

Section XII

**STORMWATER MANAGEMENT
PLAN ELEMENT**

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Municipal Stormwater
Management Plan Element
West Windsor Township
March, 2005**

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1. Introduction

The following Municipal Separate Stormwater System (MS4) stormwater plan was prepared by the West Windsor Township Engineering division. The NJDEP “Sample Municipal Stormwater Management Plan” was used as a basis for preparation of the plan.

This **Municipal Stormwater Management Plan (MSWMP)** documents the strategy for West Windsor Township to address stormwater-related impacts. The creation of this plan is required by N.J.A.C.7:14A-25 (Municipal Stormwater Regulations). As required, this plan contains all of the required elements described in N.J.A.C.7:8 (Stormwater Management Regulations).

The plan contained herein 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. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and the loss of groundwater recharge that provides base flow in receiving water bodies.

In addition, this plan describes long-term operation and maintenance measures for existing and future stormwater facilities. Included in this plan is a build out analysis pollutant loading calculation based on existing zoning and developable land. 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.

A mitigation plan is not anticipated at this point in time, however, should mitigation be needed or required for future development (s), the plan will be amended to include a viable mitigation strategy and than re-filed as amended with Mercer County and the New Jersey Department of Protection.

2. Goals

The goals of this MSWMP are as follows:

- 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, bridges and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint 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
 - protect public health
 - safeguard fish and aquatic life
 - protect scenic and ecological values
 - enhance the domestic, municipal, recreational, industrial and other uses of water
- 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 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.

3. Stormwater Discussion

Land development can dramatically alter the hydrologic cycle 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.

In addition, 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 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. 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 more subtle 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.

4. Background

West Windsor Township is approximately 26.8 square miles in area within northern Mercer County. It is bordered by the Millstone River along its northeasterly boundary, also the county boundary between Middlesex and Mercer Counties. The Township is bordered by several municipalities including Princeton Township to the northwest, Lawrence Township to the southwest, Hamilton Township to the southwest, Washington Township to the south and East Windsor Township to the east.

Although not completely built out, the Township is predominantly developed. The Mercer County website describes West Windsor as "... has experienced much commercial development along US Route One as well as significant suburban development".

According to US Census Data, Township population figures were 16,021 and 21,907 for years 1990 and 2000, respectively, with a population density of 817 per square mile in 2000. The forecasted population in 2025, per Mercer County data, is 28,100.

There are a number of surface water bodies within West Windsor Township, including the following:

- The Millstone River along the northeasterly border.
- Big Bear Brook (including Grovers Mill pond), a tributary of the Millstone River in the northeast portion of the Township.
- Little Bear Brook, a tributary of the Millstone River in the northwest portion of the Township.
- Duck Pond Run, which ultimately feeds into the Delaware and Raritan Canal in the northwestern portion of the Township.
- Mercer County Lake, a manmade lake that was constructed in-line within the Assunpink Creek, located within the southern portion of the Township.
- Bridegroom Run, a small tributary that feeds into Mercer County Lake.

The 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.

Per review of the NJDEP's Integrated Water Quality Monitoring and Assessment Report (Year 2004, 305(b) and 303(d) (Integrated List)), the following water bodies are impaired within West Windsor Township:

Station	Location	Impairment Description
AN0109	Assunpink Creek at Route 535	Benthic Macroinvertebrates
AN0383	Bear Brook at Old Trenton Road (Route 535)	Benthic Macroinvertebrates, Unknown Toxicity
AN0384	Bear Brook at Stobbe Road	Benthic Macroinvertebrates, Unknown Toxicity
AN0394	Duck Pond Run	Benthic Macroinvertebrates

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, 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. It should be noted that as part of the Township's Municipal Separate Storm Sewer (MS4) regulations, existing inlets and outfalls will be inspected and repairs/maintenance will be made. At that time, existing water quantity and erosion problems (if any) will be assessed and abated to the maximum extent practicable.

It is understood that past development, using design standards before the stormwater rule (NJAC 7:8) did not encourage recharge of ground water unless a retention basin(s) or facility was incorporated into site-specific designs. However, future major development will comply with the new NJDEP Stormwater design standards (NJAC 7:8), including the average annual recharge (retain increase in 2-year design storm) requirement.

5. Design and Performance Standards

The township will adopt 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/quantity and loss of groundwater recharge in receiving water bodies. This will be implemented by adoption of the NJDEP Model Stormwater ordinance (**Appendix B**), as amended for use and enforcement within West Windsor Township.

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). The ordinances will be submitted to the county for review and approval by January 5, 2006 (i.e., within 24 months of the effective date of the Stormwater Management Rules).

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

6. 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 to be consistent. Per 10/6/04 conversation with Sandy Blick of the NJDEP Division of Watershed Management, no regional plans have been adopted to date.

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 storm water 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 Mercer County Soil Conservation District. Per our October 5, 2004 conversation with the Mercer SCD, it has input regarding municipal MS4 compliance at this time (other than ensuring future development files for appropriate Soil Erosion/Sediment Control Permits and abide by SCD standards during construction).

7. Nonstructural Stormwater Management Strategies

Non-structural stormwater strategies for design of **new** developments, or redevelopment, as defined per the NJDEP Stormwater Design Regulations (NJAC -5.3(b)), include the following objectives:

- A. Protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
- B. Minimizing impervious surfaces and breakup or disconnecting the flow of runoff over impervious surfaces.
- C. Maximum protection of natural drainage features and vegetation.
- D. Minimizing the decrease in the “time of concentration” from pre-construction conditions to post-construction conditions.
- E. Minimizing land disturbance during clearing and grading.
- F. Minimizing soil compaction.
- G. Providing low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides.
- H. Providing vegetated open channel conveyance systems discharging into and through stable vegetative areas.
- I. Providing other source controls to prevent or minimize erosion or discharges.

The West Windsor Township Master Plan, Section IX, “Conservation Plan Element”, includes a detailed summary of goals and policies for the Township, including development of a Township-Wide greenbelt plan. The Township has developed environmental constraints and development maps as part of the existing Township Master Plan.

In addition, the Township’s “Open Space and Recreation Plan Element” includes several goals and policies developed for the protection of greenbelts, including:

- Acquisition of 250 acres of additional recreational lands per NJ Statewide Comprehensive Outdoor Recreation Plans (SCORP’s) “Balance Use Guidelines, and the acquisition of additional lands above the minimum, as required to achieve community goals for environmental protection, farmland preservation and education.
- Fully acquire control of Greenbelt areas to “prevent development of these environmentally-valuable areas”.
- Explore modifications to the Township Greenbelt Plan to maintain sustainable natural ecosystems and counterbalance land development.

In summary, West Windsor’s existing Master Plan provides an excellent foundation for the preservation of ecologically sensitive areas, protection of natural drainage features and vegetation, and minimization of land disturbance.

As indicated previously, West Windsor Township will adopt the NJDEP model stormwater control ordinance, as amended for use and enforcement within the Township. This ordinance includes methodologies for incorporating non-structural stormwater strategies identified above, in design, “to the maximum extent practicable” for future major development projects. As such, the proposed Master Plan (existing Master Plan plus Municipal Stormwater Plan and ordinance, when approved) will adequately address non-structural stormwater management strategies.

If an applicant (or his/her Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate nonstructural stormwater management strategies into the design of a particular project, the applicant will be required to develop an alternative mitigation strategy. It is understood that any project requiring NJDEP Land Use Regulation Program permitting or approvals will also be subject to a similar stormwater review by the appropriate agency.

Once the ordinance text is finalized, it will be submitted to the Mercer County Planning Board for review and approval by January 5, 2006 (i.e., within 24 months of the effective date of the Stormwater Management Rules). A copy will be sent to the Department of Environmental Protection at the time of submission.

Also included in **Appendix C** of West Windsor's Stormwater management plan is a review of the Township's existing ordinances for allowing use of non-structural stormwater management strategies using the "Municipal Regulations Checklist" from Appendix B of the New Jersey Stormwater Best Management Practices (BMP) Manual, dated February, 2004.

Areas identified as "No" on the enclosed Checklist (i.e., regulations not addressing specific aspect of non-structural measures) should be reviewed by the Township and Planning Board to determine whether ordinance changes are warranted. **Again, it must be stressed that regardless of the adequacy of the existing ordinances to allow for non-structural stormwater measures, that the eventual adoption of the NJ Model Stormwater Ordinance as part of the Township's Ordinances will require incorporation of the above-referenced non-structural strategies into design of future "major development projects" (over 1 acre disturbance or 0.25 acres impervious cover) proposed within the Township.**

8. Land Use/Build-Out Analysis

There are four steps to preparing a build-out analysis that satisfies the requirements for the municipal stormwater management plan:

1. Determine the total land area within each of the Hydrologic Unit Codes (HUC14) of the municipality.
2. Determine the area of constrained lands within each HUC14 of the municipality.
3. Determine the land available for development by simply subtracting the constrained lands from the total land area for each HUC14. In essence, the land available for development is the agricultural, forest and/or barren lands available within each HUC14. Existing residential, commercial, and industrial areas are also eligible for redevelopment and should be considered as land available for development.
4. For each HUC14, complete a build-out analysis by using the municipal zoning map and applicable ordinances to determine the acreage of new development. Once the build-out acreage of each land use is determined for each HUC14, nonpoint source loadings can be determined for the build-out scenario.

The following is a build-out analysis prepared for remaining developable land located within West Windsor Township. Also included are pollutant loading calculations for each HUC-14 watershed based on these data.

CLICK BELOW FOR POLLUTANT LOADING CALCULATIONS

[Pollutant Loading Calculations.pdf](#)

Build Out Analysis

Build Out Zoning	Un-Developed Total Area (acres)	** Existing Impervious (acres)	Wetlands / Water Area (acres)	Developable Area (acres)	Allowable Impervious (%)	Build-Out Impervious (acres)
NJDEP HUC 02030105090080						
Zone B-2 - Neighborhood Center Business	3.50	0.00	0.00	3.50	55%	1.93
Zone E - Education	290.10	0.00	24.19	265.91	50%	132.96
Zone R-1 - Rural Density Residential	165.85	0.00	119.51	46.34	10%	4.63
Zone R-1A - Low Density Residential	30.64	0.00	13.64	17.00	17%	2.89
Zone R1/O - Research / Office	23.59	0.00	17.42	6.17	60%	3.70
Zone R-2 - Low Density Residential	3.18	0.00	1.89	1.29	17%	0.22
Zone R-5A - High Density Residential	19.60	0.00	13.33	6.27	40%	2.51
Zone ROM-1 - Research / Office / Limited Manufacturing	520.57	0.00	103.08	417.49	50%	208.75
Zone ROM-4 - Research / Office / Limited Manufacturing	7.58	0.00	4.85	2.73	50%	1.37
Zone ROM-5 - Research / Office / Limited Manufacturing	44.58	0.00	15.69	28.89	50%	14.45
Zone ROR - Research / Office / Recreation	113.17	0.00	28.34	84.83	45%	38.17
Totals	1222.36		341.94	880.42		411.56
NJDEP HUC 02030105100060						
Zone R-1A - Low Density Residential	78.98	0	10.43	68.55	17%	11.65
Zone ROM-3 - Research / Office / Limited Manufacturing	24.47	0	5.95	18.52	50%	9.26
Totals	103.45		16.38	87.07		20.91
NJDEP HUC 02030105100120						
Zone P - Professional Office	48.14	0	13.43	34.71	60%	20.83
Zone R-1 - Rural Density Residential	0.62	0	0	0.62	10%	0.06
Totals	48.76		13.43	35.33		20.89
NJDEP HUC 02030105100130						
Zone P - Professional Office	3.99	0	0	3.99	60%	2.39
Zone P-1 - Planned Village Center District	21.72	0	0.98	20.74	50%	10.37
Zone R-1 - Rural Density Residential	9.45	0	9.45	0	10%	0.00

Zone R-1A - Low Density Residential	76.01	0	11.31	64.7	17%	11.00
Zone R&D - Research and Development	38.86	0	8.98	29.88	45%	13.45
Zone ROM-3 - Research / Office / Limited Manufacturing	76.51	0	30.33	46.18	50%	23.09
Totals	226.54		61.05	165.49		60.30
NJDEP HUC 02030105100140						
Zone E - Education	81.58	0	0.79	80.79	50%	40.40
Zone R-2 - Low Density Residential	12.64	0	0.00	12.64	17%	2.15
Zone R-3A - Affordable Housing	25.18	0	9.10	16.08	40%	6.43
Zone R&D - Research and Development	288.47	0	62.87	225.60	45%	101.52
Zone ROM-1 - Research / Office / Limited Manufacturing	34.68	0	3.69	30.99	50%	15.50
Zone ROM-2 - Research / Office / Limited Manufacturing	105.19	0	21.76	83.43	50%	41.72
Zone ROM-5 - Research / Office / Limited Manufacturing	57.38	0	9.47	47.91	50%	23.96
Totals	605.12		107.68	497.44		231.66
NJDEP HUC 02040105230040						
Zone R-1 - Rural Density Residential	39.67	0	12.26	27.41	10%	2.74
Totals	39.67		12.26	27.41		2.74
NJDEP HUC 02040105230050						
Zone R-1 - Rural Density Residential	159.15	0	116.83	42.32	10%	4.23
Zone R-1A - Low Density Residential	42.49	0	0	42.49	17%	7.22
Zone ROM-1 - Research / Office / Limited Manufacturing	232.51	0	29.66	202.85	50%	101.43
Zone ROM-4 - Research / Office / Limited Manufacturing	6.91	0	6.19	0.72	50%	0.36
Zone ROM-5 - Research / Office / Limited Manufacturing	2.02	0	1.47	0.55	50%	0.28
Totals	1810.30		154.15	288.93		113.52
Grand Totals	4056.20		706.89	1982.09		861.58

**** NOTE : For Conservative Build Out Calculations, it was assumed that there was zero existing impervious acres in the Un-Developed Total Area.**

9. Mitigation Plans

West Windsor Township does not desire to include or implement a stormwater mitigation plan as part of its currently-proposed stormwater management plan. Should mitigation be desired in the future for a future development(s), the plan will be amended to include a viable mitigation strategy and re-filed as amended with Mercer County and the NJDEP.

10. Stream Corridor Protection Plan (Optional)

It should be noted that currently under a draft designation, there is one Special Water Resource Protection Area designated Category One (NJAC 7:9B) located around Mercer County lake and along the Assunpink Creek within West Windsor Township. Also there are no upstream perennial or intermittent streams of said waters within the Township. If such water bodies are found or designated at a later date, future major development within 300 feet of said waters will be regulated in accordance with NJAC 7:8-5.5(h) as outlined in the model stormwater ordinance.

Appendix A -- Mapping

U.S.G.S. Quadrangle Map

Figure 1 – NJDEP Hydrologic Units Map (HUC14s)

Figure 2 – Wellhead Protection Areas/Groundwater Recharge Areas Map

Figure 3 – Zoning Districts Map

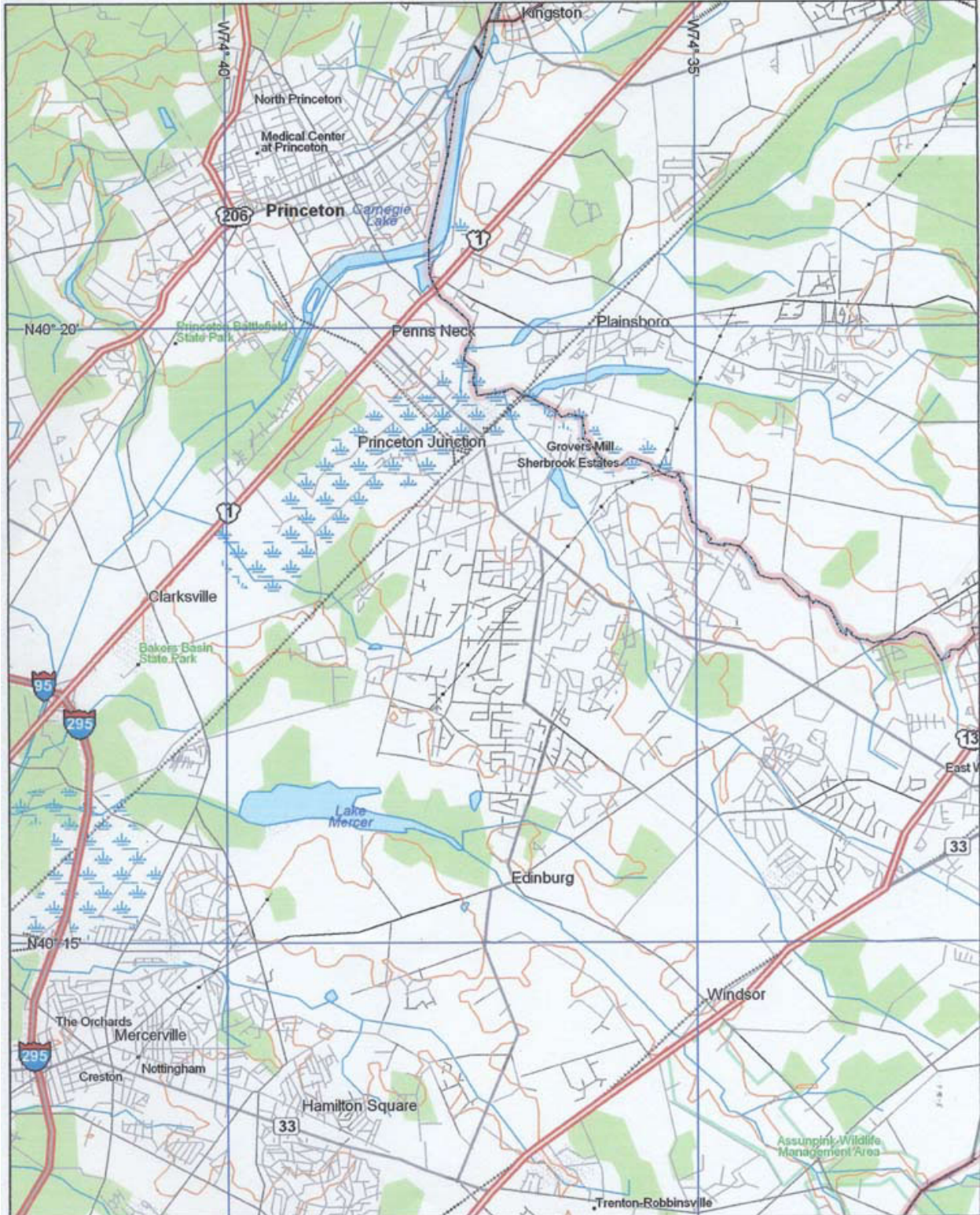
Figure 4 – Wetlands Map

Figure 5 – Soils Map

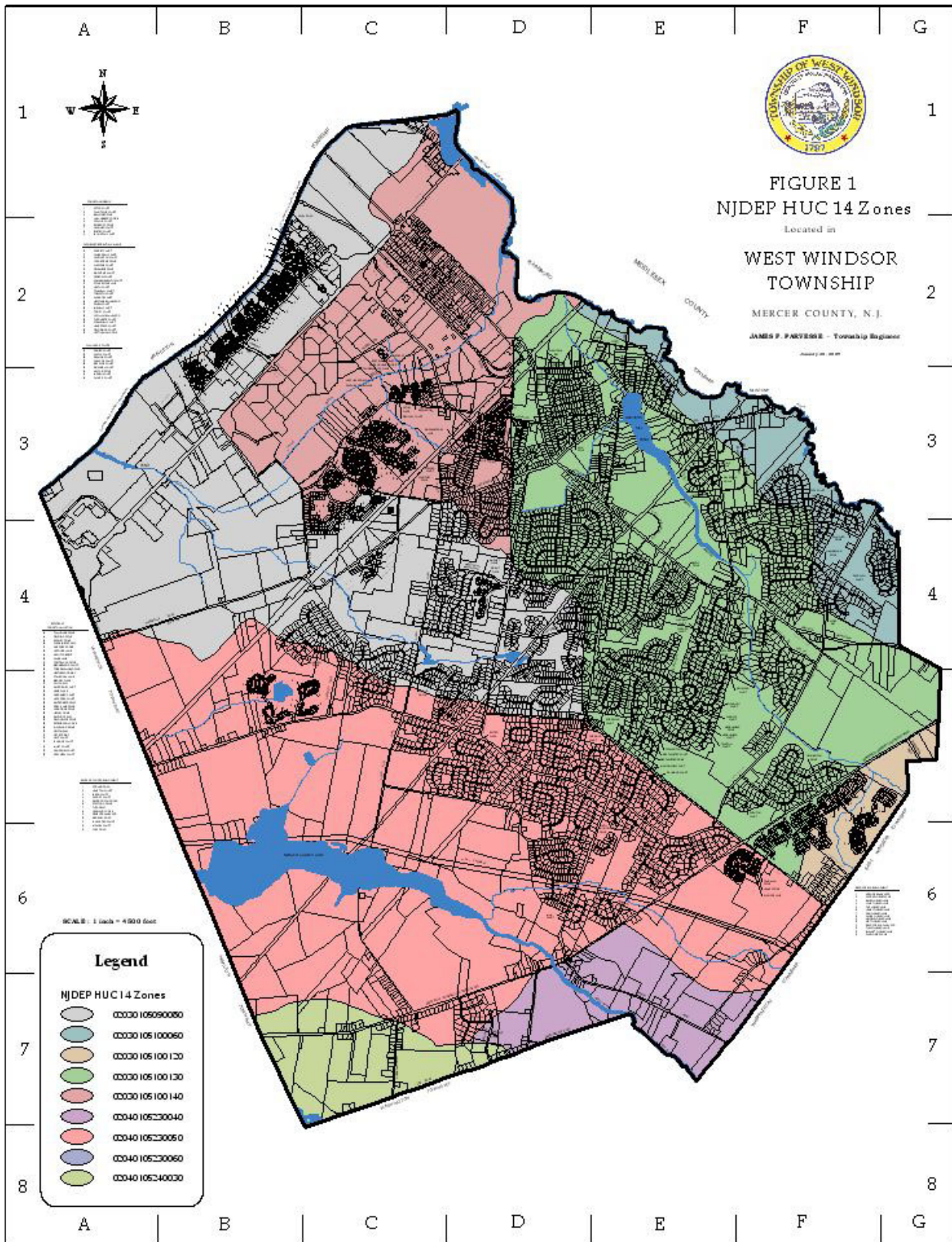
Figure 6 – Floodprone Areas Map

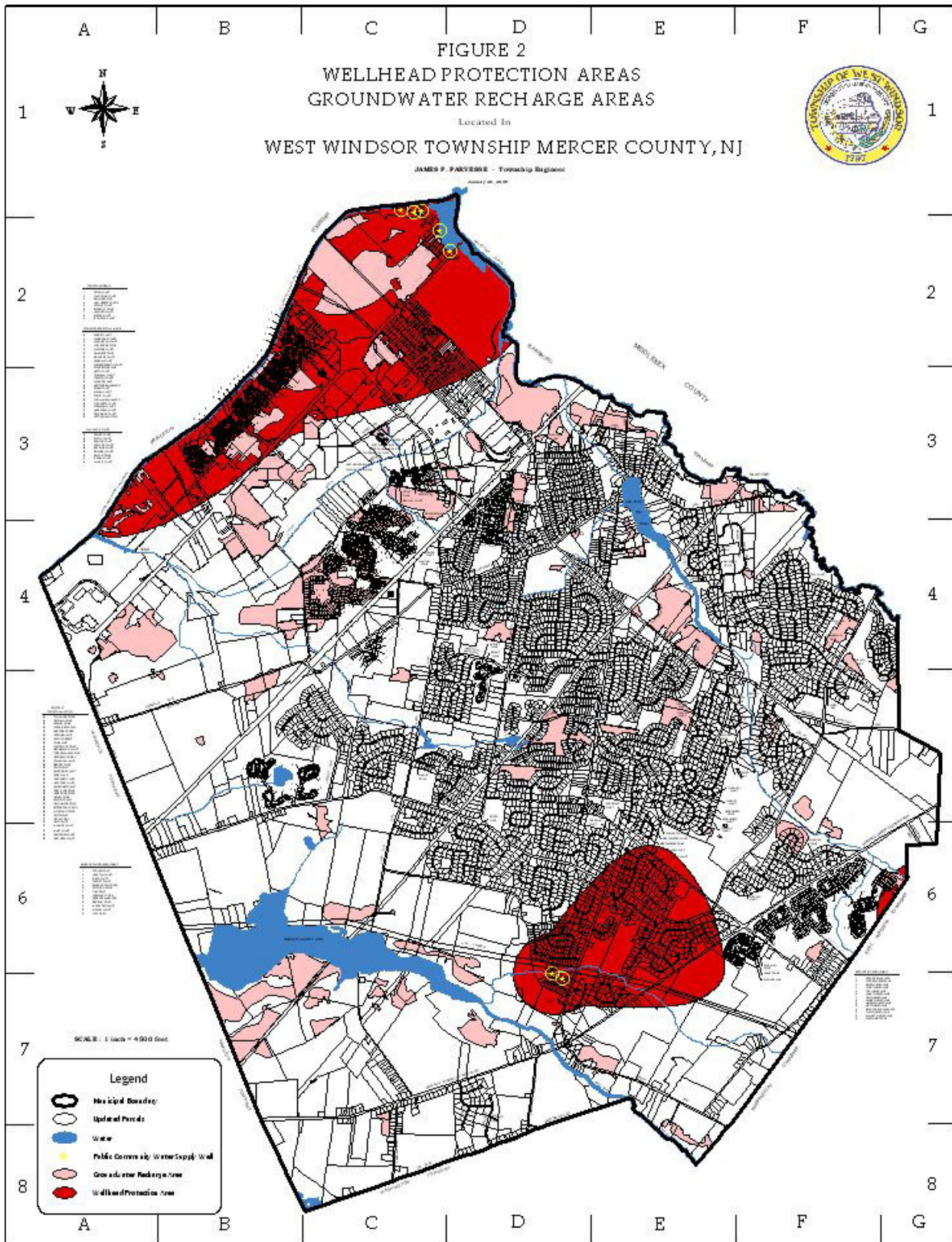
Figure 7 – Aerial Photo of Existing Conditions Map

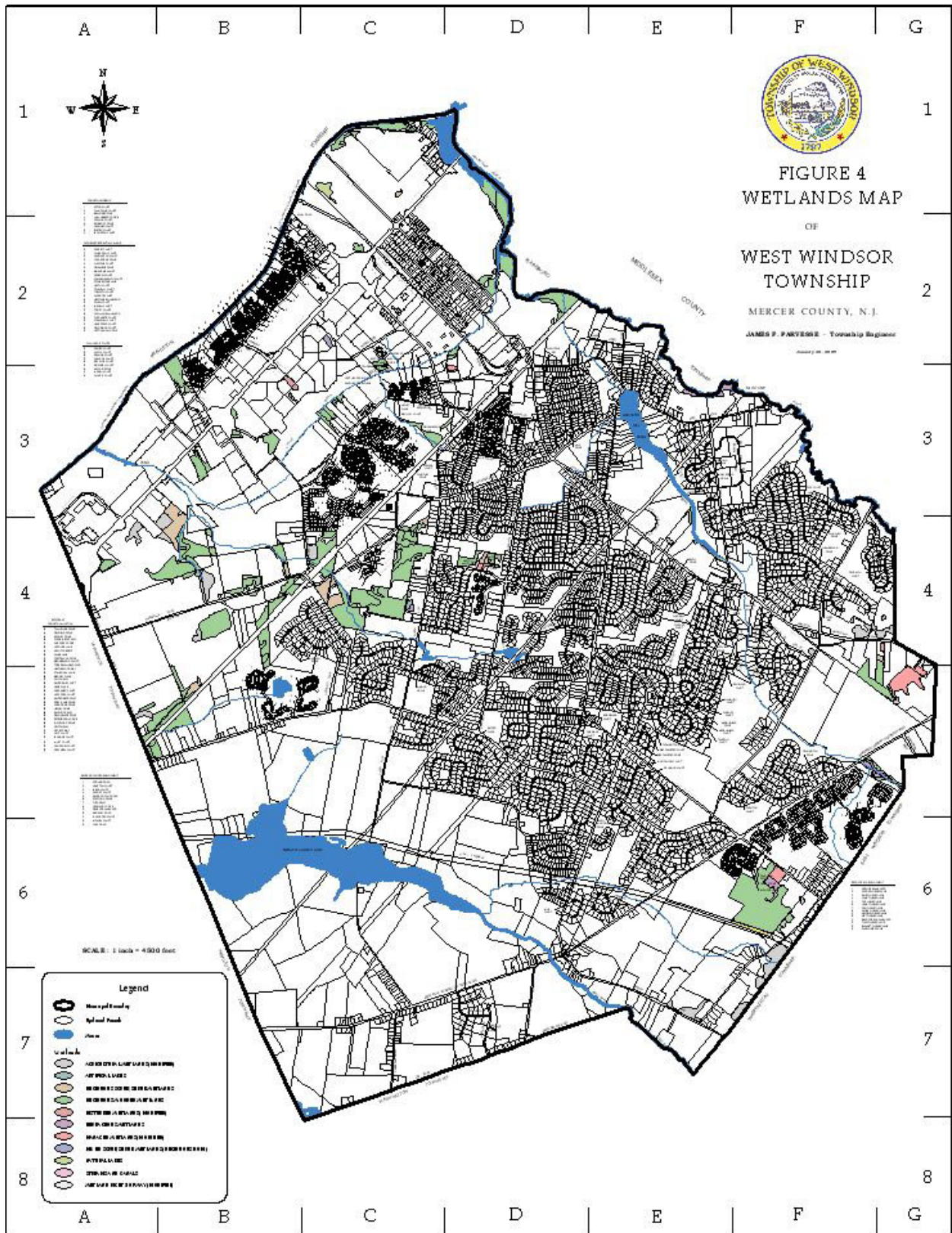
Figure 8 – Development Map



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 | 3000 ft Scale: 1 : 75,000 Detail: 10-7 Datum: NAD27







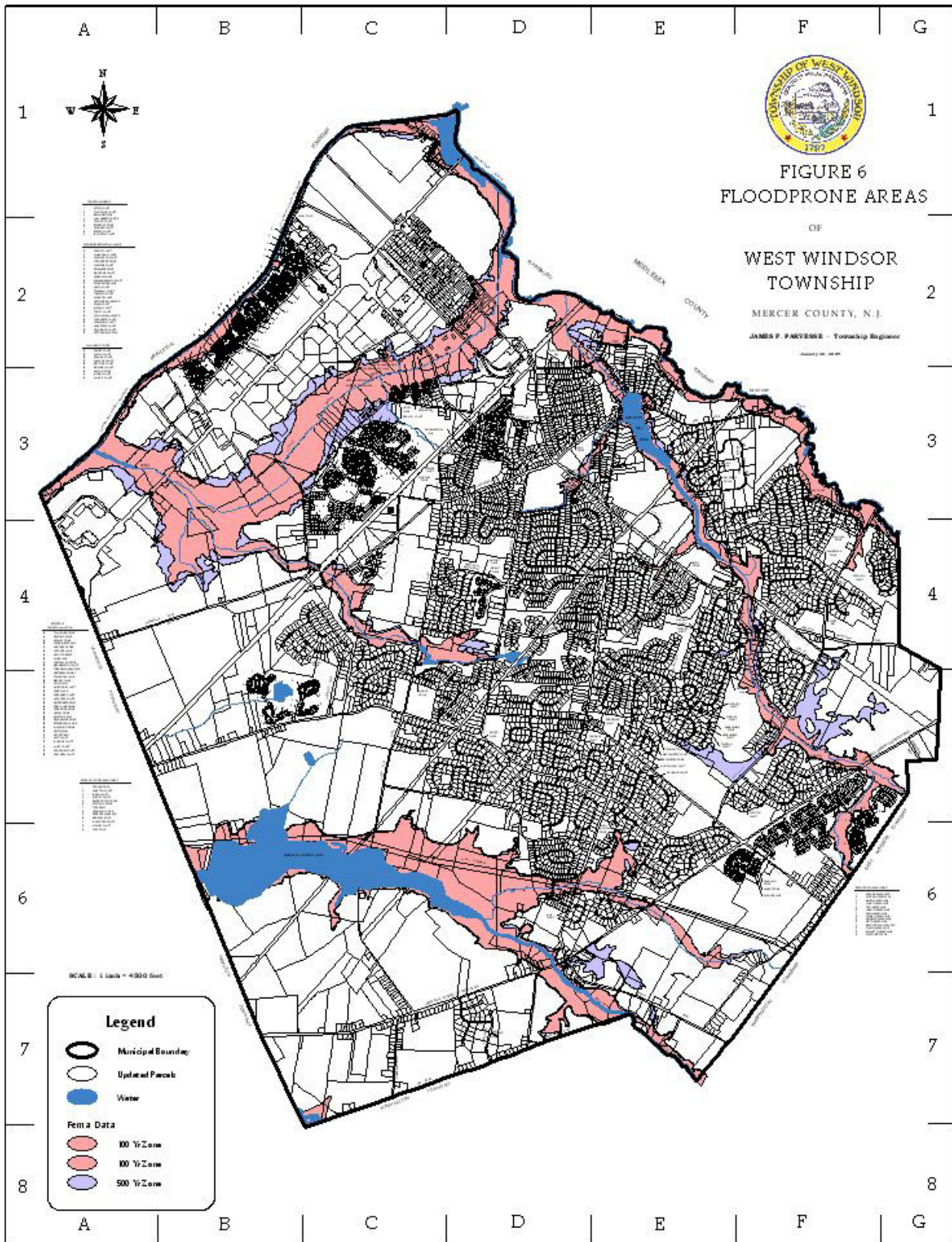


FIGURE 6
FLOODPRONE AREAS

OF
WEST WINDSOR
TOWNSHIP

MERCER COUNTY, N.J.

JAMES P. PARVENE - Township Engineer

March 2008

SCALE: 1 inch = 4000 feet

Legend

- Municipal Boundary
- Updated Parcel
- Water

Fema Data

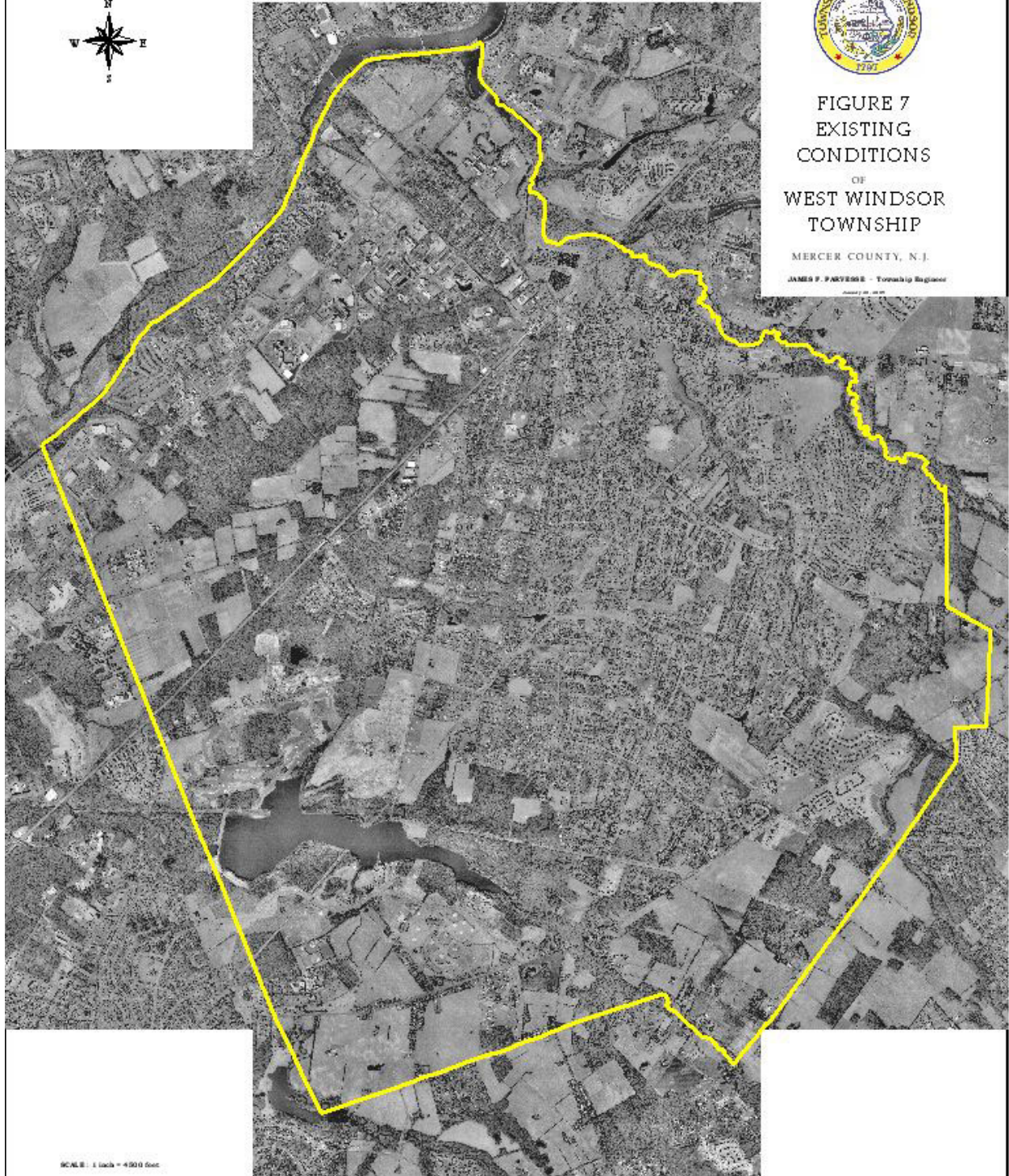
- 100 Y Zone
- 100 Y Zone
- 500 Y Zone



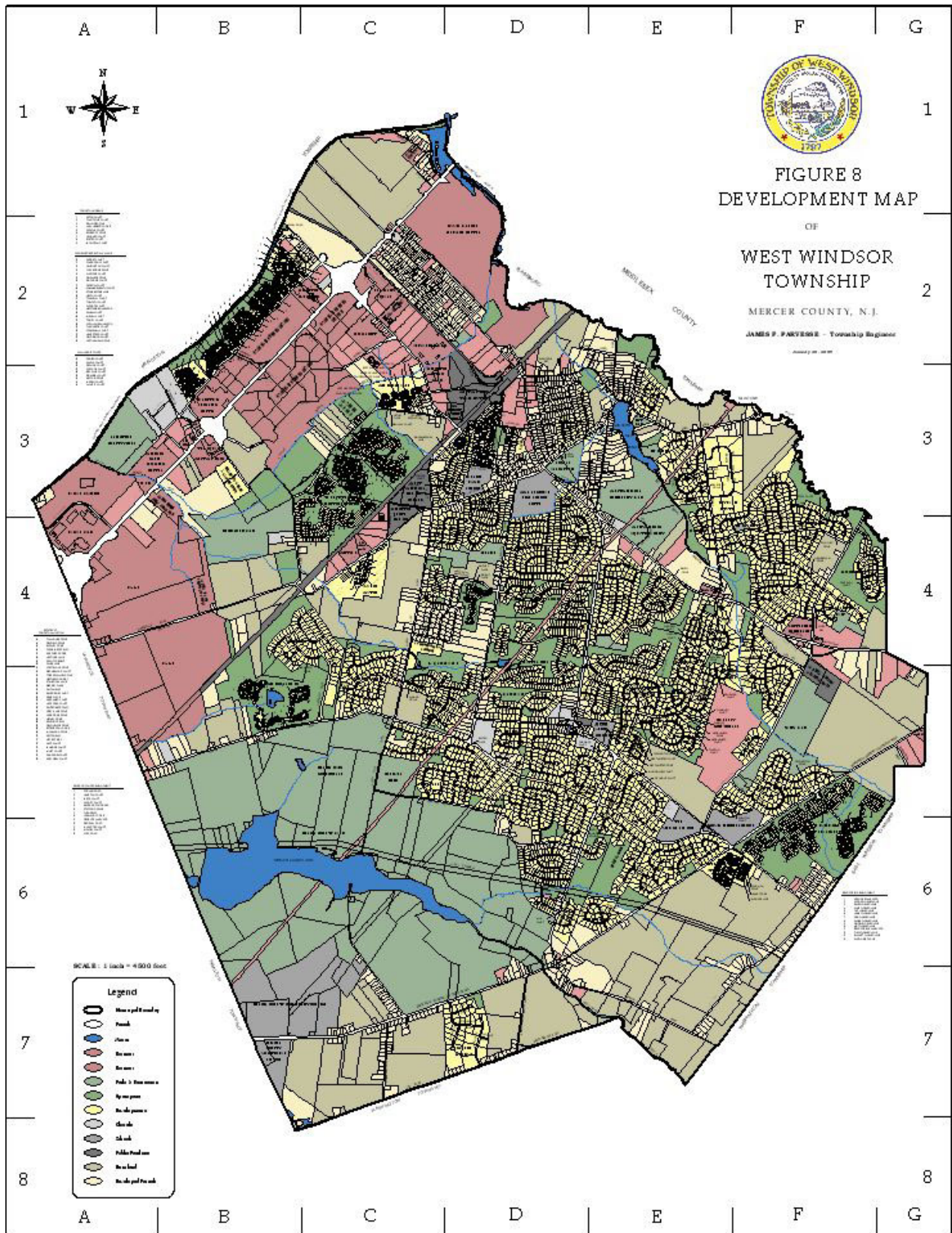
FIGURE 7
EXISTING
CONDITIONS
OF
WEST WINDSOR
TOWNSHIP

MERCER COUNTY, N.J.

JAMES F. PAVESKE - Township Engineer



SCALE: 1 inch = 4500 feet



Appendix B – Model Stormwater Ordinance

New Jersey Stormwater Best Management Practices Manual

February 2004

<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>

APPENDIX D

DRAFT Model Stormwater Control Ordinance for Municipalities

Important note: *This sample ordinance is provided to assist municipalities in the incorporation of design and performance standards into municipal plans. It is provided for information purposes only. It is important that current legislation is carefully reviewed before any portion of this draft ordinance is adopted.*

Section 1: Purpose

A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs should be integrated with nonstructural stormwater management measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

Note: Municipalities are encouraged to develop and adopt regional stormwater management plans and implement ordinances for specific drainage area performance standards that address local stormwater management and environmental characteristics.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for major development.

C. Applicability

This ordinance shall be applicable to any site plan or subdivision that requires preliminary or final site plan review.

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

Section 2: General Standards

A. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in this section. To the maximum extent feasible, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules. Such alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in this subchapter.
3. For site improvements regulated under the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21, the RSIS shall apply in addition to this section except to the extent the RSIS are superseded by this section or alternative standards applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Section 3: Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13: 1B-15. 147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
- C. The following linear development projects are exempt from the groundwater recharge,

stormwater runoff quantity, and stormwater runoff quality requirements at Sections 3.F and 3.G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements at Sections 3.F and 3.G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 3.F and 3.G to the maximum extent practicable;
3. The applicant demonstrates that, in order to meet the requirements at Sections 3.F and 3.G, existing structures currently in use, such as homes and buildings would need to be condemned; and
4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate for requirements of Sections 3.F and 3.G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in 3.F and 3.G shall be met by incorporating nonstructural stormwater management strategies at 3.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in 3.E.2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
2. Nonstructural stormwater management measures incorporated into site design shall:
 - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
 - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
 - c. Maximize the protection of natural drainage features and vegetation;

- d. Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
 - e. Minimize land disturbance including clearing and grading;
 - f. Minimize soil compaction;
 - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
 - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
 - i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:
 - (1) Site design features that help to prevent accumulation of trash and debris in drainage systems;
 - (2) Site design features that help to prevent discharge of trash and debris from drainage systems;
 - (3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
 - (4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.
3. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 3. F and 3. G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.
4. Guidance for nonstructural stormwater management measures is available in the New Jersey Stormwater Best Management Practices Manual. The manual is available on the Department of Environmental Protection's stormwater web page at <http://www.njstormwater.org>.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

- 1. This section contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
 - a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
 - b. The minimum design and performance standards for groundwater recharge are as follows:

- (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 4, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction groundwater recharge volume for the site; or
 - (b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
 - (2) This groundwater recharge requirement does not apply to projects within the “urban redevelopment” area, or projects subject to (3) below.
 - (3) The following types of stormwater shall not be recharged:
 - (a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than ‘reportable quantities’ as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
 - (b) Industrial stormwater exposed to “source material”. “Source material” means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.
 - (4) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.
- c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 4, complete one of the following:
- (1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 10, and 100 year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

- (2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2, 10, and 100 year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
- (3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or
- (4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with 1, 2 and 3 above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2. Any application for a new agricultural development that meets the definition of major development at Section 12 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, “agricultural development” means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.

G. Stormwater Runoff Quality Standards

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7: 14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution			
Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 6, or found on the Department’s website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 6. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
3. If more than one BMP in series is necessary to achieve the required 80% TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS % Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 5.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80% TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 3.F and 3.G.
6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 6.
7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
8. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
 - a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

- (1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
 - (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
- b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard For Off-Site Stability in the “Standards for Soil Erosion and Sediment Control in New Jersey”, established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.
- c. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the “Standards for Soil Erosion and Sediment Control in New Jersey”, established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:
- (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
 - (2) Stormwater associated with discharges allowed by this section shall achieve a 95% TSS post-construction removal rate;
 - (3) Temperature shall be addressed to ensure no impact on receiving waterway;
 - (4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
 - (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
 - (6) All encroachments proposed under this section shall be subject to review and approval by the Department.
- d. A stream corridor protection plan may be developed by a regional stormwater

management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 2.G(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

- e. This subsection does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before [effective date of the Stormwater Management Rules], provided that the construction begins on or before [five years from effective date of the Stormwater Management Rules].

Section 4: Calculation of Stormwater Runoff and Groundwater Recharge

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:
 - a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or
 - b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology at Section 4.A. 1.a and the Rational and Modified Rational Methods at Section 4.A. 1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.
4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces

separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release-55, Urban Hydrology for Small Watersheds and other methods may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

B. Groundwater recharge may be calculated in accordance with the following:

1. The New Jersey Geological Survey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 5: Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 7.D.
3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 7.

B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by this subchapter.

C. Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 6: Sources for Technical Guidance

A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

B. Additional technical guidance for stormwater management measures can be obtained from the following:

1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
2. The Rutgers Cooperative Extension Service, 732-932-9306; and
3. The Soil Conservation Districts listed in N .J.A.C. 2:90-1 .3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

Section 7: Safety Standards for Stormwater Management Basins

A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This subchapter applies to any new stormwater management basin.

B. The provisions of this section are not intended to preempt more stringent municipal or

county safety requirements for new or existing stormwater management basins.

Note: Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Section 7.C. 1, 7.C.2, and 7.C. 3 for trash racks, overflow grates, and escape provisions at outlet structures.

C. Requirements for Trash Racks, Overflow Grates and Escape Provisions

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
 - a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
 - b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
 - c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
 - d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
 - a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - b. The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
3. For purposes of this subsection, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
 - a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 7.D a free-standing outlet structure may be exempted from this requirement.
 - b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall

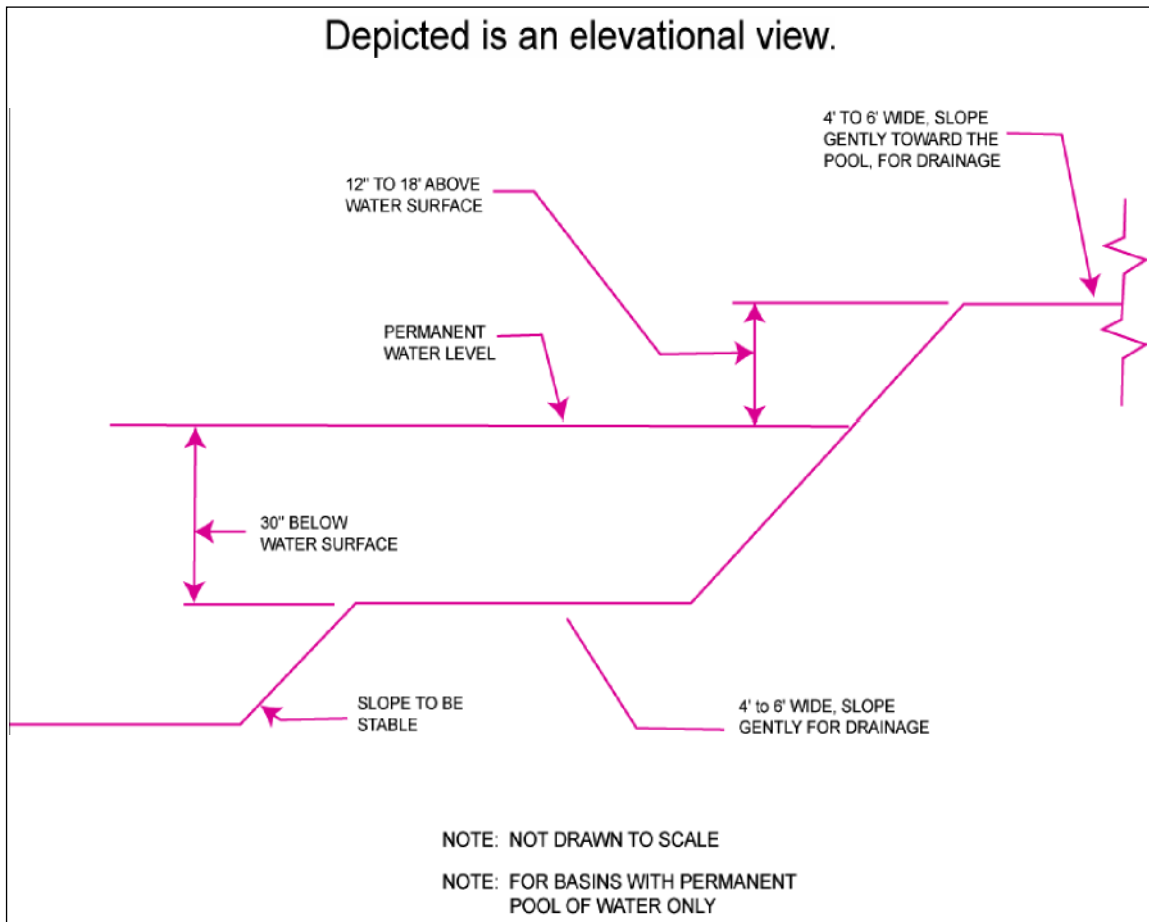
be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 7.E for an illustration of safety ledges in a stormwater management basin.

- c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

D. Variance or Exemption from Safety Standards

- 1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

E. Illustration of Safety Ledges in a New Stormwater Management Basin



Section 8: Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at 8.C below as part of the submission of the applicant's application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit [specify number] copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 8.C of this ordinance.

B. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category 1 waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s)

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 2 through 5 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

- a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 3 of this ordinance.
- b. When the proposed stormwater management control measures (e.g. infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.

7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 9.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 8.C. 1 through 8.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

Section 9: Maintenance and Repair

A. Applicability

1. Projects subject to review as in Section 1 .C of this ordinance shall comply with the requirements of Section 9.B and 9.C.

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
4. If the person responsible for maintenance identified under Section 9.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 9.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
6. The person responsible for maintenance identified under Section 9.B.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
7. The person responsible for maintenance identified under Section 9.B.2 above shall

evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

8. The person responsible for maintenance identified under Section 9.B.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 9.B.6 and 9.B.7 above.
9. The requirements of Sections 9.B.3 and 9.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

(Note: It may be appropriate to delete requirements in the maintenance and repair plan that are not applicable if the ordinance requires the facility to be dedicated to the municipality. If the municipality does not want to take this responsibility, the ordinance should require the posting of a two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53. Guidelines for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)

10. 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, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

C. Penalties

Any responsible person who violates any portion or section of this ordinance shall be subject to the following penalties: [Municipality to specify].

Section 10: Effective Date

This ordinance shall take effect upon the approval by the county review agency , or sixty (60) days after submission to the county review agency if they fail to act.

(NOTE: This model ordinance does not include a section on fees. The Department expects that the review of development applications under this ordinance would be an integral part of the municipal review of subdivisions and site plans. As a result, the costs to municipalities of reviewing development applications under this ordinance can be defrayed by fees charged for review of subdivisions and site plans under N.J.S.A. 40:55D 8.b)

Section 11: Severability

If the provisions of any article, section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision, or clause of this ordinance.

Section 12: Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

“CAFRA Planning Map” means the geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

“CAFRA Centers, Cores or Nodes” means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

"Compaction" means the increase in soil bulk density.

“Core” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“County review agency” means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58: 16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

"Department" means the New Jersey Department of Environmental Protection.

“Designated Center” means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

“Design engineer” means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

“Development” means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State

Agricultural Development Committee (SAD C), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A 4:1C-1 et seq.

“Drainage area” means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

“Environmentally constrained area” means the following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

“Environmentally critical areas” means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

“Empowerment Neighborhood” means a neighborhood designated by the Urban Coordinating Council “in consultation and conjunction with” the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

“Erosion” means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

"Impervious surface" means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

“Infiltration” is the process by which water that seeps into the soil from precipitation.

“Major development” means any “development” that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of “major development” but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. are also considered “major development.”

“Municipality” means any city, borough, town, township, or village.

“Node” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“Nutrient” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

"Person" means any individual, corporation, company, partnership, firm, association, or political subdivision of this State and any state, interstate or federal agency.

“Pollutant” means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. “Pollutant” includes both hazardous and nonhazardous pollutants.

“Recharge” means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

“Sediment” means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

“Site” means the lot or lots upon which a major development is to occur or has occurred. “Soil” means all unconsolidated mineral and organic material of any origin.

“State Development and Redevelopment Plan Metropolitan Planning Area (PA 1)” means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state’s future redevelopment and revitalization efforts.

“State Plan Policy Map” is defined as the geographic application of the State Development and Redevelopment Plan’s goals and statewide policies, and the official map of these goals and policies.

“Stormwater” means water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities.

“Stormwater runoff” means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

“Stormwater management basin” means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

“Stormwater management measure” means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

“Tidal Flood Hazard Area” means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

“Urban Coordinating Council Empowerment Neighborhood” means a neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

“Urban Enterprise Zones” means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

“Urban Redevelopment Area” is defined as previously developed portions of areas:

- (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- (2) Designated as CAFRA Centers, Cores or Nodes,
- (3) Designated as Urban Enterprise Zones; and
- (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

“Waters of the State” means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

“Wetlands” or “wetland” means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Appendix C – Non-Structural Measures Ordinance Review Checklist

Municipal Regulations Review

Township of West Windsor

As part of the requirements for municipal stormwater management plans in the Stormwater Management Rules at N.J.A.C. 7:8-4, municipalities are required to evaluate the municipal master plan, and land use and zoning ordinances to determine what adjustments need to be made to allow the implementation of nonstructural stormwater management techniques, also called low impact development techniques.

This checklist, included in the New Jersey Best Management Practices (BMP) Manual, was prepared to assist municipalities in identifying the specific ordinances that should be evaluated, and the types of changes to be incorporated to address the requirements of the Stormwater Management Rules. It was used to review the Township of West Windsor's compatibility with the nonstructural stormwater management techniques, including the Township Master Plan and Ordinances:

Part 1: Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharge and stormwater runoff quality and quantity.

A. Preservation of Natural Areas

Municipal regulations should include requirements to preserve existing vegetated areas, minimize turf grass lawn areas, and use native vegetation.

Yes **No** Are applicants required to provide a layout of the existing vegetated areas, and a description of the conditions in those areas?

For Subdivisions, per West Windsor Code Section 200-13(c,p). For Site Plans, per Code Section 200-53(c)5,20.

Yes **No** Does the municipality have maximum as well as minimum yard sizing ordinances?

Minimum yard size only, per Code Section 200-168 et. seq.

Yes **No** Are residents restricted from enlarging existing turf lawn areas?

Yes **No** Do the ordinances provide incentives for the use of vegetation as filters for stormwater runoff?

As per Code Section 200-91P(4), Landscaping, under "Stormwater".

Yes **No** Do the ordinances require a specific percentage of permanently preserved open space as part of the evaluation of cluster development?

Per Code Section 200-20, "Common Open Space shall be provided as part of any planned residential development or open space cluster". Open Space requirements specified by Zone in Section 200 of the Township Code.

B. Tree Protection Ordinances

Municipalities often have a tree ordinance to minimize the removal of trees and to replace trees that are removed. However, while tree ordinances protect the number of trees, they do not typically address the associated leaf litter or smaller vegetation that provides additional water quality and quantity benefits. Municipalities should consider enhancing tree ordinances to a forest ordinance that would also maintain the benefits of a forested area.

Yes **No** Does the municipality have a tree protection ordinance?

Chapter 170, "Trees", of the Township Code

Yes **No** Can the municipality include a forest protection ordinance?

Not needed -- Per Section 170-3, "Any such activity, however, which entails injury to or destruction of trees shall require an application and permit as provided for herein and shall be in accordance with a management plan developed by the New Jersey Department of Environmental Protection, Bureau of Forestry or other professional forester".

Yes **No** If forested areas are present at development sites, is there a required percentage of the stand to be preserved?

Per Trees ordinance. Also, in 1999, the Township prepared and submitted a Community Forestry Plan.

C. Landscaping Island and Screening Ordinances

Municipalities often have ordinances that require landscaping islands for parking areas. The landscaping islands can provide ideal opportunities for the filtration and disconnection of runoff, or the placement of small LID-BMPs. Screening ordinances limit the view of adjoining properties, parking areas, or loading areas. Low maintenance vegetation can be required in islands and areas used for screening to provide stormwater quality, groundwater recharge, or stormwater quantity benefits.

Yes **No** Do the ordinances require landscaping islands in parking lots, or between the roadway and the sidewalk? Can the ordinance be adjusted to require vegetation that is more beneficial for stormwater quality, groundwater recharge, or stormwater quantity, but that does not interfere with driver vision at the intersections?

Per Section 200-91P, Landscape Standards.

Yes **No** Is the use of bio-retention islands and other stormwater practices within landscaped areas or setbacks allowed?

As per Section 200-91P(4), "Stormwater".

Yes **No** Do the ordinances require screening from adjoining properties? Can the screening criteria require the use of vegetation to the maximum extent practicable before the use of walls or berms?

As per Section 200-91P(6), "Buffers".

D. Riparian Buffers

Municipalities may have existing buffer and/or floodplain ordinances that require the protection of vegetation adjacent to streams. Municipalities should consult existing regulations adopted by the Department to ensure that riparian buffer or floodplain ordinances reflect the requirements of the Department within these areas. The municipality should consider conservation restrictions and allowable maintenance to ensure the preservation of these areas.

Yes **No** Is there a stream buffer or floodplain ordinance in the community?

Section 200-277, "Floodways", and Part 5, "Flood Damage and Prevention" of Township Code (Section 200(257-277)).

Yes **No** Is the ordinance consistent with existing state regulatory requirements?

Ordinances are consistent with FEMA, NJDEP requirements.

Yes **No** Does the ordinance require a conservation easement, or other permanent restrictions on buffer areas?

No. However, per Section 200-228(c), "Landscaping", "No building or parking area shall be located within 200 feet from the center line of any stream or within a flood hazard area, except as modified by Part 5 of this chapter, Flood Damage and Prevention".

Yes **No** Does the ordinance identify or limit when stormwater outfall structures can cross the buffer?

Per Code Section 200-270F, storm sewers are only allowed in flood hazard area as permitted by West Windsor Planning Board and NJDEP.

Yes **No** Does the ordinance give detailed information on the type of maintenance and/or activities that is allowed in the buffer?

Allowed activities in flood hazard areas are as identified in Section 200-269, "Permitted uses", and Section 200-270, "Permitted uses by special permission".

Part 2: Minimizing Land Disturbance

The minimization of disturbance can be used at different phases of a development project. The goal is to limit clearing, grading, and other disturbance associated with development to protect existing features that provide stormwater benefits. Zoning ordinances typically limit the amount

of impervious surfaces on building lots, but do not limit the amount of area that can be disturbed during construction. This strategy helps preserve the site's existing hydrologic character, as well as limiting the occurrence of soil compaction.

A. Limits of Disturbance

Designing with the terrain, or site fingerprinting, requires an assessment of the characteristics of the site and the selection of areas for development that would minimize the impact. This can be incorporated into the requirements for existing site conditions and the environmental impact statement. Limits of disturbance should be incorporated into construction plans reviewed and approved by the municipality. Setbacks should be evaluated to determine whether they can be reduced. The following maximum setbacks are recommended for low impact development designs:

- front yard – 20 feet;
- rear yard – 25 feet; and
- side yard – 8 feet.

Yes **No** As part of the depiction of existing conditions, are environmentally critical and environmentally constrained areas identified? (Environmentally critical areas are areas or features with significant environmental value, such as steep slopes, stream corridors, natural heritage priority sites, and habitats of threatened and endangered species. Environmentally constrained areas are those with development restrictions, such as wetlands, floodplains, and sites of endangered species.)

Identification of critical areas are required in several places within the Township's Land Code, including Section 200-50 (Subdivisions), 200-13 (Site Plans), and 200-23 (Environmental Considerations – includes Environmental Impact Statement (EIS) review).

Yes **No** Can any of the existing setbacks be reduced?

Yes **No** Are there maximum turf grass or impervious cover limits in any of the setbacks?

Yes **No** Do the ordinances inhibit or prohibit the clear cutting of the project site as part of the construction?

200-23 (Environmental Considerations – includes Environmental Impact Statement (EIS) review) – clear cutting (if proposed) and other environmental impacts of construction are reviewed as part of Environmental Commission and Planning Board review.

Yes **No** Is the traffic of heavy construction vehicles limited to specific areas, such as areas of proposed roadway? Are these areas required to be identified on the plans and marked in the field?

Yes **No** Do the ordinances require the identification of specific areas that provide significant hydrologic functions, such as existing surface storage areas, forested areas, riparian corridors, and areas with high groundwater recharge capabilities?

200-23 (Environmental Considerations – includes Environmental Impact Statement (EIS) review).

Yes **No** Does the municipality require an as-built inspection before issuing a certificate of occupancy? If so, does the inspection include identification of compacted areas, if they exist within the site?

As per Section 200-252, “Certificate of Occupancy”. However, identification of compacted areas is not included.

Yes **No** Does the municipality require the restoration to compacted areas in accordance with the Soil Erosion and Sediment Control Standards?

All construction work is subject to Mercer County SCD standards.

B. Open Space and Cluster Development

Open space areas are restricted land that may be set aside for conservation, recreation, or agricultural use, and are often associated with cluster development requirements. Since open space can have a variety of uses, the municipality should evaluate its open space ordinances to determine whether amendments are necessary to provide improved stormwater benefits.

Yes **No** Are open space or cluster development designs allowed in the municipality?

As referenced in Section 200-20, “Common Open Space”, and subsequent sections, including as referenced below.

Yes **No** Are flexible site design incentives available for developers that utilize open space or cluster design options?

Detailed design requirements are provided within Section 200 of the Township Code, including 200-190c, “Common Open Space”, and 200-174, “Open Space cluster (OSC) planned development in R-1 and R1A Districts”.

Yes **No** Are there limitations on the allowable disturbance of existing vegetated areas in open space?

Per Section 200-36A(4), “Supplemental Design Criteria”, it is stated that “The protection of wooded areas, specimen trees, of five-inch caliper or over and vegetation suitable for buffer strips within the development shall be a factor in determining the location of open space, ...”.

Yes **No** Are the requirements to re-establish vegetation in disturbed areas dedicated for open space?

Yes **No** Is there a maximum allowable impervious cover in open space areas?

Part 3: Impervious Area Management

The amount of impervious area, and its relationship to adjacent vegetated areas, can significantly change the amount of runoff that needs to be addressed by BMPs. Most of a site's impervious surfaces are typically located in the streets, sidewalks, driveway, and parking areas. These areas are further hampered by requirements for continuous curbing that prevent discharge from impervious surfaces into adjacent vegetated areas.

A. Streets and Driveways

Street widths of 18 to 22 feet are recommended for low impact development designs in low density residential developments. Minimum driveway widths of 9 and 18 feet for one lane and two lanes, respectively, are also recommended. The minimum widths of all streets and driveways should be evaluated to demonstrate that the proposed width is the narrowest possible consistent with safety and traffic concerns and requirements. Municipalities should evaluate which traffic calming features, such as circles, rotaries, medians, and islands, can be vegetated or landscaped. Cul-de-sacs can also be evaluated to reduce the radius area, or to provide a landscape island in the center.

Yes **No** Are the street widths the minimum necessary for traffic density, emergency vehicle movement, and roadside parking?

Design standards are in accordance with the Residential Site Improvement Standards (RSIS).

Yes **No** Are street features, such as circles, rotaries, or landscaped islands allowed to or required to receive runoff?

As per Section 200-56, "Streets, swales and alleys", and Article XX, "Design Standards for Collector Road" runoff not precluded from these areas as long as positive drainage is provided.

Yes **No** Are curb cuts or flush curbs with curb stops an allowable alternative to raised curbs?

Mountable curbs and curb cuts allowed as per Section 200-58, "Curbs".

Yes **No** Can the minimum cul-de-sac radius be reduced or is a landscaped island required in the center of the cul-de-sac?

As per Section 200-56N(3), for cul-de-sacs radii, island sizes reductions allowed for roads less than 600 feet in length in planned developments.

Yes **No** Are alternative turn-arounds such as "hammerheads" allowed on short streets in low density residential developments?

Yes **No** Can the minimum driveway width be reduced?

Design standards are in accordance with the Residential Site Improvement Standards (RSIS).

Yes **No** Are shared driveways permitted in residential developments?

B. Parking Areas and Sidewalks

A mix of uses at a development site can allow for shared parking areas, reducing the total parking area. Municipalities require minimum parking areas, but seldom limit the total number of parking spaces. Table 1 shows recommendations for minimum parking space ratios for low impact design:

Table 1: Low Impact Development Parking Space Ratios

Use Parking Ratio per 1000 sq. ft. of Gross Floor Area

Professional office building Less than 3.0

Shopping centers Less than 4.5

Yes **No** Can the parking ratios be reduced?

Per Section 200-27, Circulation and parking, general and corporate office spaces are one per 300 square feet (sf) building floor area (not gross). Retail requires one per 200 square feet (sf) building floor area (not gross).

Yes **No** Are the parking requirements set as maximum or median rather than minimum requirements?

However, as per Section 200-28, excess spaces (above minimum) are only allowed if approved by the Planning Board.

Yes **No** Is the use of shared parking arrangements allowed to reduce the parking area?

As per Section 200-27D(1) of the code.

Yes **No** Are model shared parking agreements provided?

Yes **No** Does the presence of mass transit allow for reduced parking ratios?

Yes **No** Is a minimum stall width of 9 feet allowed?

As per Section 200-29, General circulation; parking and loading area design standards.

Yes **No** Is a minimum stall length of 18 feet allowed?

As per Section 200-29, General circulation; parking and loading area design standards.

Yes **No** Can the stall lengths be reduced to allow vehicle overhang into a vegetated area?

Yes **No** Do ordinances allow for permeable material to be used in overflow parking areas?

Yes **No** Do ordinances allow for multi-level parking?

Yes **No** Are there incentives to provide parking that reduces impervious cover, rather than providing only surface parking lots?

Sidewalks can be made of pervious material or disconnected from the drainage system to allow runoff to re-infiltrate into the adjacent pervious areas.

Yes **No** Do ordinances allow for sidewalks constructed with pervious material?

Yes **No** Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?