

TOWNSHIP OF BLOOMFIELD



STORMWATER MANAGEMENT PLAN

PREPARED FOR:
TOWNSHIP OF BLOOMFIELD
MUNICIPAL BUILDING
MUNICIPAL PLAZA
BLOOMFIELD, ESSEX COUNTY, NEW JERSEY 07003

PREPARED BY:
PMK GROUP
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April 2006

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SECTION 1.0

1.0 INTRODUCTION

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

The total land area of the Township is 5.33 square miles. According to the *2002 Master Plan*, the Township is almost fully developed; therefore, a “build-out” analysis is not required. However, the plan addresses the review and update of existing ordinances, the *2002 Master Plan*, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

SECTION 2.0

2.0 GOALS

This MSWMP is directed towards improvement of water quality in the Township. The goals of this MSWMP are to:

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

Within the Township's *Master Plan*, the following goals relative to stormwater management were described:

- Preserve and upgrade the existing utility infrastructure including stormwater management (Goal # 8 of Master Plan).

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

stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

SECTION 3.0

3.0 STORMWATER DISCUSSION

3.1 HYDROLOGIC CYCLE

The hydrologic cycle or water cycle (Figure 1) is the continuous circulation of water between the ocean, atmosphere and land. The driving force of this natural cycle is the sun. Water, stored in oceans, depressions, streams, rivers, waterbodies, vegetation and even land surface, continuously evaporates due to solar energy. This water vapor then condenses in the atmosphere to form clouds and fog. After water condenses, it precipitates, usually in the form of rain or snow, onto land surfaces and waterbodies. Precipitation falling on land surfaces is often intercepted by vegetation. Plants and trees transpire water vapor back into the atmosphere, as well as aid in the infiltration of water into the soil. The vaporization of water through transpiration and evaporation is called evapotranspiration. Infiltrated water percolates through the soil as groundwater, while surface water flows overland. Groundwater and surface water flow to major waterbodies and eventually flows to the Earth's seas and oceans. This constant process of evapotranspiration, condensation, precipitation, and infiltration comprises the hydrologic cycle.

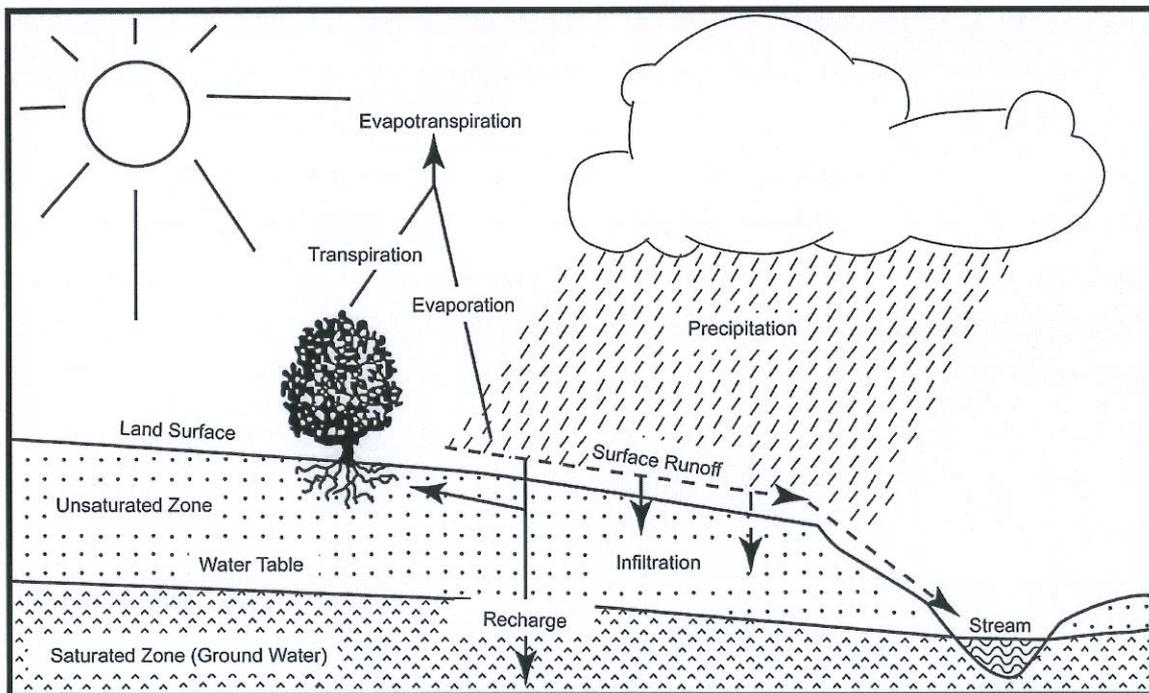


Figure 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32

3.2 STORMWATER IMPACTS

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.

Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Water quantity impacts combined with land development often adversely impacts stormwater quality. Impervious surfaces and cleared areas created by development collect pollutants from the atmosphere, fertilizers and pesticides, animal wastes, as well as pollutants from motor vehicle usage. Pollutants such as metals, suspended solids, hydrocarbons, pathogens, and nutrients collect and concentrate on impervious surfaces. During storm events, these pollutants are washed directly into municipal sewer systems.

In addition to chemical and biological pollution, thermal pollution can occur when water travels over heated impervious surfaces or collects in stormwater impoundments that are not shielded from the sun. Thermal pollution can affect aquatic habitats, adversely impacting cold water fish species such as trout. Removal of shade trees and stabilizing vegetation from stream banks also contributes to thermal pollution.

Proper stormwater management will help mitigate the negative impact of land development and its effect on stormwater. This MSWMP outlines the Township's plan to improve stormwater quality, decrease stormwater quantity, and increase groundwater recharge. By managing stormwater, the Township will improve the quality of aquatic ecosystems and restore some of the natural balance to the environment.

SECTION 4.0

4.0 BACKGROUND

4.1 TOWNSHIP CHARACTERISTICS

The Township encompasses a 5.33 square mile area in Essex County, New Jersey. According to the *2002 Master Plan*, the Township is characterized as a mature suburban community with a development pattern that is heavily influenced by its geography and location in northeastern Essex County. Several river and stream corridors traverse the Township, including Third River, Second River, Toney's Brook and Wigwam Brook. The topography throughout the Township is characterized in the *2002 Master Plan* as 'gently rolling' with level areas and areas of slopes greater than ten (10) percent.

Figure 2, Township and its Waterways, illustrates the waterways in the Township. Figure 3, USGS Topographic Map, depicts the Township boundary on USGS quadrangle maps.

4.1.1 Population and Housing Trends

According to *U.S. Census Bureau data*, the population of the Township was 47,683 persons in 2000, a 5.8% increase in population from 45,061 persons in 1990. According to the *2002 Master Plan*, the Township is a densely developed community with a stable population and little remaining vacant land.

The number of housing units increased only slightly from 1990 to 2000. According to *U.S. Census Bureau data*, there were 19,508 housing units in the Township in 2000, an approximate 1% increase from 19,293 housing units in 1990.

4.1.2 Land Use

According to the *2002 Master Plan*, residential development comprises 92.8% of the Township. Commercial development comprises 5.5% and industrial uses comprise 0.4% of the Township. Only 1.3% of the Township's parcels are vacant. The exact acreage of vacant land is not provided in the *Master Plan*.

4.1.3 Water and Sewer Service

According to the *2002 Master Plan*, the Township owns and operates its potable water distribution system.

The Township also owns and maintains its sanitary sewer collection system. Sewage treatment is conducted at the Passaic Valley Sewerage Commission in Newark, New Jersey. The discharge is released to the Newark Bay.

To the best of the Township's knowledge, no septic tanks remain in the Township.

4.1.4 State Development and Redevelopment Plan

The purpose of the *State Development and Redevelopment Plan (State Plan)* is to coordinate planning activities and establish State-wide planning objectives in the areas of land use, housing, economic development, transportation, natural resource conservation, agriculture and farmland retention, recreation, urban and suburban redevelopment, historic preservation, public facilities and services, and intergovernmental coordination. The *State Plan* designates planning areas that share common conditions with regard to development and environmental features:

- Areas for Growth: Metropolitan Planning Areas (PA-1), Suburban Planning Areas (PA-2) and Designated Centers in any planning area.
- Areas for Limited Growth: Fringe Planning Areas (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5). In these planning areas, planning should promote a balance of conservation and limited growth—environmental constraints affect development and preservation is encouraged in large contiguous tracts.
- Areas for Conservation: Fringe Planning Area (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5).

According to NJDEP *iMap*, the entire Township is located in the Metropolitan Planning Area, PA-1.

4.1.5 Brownfields Sites and Known Contaminated Sites

A brownfield is defined under NJ state law (*N.J.S.A. 58:10B-23.d*) as "any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant." According to the *2002 Master Plan*, there are four (4) major brownfield sites in the Township:

1. Westinghouse Electric Company at 1 Westinghouse Plaza
2. Ray Lar Tool and Manufacturing Company at 179 Walnut Street
3. Scientific Glass at 735 Broad Street off of Liongate Drive
4. Semonian Service Station at 200 Darling Avenue

The *Known Contaminated Sites in New Jersey report (2005 Edition)* is a municipal listing of sites where contamination of soil and/or ground water is confirmed at levels greater than the applicable cleanup criteria or standards. Sites with a confirmed on-site source(s) of contamination, as well as some sites where the source(s) of contamination is unknown, are included in the list. In addition, the report lists sites where the completed remediation requires engineering and/ or institutional controls. The *Known Contaminated Sites report* indicates that there are forty-nine (49) sites with on-site sources of contamination, and seven (7) closed sites with restrictions in the Township.

4.2 WATERWAYS

The following watercourses are located in or immediately adjacent to the Township:

- Clarks (Yantacaw) Brook
- Second River (a portion of which is locally known as Toney's Brook)
- An unnamed tributary to Springer Brook
- Third River (and an unnamed tributary)
- Wigwam Brook

The following water body is also located in the Township:

- Clarks Pond

Figure 2, Township and its Waterways, illustrates the waterways in the Township.

The Township is located within Watershed Management Area 4 (WMA #4), subtitled Lower Passaic and Saddle. A Watershed Management Area is subdivided into smaller drainage area units which are defined as HUC-14s. The term "HUC-14" is from the hydrologic unit code system developed by the United States Geological Service for delineating and identifying drainage areas. The system starts with the largest possible drainage areas and progressively smaller subdivisions of the drainage area are delineated and numbered in a nested fashion. A drainage area with a hydrologic unit code (HUC) designation with 14 numbers, or HUC-14, is one of several sub-watersheds of a larger watershed. There are portions of two (2) HUC-14s within the Township:

- 02030103150010 – Third River
- 02030103150020 – Second River

Figure 4, Hydrologic Units (HUC-14s), illustrates the HUC-14s within the Township.

All of the waterways are classified as FW2-NT / SE2 (C-2). FW2 is the general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands waters. NT (non trout) means fresh waters that have not been designated in *N.J.A.C. 7:9B-1.15(b)* through (h) as trout production or trout maintenance waters. SE2 is the general surface water classification applied to saline waters of estuaries, where the designated uses are maintenance, migration and propagation of the natural and established biota; migration of diadromous fish; maintenance of wildlife; secondary contact recreation; and any other reasonable uses. C-2 (Category Two) waters means those waters not designated as Category One.

4.3 WATER QUALITY

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.

AMNET information was available only for the Second and Third Rivers. The following are the watercourses with their AMNET testing location and classification:

- Second River, McCarter Highway, Newark/Belleville – Moderately Impaired (AMNET Station AN0293)
- Third River, West Passaic Avenue, Bloomfield - Moderately Impaired (AMNET Station AN0292A)
- Third River, Kingland Avenue, Nutley - Moderately Impaired (AMNET Station AN0292)

In addition to the AMNET data, the NJDEP and other regulatory agencies collect biological and chemical water quality data on the streams in the state. 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. The *Integrated List* is composed of the following four (4) Sublists:

- Sublist 1: Attaining the water quality standard and no use is threatened.
- Sublist 3: Insufficient or no data and information to determine if any designated use is threatened.
- Sublist 4: Impaired or threatened for one or more designated uses but does not require the development of a Total Maximum Daily Load (TMDL).
- Sublist 5: The water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

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

The following are the watercourses with their locations, sublist, and sublist constituents:

- Second River at Union Avenue in Newark is on Sublist 1 for dissolved oxygen, temperature, and unionized ammonia and Sublist 5 for phosphorus, fecal coliform and pH.
- Second River at McCarter Highway in Belleville is on Sublist 5 for benthic macroinvertebrates.
- Third River at West Passaic Avenue in Bloomfield is on Sublist 3 for benthic macroinvertebrates.
- Third River at Kingland Avenue in Clifton is on Sublist 5 for benthic macroinvertebrates.

No data is available for the other waterways.

A representative of PMK spoke with Kimberly Cenno, Supervising Environmental Specialist of NJDEP Bureau of Environmental Analysis and Restoration regarding the Sublist 5 listings of the Second and Third Rivers. Ms. Cenno indicated that Second River at Union Avenue in Newark is impaired due to a combined sewer overflow, which is scheduled to be eliminated in 2006. Therefore, establishment of a TMDL is not the appropriate response for this impairment, and no TMDL will be developed. Additionally, Ms. Cenno indicated that the NJDEP has not yet begun

to develop TMDLs for biological impairments (i.e. benthic macroinvertebrates). Ms. Cenno estimates that TMDLs addressing biological impairments will be developed around 2007 or 2008.

4.4 WATER QUANTITY

According to Paul Lasek, Bloomfield Township Engineer, each of the following areas experience frequent or prolonged flooding:

1. Hearthstone Road
2. Lakewood Drive
3. Brookside Park in the vicinity of Hoover Avenue
4. North 15th, North 16th, and North 17th Streets between Chester and Beardsley Avenues
5. Llewellyn Avenue Area around Watsessing Park, Glenwood Avenue, Prospect Street, Maolis Avenue, Evergreen Avenue, and Llewellyn Avenue
6. Areas along the Third River north of Clark Place

4.5 GROUNDWATER RECHARGE

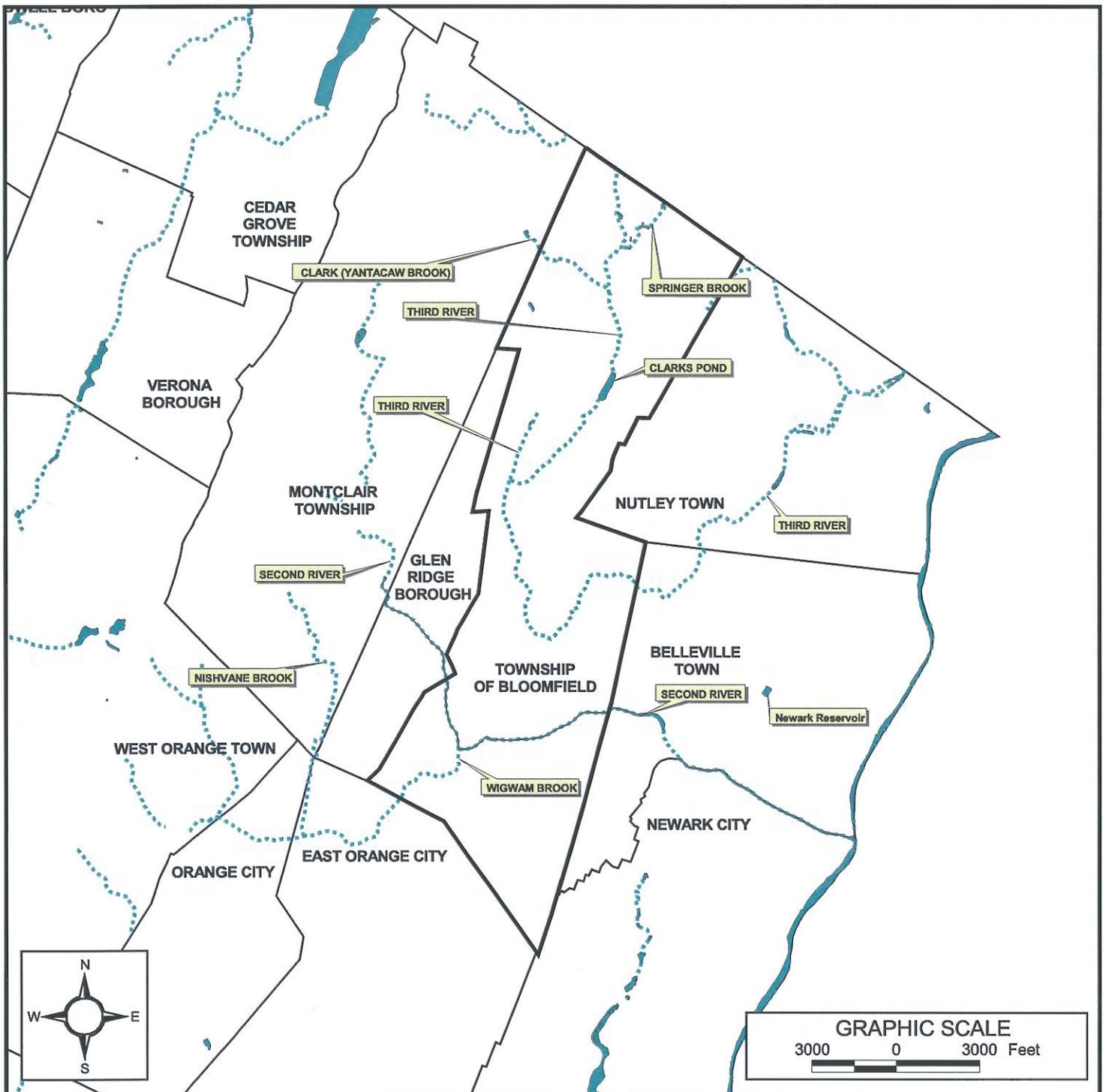
According to NJDEP digital GIS data, there are no mapped groundwater recharge areas in the Township.

Please refer to Figure 5, Groundwater Recharge Areas.

4.6 WELLHEAD PROTECTION AREAS

Public community water systems either pipe water for human consumption to at least 15 service connections used by year-round residents, or regularly serve at least 25 year-round residents (e.g. municipality or subdivision). There is one (1) mapped public community water supply well and associated wellhead protection areas located in the Township. Additionally, wellhead protection areas from neighboring municipalities extend into the Township.

Figure 6, Wellhead Protection Areas, depicts the well and wellhead protection area in the Township.



TOWNSHIP & ITS WATERWAYS

LEGEND:

-  MUNICIPAL BOUNDARY
-  LAKES
-  STREAMS

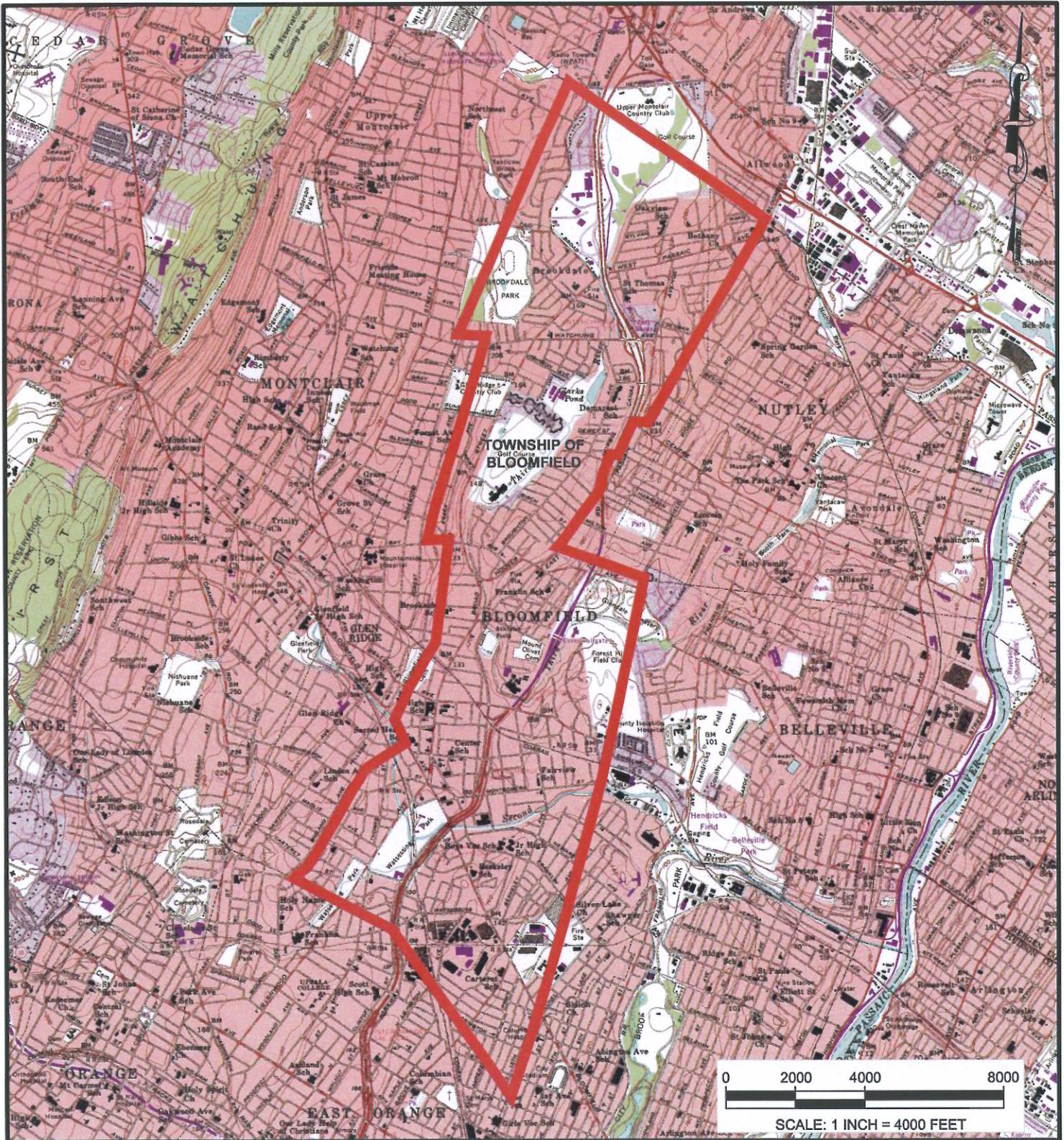
SOURCE:
NJDEP digital GIS data.

**TOWNSHIP OF BLOOMFIELD
MUNICIPAL PLAZA
ESSEX COUNTY, NEW JERSEY**



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Project No. 051995-03	Figure 2



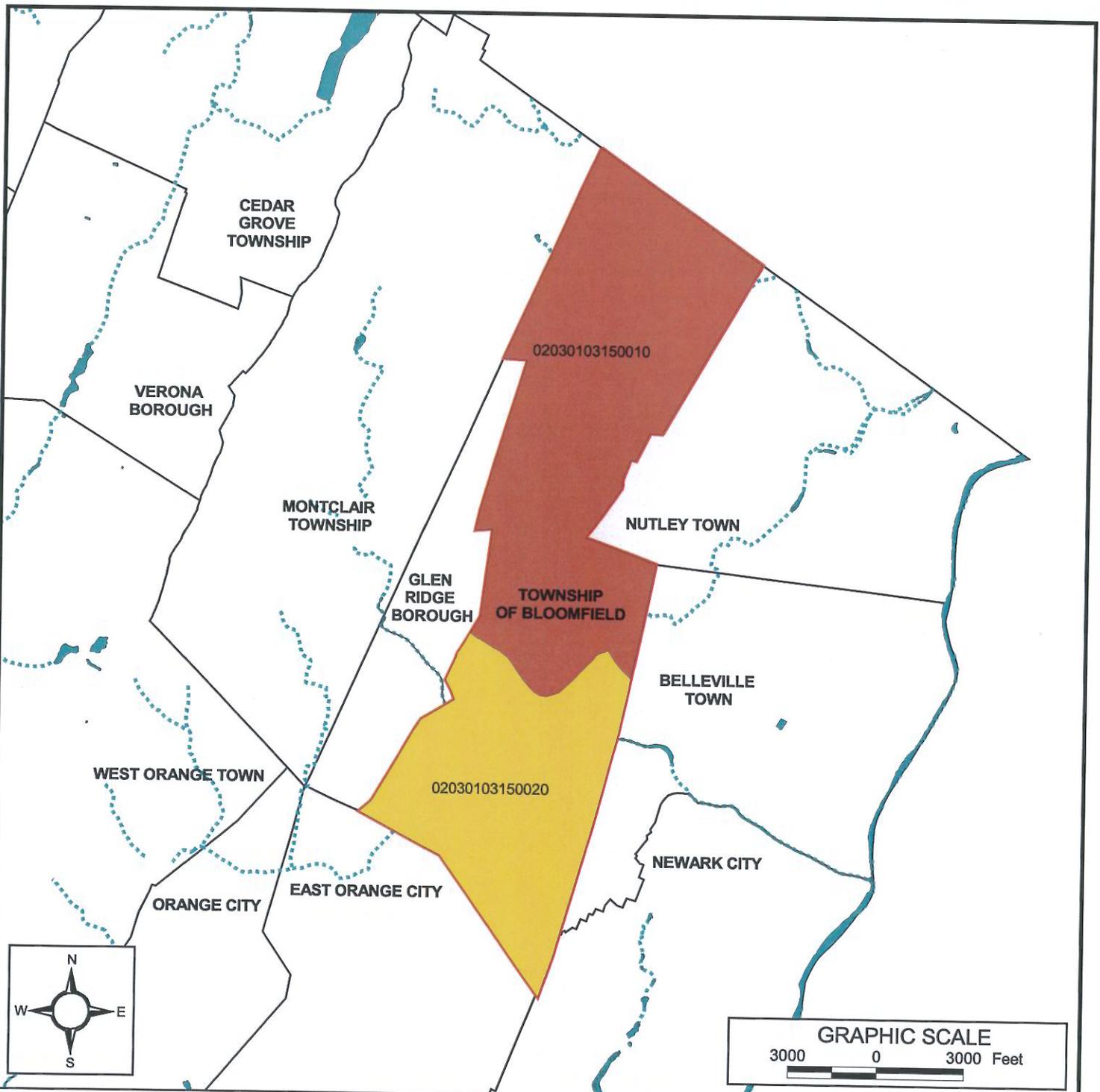
SOURCE: U.S.G.S. 7.5 MINUTE SERIES
ORANGE QUADRANGLE, (1981)

USGS TOPOGRAPHIC MAP

TOWNSHIP OF BLOOMFIELD
MUNICIPAL PLAZA
ESSEX COUNTY, NEW JERSEY

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HYDROLOGIC UNITS (HUC-14s)

LEGEND:

□ MUNICIPAL BOUNDARY

■ LAKES

⋯ STREAMS

■ 02030103150010

■ 02030103150020

SOURCE:
NJDEP digital GIS data.

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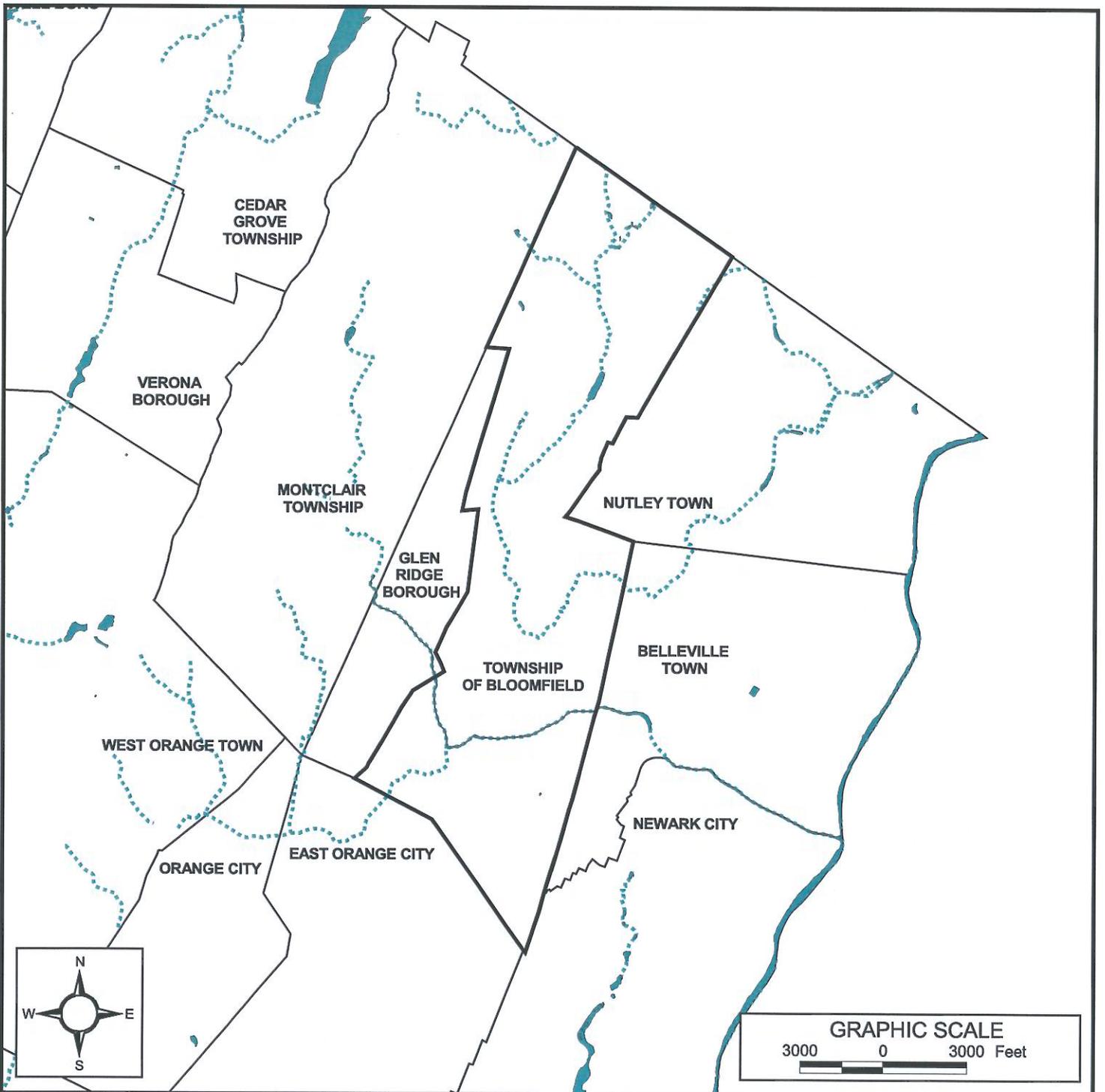
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Figure
4



GROUNDWATER RECHARGE AREAS

LEGEND:

- MUNICIPAL BOUNDARY
- LAKES
- STREAMS

THERE ARE NO MAPPED
GROUNDWATER RECHARGE AREAS
IN THE TOWNSHIP OF BLOOMFIELD

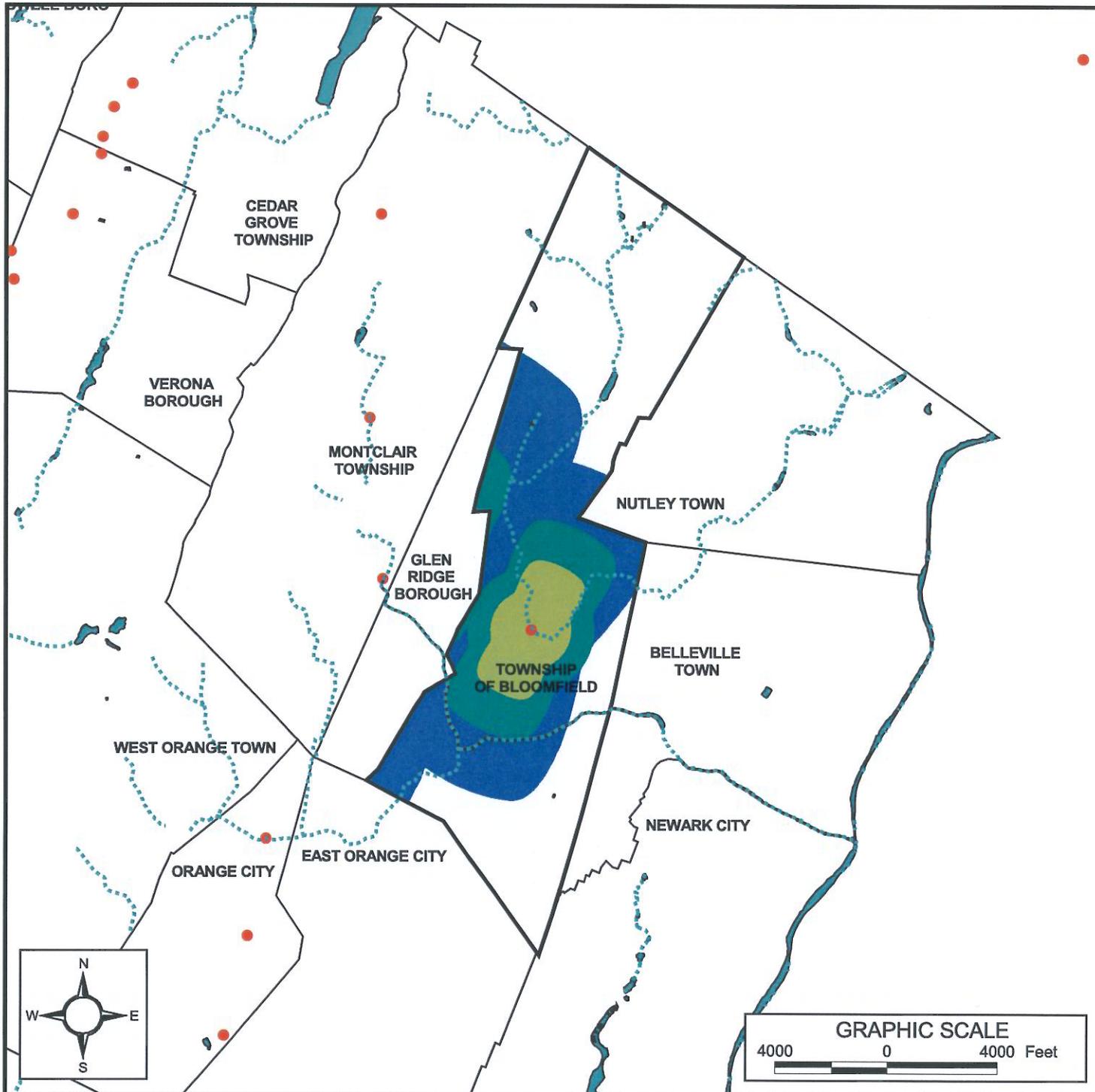
SOURCE:
NJDEP digital GIS data.

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Project No. 051995-03	Figure 5



WELLHEAD PROTECTION AREAS

LEGEND:

-  MUNICIPAL BOUNDARY
-  STREAMS
-  LAKES
-  WELLS
-  TIER 1: (TIME OF TRAVEL = 2 YEARS)
-  TIER 2: (TIME OF TRAVEL = 5 YEARS)
-  TIER 3: (TIME OF TRAVEL = 12 YEARS)

SOURCE:
NJDEP digital GIS data.

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Project No. 051995-03	Figure 6

SECTION 5.0

5.0 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 and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the *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 April 2006.

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

SECTION 6.0

6.0 PLAN CONSISTENCY

There are no Regional Stormwater Management Plans (RSWMPs) being proposed at this time. Additionally, it appears no TMDLs have been developed for the Township's waters; therefore, this MSWMP does not need to be consistent with any RSWMPs or TMDLs. If any RSWMPs or TMDLs are developed in the future, this MSWMP will be updated to be consistent.

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

As stated earlier in Section 4.1.4, State Development and Redevelopment Plan, the entire Township is located in the Metropolitan Planning Area, PA-1.

During construction, Township inspectors will perform periodic inspections of on-site soil erosion and sediment control measures and report any inconsistencies to the Hudson, Essex & Passaic Soil Conservation District.

SECTION 7.0

7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The *2002 Master Plan* and Chapters 130 (Flood Damage Prevention), 225 (Site Plan Review), 230 (Streets and Sidewalks), 234 (Subdivision of Land), 247 (Trees), and 271 (Zoning) of the Township Code were reviewed with regard to incorporating nonstructural stormwater management strategies. Below is a list of recommended revisions to existing ordinances and new strategies that the Township should consider implementing in order to incorporate the NJDEP's nonstructural strategies for stormwater management. It should be noted that the Township is near full development and future development projects may not meet the "major development" criteria. The definition of major development is provided in Section 2 of the Stormwater Control Ordinance provided in Appendix 1. Development and redevelopment projects not meeting the definition of "major development" must comply with the current Township ordinances.

7.1 MASTER PLAN REVIEW

7.1.1 Development of a Greenway Network

Objective 4 under the Parks, Recreation and Open Space section of the *Master Plan* indicates that the Township is interested in the development of a Greenway network along stream corridors linking residential neighborhoods to parks and major activity centers. This objective is consistent with NJDEP recommendations.

7.1.2 Residential Site Improvement Standards (RSIS)

The *Master Plan* includes numerous comments that the State *RSIS* standards should be incorporated into the zoning ordinances to ensure consistency for new residential development. These statements are consistent with NJDEP recommendations, and the zoning ordinance should be updated to reflect the most current State *RSIS* standards.

7.1.3 Conservation Plan Element

Recommendation 1 of the Conservation Plan Element states that the Township should establish a critical areas ordinance to protect natural features (streams, lakes, ponds, floodplains,

wetlands, and steep slopes) and adjacent areas. This recommendation is consistent with NJDEP recommendations and the Township should consider adoption of such an ordinance.

Recommendation 5 of the Conservation Plan Element states that the Township should promote environmentally friendly development through amendments to the Zoning Ordinance including regulations for lot/building coverage, buffers/setbacks and site design including increased landscaping, use of species native to New Jersey and street trees. This recommendation is consistent with NJDEP recommendations and the Township should consider such amendments to the Zoning Ordinance.

Recommendation 8 of the Conservation Plan Element states that the Township should consider amending the Zoning Ordinance to require an Environmental Assessment Report for certain types of intensive development. This recommendation is consistent with NJDEP recommendations and the Township should consider amending the Zoning Ordinance to require said report.

7.2 ORDINANCE REVIEW

7.2.1 Chapter 130: Flood Damage Prevention

Section 130-12 Establishment of Development Permit

Section 130-12 details the information that is required for a development permit application. Since all flood plain and watercourse activities must comply with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*, this section should be amended to require that “proof or statement of compliance with the *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*” be provided as part of the development permit application.

Item B(4) of this Section states that a description of the extent to which any watercourse will be altered or relocated as a result of proposed development must be provided as part of the development permit. Item B(4) is inconsistent with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)* and should be deleted.

Additionally, the ordinance should be amended to state: “The NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)* contains detailed regulations regarding development in and maintenance of the flood plain and the watercourses that create them. All flood plain and watercourse activities must comply with the NJDEP regulations.”

Section 130-14D Alteration of Watercourses

Section 130-14D discusses alteration of watercourses. The ordinance states that when alteration of a watercourse is proposed, the Building Inspector shall:

- 1.) Notify adjacent communities and the New Jersey Department of Environmental Protection and Energy prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration, and,
- 2.) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood-carrying capacity is not diminished.

This section is inconsistent with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*. Therefore, the existing text should be deleted and this section should be amended to state: “Alteration of watercourses is prohibited except where necessary to control existing flooding and or erosion which threatens life or property or in cases in which the New Jersey Department of Environmental Protection (NJDEP) determines that the effects of channelization are offset by the resulting restoration or improvement of the natural characteristics of the nearby environment. Any alteration to a watercourse requires an NJDEP-issued permit.”

Section 130-14E Interpretation of FIRM [Flood Insurance Rate Map] Boundaries

Section 130-14E states that the Building Inspector shall make interpretations where needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions).

This section is inconsistent with State regulations. Therefore, this section should be amended to state: “In areas where there appears to be a conflict between a mapped boundary and actual field conditions, the flood elevation shall be established by a New Jersey Licensed Land Surveyor based on the Flood Insurance Rate Map (FIRM) flood elevations.”

7.2.2 Chapter 225: Site Plan Review

Section 225-11: Site Plan Details

Item D(6) of this section states that site plans must show the location of existing rock outcrops, high points, watercourses, depressions, ponds, marshes, wooded areas, single trees not in wooded areas, with a diameters of six (6) inches or more as measured three (3) feet above the base of the trunk or other significant existing features as determined by survey.

Section 225-12: Principles and standards for site plan review

Item C of this Section encourages preservation of existing natural resources on the site, where feasible, and contribution to the environmental quality of the surrounding properties and neighborhood.

Item M of this section encourages the protection and conservation of soils from erosion by wind or water or from excavation or grading.

Both of these items are consistent with NJDEP recommendations.

7.2.3 Chapter 230: Streets and Sidewalks

Section 230-28: Sidewalk Specifications

This section states that generally, all new sidewalks shall be not less than four (4) feet wide and shall be constructed of concrete, unless the Township Council shall direct or authorize the construction of a flagstone sidewalk. Flagstone sidewalks are also permitted. Language should be added to this section to recommend that sidewalks be graded to discharge to grass areas where possible, and to encourage the use of permeable paving materials where appropriate.

7.2.4 Chapter 234: Subdivision of Land

Section 234-10: Sketch Plat

Item B of this section states that the sketch plat must show all existing structures and wooded areas within the portion to be subdivided and within two hundred (200) feet thereof. In order to

be consistent with NJDEP recommendations, a description of the conditions in the existing vegetated areas should also be provided.

7.2.5 Chapter 247: Trees

Section 247-1: Permit Required to Cut or Prune

Item A of this section states that it shall be unlawful for any person, without a written permit from the Township Engineer, to cut, break or injure any tree or plant or portion of any tree or plant planted or growing in any public highway, parking strip area or park or to cause, authorize or procure any person to cut, break or injure any such tree or plant or any portion thereof within the township.

This section is consistent with the NJDEP recommendations.

7.2.6 Chapter 271: Zoning

Section 271-16: Driveways

Item A of this section states that for one and two family dwellings, the minimum driveway width is eight (8) feet and the maximum driveway width is 10 feet or the width of garage.

The NJDEP recommends minimum driveway widths of nine (9) and eighteen (18) feet for one lane and two lanes, respectively. Therefore, this section is consistent with the NJDEP recommendations. However, language should be added to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Parking Stalls

Several sections of the Township Code states that parking spaces shall be nine (9) feet wide and eighteen (18) feet long with a minimum aisle width of twenty-two (22) feet. Specifically, this ordinance applies to the R-T, C-1, C-2, M-1 and O zones and community shopping centers in the B-2 zone. Section 271-26A states that a required space in all other zones shall be ten (10) feet wide and twenty (20) feet long.

The NJDEP recommends that parking stalls be 9 feet wide by 18 feet long. Therefore, Section 271-26A should be amended to allow the minimum parking stall size to be 9 feet wide by 18 feet long.

Section 271-27 Specific Off-Street Parking Requirements

Section 271-27B(1) states that new and expanded office buildings in the B-1 Central Business Zone must provide off-street parking at the rate of one (1) space for every 400 square feet (SF) of gross floor area (GFA). This rate is equivalent to 2.5 spaces per 1,000 SF of GFA. This rate is consistent with NJDEP recommendations.

Section 271-27B(3) indicates that community shopping centers shall provide a minimum of one (1) parking space for every 200 SF of sales area. This rate is equivalent to five (5) spaces per 1,000 SF of sales area. The Low Impact Development Parking Space Ratios provided by the NJDEP indicate that ratios at shopping centers shall be less than 4.5 spaces per 1,000 SF of GFA. Therefore, the parking ratios should be reduced to meet the Low Impact Development ratios where practical.

Section 271-27C states that office and research buildings in the O, C-1 and C-2 Zones shall provide parking at the rate of at least one (1) parking space for each 300 SF of GFA or two (2) parking spaces for each three (3) employees on the largest shift, whichever is greater. The required parking rate is equivalent to 3.3 spaces per 1,000 SF of GFA. The Low Impact Development Parking Space Ratios provided by the NJDEP indicate that ratios at professional office buildings shall be less than 3.0 spaces per 1,000 square feet (sf) of GFA. The parking ratios should be reduced to meet the Low Impact Development ratios where practical.

Additionally, this section should be amended to allow and encourage the use of multi-level parking decks and shared parking, where practical.

7.3 NEW ORDINANCES

Unconnected Impervious Areas

Disconnection of impervious areas can occur in both low density development and high density commercial development, provided sufficient vegetated area is available to accept dispersed stormwater flows. Areas for disconnection include parking lot or cul-de-sac islands, lawn areas and other vegetated areas.

Applicants should be required to disconnect impervious surfaces, where practical, to promote pollutant removal and groundwater recharge.

Soil Movement

Currently, there is no ordinance regarding soil movement in the Township. Therefore, an ordinance should be created which states that all soil activities must comply with New Jersey's *Soil Erosion and Sediment Control Standards*. During construction, Township inspectors should perform periodic inspection of on-site soil erosion and sediment control measures and report any inconsistencies to the Hudson, Essex & Passaic Soil Conservation District.

Depiction of Existing Conditions

A new ordinance should be adopted which requires that environmentally critical or constrained areas are identified as part of the depiction of existing conditions. Environmentally critical areas are areas or features with significant environmental value, such as steep slopes, stream corridors, natural heritage priority (historic) sites, and habitats of threatened or endangered species. Environmentally constrained areas are those with development restrictions, such as wetlands, floodplains, and sites of endangered species.

Minimization of Turf Grass Lawn Areas

In order to minimize turf grass lawn areas, a new ordinance should be established to discourage enlargement of existing turf lawn areas without proper justification.

Tree Protection

A new ordinance should be created to allow trees to be removed only within 20 feet around the perimeter of any area to be occupied by a building, driveway, drainage field, recreation area (tennis courts, swimming pools or similar facilities). Removal of trees beyond this “footprint” of 20 feet should be restricted.

Parking Areas

Landscaping islands should be required in parking lots. The vegetation shall be beneficial for stormwater quality, groundwater recharge, and/or stormwater quantity but not interfere with driver vision.

Additionally, the use of multi-level, underground or shared parking should be encouraged where practical. Other low-impact development options include the use of pervious paving materials to reduce the amount of impervious cover, or vehicle overhang into a vegetated area to allow for shorter parking stall lengths.

Vegetated Open Channels

The use of vegetated channels, rather than the standard concrete curb and gutter configuration, can decrease flow velocity, and allow for stormwater filtration and re-infiltration.

Section 5.3(b)8 of the *Rules* indicates that nonstructural stormwater management strategies incorporated into site design shall provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas. The Township has no existing ordinances regarding the use of vegetated open channels. Therefore, a new ordinance should be adopted to encourage the use of vegetated open channel conveyance instead of the standard curb and gutter design where practical. One design option is for vegetated channels that convey smaller storm events, and provide an overflow into a storm sewer for larger storm events.

Stormwater Control Ordinance

The Stormwater Control Ordinance, provided in Appendix 1, should be inserted in its entirety.

Wellhead Protection Areas

The Township should consider adoption of a wellhead protection area ordinance to minimize the infiltration of pollutants into aquifers. A sample Wellhead Protection Ordinance is provided in Appendix 2.

SECTION 8.0

8.0 LAND USE / BUILD OUT ANALYSIS

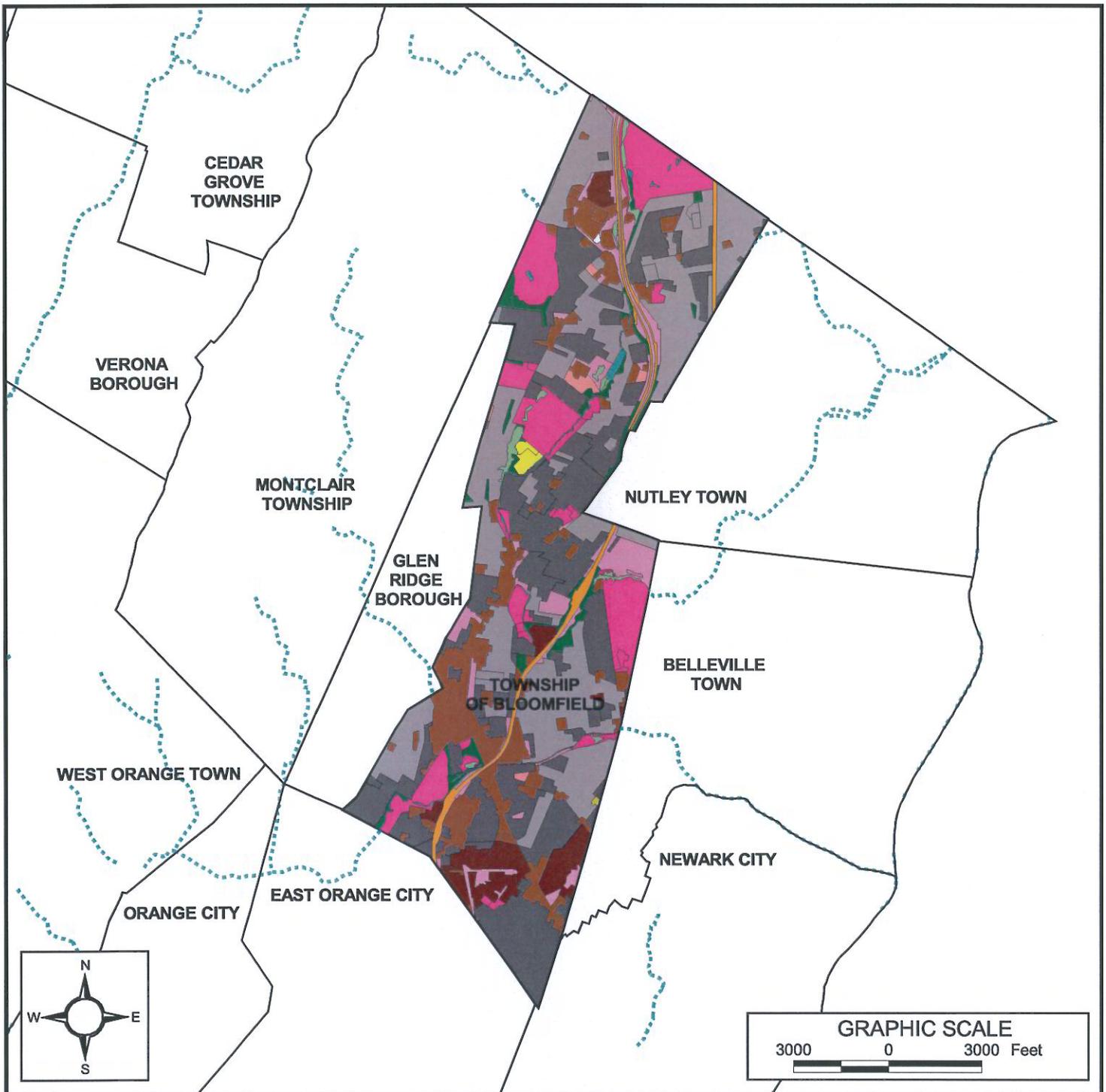
The Township encompasses a 5.33 square mile area. According to the *2002 Master Plan*, the Township is almost fully developed; therefore, a “build-out” analysis is not required.

Figure 7 illustrates the existing land use in the Township based on 1995/97 GIS information from NJDEP. As shown, the Township is primarily comprised of high- and medium-density residential areas with modest commercial areas. The Township has some considerable parcels of recreational land. A Land Use Plan Map can also be obtained from the *2002 Master Plan*.

The Zoning Map currently utilized by the Township is shown in Figure 8.

Wetlands and floodplains are located throughout the Township in the vicinity of the Township’s waterways. These lands are constrained by regulatory development restrictions. Figure 9 illustrates the constrained lands within the Township.

Small development projects not meeting the definition of “major development” must comply with existing ordinances.



EXISTING LAND USE MAP

LEGEND:

- ATHLETIC FIELDS (SCHOOLS)
- COMMERCIAL/SERVICES
- FORESTED AREAS
- INDUSTRIAL
- MIXED URBAN OR BUILT-UP LAND
- OTHER URBAN OR BUILT-UP LAND
- RECREATIONAL LAND
- RESIDENTIAL, HIGH DENSITY, MULTIPLE DWELLING
- RESIDENTIAL, RURAL, SINGLE UNIT
- RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
- TRANSITIONAL AREAS
- TRANSPORTATION/COMMUNICATIONS/UTILITIES
- WATERBODIES
- WETLAND AREAS

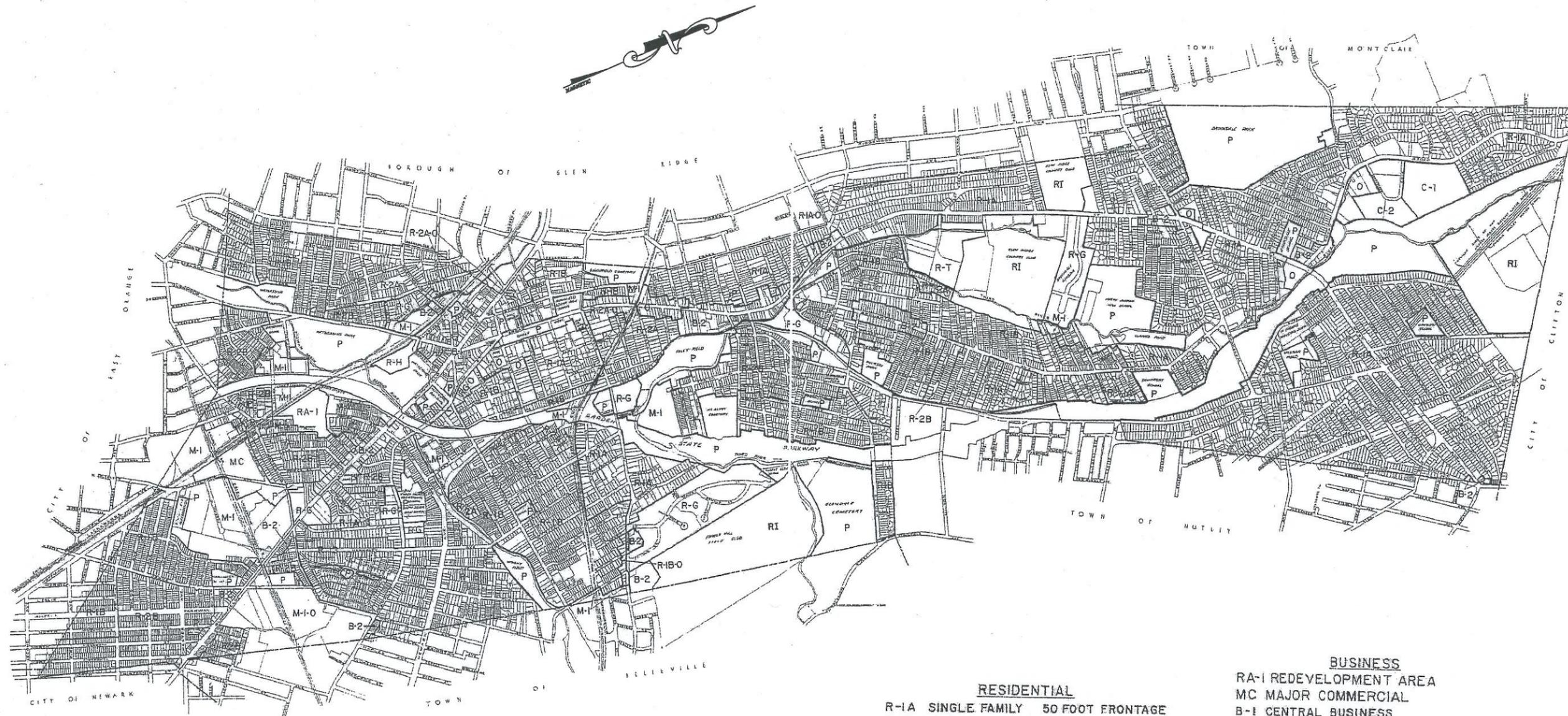
SOURCE:
NJDEP digital GIS data.

TOWNSHIP OF BLOOMFIELD MUNICIPAL PLAZA ESSEX COUNTY, NEW JERSEY



65 Jackson Drive, Cranford, New Jersey 07016
(908) 497-8900 * Fax: (908) 497-8945 * www.pmkgroup.com
CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 7/7/05
Checked By: DS	Scale: As Noted
Project No. 051995-03	Figure 7



- RESIDENTIAL**
- R-1A SINGLE FAMILY 50 FOOT FRONTAGE
 - R-1B SINGLE FAMILY 40 FOOT FRONTAGE
 - R-2A TWO FAMILY 50 FOOT FRONTAGE
 - R-2B TWO FAMILY 40 FOOT FRONTAGE
 - R-G GARDEN APARTMENT
 - R-H HIGH RISE APARTMENT
 - R-T RESIDENTIAL TOWNHOUSE
 - R-C RESIDENTIAL CONVERSION

- BUSINESS**
- RA-1 REDEVELOPMENT AREA
 - MC MAJOR COMMERCIAL
 - B-1 CENTRAL BUSINESS
 - B-2 NEIGHBORHOOD BUSINESS
 - C-1 OFFICE AND RESEARCH 15 ACRE LOTS
 - C-2 OFFICE AND RESEARCH 3.5 ACRE LOTS
 - O OFFICE
 - RI RECREATIONAL AND INSTITUTIONAL
- INDUSTRIAL**
- M-1 GENERAL INDUSTRIAL

- PUBLIC**
- P PUBLIC USES



SCALE: 1 INCH = 2000 FEET

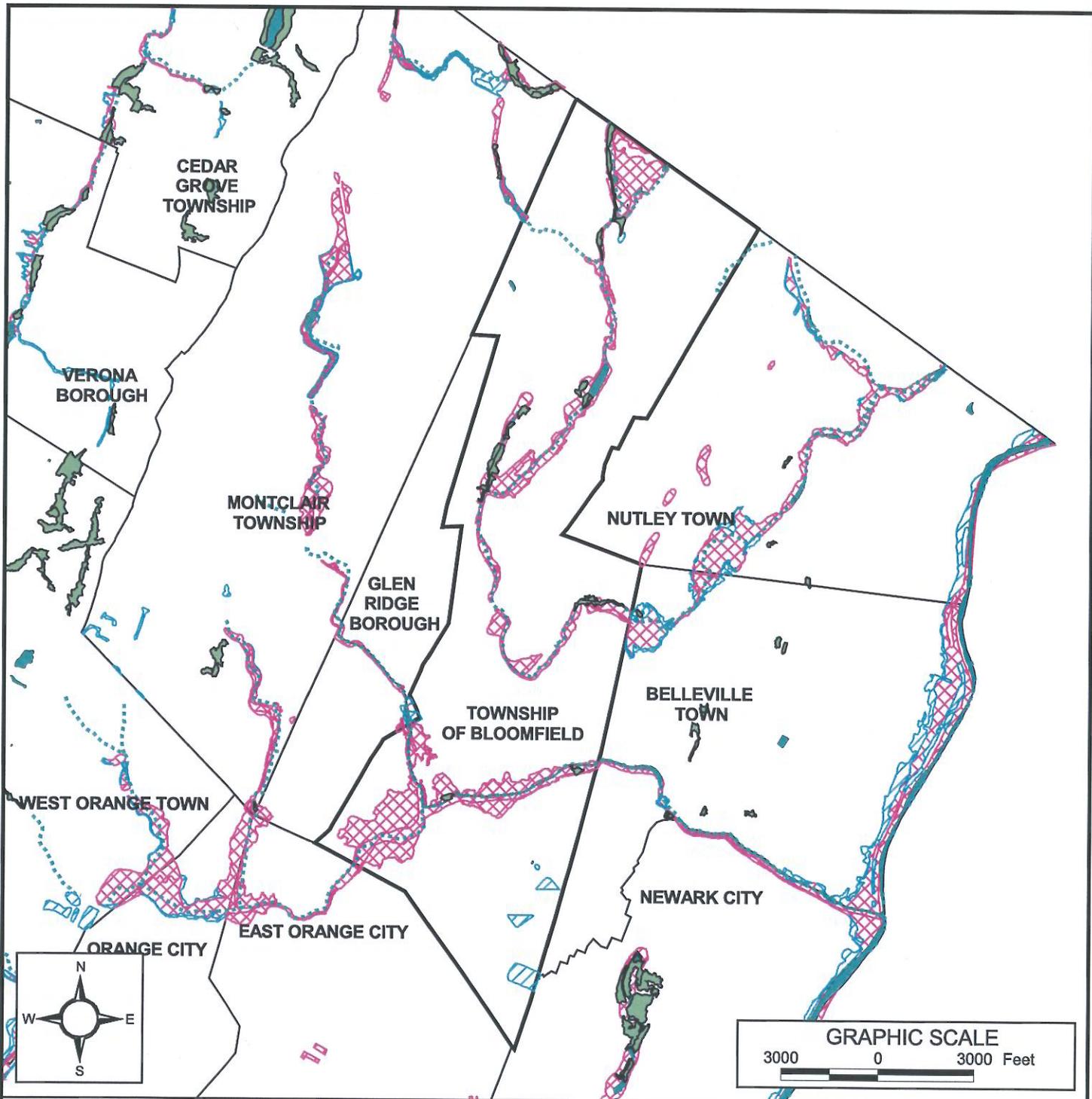
SOURCE: TOWNSHIP OF BLOOMFIELD ORDINANCE,
DATED: JULY 9, 1979 ADOPTED : AUGUST 13, 1979.

ZONING MAP

TOWNSHIP OF BLOOMFIELD
MUNICIPAL PLAZA
ESSEX COUNTY, NEW JERSEY

PMK Group
CONSULTING & ENVIRONMENTAL ENGINEERS
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CERTIFICATE OF AUTHORIZATION #24GA28028000

DRAWN BY: TS	DATE: 7/7/05
CHECKED BY: DS	SCALE: 1" = 2000'
PROJECT NO: 051995-03	FIGURE: 8



CONSTRAINED LAND MAP

LEGEND:

- MUNICIPAL BOUNDARY
- LAKES
- STREAMS
- WETLANDS
- 100 YEAR FLOOD PLAIN
- 500 YEAR FLOOD PLAIN

SOURCE:
NJDEP digital GIS data.

TOWNSHIP OF BLOOMFIELD MUNICIPAL PLAZA ESSEX COUNTY, NEW JERSEY



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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 7/7/05
Checked By: DS	Scale: As Noted
Project No. 051995-03	Figure 9

SECTION 9.0

9.0 MITIGATION PLANS

This mitigation plan is provided for a proposed development or redevelopment projects that seek a variance or exemption from the Township Stormwater Management Plan or the *Rules*. Approval of the option to utilize a mitigation plan and choice of mitigation plan shall be under the sole discretion of the Township agency providing review, i.e. Board of Adjustment, Planning Board, Township Council and the Township Engineer.

Any relief from this MSWMP or the *Rules* via a mitigation plan option shall utilize an option to provide equal or greater, quantifiable benefit than the specific relief being sought. For example, if a relief for stormwater quality is sought for a particular project, the necessary amount of stormwater quality improvements shall be accomplished via the mitigation plan. Calculations shall be provided indicating the parameter of relief being sought along with equal or greater benefit via the mitigation plan option. These calculations shall be reviewed and approved by the Township Engineer before being approved by the appropriate reviewing authority.

In general, the mitigation project must be implemented in the same drainage area as the proposed development. The applicant must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP *Stormwater BMP Manual*.

If a suitable site cannot be located in the same drainage area as the proposed development, a mitigation project may be recommended that is not within the same drainage area but does provide an equal relief.

As a third option, in the case of mitigation plan options that do not address the variance or relief sought, the applicant may create a new mitigation option or provide a cash contribution to the Township of Bloomfield which will be used by the Township for Township-wide drainage improvements and stormwater management improvement planning. The amount of the contribution shall be based on the relief being sought, the applicant's opinion on the cost impacts to meet this Plan and the *Rules*, and the discretion of the Township agency providing review, i.e. Board of Adjustment, Planning Board, Township Council and the Township Engineer.

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. The applicant will also be responsible for any State, Federal, County or local approvals required to implement the mitigation project. More detailed information on the projects can be obtained from the Township Engineer. A current list of mitigation projects shall be maintained by the Township Engineer. Listed below are specific projects that may be used to address the mitigation requirement.

1. Retrofit and rehabilitate storm sewer inlets within the drainage sub-basin of the proposed development. The number of inlets to be retrofitted will be determined by the Township Engineer based upon the size or acreage of the proposed development.
2. Perform slope stabilization along a designated stream or drainage ditch within the Township. The location of the proposed slope stabilization will be determined by the Township Engineer based upon the size or acreage of the proposed development. Mitigation plan should include the acquisition of all required environmental permits or a cash contribution toward the cost of obtaining said permits.
3. Reconstruct or rehabilitate a municipal parking facility to the following standards:
 - a. Reduce the amount of impervious area through the introduction of landscaped areas.
 - b. Introduce or install stormwater quality structures such as grassed channels, sand filters, etc.
 - c. Reduce the peak amount of stormwater runoff from the parking facility to those prescribed within the stormwater management plan.
 - d. Provide any other improvement to meet the standards of the stormwater management plan subject to review and approval by the Township Engineer.

The location and size of the project will be specified by the Township Engineer.

4. Perform slope stabilization along areas of steep slopes within the Township that are subject to erosion due to stormwater runoff.
5. Perform storm drainage improvements to alleviate flooding. A list of such projects is on file with the Township Engineer. The size and scope of these projects will be based upon the size and acreage of the proposed development.

APPENDIX 1
STORMWATER CONTROL ORDINANCE

APPENDIX 1: Stormwater Control Ordinance

Section 1: Scope and 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 strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- B. **Purpose**
It is the purpose of this ordinance to establish proper stormwater management requirements and controls for "major development," as defined in Section 2.
- C. **Applicability**
1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
 - a. Non-residential major developments; and
 - b. Aspects of residential major developments that are not preempted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
 2. This ordinance shall also be applicable to all major developments undertaken by the Township of Bloomfield.
- D. **Compatibility with Other Permit and Ordinance Requirements**
Development approvals issued for subdivisions and site plans 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: 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. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

“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, by any person, 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 (SADC), 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 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 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.

“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, The Township of Bloomfield, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

“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, ice 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 (PA1)” 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, or conveyed by snow removal equipment.

“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.

Section 3: 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 Section 4. To the maximum extent practicable, 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.

Section 4: 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 in accordance with Section 10.
- 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 muhlenbergi* (bog turtle).

- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.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 of Sections 4.F and 4.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 4.F and 4.G to the maximum extent practicable;
 3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.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 the requirements of Sections 4.F and 4.G that were not achievable on-site.
- E. Nonstructural Stormwater Management Strategies
1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.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 Paragraph 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 strategies 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. Such source controls include, but are not limited to:
 - (1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;
 - (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. Site design features identified under Section 4.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 4.E.3.c below.
- a. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - (1) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
 - (2) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or

is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

- b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.
 - c. This standard does not apply:
 - (1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;
 - (2) Where flows from the water quality design storm as specified in Section 4.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - (a) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or
 - (b) A bar screen having a bar spacing of 0.5 inches.
 - (3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or
 - (4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.
4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.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.
 5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices

Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

- F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards
1. This subsection 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 5, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent 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 to 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 5, complete one of the following:

- (1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 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 two, 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 2 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 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. 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 percent 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

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Infiltration Structure	40-60
Extended Detention Basin	80
Manufactured Treatment Device	See Section 6.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 percent 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 4.F and 4.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 7.
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 area. 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 percent TSS post-construction removal rate;
 - (3) Temperature shall be addressed to ensure no impact on the 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 4.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. Paragraph G.8 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 February 2, 2004, provided that the construction begins on or before February 2, 2009.

Section 5: 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 5.A.1.a and the Rational and Modified Rational Methods at Section 5.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 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 6: 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 8.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 8.
- 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 Section 4 of this ordinance.
- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 7: 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, New Jersey 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 8: 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 section applies to any new stormwater management basin.
Note to the Applicant: The provisions of this section are not intended to preempt more stringent municipal or County safety requirements for new or existing stormwater management basins. 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 Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.
- B. 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 paragraph 3, 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:

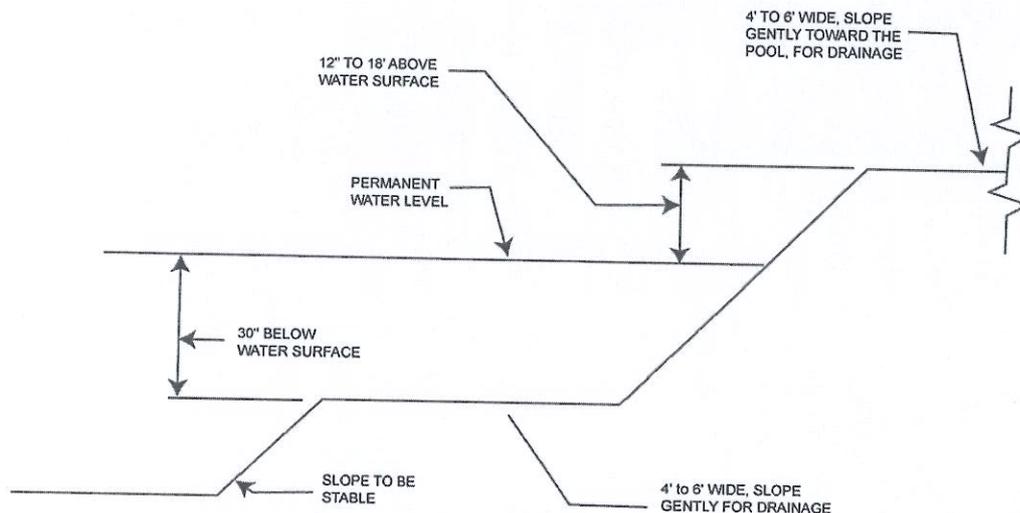
- a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a free-standing outlet structure may be exempted from this requirement.
- b. Safety ledges shall be 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 8.D 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.

C. 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.

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

Depicted is an elevational view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

Section 9: 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 Section 9.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 9.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 of 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 One 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 3 through 6 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 4 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 soils 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 10.
8. Waiver from Submission Requirements
The municipal official or board reviewing an application under this ordinance may, in consultation with the Township Engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.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 10: Maintenance and Repair

- A. Applicability
 1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.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 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.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 10.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 10.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 10.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 10.B.6 and 10.B.7 above.
 9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
 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 or repair, 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. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.
 11. A two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53 shall be posted for the maintenance of the stormwater facilities.

12. 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.)
- 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.

Section 11: Penalties

Any person who shall violate the provisions of this ordinance shall, upon conviction, suffer and pay the penalty as per the schedule set forth in the Municipal Ordinances of the Township of Bloomfield and/or State Statute.

Section 12: Effective Date

This ordinance shall take effect immediately upon the approval by the County review agency, or sixty (60) days from the receipt of the ordinance by the County review agency if the County review agency should fail to act.

Section 13: Severability

If the provisions of any 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 section, subsection, paragraph, subdivision, or clause of this ordinance.

APPENDIX 2

SAMPLE MUNICIPAL WELLHEAD PROTECTION ORDINANCE

Appendix 2: Sample Municipal Well Head Protection Ordinance

The purpose of this Ordinance is to protect the public health, safety and welfare through the protection of the ground water resources underlying the municipality, and to ensure a supply of safe and healthful drinking water for the present and future generations of local residents, employees and the general public in this municipality, as well as users of these water supplies outside this municipality. Areas of land surrounding each public community well, known as Well Head Protection Areas (WHPAs), from which contaminants may move through the ground to be withdrawn in water taken from the well, have been delineated. Through regulation of land use, physical facilities and other activities within these areas, the potential for ground water contamination can be reduced. The purpose of the regulations contained in this ordinance is to prevent the migration of potential pollutants from areas within a WHPA into ground water that is withdrawn from a public community well.

Any applicant for a permit requesting a change in land use or activity which is subject to review under the provisions of the Municipal Land Use Law and other pertinent regulations, which is located within a delineated WHPA, and which involves a Potential Pollutant Source (PPS) shall comply with the requirements of this ordinance. This ordinance requires the following:

- Any change in land use or activity that introduces a Major or Minor PPS shall be prohibited within a Tier 1 WHPA.
- Any change in land use or activity that introduces a Major PPS shall be prohibited within a Tier 2 WHPA.
- Any change in land use or activity that involves any PPS within any WHPA, that is not prohibited, shall comply with Best Management Practice Standards. This ordinance applies to future activities, not existing uses.

Section I. Statement of Findings

Section II. Purpose

Section III. Statutory Authority

Section IV. Definitions

Section V. Establishment of Well Head Protection Areas and Maps

Section VI. Regulation of Well Head Protection Areas for Public Community Wells

Section VII. Potential Pollutant Sources Listed

Section VIII. Best Management Practice Performance Standard

Section IX. Operations and Contingency Plan

Section X. Enforcement

Section XI. Severability

Section XII. Effective Date

Appendix A. Types of Facilities that are Major Potential Pollutant Sources

Appendix B. New Jersey Department of Environmental Protection Delineations of Well Head Protection Areas around Public Community Water Supply Wells

SECTION I. STATEMENT OF FINDINGS

The governing body of [municipality] finds that:

- A. The ground water underlying this municipality is a major source of existing and future water supplies, including drinking water. The ground water underlying this municipality lies within the Buried Valley Aquifer Systems of the Central Passaic River Basin, which are designated

as a "sole source" aquifer under Section 1424(e) of the federal Safe Drinking Water Act of 1974.

- B. The ground water aquifers are integrally connected with, are recharged by, and flow into the surface waters, lakes and streams, which also constitute a major source of water for drinking, commercial and industrial needs.
- C. Accidental spills and discharges of toxic and hazardous materials may threaten the quality of these ground water supplies and related water sources.
- D. Contaminated water from any source is a detriment to the health, welfare and comfort of the residents of this municipality, and other users of these water resources.
- E. Spills or discharges of hazardous substances or hazardous wastes may contaminate or pollute water. As a preventive measure, the proximity of such materials to sources of water supplies, such as public community wells, should be restricted so that there will be sufficient time to find and clean up such spills or discharges before water supplies become contaminated.

SECTION II. PURPOSE

The purpose of this Ordinance is to protect the public health, safety and welfare through the protection of the ground water resources underlying the municipality to ensure a supply of safe and healthful drinking water for the present and future generations of local residents, employees and the general public in this municipality, as well as users of these water supplies outside this municipality. Areas of land surrounding each public community well, known as Well Head Protection Areas (WHPAs), from which contaminants may move through the ground to be withdrawn in water taken from the well, have been delineated. Through regulation of land use, physical facilities and other activities within these areas, the potential for ground water contamination can be reduced. The purpose of the regulations contained in this ordinance is to prevent the migration of potential pollutants from areas within a WHPA into ground water that is withdrawn from a public community well.

SECTION III. STATUTORY AUTHORITY

The municipality of [municipality] is empowered to regulate these activities under the provisions of the New Jersey Municipal Land Use Law, N.J.S.A 40:55D-1 *et seq.*, which authorizes each municipality to plan and regulate land use to secure a safe and adequate drinking water supply for its residents. The Board of Health of this municipality has autonomous power granted by the State Legislature to develop this Ordinance to protect public health, safety and welfare, as set forth in the New Jersey Local Boards of Health Law, N.J.S.A. 26:3-1 *et seq.*, and the New Jersey County Environmental Health Act, N.J.S.A. 26:3A2-21 *et seq.*

SECTION IV. DEFINITIONS

Administrative Authority-- The Planning Board or Board of Adjustment and the Board of Health, acting jointly and in consultation, with all of the powers delegated, assigned, or assumed by them according to statute or ordinance.

Applicant-- Person applying to the Board of Health, Planning Board, Board of Adjustment or the Construction Office proposing to engage in an activity that is regulated by the provisions of this ordinance, and that would be located within a regulated Well Head Protection Area.

Aquifer-- A formation, group of formations, or part of a formation that contains sufficient saturated permeable rock, sand, or gravel which is capable of storing and transmitting usable quantities of water to wells and springs.

Best Management Practices (BMP) -- These are performance or design standards established to minimize the risk of contaminating ground water or surface waters while managing the use, manufacture, handling or storage of hazardous substances or hazardous wastes.

Contamination-- The presence of any harmful or deleterious substances in the water supply.

Development-- The carrying out of any construction, reconstruction, alteration of surface or structure or change of land use or intensity of use.

Discharge-- Any intentional or unintentional action or omission, unless pursuant to and in compliance with the conditions of a valid and effective Federal or State Permit, resulting in the releasing, spilling, pumping, pouring, emitting, emptying or dumping of a hazardous substance into the waters or lands of the State or into waters outside the jurisdiction of the State when damage may result to the lands, waters or natural resources within the jurisdiction of the State.

Ground Water-- Water contained in interconnected pores of a saturated zone in the ground, also known as well water. A saturated zone is a volume of ground in which the voids in the rock or soil are filled with water at a pressure greater than atmospheric.

Hazardous Substance-- Any substance designated under 40 CFR 116 pursuant to Section 311 of the Federal Act, the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 *et seq.*, or Section 4 of the State Act. Substances listed include petroleum, petroleum products, pesticides, solvents and other substances.

Hazardous Waste-- Any solid waste that is defined or identified as a hazardous waste pursuant to the Solid Waste Management Act, N.J.S.A. 13:1E *et seq.*, N.J.A.C. 7:26-8, or 40 CFR Part 261.

Maximum Contaminant Level-- Maximum permissible level of a contaminant in water which is delivered to any user of a Public Community Water System.

NJDEP-- New Jersey Department of Environmental Protection.

Person-- Any individual, public or private corporation, company, partnership, firm, association, owner or operator, political subdivision of this State, and any state, Federal or interstate agency or an agent or employee thereof.

Polluted Water-- In the content of drinking water, water is polluted when a pollutant is present in excess of a maximum contaminant level or bacteriological limit established by law or regulation.

Potential Pollutant Source (PPS)-- Activity or land use which may be a source of a pollutant that has the potential to move into ground water withdrawn from a well. For the purposes of this ordinance Potential Pollutant Sources are defined in Section VII.

PPS-- Potential Pollutant Source

Public Community Well-- A public water supply well which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

SIC-- Standard Industrial Classification.

Sole Source Aquifer-- Any drinking water aquifer upon which more than 50% of a population group depends and for which there is no practicable or affordable alternate water supply, as certified by the United States Environmental Protection Agency.

Time of Travel (TOT)-- The average time that a volume of water will take to travel in the saturated zone from a given point to a pumping well.

Tier 1 Well Head Protection Area-- That area of land within a WHPA from which ground water may enter the well within 2 years. (See maps referenced under Section V.)

Tier 2 Well Head Protection Area-- That area of land within a WHPA from which ground water may enter the well within 5 years. (See maps referenced under Section V.)

Tier 3 Well Head Protection Area-- That area of land within a WHPA from which ground water may enter the well within 12 years. (See maps referenced under Section V.)

Well Head-- The well borehole and appurtenant equipment.

Well Head Protection Area (WHPA)-- An area described in plan view around a well, from which ground water flows to the well and ground water pollution, if it occurs, may pose a significant threat to the quality of water withdrawn from the well.

WHPA-- Well Head Protection Area.

SECTION V. ESTABLISHMENT OF WELL HEAD PROTECTION AREAS AND MAPS

A. Well Head Protection Area Maps:

- 1) The delineations of Well Head Protection Areas for public community wells, which were published by the New Jersey Geological Survey of the New Jersey Department of Environmental Protection, are incorporated herein and made a part of this Ordinance. They are designated as follows: New Jersey Well Head Protection Areas, Edition 2, Geospatial Data Presentation, New Jersey Digital Data Series, DGS02-2, dated 18 June 2002. A description of these data, which has been excerpted from these materials, is appended as Appendix B. A map of the Well Head Protection Areas located within [municipality] is included as part of this Ordinance, is appended as Figure [?], and is adopted as of [date]. Maps of the municipality on which these delineations have been overlain shall be on file and maintained by the offices of the Clerk of [municipality], and of the Board of Health of [municipality].
- 2) Well Head Protection Areas, as shown on the maps described in Section V.A(1), shall be considered to be superimposed over any other established zoning district. Land in a Well Head Protection Area may be used for any purpose permitted in the underlying district, subject to the additional restriction presented herein.

B. Assignment of Restriction within Well Head Protection Areas:

Properties located wholly or partially within a Well Head Protection Area shall be governed by the restrictions applicable to the Well Head Protection Area.

C. Inclusion of Well Head Protection Area Zoning into Master Plan:

The municipal Master Plan provides the legal basis for zoning and land use regulation at the local level. The technical foundation for local well head protection in this municipality should be incorporated into the Master Plan. A technical report on the need for well head protection in [municipality] may be adopted as part of the Master Plan (N.J.S.A 40:55D-28b(11)). The technical report should include the following information:

- 1) A statement setting forth the rationale and need to protect the public water supply through a program of well head protection for public community wells.
- 2) Reference to the method used to delineate the Well Head Protection Areas (WHPAs) according to the "tiered" level of protection for public community wells based upon the time of travel (TOT) of ground water, as developed by the New Jersey Geological Survey.

SECTION VI. REGULATION OF WELL HEAD PROTECTION AREAS FOR PUBLIC COMMUNITY WELLS

- A. The Administrative Authority for administering the provisions of this Ordinance shall be the Planning Board or Board of Adjustment and the Board of Health of [municipality] acting jointly and in consultation.
- B. Any applicant for a permit requesting a change in land use or activity, which is subject to review under the provisions of the Municipal Land Use Law and other pertinent regulations of [municipality], [code references], and which is located within a delineated WHPA, as defined in Section V, that involves a Potential Pollutant Source (PPS), as defined in Section VII, shall comply with the requirements of this ordinance.
- C. Any applicant for a permit requesting a change in land use or activity, which is subject to the requirements of this ordinance, shall file an Operations and Contingency Plan, as required by Section IX, with the Administrative Authority. No permit that allows a change in land use or activity, which is subject to the requirements of this ordinance, shall be granted unless an Operations and Contingency Plan for the proposed change has been approved by the Administrative Authority. Any plan approved by the Administrative Authority shall be kept on file in the office of the [office] of [municipality], and shall be available to the public for inspection.
- D. Any change in land use or activity that introduces a Major or Minor Potential Pollutant Source (PPS), as defined in Section VII, shall be prohibited within a Tier 1 WHPA.
- E. Any change in land use or activity that introduces a Major PPS, as defined in Section VII, shall be prohibited within a Tier 2 WHPA.
- F. Any change in land use or activity that involves any PPS, as defined in Section VII, within any WHPA, that is not prohibited pursuant to Section VI.D. or VI.E., shall comply with the Best Management Practice Standards, as defined in Section IX.
- G. This Ordinance is supplementary to other laws and Ordinances in this municipality. Where this Ordinance or any portion thereof imposes a greater restriction than is imposed by other regulations, the provisions of this Ordinance shall supersede. These Rules and Regulations shall in no way effect the limitations or requirements applicable in the underlying municipal land use and zoning districts.

SECTION VII. POTENTIAL POLLUTANT SOURCES LISTED

The following are Major and Minor Potential Pollutant Sources (PPS) subject to the requirements of this Ordinance. This listing is consistent with the New Jersey Safe Drinking Water Act, N.J.A.C. 7:10-11.7 through 12.12.

A. Major PPSs include:

- 1) Permanent storage or disposal of hazardous wastes, industrial or municipal sludge or radioactive materials, including solid waste landfills.
- 2) Collection and transfer facilities for hazardous wastes, solid wastes that contain hazardous materials, and radioactive materials.
- 3) Any use or activity requiring the underground storage of a hazardous substance or waste in excess of an aggregate total of 50 gallons.
- 4) Underground fuel and chemical storage and oil tanks regulated by NJDEP under provisions of the Underground Storage of Hazardous Substances Act (N.J.S.A. 58:10A-21 et seq.).
- 5) Above-ground storage facility for a hazardous substance or waste with a cumulative capacity greater than 2,000 gallons.
- 6) Any industrial treatment facility lagoon.
- 7) Any facility with a SIC Code number included under the New Jersey Safe Drinking Water Act Regulations at N.J.A.C 7:10A-1.14, Table II(N), with a toxicity number of II or greater. (See Appendix A.)
- 8) Automotive service center (repair & maintenance).
- 9) Landfill.
- 10) Dry cleaning facility.
- 11) Road salt storage facility.
- 12) Cemetery.
- 13) Highway maintenance yard.
- 14) Truck, bus, locomotive maintenance yard.
- 15) Site for storage and maintenance of heavy construction equipment and materials.
- 16) Site for storage and maintenance of equipment and materials for landscaping.
- 17) Livestock operation.
- 18) Quarrying and/or mining facility.
- 19) Asphalt and/or concrete manufacturing facility.
- 20) Junkyard/auto recycling and scrap metal facility.
- 21) Residential or agricultural motor fuel in NJDEP exempted underground storage tanks (i.e., under 1,000 gallons).

B. Minor PPSs include:

- 1) Underground storage of hazardous substance or waste of less than 50 gallons.
- 2) Underground heating oil storage tank with a capacity of less than 2,000 gallons.
- 3) Sewage treatment facility.
- 4) Sanitary sewer system, including sewer line, manhole, or pump station. (See conditions in Section VII.C.)
- 5) Industrial waste line. (See conditions in Section VII.C.)
- 6) Septic leaching field.
- 7) Facility requiring a ground water discharge permit issued by the NJDEP pursuant to N.J.A.C 7:14A et seq.
- 8) Stormwater retention-recharge basin.
- 9) Dry well. (See conditions in Section VII.C.)
- 10) Storm water line. (See conditions in Section VII.C.)
- 11) Waste oil collection, storage and recycling facility.
- 12) Agricultural chemical bulk storage and mixing or loading facility including crop dusting facilities.

- 13) Above-ground storage of hazardous substance or waste in quantities of less than 2,000 gallons.

C. Conditions:

- 1) Sanitary sewer lines, industrial waste lines and storm water lines may be located no closer than 100 feet to a regulated well, and only if they are constructed of watertight construction (that is steel, reinforced concrete, cast iron, PVC or other suitable material).
- 2) Manhole and/or connections to a sanitary sewer system are prohibited within 100 feet of a regulated well.
- 3) Dry wells dedicated to roof runoff and serving residential properties or commercial or industrial properties with SIC codes not listed in Appendix A may be located no closer than 100 feet to a regulated well.

SECTION VIII. BEST MANAGEMENT PRACTICE PERFORMANCE STANDARD

Any applicant proposing any change in land use or activity that involves any PPS, as defined in Section VII, that would be located either wholly or partially within any WHPA shall comply with and operate in a manner consistent with the following Best Management Practices:

- A. All portions or areas of a facility in which hazardous substances or hazardous wastes are stored, processed, manufactured or transferred outdoors, shall be designed so that the discharges of hazardous substances will be prevented from overflowing, draining, or leaching into the ground water or surface waters.
- B. Outdoor storage, dispensing, loading, manufacturing or processing areas of hazardous substances or hazardous wastes must be protected from precipitation, stormwater flows or flooding.
- C. Wherever hazardous substances are stored, processed, manufactured or transferred outdoors, the design features shall include secondary containment and/or diversionary structures which may include but not be limited to:
 - 1) Containers, dikes, berms or retaining walls sufficiently impermeable to contain spilled hazardous substances, for the duration of a spill event.
 - 2) Curbing.
 - 3) Gutter, culverts and other drainage systems.
 - 4) Weirs, booms and other barriers.
 - 5) Lined diversion ponds, lined lagoons and lined retention basins, holding tanks, sumps, slop tanks and other collecting systems.
 - 6) Drip pans.
- D. Secondary containment and/or diversionary systems, structure or equipment must meet the following standards:
 - 1) The system must block all routes by which spilled hazardous substances could be expected to flow, migrate, or escape into the ground water or surface waters.
 - 2) The system must have sufficient capacity to contain or divert the largest probable single discharge that could occur within the containment area, plus an additional capacity to compensate for any anticipated normal accumulation of rainwater.
 - 3) In order to prevent the discharge of hazardous substances into ground water, all components of the system shall be made of or lined with impermeable materials sufficient to contain the substance for the duration of a spill event. Such material or liner must be maintained in an impermeable condition.
 - 4) No manufacturing area, processing area, transfer area, dike storage area, or other storage area, or secondary containment/diversion system appurtenant thereto shall drain

into a watercourse, or into a ditch, sewer, pipe or storm drain that leads directly or indirectly into a surface or subsurface disposal area, unless provision has been made to intercept and treat any spilled hazardous substances in an NJDEP approved industrial wastewater treatment or pre-treatment facility, or other NJDEP approved facility.

- 5) Catchment basins, lagoons and other containment areas that may contain hazardous substances should not be located in a manner that would subject them to flooding by natural waterways.
- E. Stormwater shall be managed so as to prevent contamination of ground water, and so as to be in accordance with applicable laws and regulations of the State of New Jersey, and of [municipality].

SECTION IX. OPERATIONS AND CONTINGENCY PLAN

- A. Any applicant proposing any change in land use or activity that involves any PPS, as defined in Section VII, that would be located either wholly or partially within any WHPA shall submit an Operations and Contingency Plan to the Administrative Authority. This Operations and Contingency Plan shall inform the Administrative Authority about the following aspects of the proposal:
- 1) Types of PPS proposed for the site;
 - 2) Types and quantities of hazardous substances or hazardous wastes that may be used or stored on site;
 - 3) Means to be employed to contain or restrict the spillage or migration of hazardous substances or hazardous wastes from the site into ground water;
 - 4) Means to be used to contain or remediate accidental spillage of such materials;
 - 5) Means to notify administrative authority about any accidental spillage of such materials;
 - 6) Demonstration that the proposed use and/or activity would employ, to the maximum extent possible, best management practices as set forth in Section VIII, to protect ground water quality in the WHPA and minimize the risk of potential ground water contamination.
- B. The Administrative Authority shall review, and shall approve or reject any Operations and Contingency Plan prior to approving or denying the application for a land use change or activity.
- C. Any Operations and Contingency Plan submitted shall be available for public review and comment.

SECTION X. ENFORCEMENT

A prompt investigation shall be made by the appropriate personnel of the Health Department of [municipality], of any person or entity believed to be in violation hereof. If, upon inspection, a condition which is in violation of this Ordinance is discovered, a civil action in the Special Part of the Superior Court, or in the Superior Court, if the primary relief sought is injunctive or if penalties may exceed the jurisdictional limit of the Special Civil Part, by the filing and serving of appropriate process. Nothing in this Ordinance shall be construed to preclude a municipality's right, pursuant to N.J.S.A 26:3A-25, to initiate legal proceedings hereunder in Municipal Court. The violation of any section or subsection of this Ordinance shall constitute a separate and distinct offense independent of the violation of any other section or subsection, or of any order issued pursuant to this Ordinance. Each day a violation continues shall be considered a separate offense.

SECTION XI. SEVERABILITY

If any section, sentence, clause or phrase of this Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holdings shall in no way affect the validity of the remaining portions of this Ordinance.

SECTION XII. EFFECTIVE DATE

This Ordinance shall take effect upon final adoption and publication in accordance with the law on [date].

Appendix A

See N.J.A.C. 7:10A-1.14, Table II(N).

Appendix B

New Jersey Department of Environmental Protection (NJDEP) Delineations of Well Head Protection Areas (WHPAs) around Public Community Water Supply Wells

Excerpts from:

New Jersey Geological Survey, New Jersey Department of Environmental Protection, New Jersey Public Community Water Supply Well Head Protection Areas, Edition 2, Geospatial Data Presentation, New Jersey Digital Data Series, DGS02-2, dated 18 June 2002.

Description of WHPAs: A Well Head Protection Area (WHPA) is an area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of groundwater captured by a well pumping at a specific rate over two-, five-, and twelve-year periods of time. The area of capture is defined using line boundaries and polygon areas generated with the ARC/INFO Geographic Information System (GIS). GIS coverages are produced for each PCWS well and for the set of all PCWS wells in a county using the ARC/INFO UNION command on individual coverages. WHPA delineation methods are described in "Guidelines for Delineation of Well Head Protection Areas in New Jersey (<<http://www.state.nj.us/dep/njgs/whpaguide.pdf>>). An ARC/INFO point coverage of associated PCWS wells is available as N.J. Geological Survey Digital Geodata Series DGS97-1 (<<http://www.state.nj.us/dep/njgs/geodata/dgs97-1.htm>>).

Internet Address:

<<http://www.state.nj.us/dep/njgs/geodata/dgs02-2.htm>>

NJDEP Data Distribution Agreement:

The Data provided herein are distributed subject to the following conditions and restrictions.

- I. Description of Data to be Provided: For all data contained herein, NJDEP makes no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the

digital data layers furnished hereunder. NJDEP assumes no responsibility to maintain them in any manner or form.

II. Terms of Agreement:

- 1) Digital data received from the NJDEP are to be used solely for internal purposes in the conduct of daily affairs.
- 2) The data are provided, as is, without warranty of any kind and the user is responsible for understanding the accuracy limitations of all digital data layers provided herein, as documented in the accompanying cross-reference files (see Section 1.14 CROSS_REFERENCE). Any reproduction or manipulation of the above data must ensure that the coordinate reference system remains intact.
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Process Description:

The WHPA delineations were created using the methods outlined in "Guidelines for Delineation of Well Head Protection Areas in New Jersey" available as a download at <http://www.state.nj.us/dep/njgs/whpaguide.pdf>. Coordinate files delineating each WHPA boundary were generated using a custom MS-DOS program on-file at the offices of the N.J. Geological Survey. The MS-DOS coordinate files are formatted as ARC/INFO coverages and contain line attributes specifying each time of travel tier for groundwater to the well. Each coverage was built as both a line and a polygon coverage having both arc and polygon attributes for the three Time of Travel (TOT) tiers. PCWS wells were located using a Global Positioning System (GPS). WHPA delineations are considered to have an accuracy of plus or minus 40 feet in any direction from the mapped location. WHPA delineations for wells completed in the glacial sand and gravel aquifer were clipped to a custom hydrologic boundary. Sand and gravel aquifers occur where deposits are more than 50 feet thick. The hydrologic boundary is generated as a 2000 foot buffer around the polygon representing the contact of the sand and gravel aquifer for those areas where the aquifer is less than 50 feet thick. This distance was selected based on an average distance between the 50 and 100 foot thickness contours of the sand and gravel aquifer. The average inter contour distance was doubled to provide a conservative estimate of the thickness variation. Therefore, any portion of the WHPA delineation that lies beyond this extent is clipped.

Prepared by Passaic Valley Ground Water Protection Committee 2003