

STORMWATER MANAGEMENT PLAN  
OLDMANS TOWNSHIP  
SALEM COUNTY, NEW JERSEY

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## INTRODUCTION

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

The Plan addresses 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. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The Plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A build-out analysis has been included in this Plan based upon existing zoning and land available for development. The Plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques.

The final component of this Plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, stormwater management measures are identified to lessen the impact of existing development.

## GOALS

The goals of this MSWMP are to:

- \* reduce flood damage, including damage to life and property;
- \* minimize, to the extent practical, any increase in stormwater runoff from any new development;
- \* reduce soil erosion from any development or construction project;
- \* assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- \* maintain groundwater recharge;
- \* prevent, to the greatest extent feasible, an increase in non-point 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 safe guard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water; and
- \* protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this Plan outlines specific stormwater design and performance standards for new development. Additionally, the Plan proposes

stormwater management controls to address impacts from existing development. Additionally, the Plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the Plan to ensure long-term effectiveness of stormwater management facilities. The Plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

### STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle (see Figure OS-1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is

eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

## BACKGROUND

Oldmans Township is a rural community that has slow development. It is located in the State of New Jersey and Salem County Smart Growth area. It is expected that within the period of 2005 to 2010 there will be considerable development, both residential and industrial. Presently the land use in the municipality is stable but, as stated, changes are expected.

The Township encompasses approximately 20 square miles in Salem County, New Jersey. The population in the 1990 census was 1683. The population in the 2000 census was 1798.

It can be seen that there was a slight increase in the population of the Township.

It is expected that the next census will show a larger increase in population. Any increase in population could be due to major residential developments. The developments would be expected to occur in the Smart Growth area. The increase in development will result in changes in the landscape with most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Figure 0S-2 illustrates the waterways in the Township.

Figure 0S-3 depicts the Township boundary on the USGS quadrangle maps.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the State of New Jersey. These sites are sampled for benthic microinvertebrates 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.

No streams in Oldmans Township have been listed as impaired.

The NJDEP is required to develop a Total Maximum Daily Load (TMDL) for the pollutants of impaired waterways. A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as, stormwater and wastewater discharges, which require an NJPDES permit to discharge, and non-point 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.

Oldmans Township has exhibited severe water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams.

During severe storms the stormwater runoff along NJSH 130 is deferred for various reasons, such as, drainage problems with NJDOT ditches and pipes and Army Corps of Engineers ditches and pipes. The excessive amounts of water result in flooding along N.J.S.H. 130 and adjacent properties. Excessive water can have a negative impact on instream habitat during the summer months. A map of the groundwater contaminated areas is shown in Figure OS-10. Well head protection areas are shown in Figure OS-5 and OS-6.



## DESIGN AND PERFORMANCE STANDARDS

Oldmans Township will adopt 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. Oldmans Township will require design and performance standards that include the language for the maintenance of stormwater management measures that are consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements. Safety standards will be required to be consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins.

The Township will submit ordinances to Salem County for review and approval on or before April 4, 2006.

During construction of projects that come within the regulations of the Stormwater Management Plan and the Residential Site Improvement Standards, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed and required.

## PLAN CONSISTENCY

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

developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

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

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

#### NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

Oldmans Township Personnel have reviewed the Master Plan and Ordinances, and have provided a list of the sections in the Township Land Use and Zoning Ordinances that are to be modified to incorporate nonstructural stormwater management strategies. Following are the ordinances that have been identified for revision(s). Once the ordinance texts are revised, they will be submitted to the Salem County review agency for review and approval by April 1, 2006. A copy of the revised ordinance sections will be sent to the Department of Environmental Protection at the time that the changes are submitted to the Salem County Agency.

Chapter 110 of the Oldmans Township Land Use Code was reviewed with regard to incorporating nonstructural stormwater management strategies.

Changes will be completed, by the required date, to Article V, "Design Standards", to incorporate these strategies.

SECTION 110-23. DRAINAGE

This section will be amended to encourage the use of natural vegetated swales in lieu of inlets and pipes. The section will include language that requires compliance to the Residential Site Improvement Standards and the Municipal Stormwater Management Plan.

SECTION 110-25. FLOODPLAIN REGULATIONS

This section will be revised to include the requirements of the Residential Site Improvement Standards and the Municipal Stormwater Management Plan.

SECTION 110-29. NATURAL FEATURES

This section will be revised to include the requirements of the RSIS and the MSWMP.

SECTION 110-30. NONCONFORMING LOTS, STRUCTURES AND USES

The section will be revised to state that the lot must meet all the requirements of the Zone in which it is located, except lot size. The section will require variances for any exceptions to the Zone so as to avoid flooding and to provide for groundwater recharge and water quality.

### SECTION 110-31. OFF-STREET PARKING, LOADING AREAS AND DRIVEWAYS

This Section shall require meeting the regulations set forth in the RSIS and the MSWMP.

The Section will be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, language will be included to allow for the use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers. The section will allow for pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls and shared parking.

### SECTION 110-32. PERFORMANCE STANDARDS FOR ALL USES

This section will be revised to include all the requirements of the RSIS and the MSWMP.

### SECTION 110-38. STREETS, CURBS AND SIDEWALKS

Language will be added to this section to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials, where appropriate. The section will be revised to include all the requirements set forth in the RSIS and the MSWMP.

### LAND USE/BUILD-OUT ANALYSIS

Figure OS-9 shows growth in Developed Use Areas from 1986 to 1995/97. The yellow outlined areas delineate areas that were developed between 1986 and

parking lots, etc.) is about 321 acres. About 31 acres of this total were added since 1996. The total area of impervious surface constitutes 3% of the total (12,824) acres in the municipality.

Changes will be made to Article III, Zoning Districts and Zoning Map. The Township has nine (9) zoning districts. There are four types of residential districts. Each district has a maximum building coverage allocation, ranging from 16 percent to 50 percent. The Township has five types of non-residential districts with a maximum building coverage ranging from 25 to 60 percent and a maximum impervious coverage ranging from 75 to 80 percent.

Future changes to the Codes and instructions to developers will require satisfying the percent impervious requirements with no relief of responsibility to comply with the Oldmans Township Stormwater Management Plan and Chapter 110 of the Land Use Ordinance.

The Township is evaluating the maximum impervious cover for each zone to determine whether a reduction in impervious coverage is appropriate. The Township is also evaluating a maximum percent of disturbance for each zone. Also, if a developer is granted a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. The mitigation effort must address water quality, flooding and groundwater recharge. The Township will prepare a mitigation plan.

## LAND USE/BUILD OUT ANALYSIS

A land use analysis was conducted for Oldmans Township. Figure OS-4 illustrates the existing land use in the Township based on 1995/1997 GIS information from NJDEP. Figure OS-5 illustrates the HUC14s within the Township. The Township Zoning Map is shown on Figure OS-6. Figure OS-7 illustrates the wetlands areas of the Township.

The build-out calculations for impervious cover are shown in Table OS-11. As expected when developing agricultural and forest lands, the build-out of the HUC14s will result in a significant increase in impervious surfaces.

Table OS-T2 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table OS-T3.

## MITIGATION PLAN

A mitigation plan is required for an agency to grant a variance or exemption from the design and performance standards of this municipal stormwater plan.

The Mitigation Plan will cover the various items of concern expressed in this municipal stormwater management plan.

A mitigation plan must be approved by the Planning Board or Zoning Board Engineer and the Township Engineer. The mitigated project shall provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in this Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project,

including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

The applicant is permitted to select one of the following projects to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects can be obtained from the Township Engineer. Listed below are typical projects that can be used to address the mitigation requirement. The items mentioned are suggestive but do not include all the possible projects.

GROUNDWATER RECHARGE

Repair detention basins or repair a parking lot.

WATER QUALITY

Retrofit an existing stormwater facility to provide the removal of 80 percent of Total Suspended Solids from the facility runoff.

WATER QUANTITY

Install stormwater measurement measures in an open space area to reduce the peak flow from an upstream development on a receiving stream by 20 cfs, 35 cfs and 100 cfs for the 2, 10 and 100 year storms respectively.

WATER QUALITY

Re-establish a vegetative buffer (minimum 50 feet wide) along a specified length of shoreline at a specific location as a goose control measure and to filter stormwater runoff from the high goose traffic areas.

## FOLLOW-UP ACTION ITEMS

Evaluate the extent to which the Oldmans Township Master Plan (including the land use plan element), official map and development regulations (including the zoning ordinances) implement principles expressed in the nonstructural stormwater management strategies.

Land Use Chapter 110 will require corrections and additions to comply with the Oldmans Township Stormwater Management Plan. The changes will stress the intent to provide low impact development techniques.

The items to be addressed in the Land Use Ordinance will include, but not necessarily be limited to, the following:

- Preservation of Natural Areas.
- Tree Protection.
- Landscaping and screening.
- Minimize land disturbance.
- Open space and cluster development.
- Impervious Area Management, including streets, driveways, parking areas and sidewalks.
- Vegetated and Open Channels.

These items, along with specific ordinances for adoptions and enforcements, will be addressed within the required time period.

In addition, the Municipality will follow the required procedures for inspections, notification to the residents and annual reports.



## Build-Out Calculations

OST 3-1

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|-----------------------------|--------------------------|--------------------------|------------------------------|
| 02040206020010                |                    |                         |                             |                             |                          |                          |                              |
| Commercial Industrial (CI)    | 298                | 2                       | 5.96                        | 5                           | 293                      | 5                        | 14.65                        |
| Public (P)                    | 1721               | 1                       | 17.21                       | 5                           | 85                       | 5                        | 4.25                         |
| Industrial (I)                | 137                | 5                       | 6.85                        | 10                          | 127                      | 5                        | 6.35                         |
| Residential (R)               | 8865               | 3                       | 25.95                       | 200                         | 665                      | 5                        | 33.25                        |
| Agricultural Residential (AR) | 115                | 3                       | 3.45                        | 25                          | 90                       | 5                        | 4.5                          |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
| <b>TOTALS</b>                 | <b>3136</b>        | <b>1.9</b>              | <b>59.42</b>                | <b>245</b>                  | <b>1260</b>              | <b>5</b>                 | <b>63</b>                    |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Build-Out Calculations

OST 3-2

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|-----------------------------|--------------------------|--------------------------|------------------------------|
| 02040202160060                |                    |                         |                             |                             |                          |                          |                              |
| Agricultural Residential (AR) | 956                | 4                       | 38.24                       | 300                         | 656                      | 5                        | 32.8                         |
| Industrial (I)                | 23                 | 20                      | 4.6                         | 10                          | 13                       | 25                       | 3.25                         |
| Public (P)                    | 140                | 2                       | 2.8                         | 50                          | 0                        | 5                        | 0                            |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
| <b>TOTALS</b>                 | <b>1119</b>        | <b>4</b>                | <b>45.64</b>                | <b>360</b>                  | <b>669</b>               | <b>5.3</b>               | <b>36.05</b>                 |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Build-Out Calculations

OST 3-3

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/ Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|------------------------------|--------------------------|--------------------------|------------------------------|
| 02040206030070                |                    |                         |                             |                              |                          |                          |                              |
| Agricultural Residential (AR) | 2000               | 2                       | 40                          | 500                          | 1500                     | 5                        | 75                           |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
| <b>TOTALS</b>                 | <b>2000</b>        | <b>2</b>                | <b>40</b>                   | <b>500</b>                   | <b>1500</b>              | <b>5</b>                 | <b>75</b>                    |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Build-Out Calculations

OST 3-4

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/ Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|------------------------------|--------------------------|--------------------------|------------------------------|
| 02040206030050                |                    |                         |                             |                              |                          |                          |                              |
| Agricultural Residential (AR) | 1560               | 10                      | 156                         | 300                          | 1260                     | 5                        | 63                           |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
|                               |                    |                         |                             |                              |                          |                          |                              |
| <b>TOTALS</b>                 | 1560               | 10                      | 156                         | 300                          | 1260                     | 5                        | 63                           |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Build-Out Calculations

OST 3-5

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|-----------------------------|--------------------------|--------------------------|------------------------------|
| 02040202160040                |                    |                         |                             |                             |                          |                          |                              |
| Residential (R)               | 1834               | 5                       | 91.7                        | 600                         | 1234                     | 5                        | 61.7                         |
| Village Residential (VR)      | 50                 | 10                      | 5                           | 1                           | 49                       | 10                       | 4.90                         |
| Industrial (IPRA)             | 120                | 1                       | 1.2                         | 2                           | 118                      | 40                       | 47.2                         |
| Public (P)                    | 32                 | 15                      | 4.8                         | 0                           | 32                       | 15                       | 4.8                          |
| Commercial Industrial (CI)    | 574                | 20                      | 114.8                       | 100                         | 474                      | 5                        | 23.7                         |
| Commercial (C)                | 45                 | 40                      | 18                          | 2                           | 43                       | 40                       | 17.2                         |
| Agricultural Residential (AR) | 1125               | 2                       | 22.5                        | 200                         | 925                      | 5                        | 46.25                        |
|                               |                    |                         |                             |                             |                          |                          |                              |
| <b>TOTALS</b>                 | <b>3780</b>        | <b>7.97</b>             | <b>301.2</b>                | <b>905</b>                  | <b>2875</b>              | <b>7.2</b>               | <b>205.75</b>                |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Build-Out Calculations

OST 3-6

| HUC14 and Zone                | Total Area (acres) | Existing Impervious (%) | Existing Impervious (acres) | Wetlands/Water Area (acres) | Developable Area (acres) | Allowable Impervious (%) | Build-Out Impervious (acres) |
|-------------------------------|--------------------|-------------------------|-----------------------------|-----------------------------|--------------------------|--------------------------|------------------------------|
| 02040202160050                |                    |                         |                             |                             |                          |                          |                              |
| Village Commercial (VC)       | 11.5               | 30                      | 3.45                        | 1                           | 10.5                     | 5                        | 0.525                        |
| Village Residential (VR)      | 34.5               | 30                      | 10.35                       | 3                           | 31.5                     | 5                        | 1.575                        |
| Agricultural Residential (AR) | 1183               | 3                       | 35.49                       | 500                         | 683                      | 5                        | 34.15                        |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
|                               |                    |                         |                             |                             |                          |                          |                              |
| <b>TOTALS</b>                 | <b>1229</b>        | <b>4</b>                | <b>49.29</b>                | <b>504</b>                  | <b>725</b>               | <b>5</b>                 | <b>36.25</b>                 |

**Table Pollutant Loads by Land Cover**

| Land Cover                       | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/yr) |
|----------------------------------|---------------------------------------|-------------------------------------|-------------------------------------------|
| High, Medium Density Residential | 1.4                                   | 15                                  | 140                                       |
| Low Density, Rural Residential   | 0.6                                   | 5                                   | 100                                       |
| Commercial                       | 2.1                                   | 22                                  | 200                                       |
| Industrial                       | 1.5                                   | 16                                  | 200                                       |
| Urban, Mixed Urban, Other Urban  | 1.0                                   | 10                                  | 120                                       |
| Agricultural                     | 1.3                                   | 10                                  | 300                                       |
| Forest, Water, Wetlands          | 0.1                                   | 3                                   | 40                                        |
| Barrenland/Transitional Area     | 0.5                                   | 5                                   | 60                                        |

## Nonpoint Source Loads at Build-Out

OST 4-1

| HUC14 and Zone | Build-Out Zoning         | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|--------------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040206020010 |                          |                          |                  |             |                  |             |                   |              |
| CI             | Commercial Industrial    | 293                      | 2.10             | 615         | 22               | 6450        | 200               | 58600        |
| P              | Public                   | 1721                     | 0.60             | 1032.6      | 5                | 8500        | 100               | 172100       |
| I              | Industrial               | 137                      | 1.50             | 205.5       | 16               | 2192        | 200               | 27400        |
| R              | Residential              | 865                      | 0.60             | 519         | 5                | 4000        | 100               | 86500        |
| AR             | Agricultural Residential | 115                      | 0.60             | 70          | 5                | 575         | 100               | 11500        |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
| TOTALS         |                          | 3131                     |                  | 2442.1      |                  | 20225       |                   | 1342400      |

### Nonpoint Source Loads at Build-Out

OST 4-2

| HUC14 and Zone | Build-Out Zoning         | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|--------------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040202160060 |                          |                          |                  |             |                  |             |                   |              |
| AR             | Agricultural Residential | 956                      | 0.60             | 570         | 5                | 4780        | 100               | 95600        |
| I              | Industrial               | 23                       | 1.50             | 34          | 16               | 368         | 200               | 4600         |
| P              | Public                   | 140                      | 0.60             | 84          | 5                | 700         | 100               | 14000        |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
|                |                          |                          |                  |             |                  |             |                   |              |
| TOTALS         |                          | 1119                     |                  | 688         |                  | 5848        |                   | 114200       |



### Nonpoint Source Loads at Build-Out

OST 4-3

| HUC14 and Zone | Build-Out Zoning | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040206030070 |                  |                          |                  |             |                  |             |                   |              |
| AR             | Agricultural     | 2000                     | 0.60             | 1200        | 5                | 10000       | 100               | 200000       |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
| TOTALS         |                  | 2000                     |                  | 1200        |                  | 10000       |                   | 200000       |

## Nonpoint Source Loads at Build-Out

OST 4-4

| HUC14 and Zone | Build-Out Zoning | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040206030050 |                  |                          |                  |             |                  |             |                   |              |
| AR             | Agricultural     | 1560                     | 0.60             | 936         | 5                | 7800        | 100               | 156000       |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
|                |                  |                          |                  |             |                  |             |                   |              |
| TOTALS         |                  | 1560                     |                  | 936         |                  | 7800        |                   | 156000       |

## Nonpoint Source Loads at Build-Out

OST 4-5

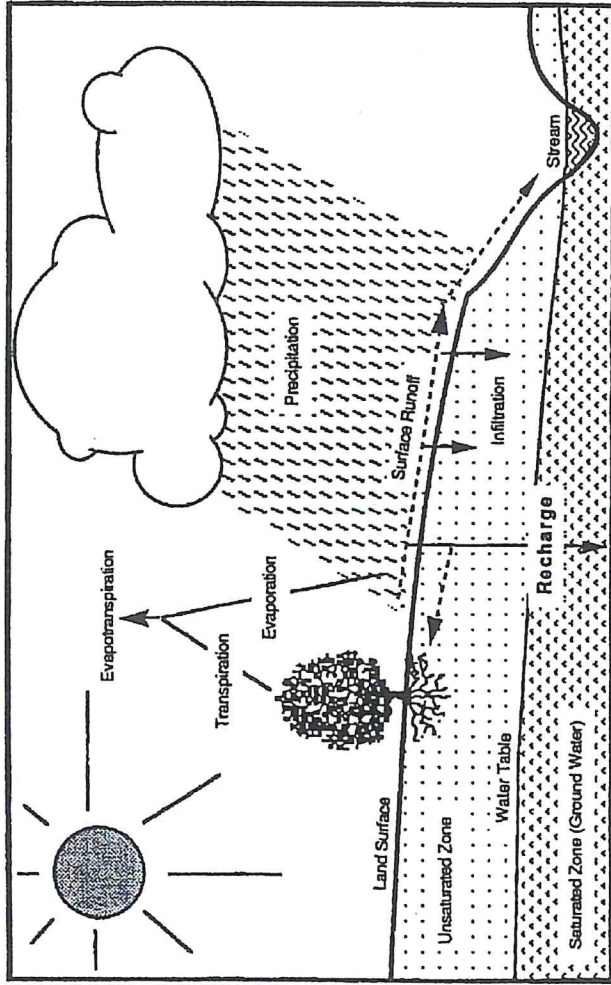
| HUC14 and Zone | Build-Out Zoning      | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|-----------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040202160040 |                       |                          |                  |             |                  |             |                   |              |
| R              | Residential           | 1834                     | 0.60             | 1100        |                  | 9170        |                   | 183400       |
| VR             | Village Residential   | 50                       | 0.60             | 30          |                  | 250         |                   | 5000         |
| IPRA           | Industrial            | 120                      | 1.50             | 180         |                  | 1920        |                   | 24000        |
| P              | Public                | 32                       | 0.60             | 19          |                  | 160         |                   | 3200         |
| CI             | Commercial Industrial | 574                      | 1.50             | 861         |                  | 9184        |                   | 114800       |
| C              | Commercial            | 45                       | 2.10             | 94.5        |                  | 990         |                   | 9000         |
| AR             | Agricultural          | 1125                     | 0.60             | 675         |                  | 5625        |                   | 112500       |
|                |                       |                          |                  |             |                  |             |                   |              |
| TOTALS         |                       | 3780                     |                  | 2959.5      |                  | 27299       |                   | 451900       |

### Nonpoint Source Loads at Build-Out

OST 4-6

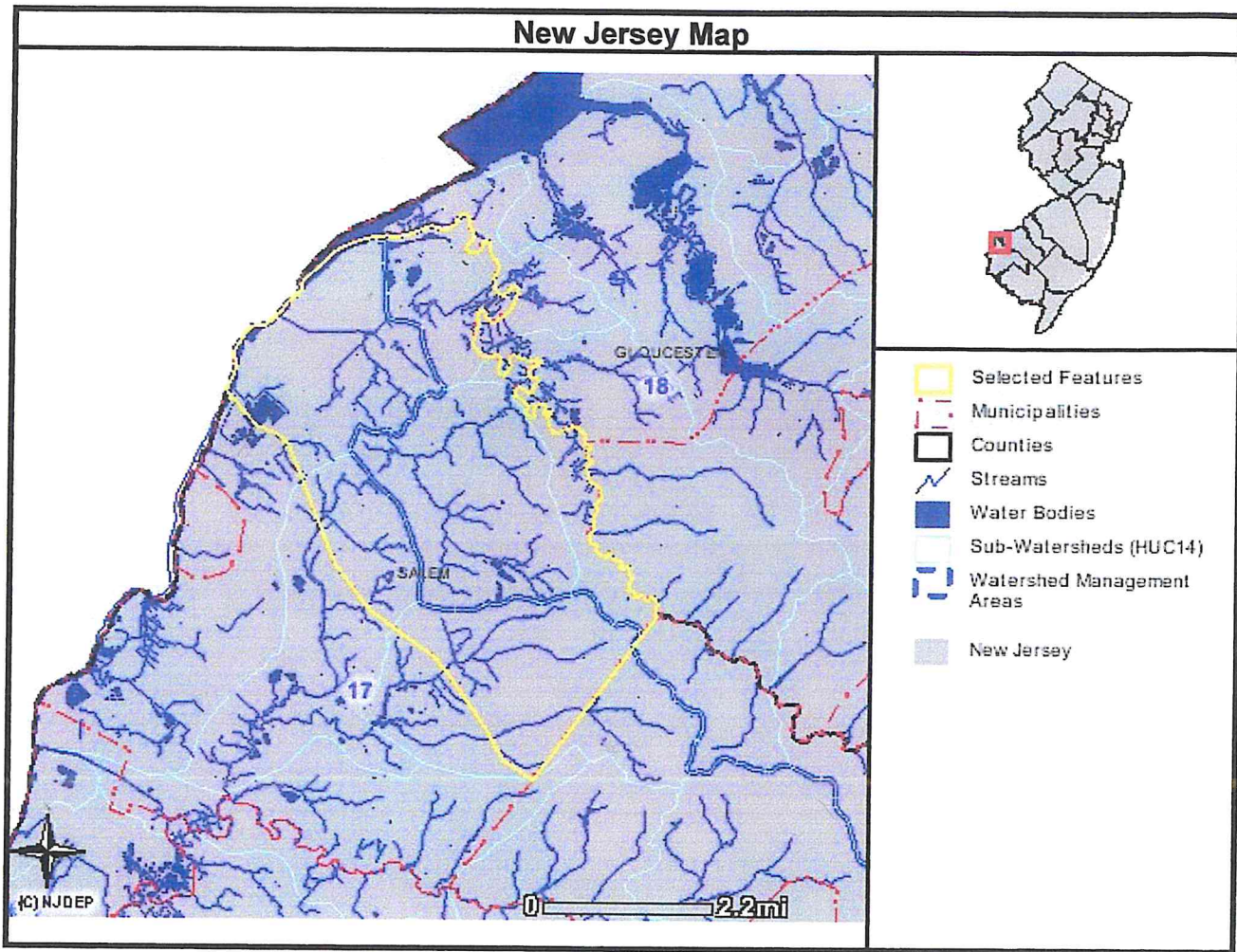
| HUC14 and Zone | Build-Out Zoning    | Developable Area (acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/yr) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|----------------|---------------------|--------------------------|------------------|-------------|------------------|-------------|-------------------|--------------|
| 02040202160050 |                     |                          |                  |             |                  |             |                   |              |
| VC             | Village Commercial  | 11.5                     | 2.1              | 24          | 22               | 253         | 200               | 22300        |
| VR             | Village Residential | 34.5                     | 0.60             | 20          | 5                | 172         | 100               | 3450         |
| AR             | Agricultural        | 1183                     | 0.60             | 710         | 5                | 5915        | 100               | 118300       |
|                |                     |                          |                  |             |                  |             |                   |              |
|                |                     |                          |                  |             |                  |             |                   |              |
|                |                     |                          |                  |             |                  |             |                   |              |
|                |                     |                          |                  |             |                  |             |                   |              |
|                |                     |                          |                  |             |                  |             |                   |              |
|                |                     |                          |                  |             |                  |             |                   |              |
| TOTALS         |                     | 1229                     |                  | 754         |                  | 6340        |                   | 124050       |

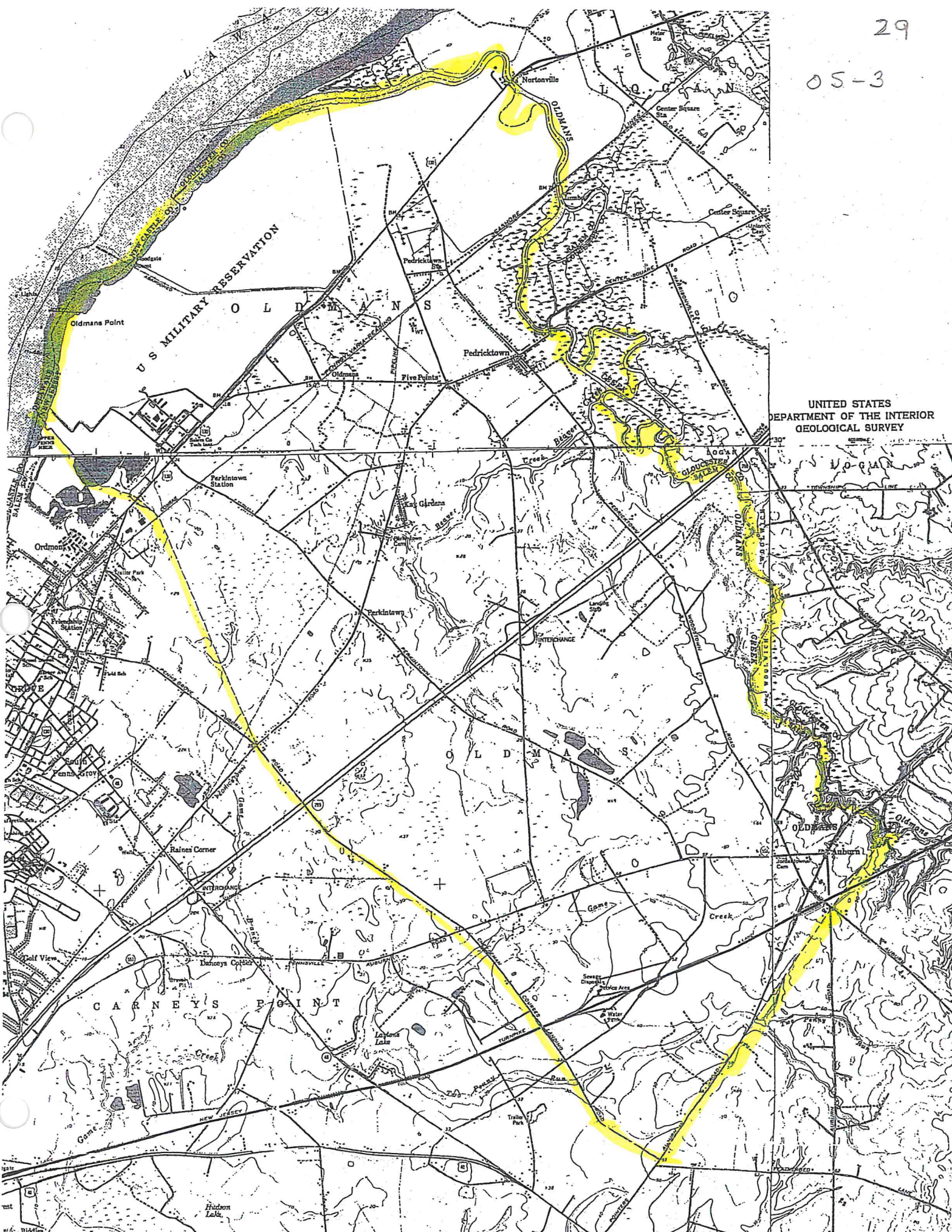
05-1  
Figure 1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

05-2





UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY



**REFERENCES & NOTES:**

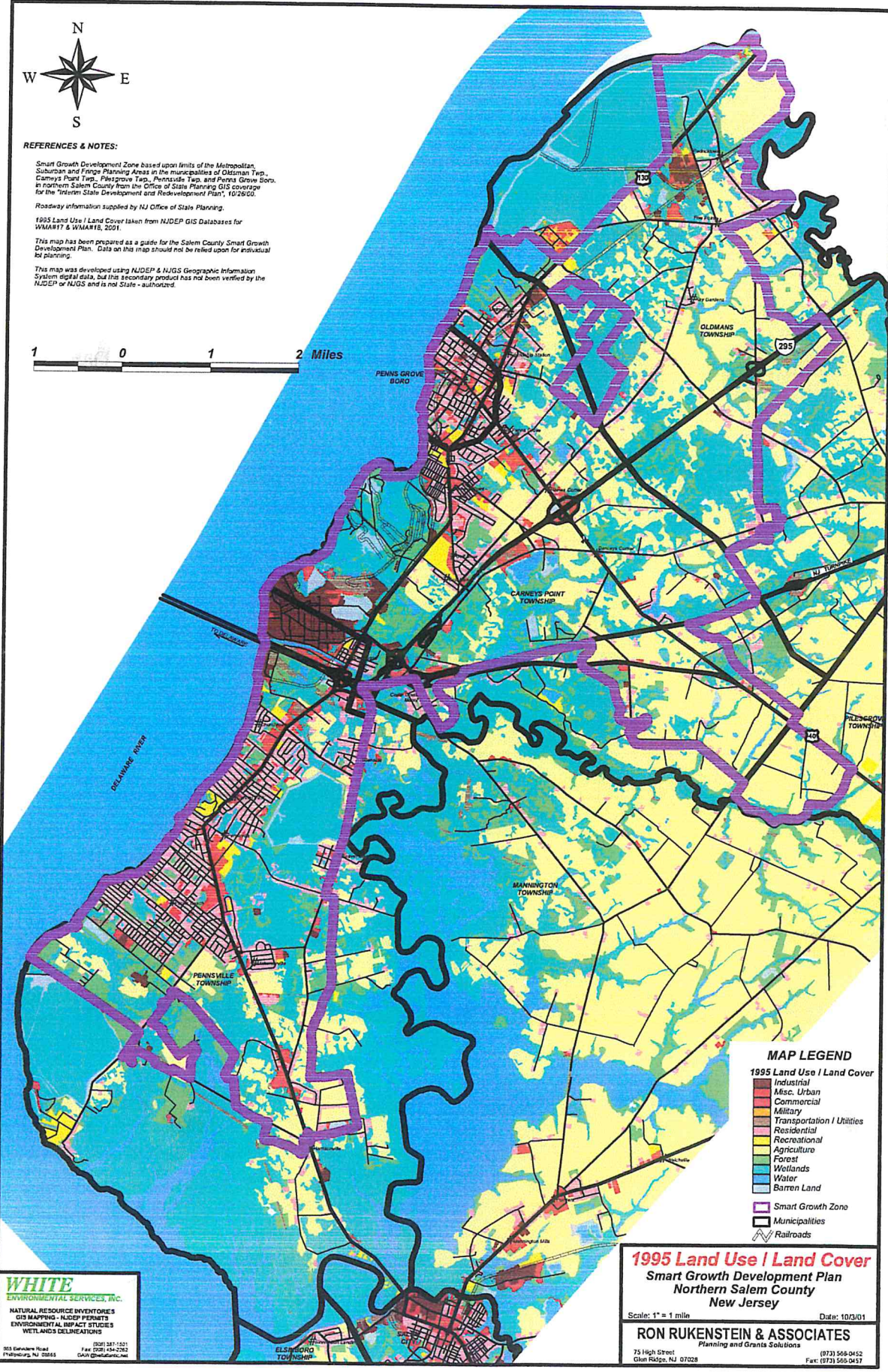
Smart Growth Development Zone based upon limits of the Metropolitan, Suburban and Fringe Planning Areas in the municipalities of Oldman Twp., Carneys Point Twp., Penns Grove Twp., Pennsville Twp. and Penns Grove Boro. in northern Salem County from the Office of State Planning GIS coverage for the "Northern Salem County Smart Growth Development and Redevelopment Plan", 10/26/00.

Roadway information supplied by NJ Office of State Planning.

1995 Land Use / Land Cover taken from NJDEP GIS Databases for WMA817 & WMA818, 2001.

This map has been prepared as a guide for the Salem County Smart Growth Development Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NUGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NUGS and is not State - authorized.



**MAP LEGEND**

**1995 Land Use / Land Cover**

- Industrial
- Misc. Urban
- Commercial
- Military
- Transportation / Utilities
- Residential
- Recreational
- Agriculture
- Forest
- Wetlands
- Water
- Barren Land

- Smart Growth Zone
- Municipalities
- Railroads

**WHITE**  
ENVIRONMENTAL SERVICES, INC.

NATURAL RESOURCE INVENTORIES  
GIS MAPPING - NJDEP PERMITS  
ENVIRONMENTAL IMPACT STUDIES  
WETLANDS DELINEATIONS

(908) 387-1501  
203 Seawanhock Road  
Parsippany, NJ 08859  
Fax: (973) 434-2762  
OWM@whiteservices.com

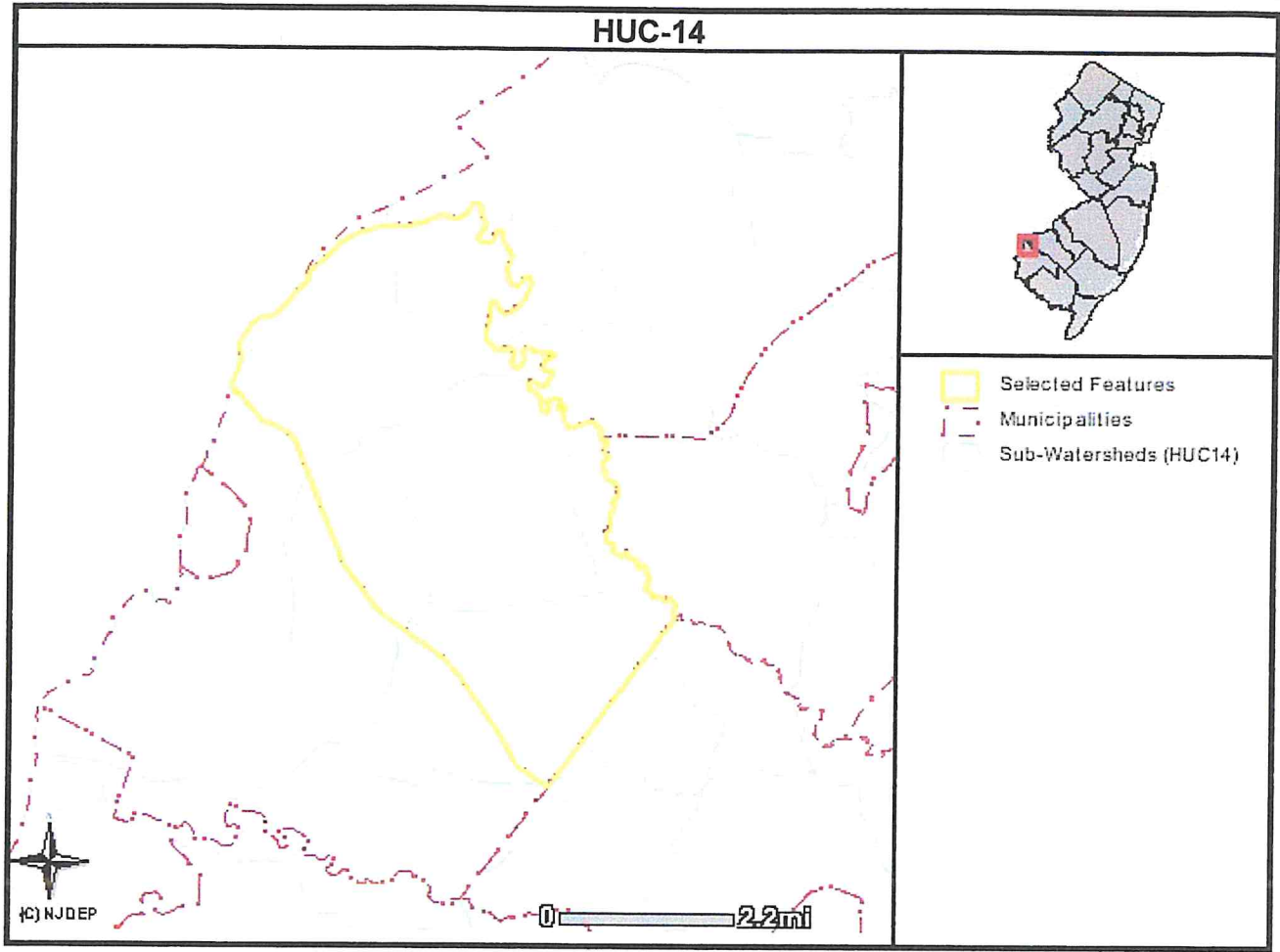
**1995 Land Use / Land Cover**  
Smart Growth Development Plan  
Northern Salem County  
New Jersey

Scale: 1" = 1 mile Date: 10/3/01

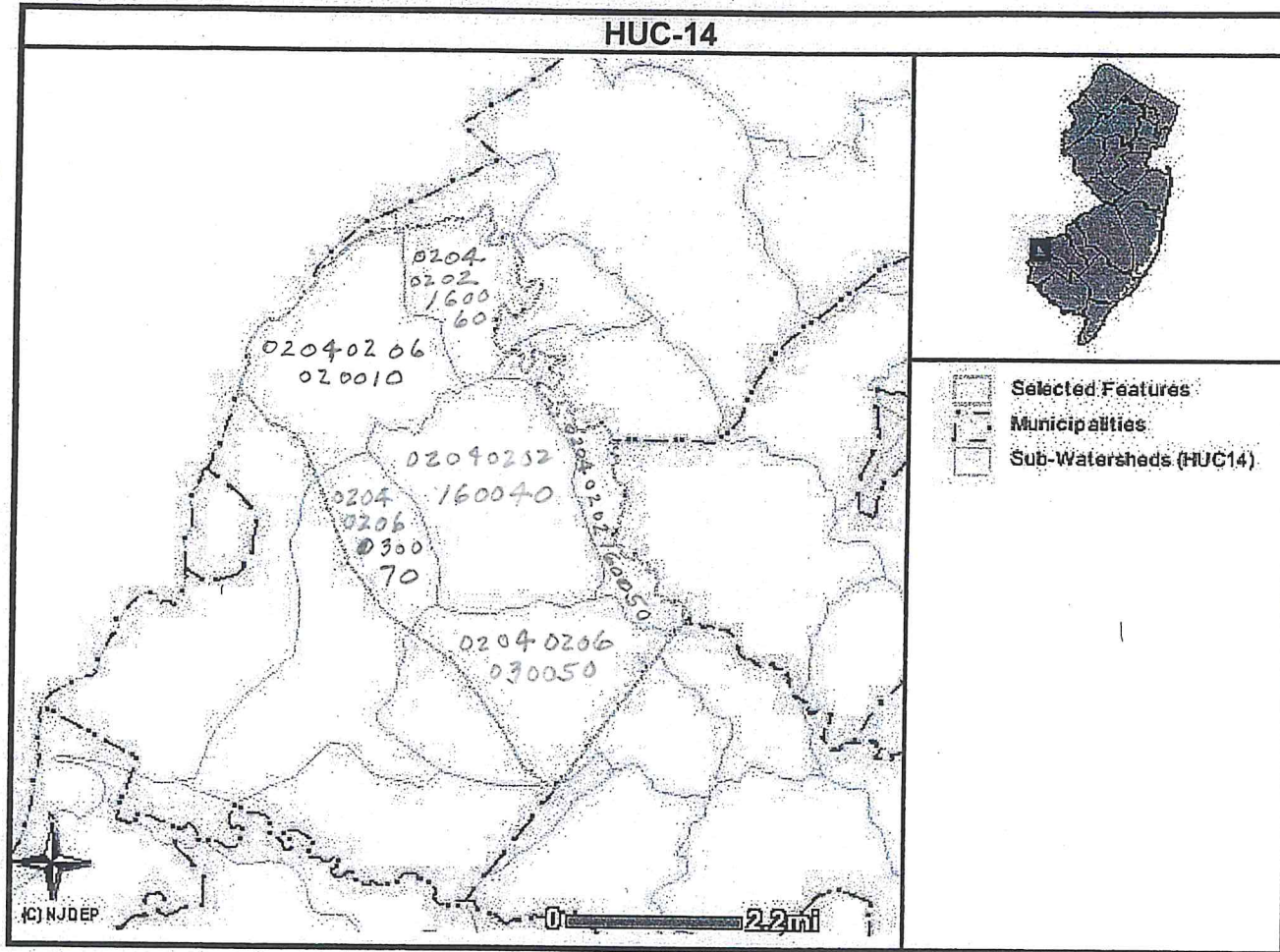
**RON RUKENSTEIN & ASSOCIATES**  
Planning and Grants Solutions

75 High Street  
Glen Ridge, NJ 07028 (973) 568-0452  
Fax: (973) 568-0457

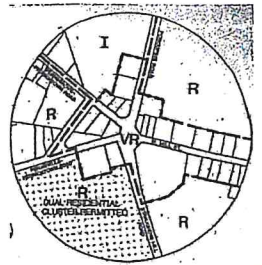
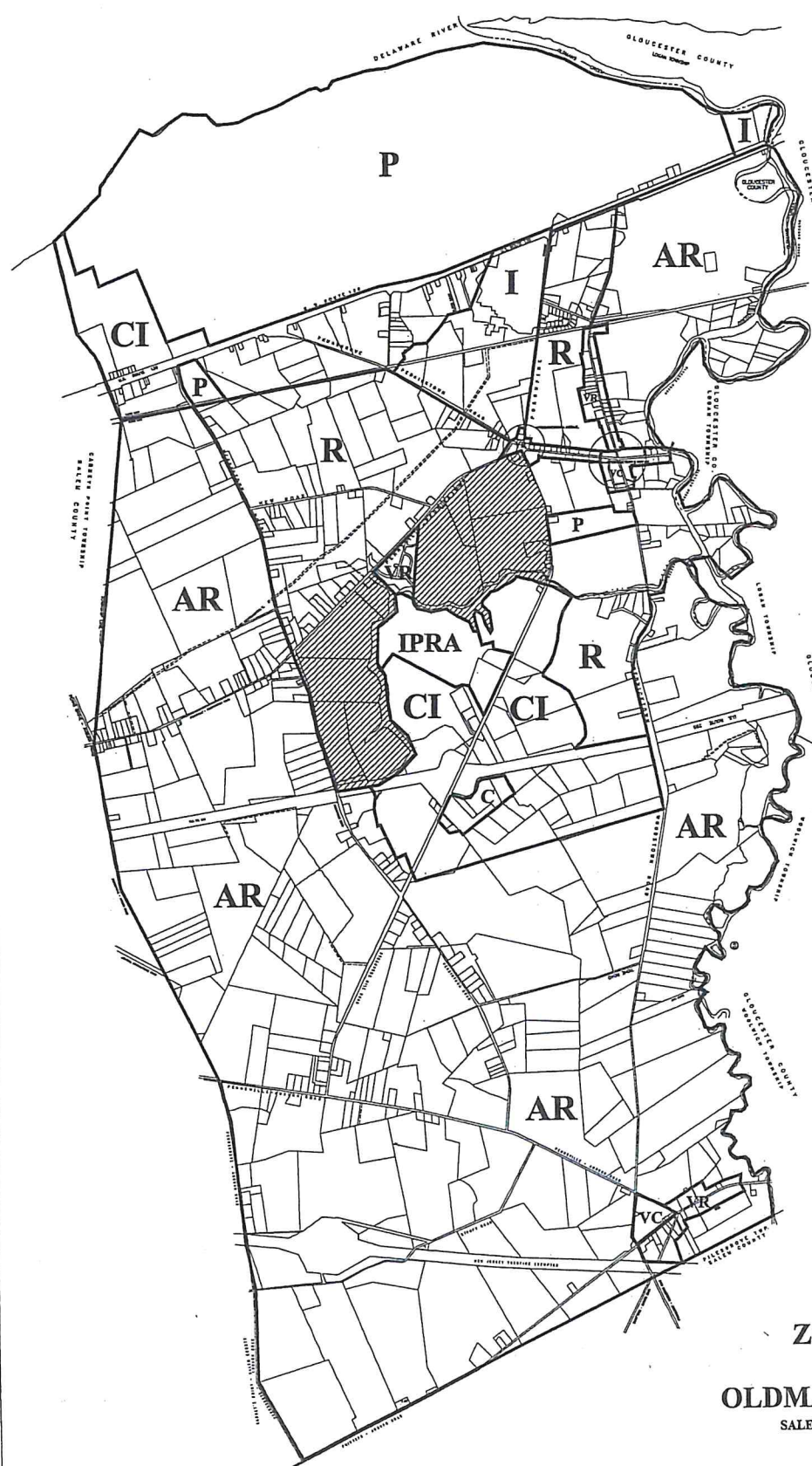




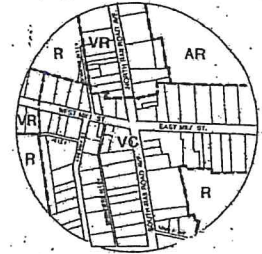
HUC-14



05-6




**INTERSECTION 'A' DETAIL**  
SCALE: 1" = 400'



**INTERSECTION 'B' DETAIL**  
SCALE: 1" = 300'

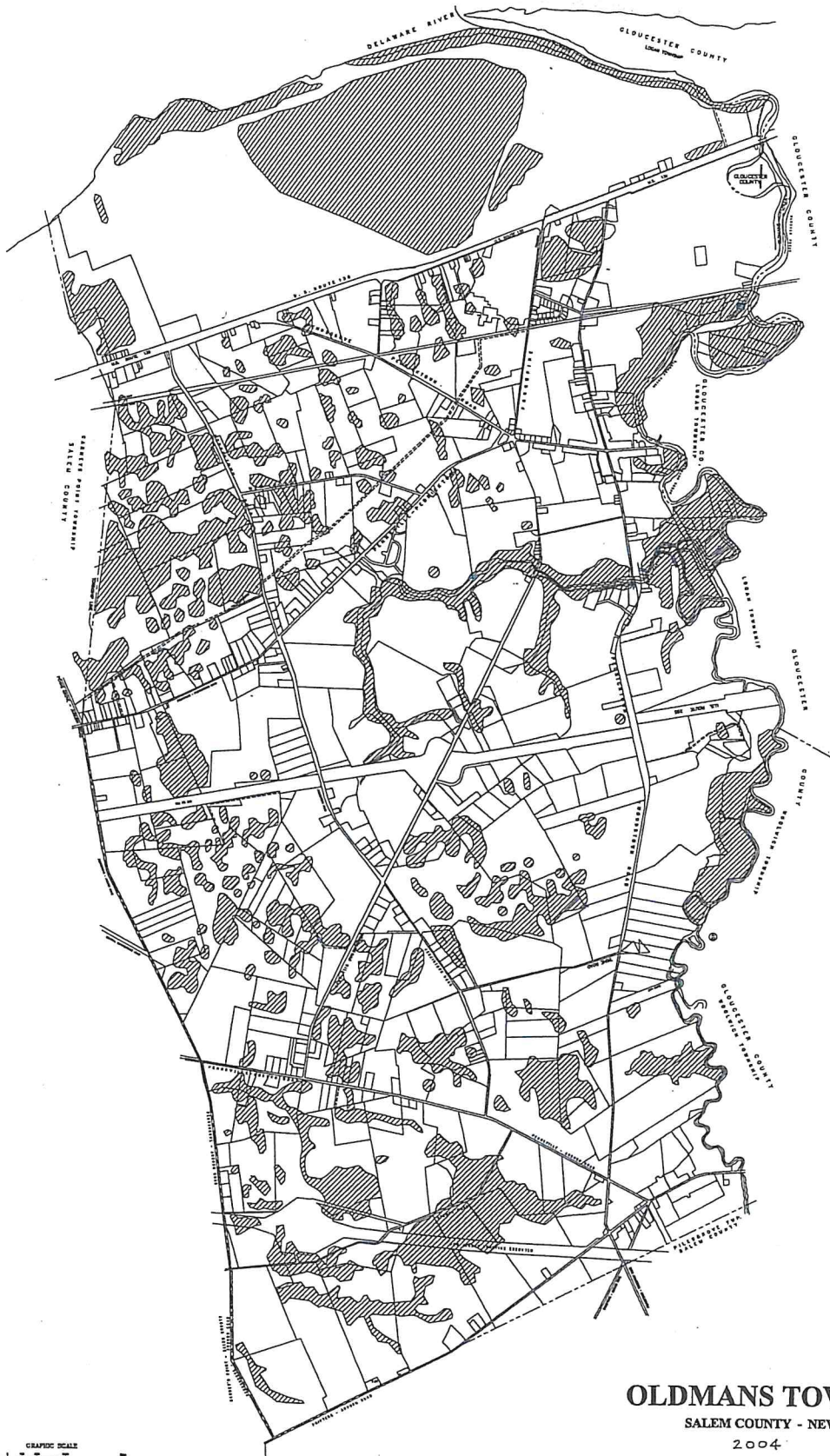
**ZONING LEGEND**

- P PUBLIC
- AR AGRICULTURAL RESIDENTIAL
- R RESIDENTIAL
- VR VILLAGE RESIDENTIAL
- VC VILLAGE
- C COMMERCIAL
- I INDUSTRIAL
- CI COMMERCIAL INDUSTRIAL
-  DUAL RESIDENTIAL CLUSTER PERMITTED
- IPRA INDUSTRIAL PARK REDEVELOPMENT AREA

**ZONING MAP  
OF  
OLDMANS TOWNSHIP  
SALEM COUNTY - NEW JERSEY**  
2004

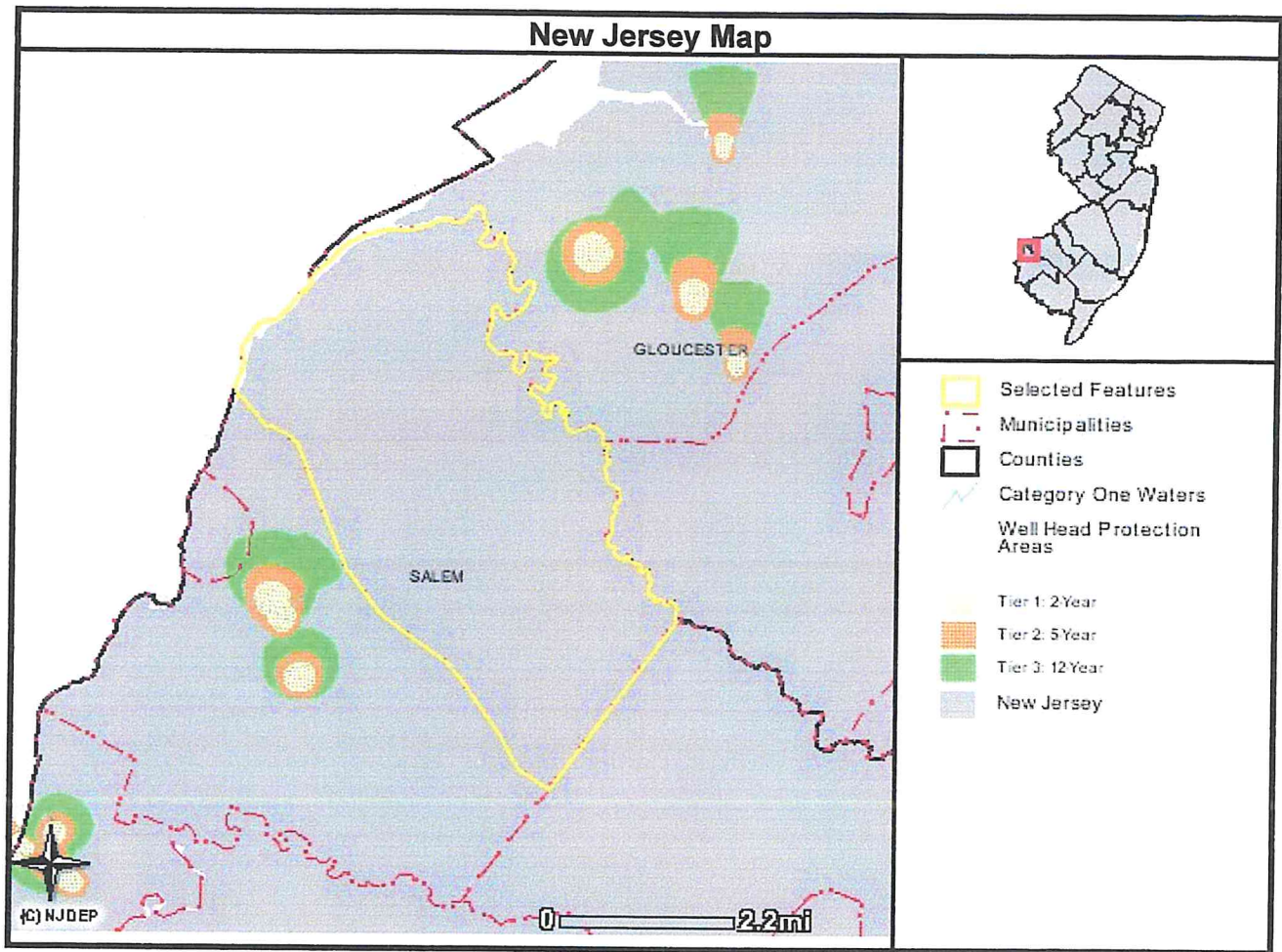
# WETLANDS

05-7

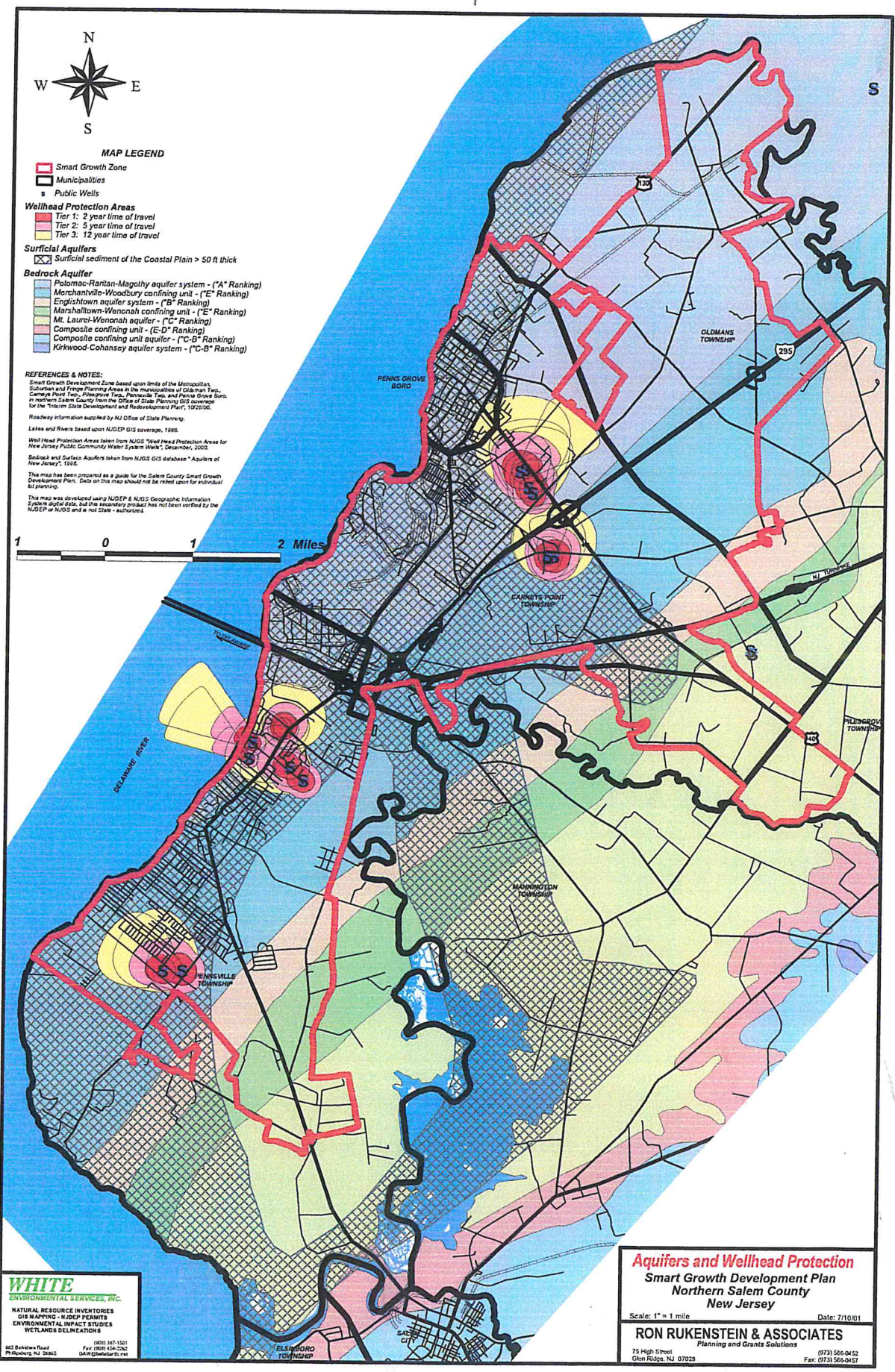


**OLDMANS TOWNSHIP**  
SALEM COUNTY - NEW JERSEY  
2004

05-8









2 4



# Oldmans Twp, New Jersey Showing Growth in Developed Use Areas from 1986 to 1995/97



**Legend**

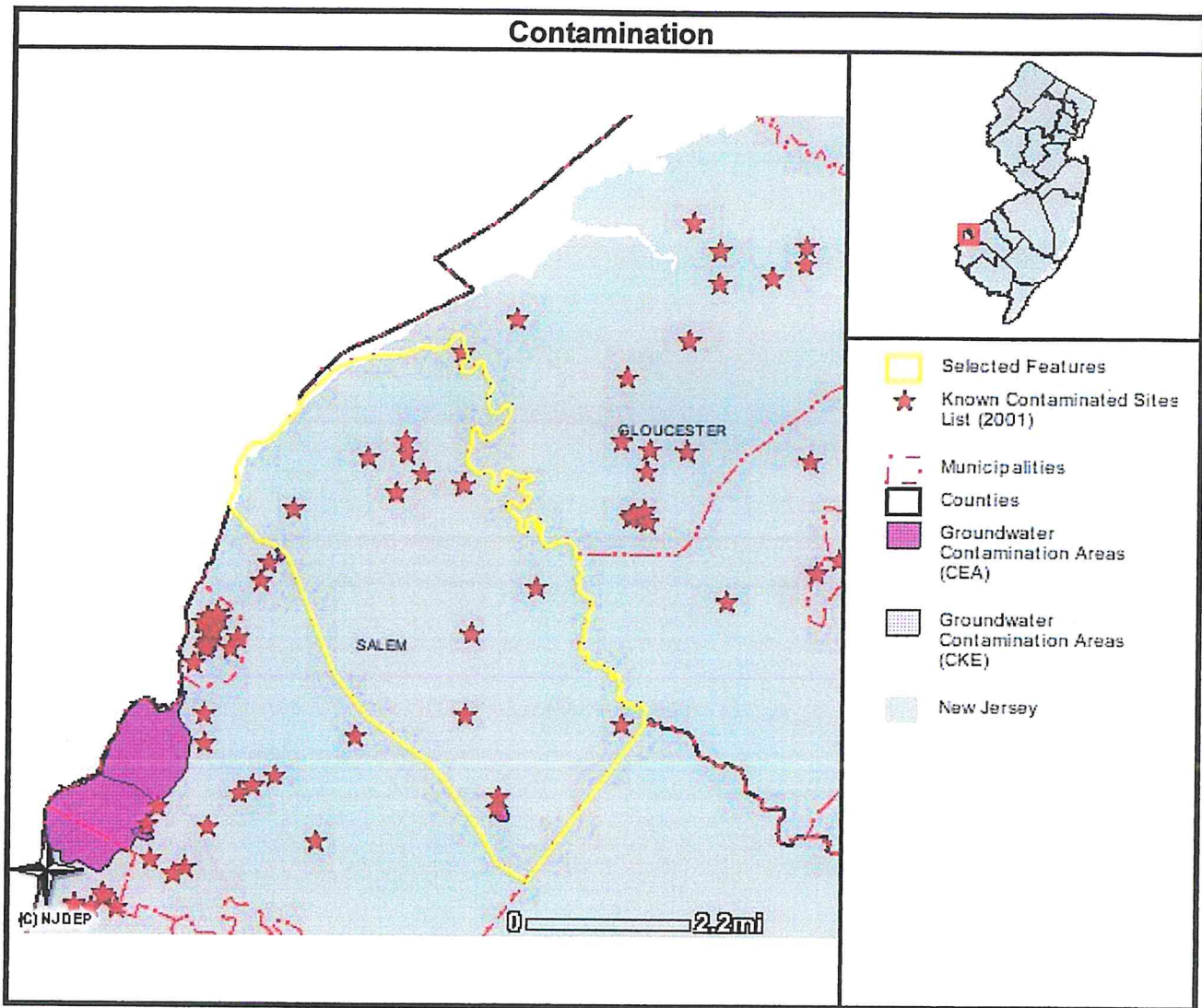
-  Municipal Boundary
-  Roads
-  Streams
-  Lakes
-  Developed Areas in 1986
-  Developed Area Growth from 1986 to 1995/1997

Note: Developed areas between 1986 and 1995/1997 are shown in solid yellow.



The yellow outlined areas delineate areas that were developed as of 1986. The solid yellow areas have been developed between 1986 and 1995/97. The total area of impervious surface (buildings, sidewalks, driveways, parking lots, etc.) is about 321 acres. About 31 acres of this total were added since 1986. The total area of impervious surface constitutes 3% of the total (12,824) acres in the municipality.

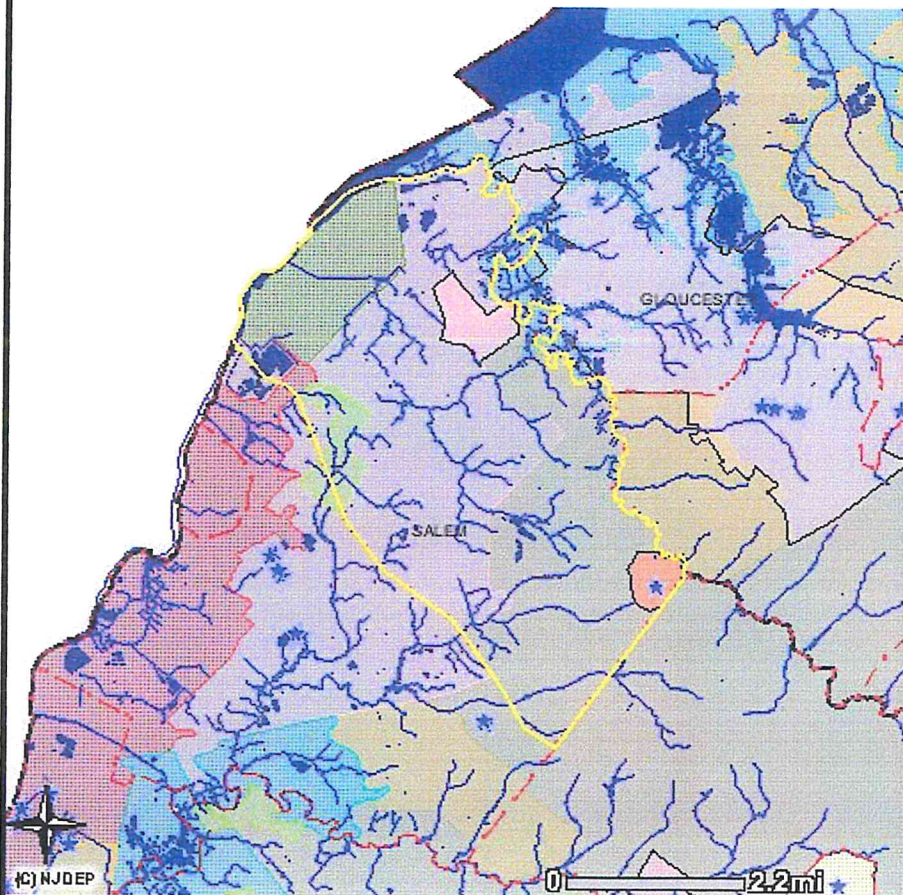
05-11



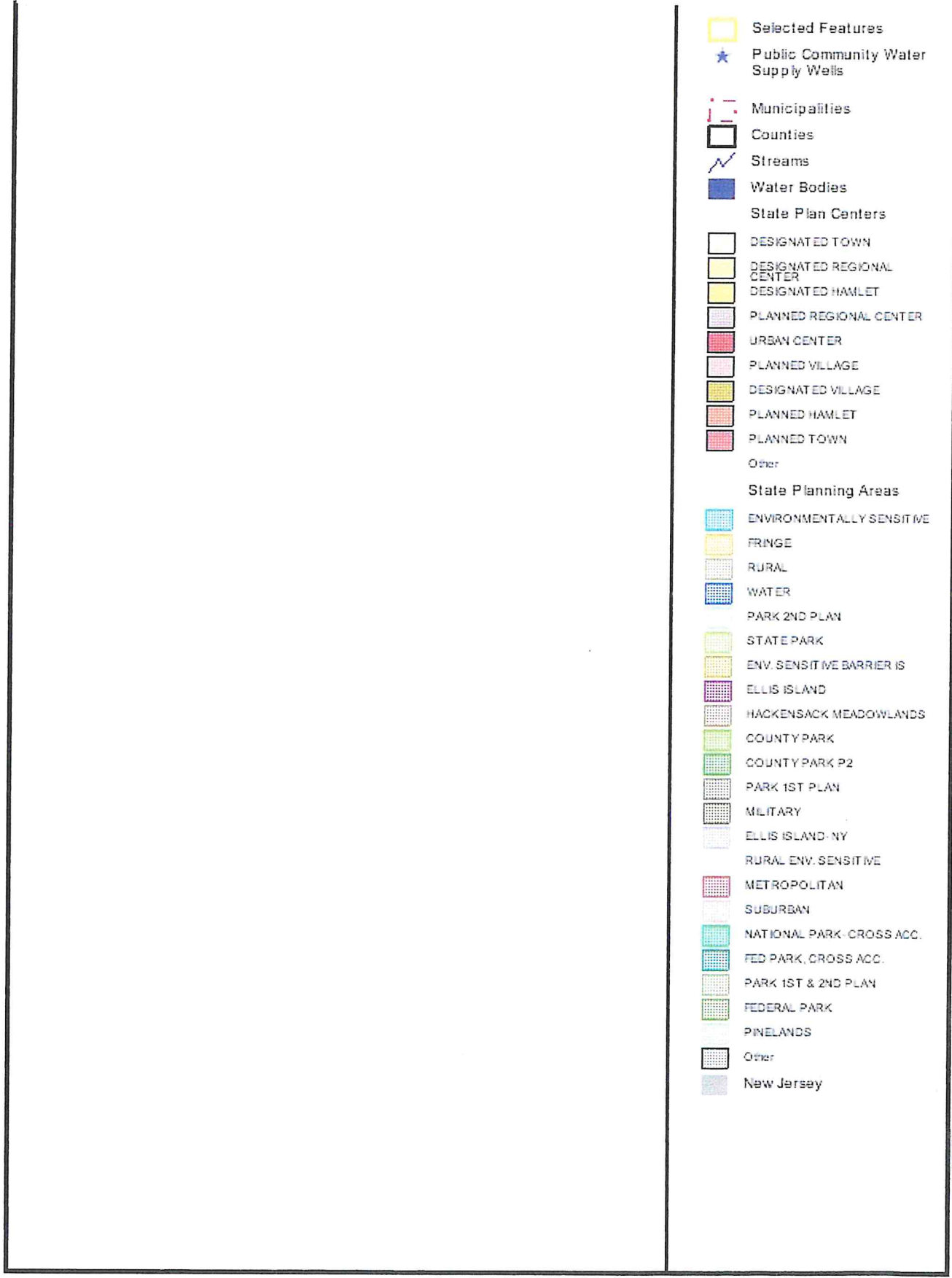


05-12

### New Jersey Map



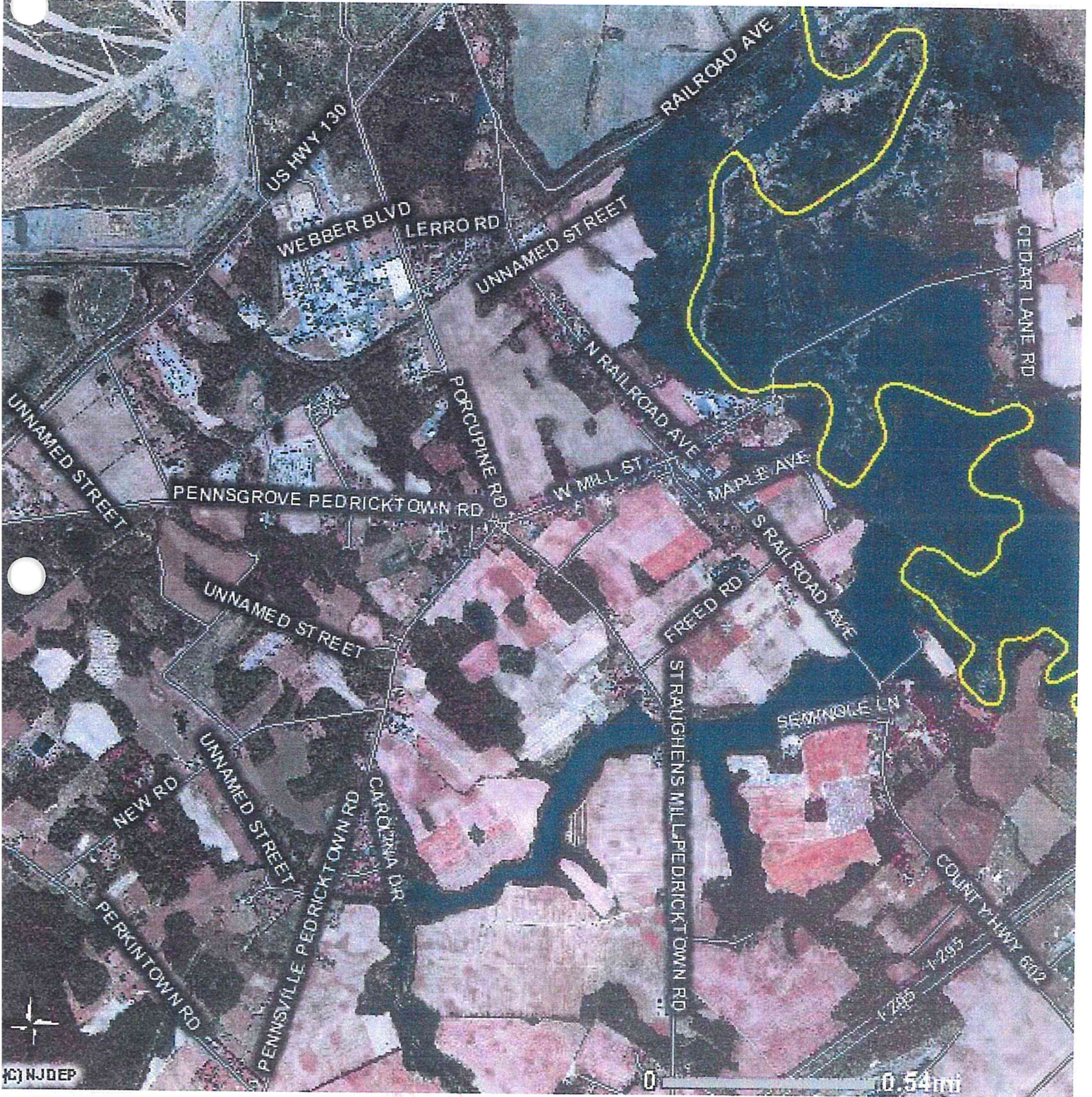
05-12



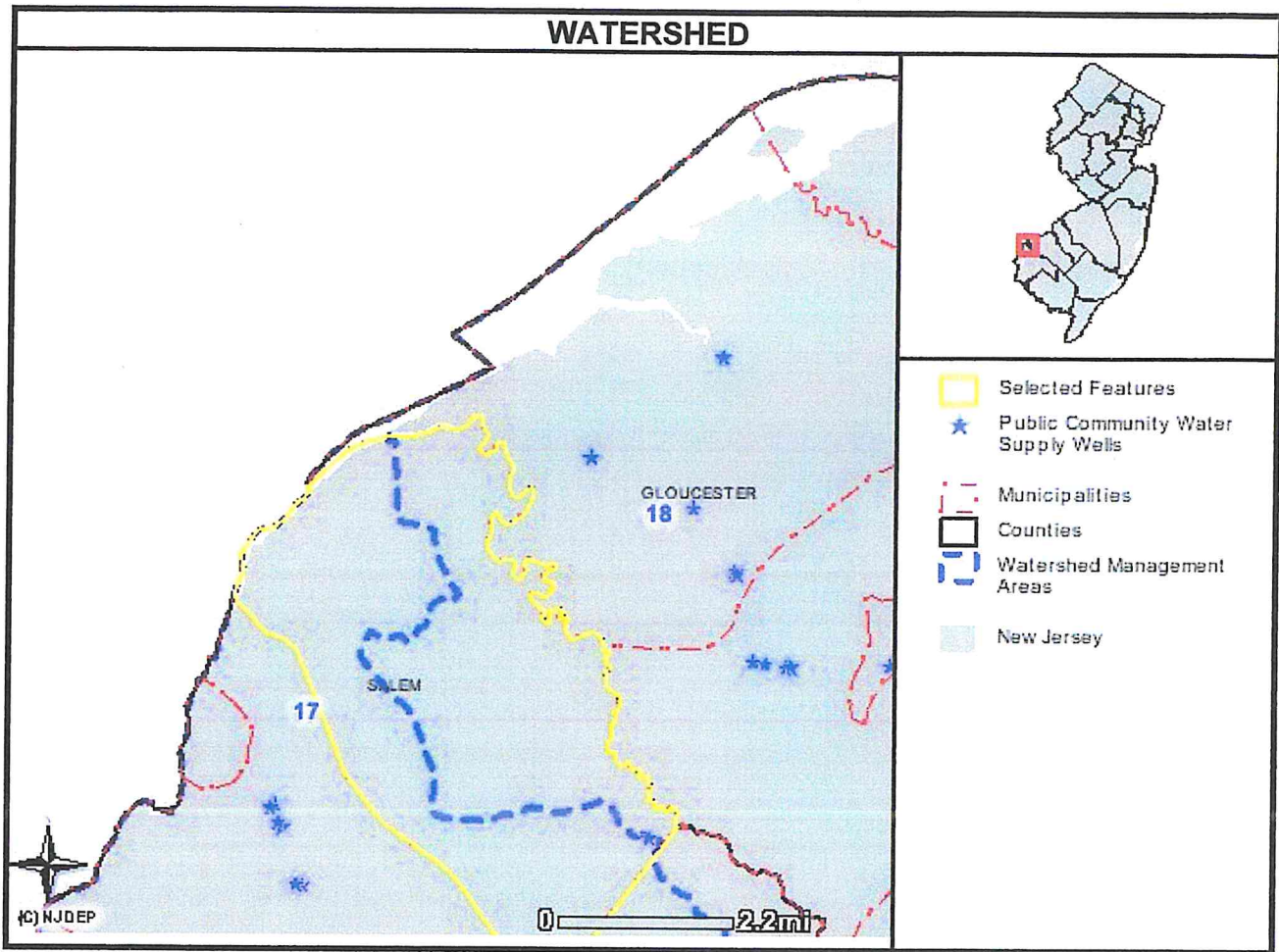
-  Selected Features
-  Public Community Water Supply Wells
-  Municipalities
-  Counties
-  Streams
-  Water Bodies
- State Plan Centers
- DESIGNATED TOWN
- DESIGNATED REGIONAL CENTER
- DESIGNATED HAMLET
- PLANNED REGIONAL CENTER
- URBAN CENTER
- PLANNED VILLAGE
- DESIGNATED VILLAGE
- PLANNED HAMLET
- PLANNED TOWN
- Other
- State Planning Areas
- ENVIRONMENTALLY SENSITIVE
- FRINGE
- RURAL
- WATER
- PARK 2ND PLAN
- STATE PARK
- ENV. SENSITIVE BARRIER IS
- ELLIS ISLAND
- HACKENSACK MEADOWLANDS
- COUNTY PARK
- COUNTY PARK P2
- PARK 1ST PLAN
- MILITARY
- ELLIS ISLAND - NY
- RURAL ENV. SENSITIVE
- METROPOLITAN
- SUBURBAN
- NATIONAL PARK - CROSS ACC.
- FED PARK, CROSS ACC.
- PARK 1ST & 2ND PLAN
- FEDERAL PARK
- PINELANDS
- Other
- New Jersey

2 8 R

05-13

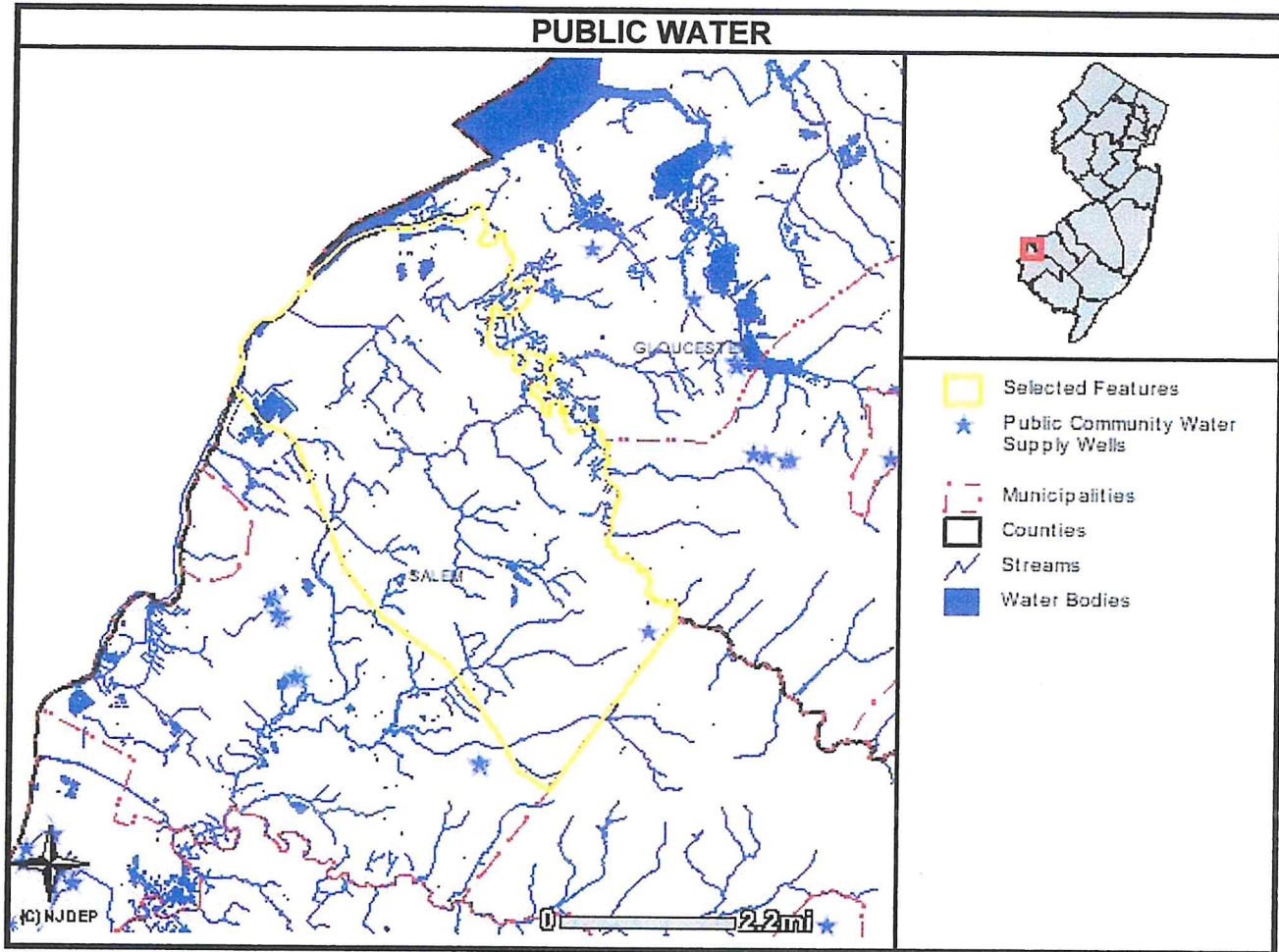


05-14



40

05-15





Bureau of Nonpoint Pollution Control  
Division of Water Quality  
PO Box 029  
Trenton, NJ 08625-0029  
Phone: (609) 633-7021  
Fax: (609) 984-2147

**AUTHORIZATION TO DISCHARGE**  
**R10 -Tier B Municipal Stormwater General Permit**

**Facility Name:**

**PI ID #:** 207292

OLDMANS TWP

**Facility Address:**

**NJPDES #:** NJG0154385

32 W MILL ST  
OLDMANS TWP, NJ 08067-0416

**Type of Activity:** Stormwater Discharge General Permit Authorization New

**Owner:**

OLDMANS TWP  
32 W MILL ST  
OLDMANS TWP, NJ 08067-0416

**Operating Entity:**

OLDMANS TWP  
32 W MILL ST  
OLDMANS TWP, NJ 08067-0416

**Issuance Date:**

03/26/2004

**Effective Date:**

04/01/2004

**Expiration Date:**

02/28/2009

Your Request for Authorization under NJPDES General Permit No. NJ0141861 has been approved by the New Jersey Department of Environmental Protection.

**Date:** 03/26/2004

Barry Chalofsky, P.P., Chief  
Bureau of Nonpoint Pollution Control  
Division of Water Quality  
New Jersey Department of Environmental Protection

# Ordinance No. 2006-06

## Township of Oldmans, County of Salem Municipal Stormwater Management Ordinance

NOW, THEREFORE, BE IT ORDAINED by the Township Committee of the Township of Oldmans, County of Salem and State of New Jersey that the following Chapter and Sections be added to the Oldmans Township:

### CHAPTER 149.

#### STORMWATER MANAGEMENT

#### Section 149.1: 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 minimum stormwater management requirements and controls for "major development," as defined in Section 149.2.

##### 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 pre-empted 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 Oldmans Township.

#### 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 149.2: 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. 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 that 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, Oldmans Township, 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 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 149.3: 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 149.4. 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 149.4: 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 149.10.
- 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 149.4.F and 149.4.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 149.4.F and 149.4.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 149.4.F and 149.4.G to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements of Sections 149.4.F and 149.4.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 149.4.D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 149.4.F and 149.4.G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 149.4.F and 149.4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 149.4.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 149.4.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 149.4.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 149.4.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 149.4.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 149.4.F and 149.4.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 149.7, or found on the Department's website at [www.njstormwater.org](http://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 149.5, 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 149.5, 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 149.2 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.

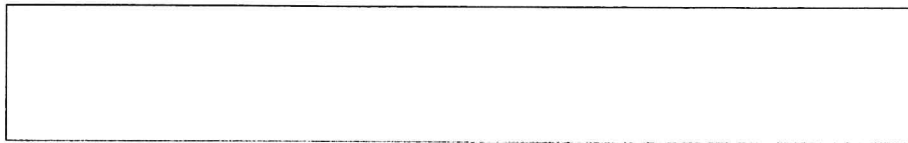


Table 1: Water Quality Design Storm Distribution

| Time<br>(Minutes) | Cumulative<br>Rainfall<br>(Inches) | Time<br>(Minutes) | Cumulative<br>Rainfall<br>(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 149.7, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in Section 149.7. 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

Table 2: TSS Removal Rates for BMPs

| Best Management Practice       | TSS Percent Removal Rate |
|--------------------------------|--------------------------|
| Bioretention Systems           | 90                       |
| Constructed Stormwater Wetland | 90                       |
| Extended Detention Basin       | 40-60                    |
| Infiltration Structure         | 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 149.4.F and 149.4.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 149.7.
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 149.4.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 149.G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 149.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 149.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 149.5: 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 149.5.A.1.a and the Rational and Modified Rational Methods at Section 149.5.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/nigs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

## Section 149.6: 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 149.8.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 149.7: 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 149.8: 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.
- 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.

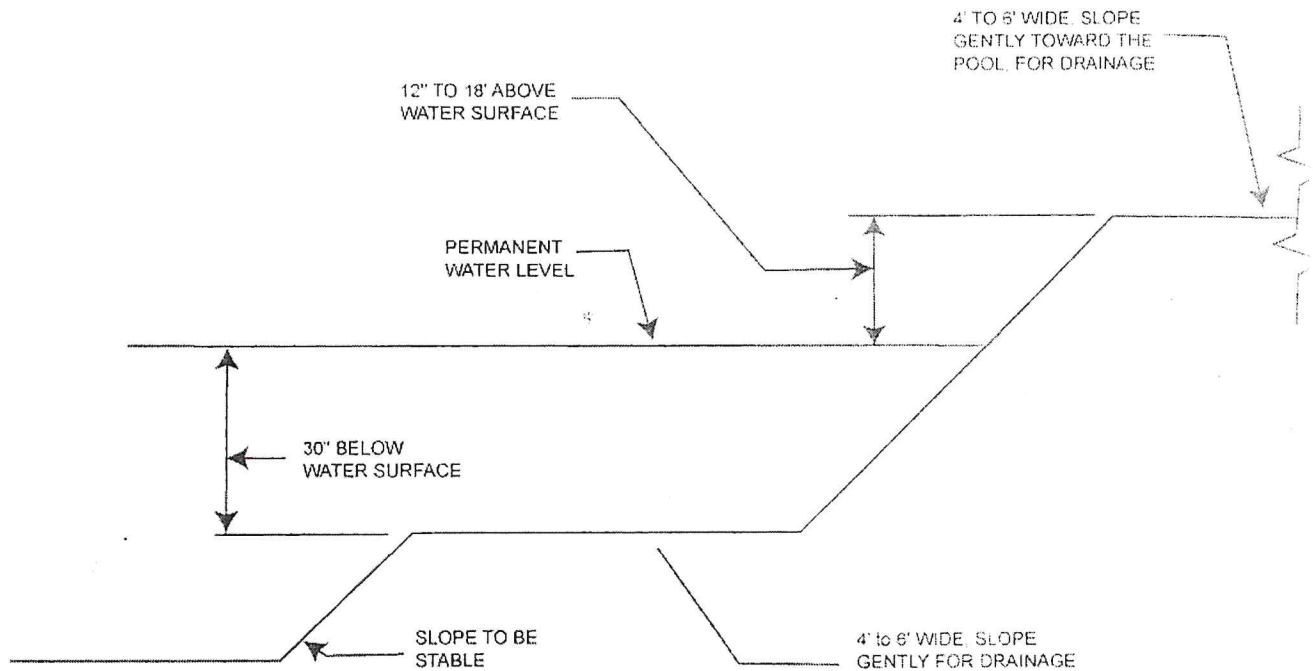
- b. The overflow grate spacing shall be no less than two inches across the smallest dimension.
  - c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
3. For purposes 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 149.8.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 149.9: 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 149.9.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 eighteen (18) copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 149.9.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 149.3 through 149.6 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 149.4 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 149.10.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 149.9.C.1 through 149.9.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 149.10: Maintenance and Repair**

A. Applicability

1. Projects subject to review as in Section 149.1.C of this ordinance shall comply with the requirements of Sections 149.10.B and 149.10.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 149.10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 149.10.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 149.10.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 149.10.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 149.10.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 149.10.B.6 and 149.10.B.7 above.
9. The requirements of Sections 149.10.B.3 and 149.10.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.

C. 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 149.11: Penalties**

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the following penalties:

A fine not to exceed \$1,000.00 and/or imprisonment not to exceed 180 days. Each day the violation continues may be treated as a separate offense.

### **Section 149.12: Effective Date**

This ordinance shall take effect after final adoption by Oldmans Township and approval by the county review agency.

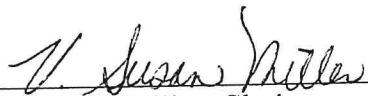
### **Section 149.13: Severability**

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.


### **Section 149.14: Repealer**

All Ordinances or parts thereof, which are inconsistent with the provisions of this Ordinance, are hereby repealed to the extent of such inconsistency.

ATTEST:

  
V. Susan Miller, Clerk

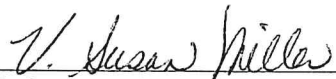
OLDMANS TOWNSHIP

  
Harry A. Moore, Mayor

## NOTICE

Notice is hereby given that the foregoing proposed Ordinance was introduced and passed by the Township Committee of the Township of Oldmans at its regular meeting which was held on Wednesday, April 5, 2006 and that a public hearing upon the said Ordinance will be conducted by the Township Committee at a meeting on Wednesday, May 3, 2006 at 7:30 PM at the Township Hall, Oldmans, New Jersey.

Dated: April 5, 2006

  
V. Susan Miller, Clerk  
Oldmans Township

**PUBLIC NOTICE**

**OLDMANS TOWNSHIP**

**NOTICE OF ADOPTION ORDINANCE 2006-06**

**NOTICE OF ADOPTION OF STORMWATER  
MANAGEMENT ORDINANCE**

The foregoing Ordinance was duly adopted at a meeting of the Oldmans Township Committee held on Wednesday, May 3, 2006 at 7:30 PM

V. Susan Miller, Clerk  
Oldmans Township

Cost \$18.20

5/9/ 1t (2423256)

OLDMANS TOWNSHIP  
ORDINANCE NO. 2006-06

Township of Oldmans, County of Salem, Municipal Stormwater Management Ordinance Notice is hereby given that Ordinance 2006-06 was introduced by the Oldmans Township Committee at a meeting held on April 5, 2006.

In accordance with provisions of P.L. 1995,c259, the Municipal Clerk has prepared a statement setting forth the purpose of the Ordinance. A copy of the Ordinance in its entirety may be obtained without cost by any member of the general public from the Township Clerk, 32 W. Mill St., Pedricktown, NJ..

STATEMENT OF PURPOSE

The general purpose of this ordinance is to establish minimum stormwater management requirements and controls for "major development," as defined in Section 149.2 of the ordinance.

NOTICE

Notice is hereby given that the foregoing proposed Ordinance was introduced and passed by the Township Committee of the Township of Oldmans at a meeting which was held on Wednesday, April 5, 2006 and that a public hearing upon the said Ordinance will be conducted by the Township Committee at a meeting on Wednesday, May 3, 2006, at 7:30 p.m. at the Township Hall, Pedricktown, New Jersey.

  
V. Susan Miller, RMC

| Public Notice                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Public Notice |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <p><b>PUBLIC NOTICE</b></p> <p><b>OLDMANS TOWNSHIP</b></p> <p><b>ORDINANCE NO. 2006-06</b></p> <p><b>Municipal Stormwater Management Ordinance</b></p> <p>Notice is hereby given the Ordinance 2005-06 was introduced by the Oldmans Township Committee at a meeting held on April 5, 2006.</p> <p>In accordance with provisions of P.L. 1995, c 259, the Municipal Clerk has prepared a statement setting forth the purpose of this Ordinance. A copy of the Ordinance in its entirety may be obtained without cost by any member of the general public from the Township Clerk, 32 W. Mill St., Pedricktown, NJ</p> <p style="text-align: center;"><b>STATEMENT OF PURPOSE</b></p> <p>The general purpose of this ordinance is to establish minimum stormwater management requirements and controls for "major development," as defined in Section 149.2 of the ordinance.</p> <p style="text-align: center;"><b>NOTICE</b></p> <p>Notice is hereby given that the foregoing proposed Ordinance was introduced and passed by the Township Committee of the Township of Oldmans at a meeting which was held on April 5, 2006 and that a public hearing upon the said Ordinance will be conducted by the Township Committee at a meeting on Wednesday, May 3, 2006 at 7:30 p.m. at the Township Hall, Pedricktown, New Jersey.</p> <p style="text-align: right;">V. Susan Miller, Clerk</p> <p>Cost \$39.90 <span style="float: right;">4/17/ 1t (2419836)</span></p> |               |

OLDMANS TOWNSHIP  
RESOLUTION NO. 2006-56\_\_\_\_\_


WHEREAS, an Ordinance entitled MUNICIPAL STORMWATER MANAGEMENT ORDINANCE was introduced and passed first reading on April 5, 2006, and

WHEREAS, public hearing has been held thereon;

NOW THEREFORE, BE IT RESOLVED by the Mayor and Township Committee of the Township of Oldmans, County of Salem, and State of New Jersey, that an Ordinance entitled MUNICIPAL STORMWATER MANAGEMENT ORDINANCE be finally adopted and that notice of its adoption and the ordinance be published in the Today's Sunbeam in accordance with law.

Adopted: May 3, 2006

\_\_\_\_\_  
V. Susan Miller, Clerk

  
\_\_\_\_\_  
Harry A. Moore, Mayor



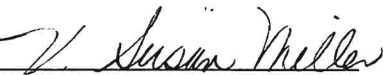
OLDMANS TOWNSHIP  
RESOLUTION NO. 2006-\_\_\_\_\_

WHEREAS, an Ordinance entitled MUNICIPAL STORMWATER MANAGEMENT ORDINANCE was introduced and passed first reading on April 5, 2006, and

WHEREAS, public hearing has been held thereon;

NOW THEREFORE, BE IT RESOLVED by the Mayor and Township Committee of the Township of Oldmans, County of Salem, and State of New Jersey, that an Ordinance entitled MUNICIPAL STORMWATER MANAGEMENT ORDINANCE be finally adopted and that notice of its adoption and the ordinance be published in the Today's Sunbeam in accordance with law.

Adopted: May 3, 2006

  
\_\_\_\_\_  
V. Susan Miller, Clerk

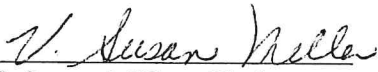
  
\_\_\_\_\_  
Harry A. Moore, Mayor

## Ordinance 2006-06

### NOTICE OF ADOPTION OF STORMWATER MANAGEMENT ORDINANCE

The foregoing named Ordinance was duly adopted at a meeting of the Township Committee of the Township of Oldmans held Wednesday, May 3, 2006 at 7:30 PM.

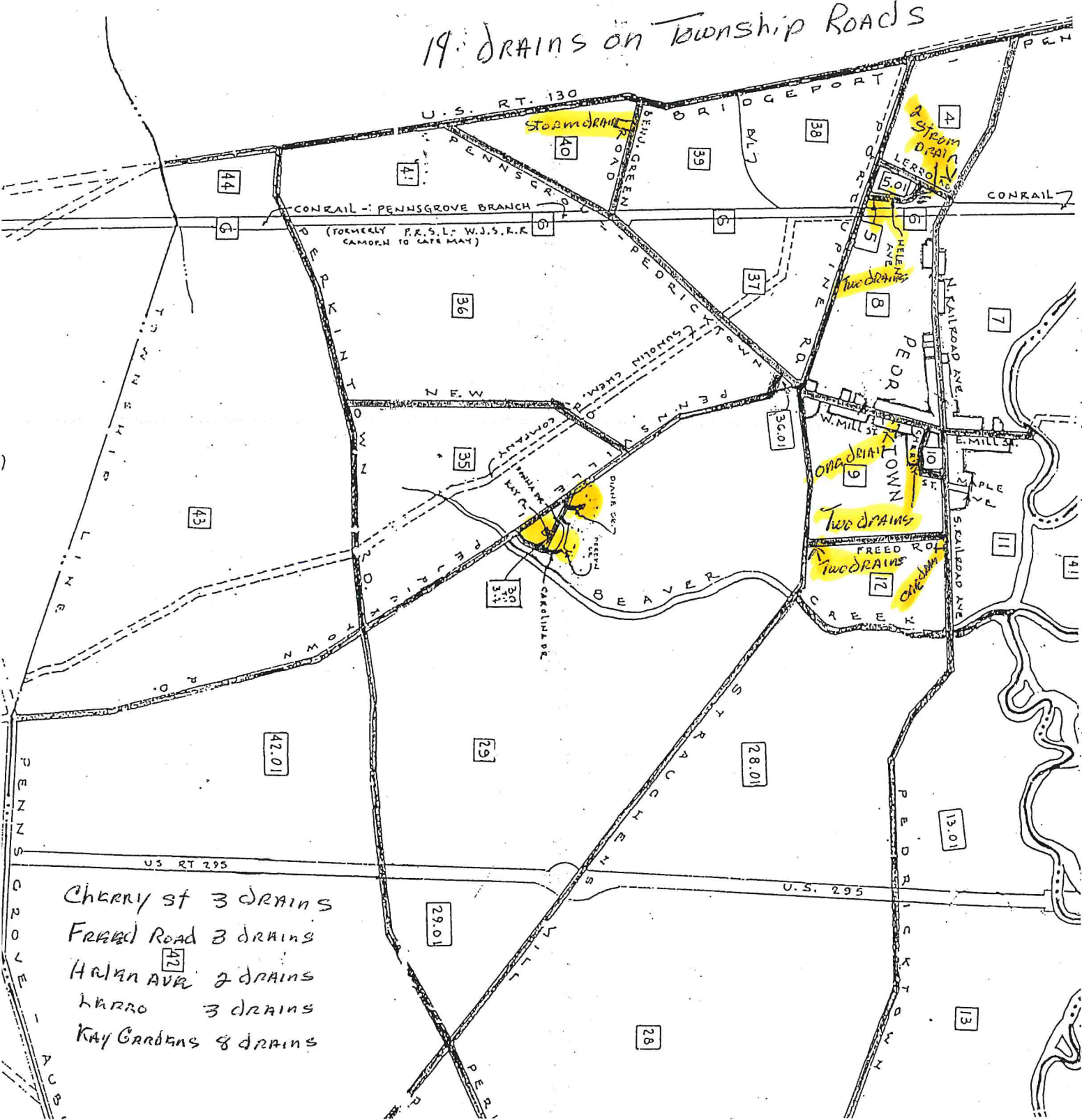
Dated: *May 3, 2006*

  
\_\_\_\_\_  
V. Susan Miller, Clerk  
Oldmans Township

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# OLDMANS TOWNSHIP STORMWATER DRAINS

19 DRAINS on Township Roads



- Cherry St 3 DRAINS
- Freed Road 3 DRAINS
- Helen Ave 2 DRAINS
- Larao 3 DRAINS
- Kay Gardens 8 DRAINS