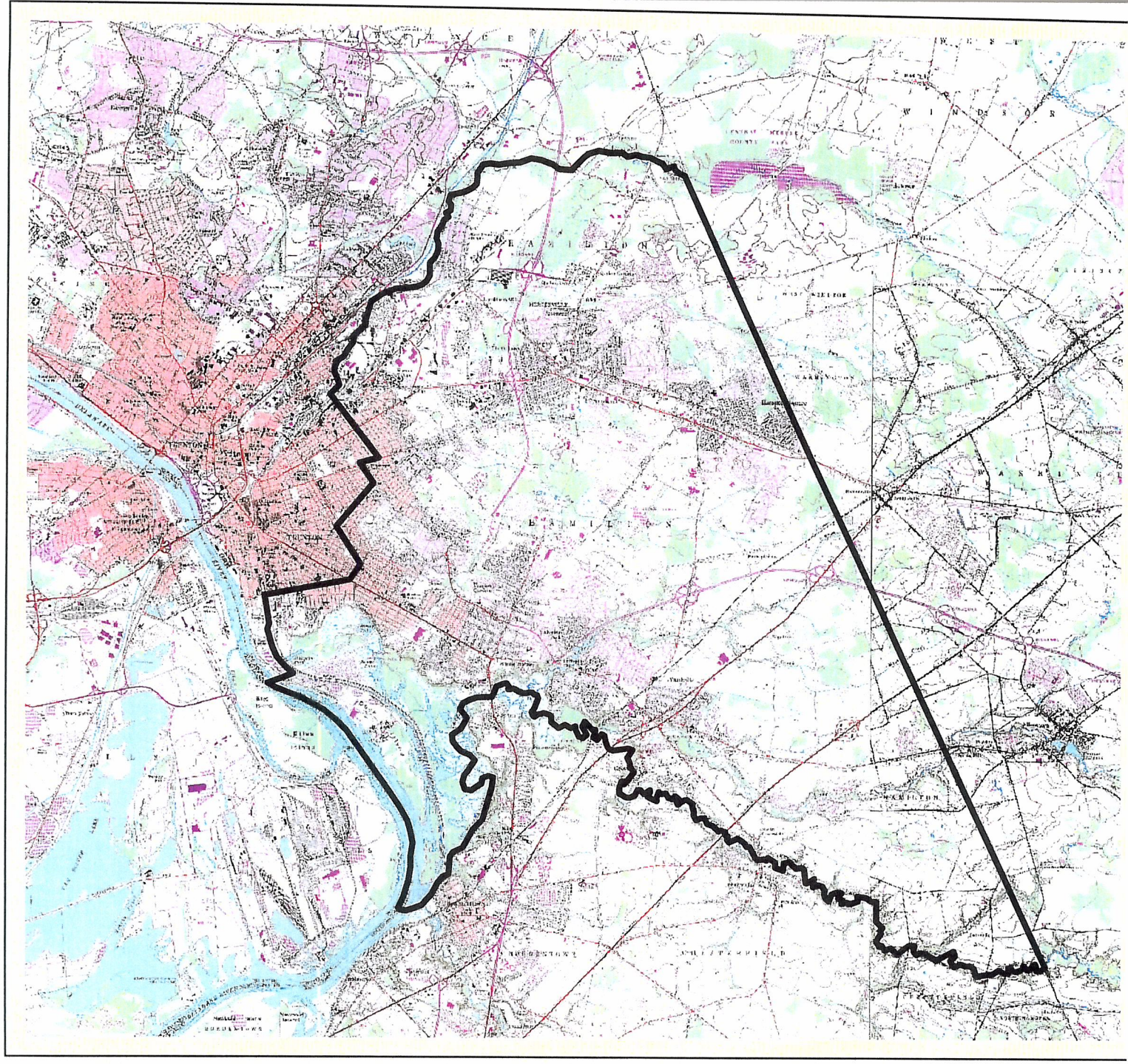


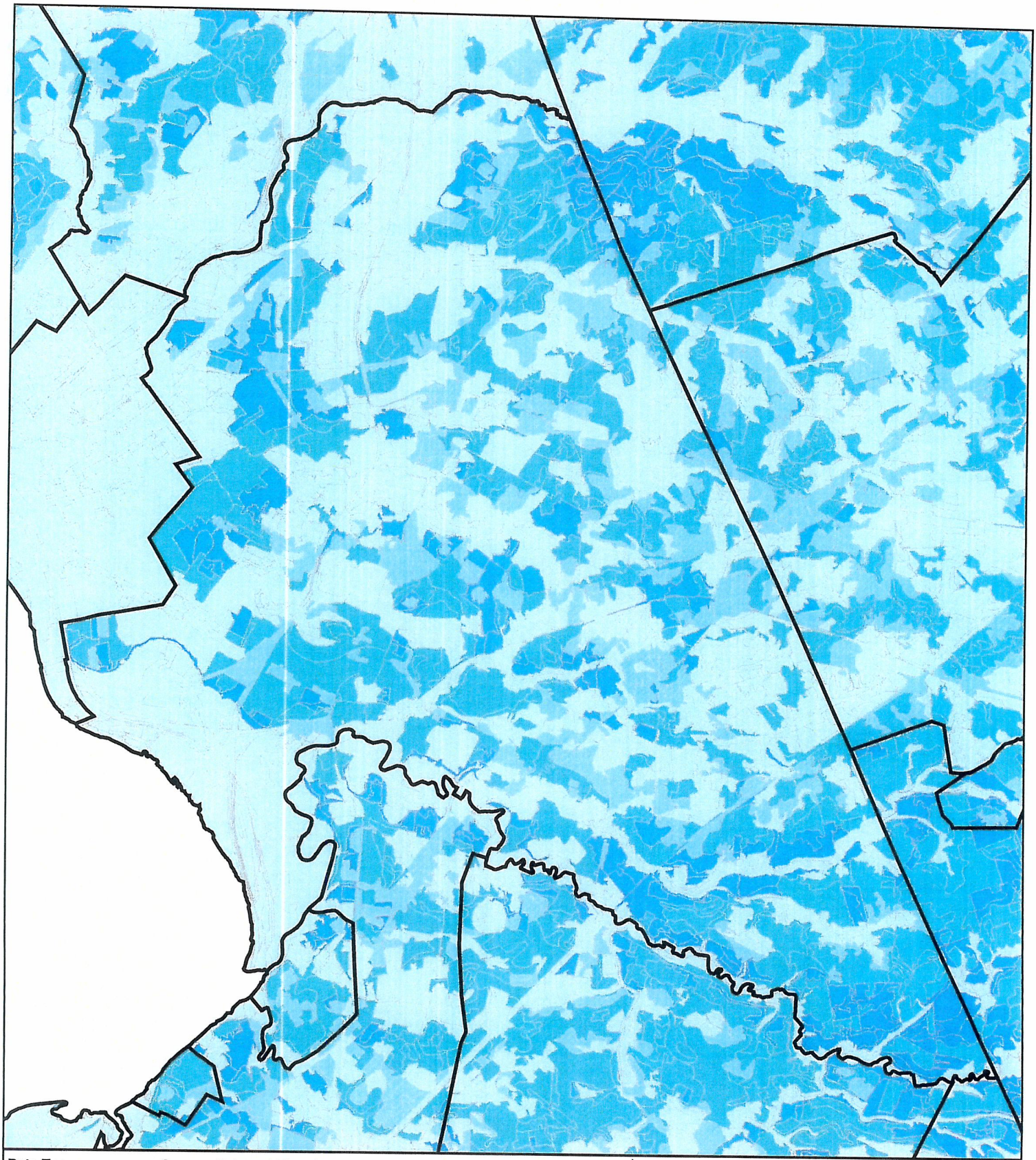
Figure C-3: Township Boundary on USGS Quadrangles
Hamilton Township
Mercer County, NJ

N
W E
S

Legend

Hamilton Township Boundary

SCHOOR DEPALMA
Engineers and Consultants



Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Groundwater Recharge Areas	NJDEP	Various

0 1,000 2,000
Feet

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure C-4

Groundwater Recharge Areas in the Township

Hamilton Township
Mercer County, New Jersey

N
W E
S

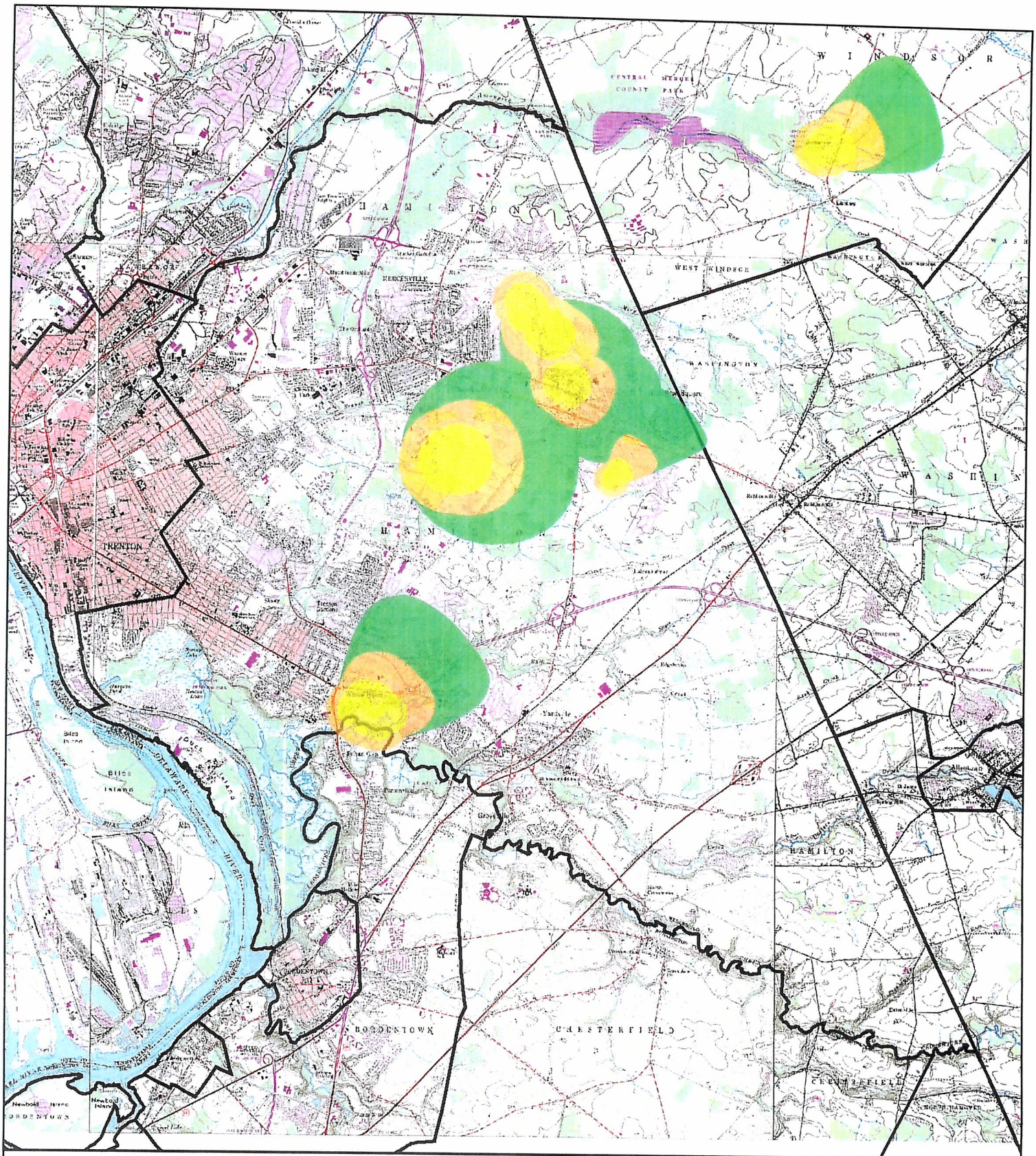
SCHOOR DEPALMA
Engineers and Consultants

Symbol Legend

Municipal Boundary

Ground Water Recharge Areas

- 0.00 in/yr
- 0.01 - 9.00 in/yr
- 9.01 - 12.00 in/yr
- 12.01 - 16.00 in/yr
- 16.01 - 22.74 in/yr



Data Type	Source	Relevant Time Period
USGS Quadrangles	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wellhead Protection Areas	NJDEP	2004 (Updated)

0 1,000 2,000
Feet

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure C-5

Wellhead Protection Areas in the Township

Township of Hamilton
Mercer County, New Jersey

Symbol Legend

- Municipal Boundary

Wellhead Protection Areas

- 2 Year
- 5 Year
- 12 Year

N W E S

SCHOOR DEPALMA
Engineers and Consultants

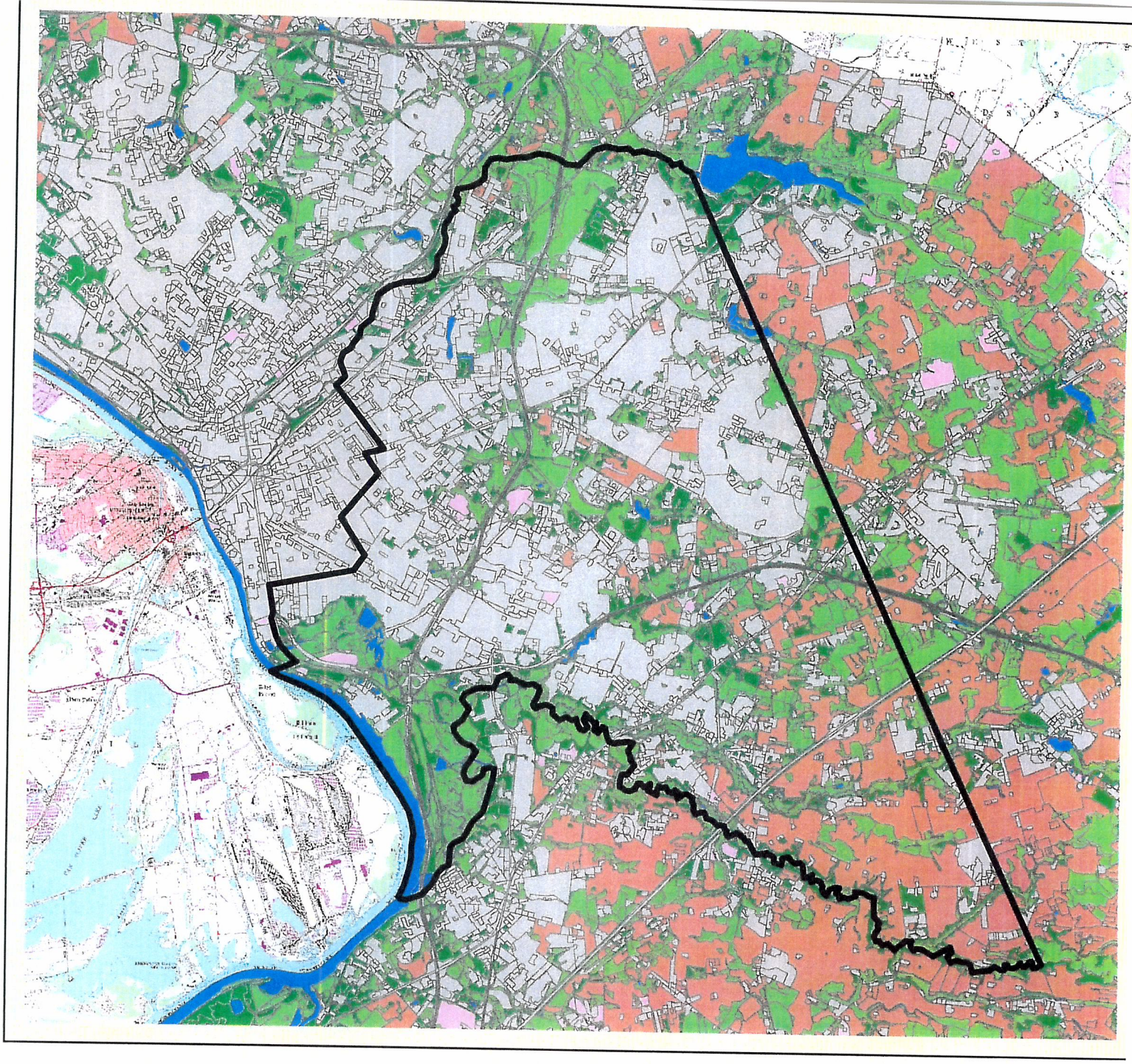


Figure C-6: Township's Existing Land Use
Hamilton Township
Mercer County, NJ

SCHOOR DEPALMA
Engineers and Consultants

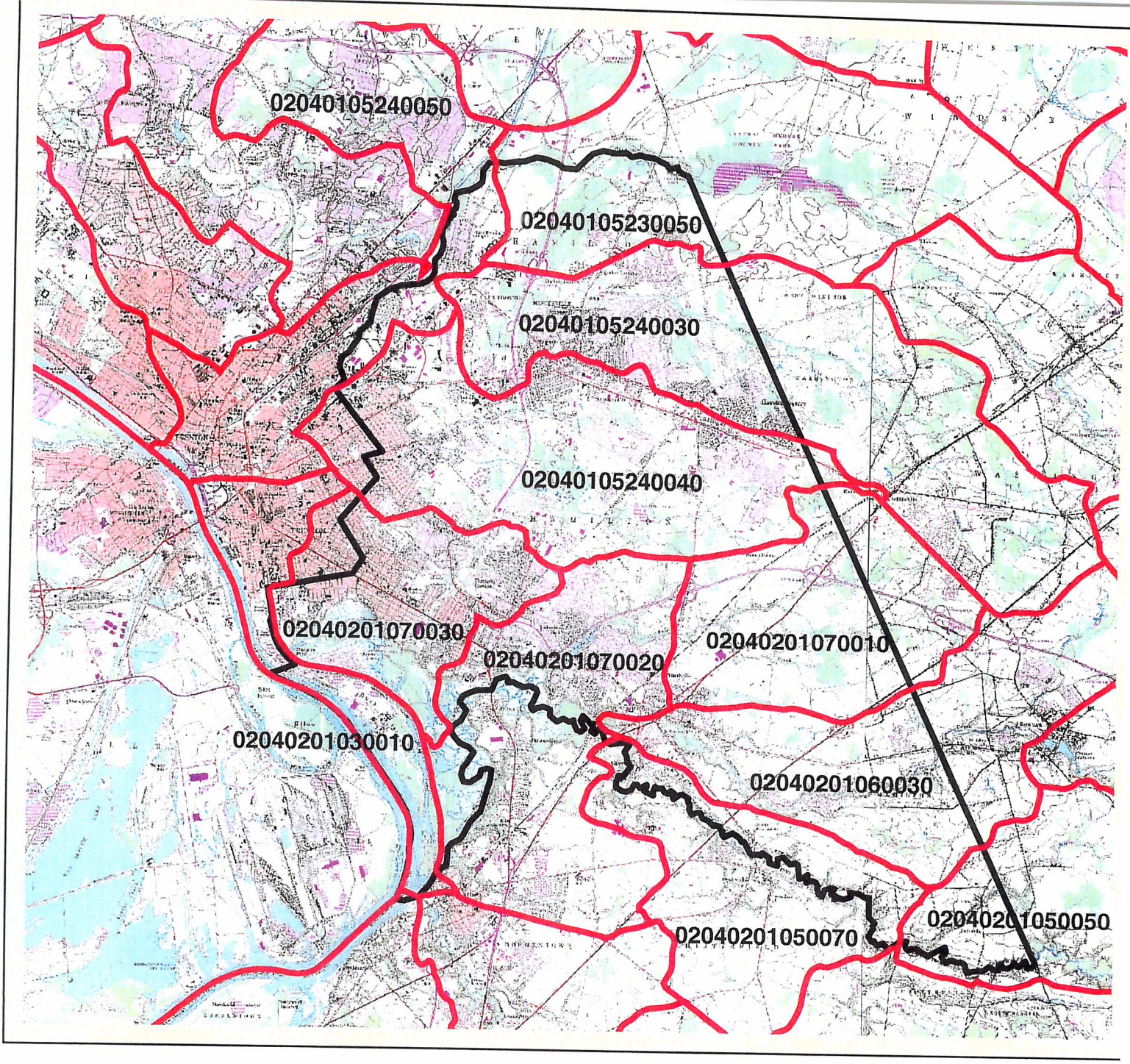


Figure C-7: Hydrologic Units (HUC14s)
Hamilton Township
Mercer County, NJ

N
W E
S

Legend

- NJDEP HUC 14
- Hamilton Township Boundary

SCHOOR DEPALMA
Engineers and Consultants

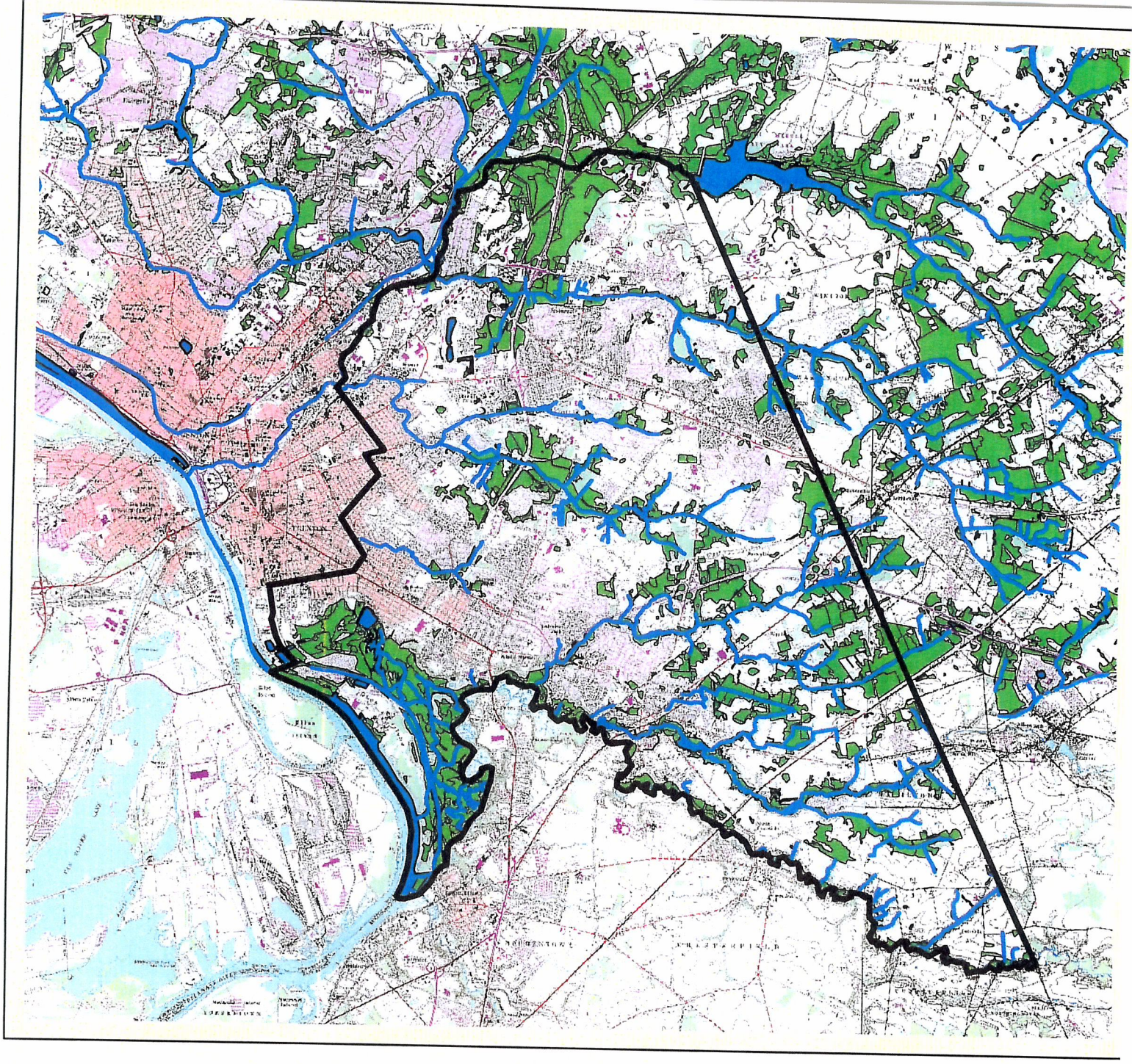


Figure C-9:
Wetlands and Water Land Uses within Hamilton Township Mercer County, NJ

N
W E
S

Legend

- Hamilton Township Boundary
- mercer county lakes
- mercer county streams
- mercer county wetlands

SCHOOR DEPALMA
Engineers and Consultants