Pennoni

# Township of Delran

(Tier A Municipality)



# Municipal Stormwater Management Plan (MSWMP)

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New Jersey License No. GE43449

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# Township of Delran

# Municipal Stormwater Management Plan

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## Introduction

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

The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land.

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 Delran 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:

a. Reduce flood damage, including damage to life and property.
b. Minimize, to the extent practical, any increase in stormwater runoff from any new development.
c. Reduce soil erosion from any development or construction project.
d. Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures.
e. Maintain groundwater recharge.
f. Prevent, to the greatest extent feasible, an increase in nonpoint pollution.
g. Maintain the integrity of stream channels for their biological functions, as well as for drainage.
h. Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water.

i. Protect public safety through the proper design and operation of stormwater basins.

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

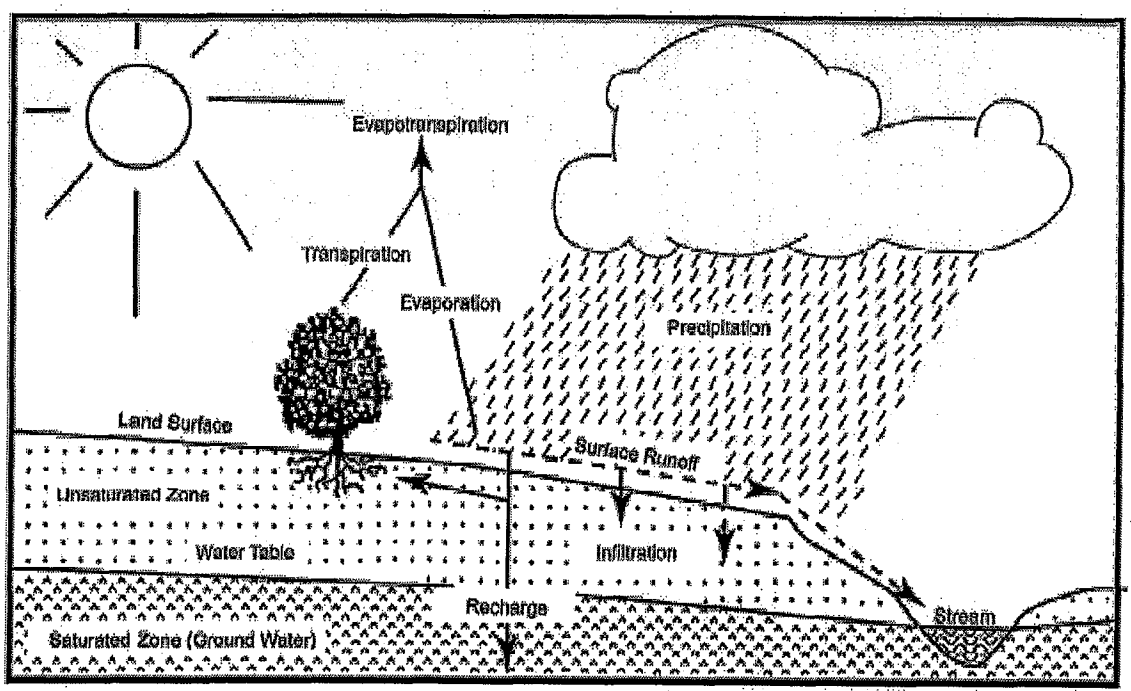
## Stormwater Discussion

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

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.




Source: New Jersey Geological Survey Report GSR-32.

Figure 1: Hydrologic Cycle

## Background

Delran Township is located along the Route 130 corridor in Burlington County, New Jersey. It is composed of 7.3 square miles and is a suburban residential community. The population has grown 17.9% in the ten-year period of 1990 to 2000. The year 2000 population was determined to be 15,536 residents. It is expected that the population will reach 18,610 residents by the year 2025, a 20% increase from the 2000 census. The Township experienced a large portion of its development between 1950 and 1980, but it was estimated to have approximately 400 remaining vacant parcels as of 1999. Figure 2 provides a graphic illustration of the Township on the USGS quadrangle map.

The northernmost area in Delran is comprised of the Delran Harbor, which provides access to the Delaware River. Swedes Run flows through the Township perpendicular to the Delaware River. Laurel Run, Pompeston Creek and Boundary Creek run through the Township, and the Rancocas Creek provides the border to the west. There are also numerous lakes and ponds scattered throughout the Township. Swedes Lake is the largest

water body and is located near the Delran Harbor. Lake Lonnie is to its south and adjacent to Swedes Run. A map of the Township's waterways is provided as Figure 3.

The New Jersey Department of Environmental Protection ("NJDEP") has established the Ambient Biomonitoring Network ("AMNET") to monitor and document the health of the state waterways. Sites are classified as non-impaired, moderately impaired, or severely impaired based on biometrics related to benthic macroinvertebrate data. The New Jersey Integrated Water Quality Monitoring and Assessment Report, 305(b) and 303(d), is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants. According to this data, Swedes Run is the only waterway within the Township that is impaired. Its impairment is identified by AMNET as benthic macroinvertebrates. The Delaware River, bordering the Township, is also impaired. Its impairment is identified as PCBs.

Some impaired waters are issued a Total Maximum Daily Load ("TMDL") from NJDEP for the pollutant. 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 more of its designated uses. Implementation plans must be adopted to comply with a NJDEP TMDL. The United States Environmental Protection Agency established and approved a TMDL for the Delaware River on December 15, 2003 for PCBs. The Delran Township MSWMP is consistent with this TMDL and will comply with the strategies developed to reduce the current PCB loadings from both point and nonpoint sources.

The Township does not experience any significant flooding problems, with the exception of occasional flooding along Norman Avenue and River Drive (aka "Dredge Harbor"), Westover Drive and Waterford Drive. Four (4) Special Flood Hazard Areas are identified on Federal Emergency Management Area Flood Insurance Rate maps ("FEMA FIRM maps"). Those areas are defined as areas adjacent to Swedes Run, Rancocas Creek, Pompeston Creek and Dredge Harbor.

As the impervious cover has increased in Delran, the peak and volumes of stream flows have also increased. The high imperviousness of the Township has decreased the groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months.

The impacts of climate changes are predicted to increase the volatility and intensity of weather events, and increases in sea level will impact coastal communities. Stormwater management plans will need to be reviewed and updated as flood plain delineations and the probability of flood events (e.g., 25-year, 50-year and 100-year floods) are revised. Those portions of Delran that are situated along the Delaware Estuary (tidal) would be

impacted by sea level changes; however, such changes are not predicted to be significant until later this century.

A map of the groundwater recharge areas is presented as Figure 4. Wellhead protection areas, also a required aspect of the MSWMP, are shown in Figure 5. There are three wellhead protection areas within the Township. There are also numerous wellhead protection areas in the surrounding municipalities.

## Design and Performance Standards

Delran has adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The Stormwater Control Ordinance, Ordinance 2006-6, was adopted on May 23, 2006.

Township inspectors will observe the construction of the projects to ensure that the stormwater management measures are constructed as designed.

## Plan Consistency

Delran Township is not currently within a Regional Stormwater Management Planning Area. However, a regional stormwater management plan ("RSWMP") for the Pompeston Creek is being developed. When the RSWMP is implemented, this MSWMP will be revised to be consistent with it. Also, a TMDL for PCB has been adopted in the Delaware River. The plan will be consistent with the TMDL regulations and any numeric values established. If a Delran waterway is issued an additional TMDL or a RSWMP is developed, this MSWMP will be revised to be consistent.

The Delran MSWMP is consistent with the Residential Site Improvement Standards (RSIS) as specified in N.J.A.C. 5:21. Any review of residential sites for stormwater management compliance will follow the most recent RSIS and this plan will be revised to include any RSIS updates.

The Delran Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. Township inspectors will enforce these standards at all construction sites and report any violations or inconsistencies to the local Soil Conservation District.

## Nonstructural Stormwater Management Strategies

Delran has reviewed the master plan, land use and zoning ordinances, and maps to determine what adjustments are needed for the implementation of the nonstructural stormwater management techniques. The ordinances that have been revised are listed below.

Section 310-5. Applicability of Chapter 37, Land Use Procedures and Chapter 308, Stormwater Management.

This section was revised with the following text: "Nothing in this Chapter 310, Subdivision of Land shall be deemed to be in conflict with Chapter 308, Stormwater Management. In the event of any inconsistency, whether perceived or actual, the provisions of Chapter 308, Stormwater Management shall be controlling."

Section 310-34. Parking lots.

This section was amended to encourage the use of curb cuts and/or flush curbs to allow for overland flow to landscaped areas for stormwater management. It also encourages planners and architects to utilize natural vegetated swales in their designs.

Section 310-39. Storm drainage.

This section was amended to comply with the New Jersey Stormwater Management Regulations Best Management Practices Manual and Residential Site Improvement Standards.

Section 310-41. Sidewalks, curbs and gutters.

This section was amended to encourage the developers to drain sidewalks to landscaped areas and use permeable surfaces where appropriate. It also encourages curb cuts and/or flush curbs which allow for overland flow to landscaped areas.

Section 310-47. Planted buffer areas and green space.

This section was amended to limit tree clearing to no greater than 20 feet beyond the driveway, parking lot, stormwater management facilities, and building footprint except as approved by the Township Planner.

Section 310-50. Recreation and open space.

This section was amended to increase the percentage of total area set aside for open space and recreation in subdivisions of 25 or more dwellings from 10% to 15%.

Section 310-59. Compliance with design criteria.

This section was amended to conform to the New Jersey Stormwater Management Rules.

The portion of the Code of Delran Township, regarding lot size and maximum percent impervious surface, may be further reviewed. Delran may evaluate the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. Also, the Code may be amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures.

## Land Use/ Build-Out Analysis

A detailed land use analysis for Delran was conducted. Figures 6 and 7 illustrate the HUC14s within the Township. A zoning plan is attached as Figure 8 and an existing land use map, based on the 1995/97 GIS information from NJDEP, is attached as Figure 9. The build-out calculations for impervious cover are shown in Table 1, and were calculated using the Delran zoning plan and zoning regulations. The existing impervious percentages are estimates based on the existing land use map, NJDEP impervious cover maps, aerial photography, and the current zoning regulations. As expected, the build-out of much of the currently undeveloped land will result in a significant increase in the impervious cover within the Township.

Table 2 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table 3.

At full build-out, each HUC 14s will experience different pollutant loading ranging from 21 lbs/year to 2,468 lbs/year for Phosphorus loading, 230 lbs/year to 24,063 lbs/year for Nitrogen loading, and 2,878 lbs/year to 351,827 lbs/year for total suspended solid loading. Stormwater management strategies will be used to minimize the amount of nonpoint pollution occurring with increased development. Stormwater quality measures include directing runoff into natural areas and away from waterways to be filtered or infiltrated into the ground. Existing forested and vegetated areas, restricted for future development, can also be used as water quality mitigation areas for discharged sheet flow. The Township of Delran has adopted design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of runoff, including pollutant loading, into receiving water bodies. The Township has also adopted nonstructural stormwater management strategies which will reduce the adverse effects predicted by the build-out analysis. The nonstructural stormwater strategies adopted appear in the previous section of this report and include increased buffer areas and open space and encourage the construction of permeable services. The mitigation plans provided in this report will reduce the negative build-out effects in situations in which a variance or exception to the design and performance standards was granted. It is the intention of these efforts to prevent the total pollutant loads per year, created by the complete Township build-out as regulated by zoning ordinances, from being carried directly into waterways, but rather to be infiltrated, filtered, treated, or otherwise directed away from adjacent water bodies.

## Mitigation Plans

This mitigation plan is provided for any proposed development that is granted a variance or exemption to the design and performance standards for stormwater runoff quality, stormwater runoff quantity, and groundwater recharge. The existence of the mitigation plan does not preclude the requirement than an applicant meet the design and performance standards to the maximum extent practicable but allows the Township to

waive strict compliance of one or more of the performance standards where full compliance cannot be reasonably accommodated on-site.

Applicants may incorporate specific mitigation projects and identified by the Township Engineer, or they may work with the Township to develop a suitable project according to the following requirements:

**Mitigation Project Criteria**

A mitigation project must be implemented within the same area that would contribute to a sensitive receptor impacted by the development. If no sensitive receptor has been identified, the project should be implemented within the same drainage area as close to the proposed development as possible. The project may also be located elsewhere in the Township at a location that would provide a greater benefit.

Sensitive receptors are areas with specific sensitivity to impacts of stormwater, whether through changes in stormwater runoff quality, quantity, and groundwater recharge. All waterways and farm lands within the Township have been identified as sensitive receptors for stormwater. The Delaware River and Swedes Run are specially noted as sensitive receptors due to their impairment.

The mitigation project must provide additional groundwater recharge benefits, or provide protection of previously developed property from stormwater runoff. The developer must also ensure long-term maintenance for the project, including those maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater Best Management Practices Manual. A maintenance plan, including the maintenance responsibility and the expected costs shall be included. The responsible party for the construction and maintenance must also be identified.

The applicant may also select a project type from the following list to compensate for not meeting the requirements of the individual performance standards.

Groundwater Recharge

- Retrofit existing detention basin(s) to provide additional annual groundwater recharge.
- Replace impervious parking lot with permeable paving to provide additional groundwater recharge.

Water Quality

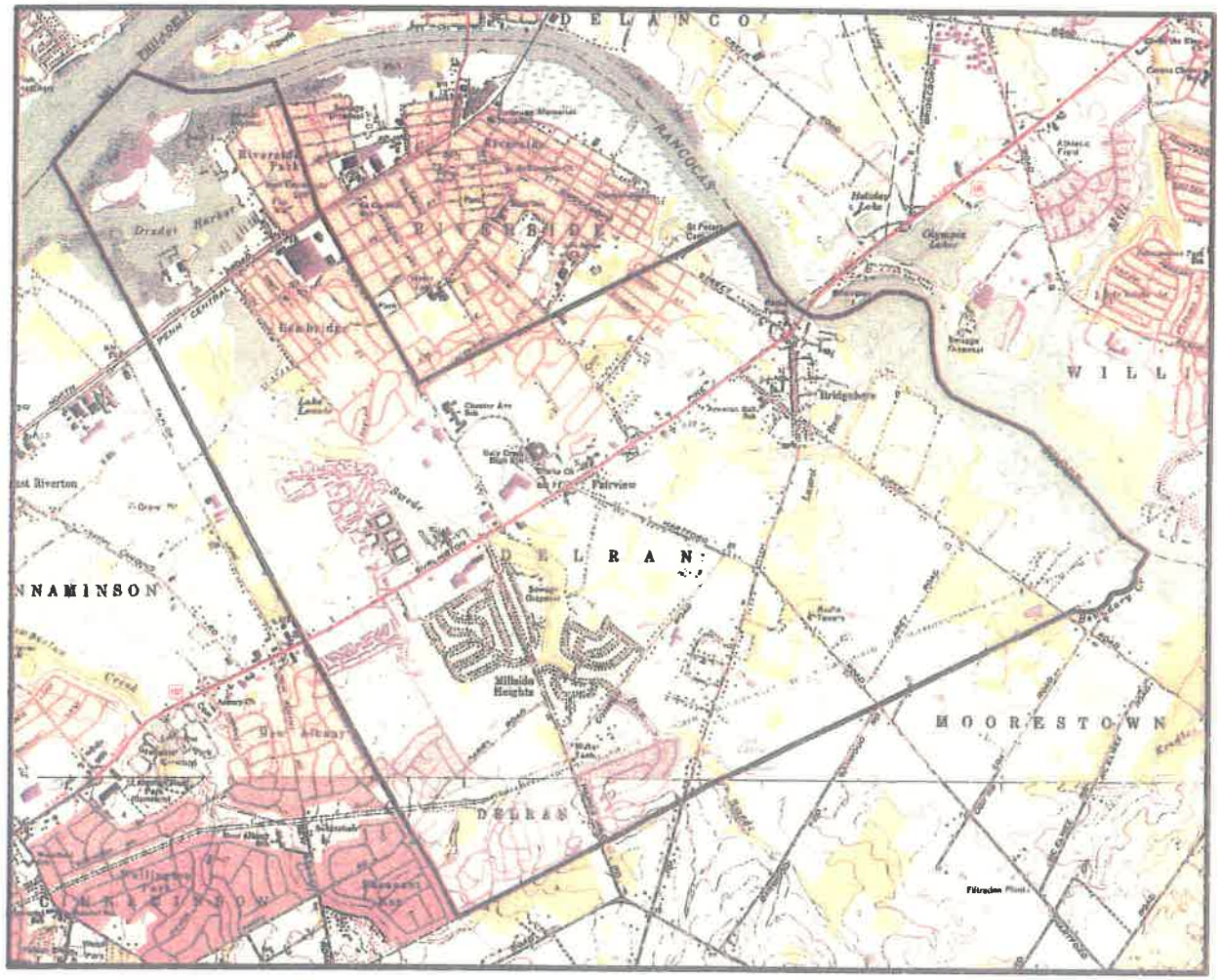
- Retrofit existing stormwater management facility to provide removal of 80% of total suspending solids from the parking lot runoff.
- Retrofit existing parking area to provide removal of total suspended solids. The retrofit BMP must be installed underground and may not reduce number of parking spaces.
- Enhance vegetative buffer within the "stream corridor".

Water Quantity

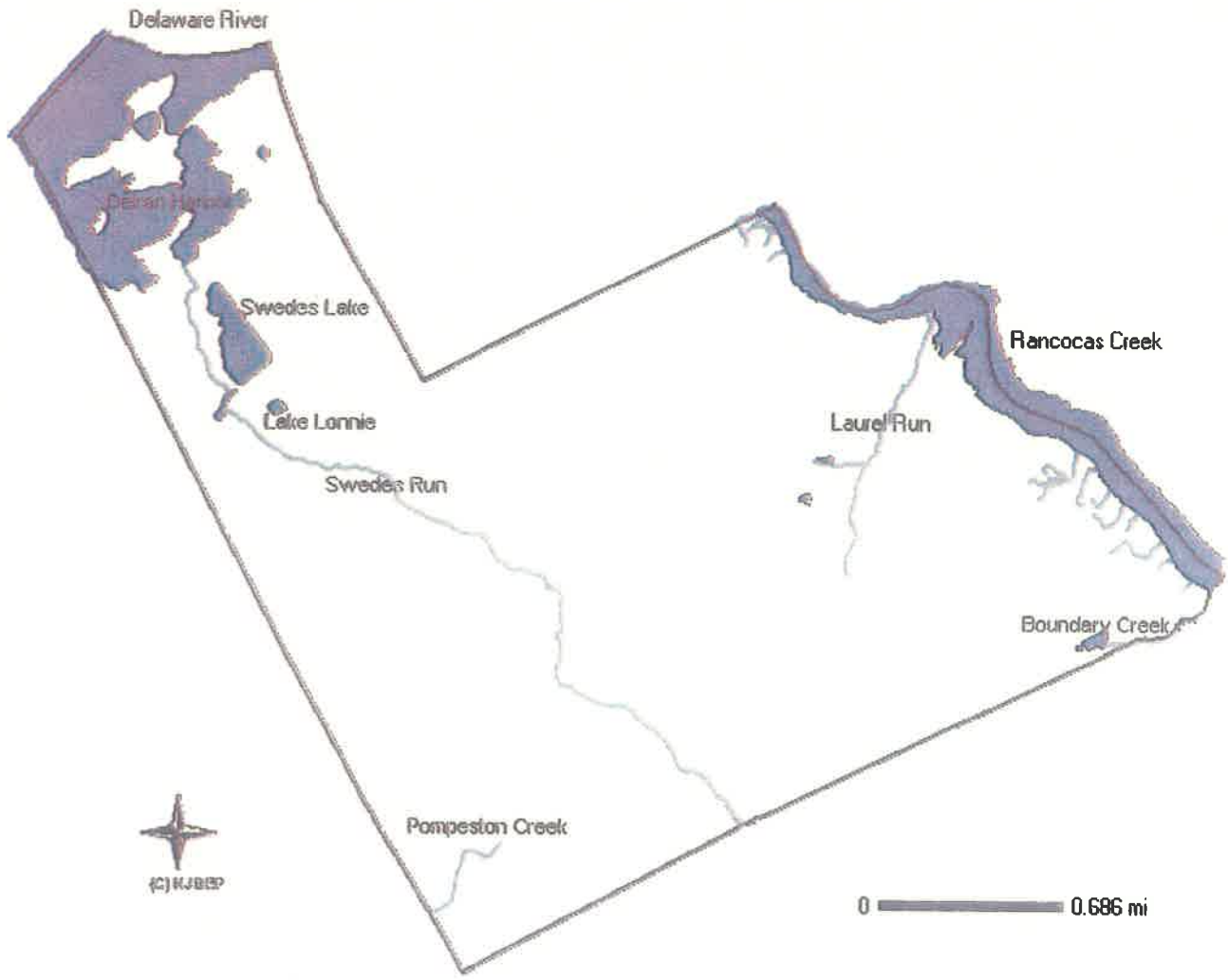
- Install stormwater management measures in the open space to reduce the peak flow from the upstream development on the receiving stream for the 2, 10, and 100 –year storms respectively.

Financial contributions may be used in situations where a project will have no immediate impact to a sensitive receptor or it is not practical to have a mitigation project for an individual application. In such cases, the contributions may be used alone or may be put towards a larger project. Funding a study or analysis for the Township may also be an acceptable compensation.

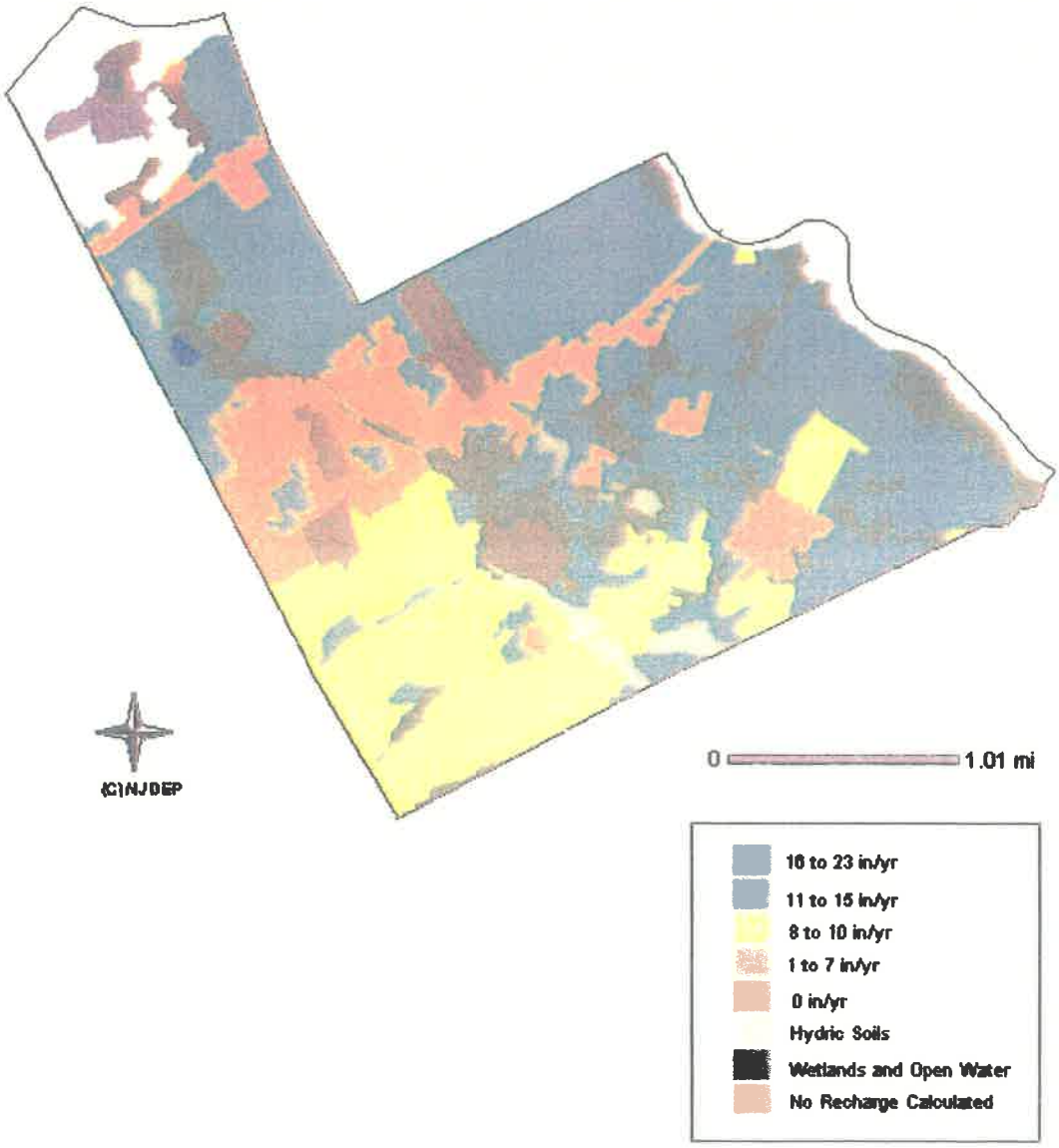
# Figure 2: Township Boundary on USGS Quadrangle



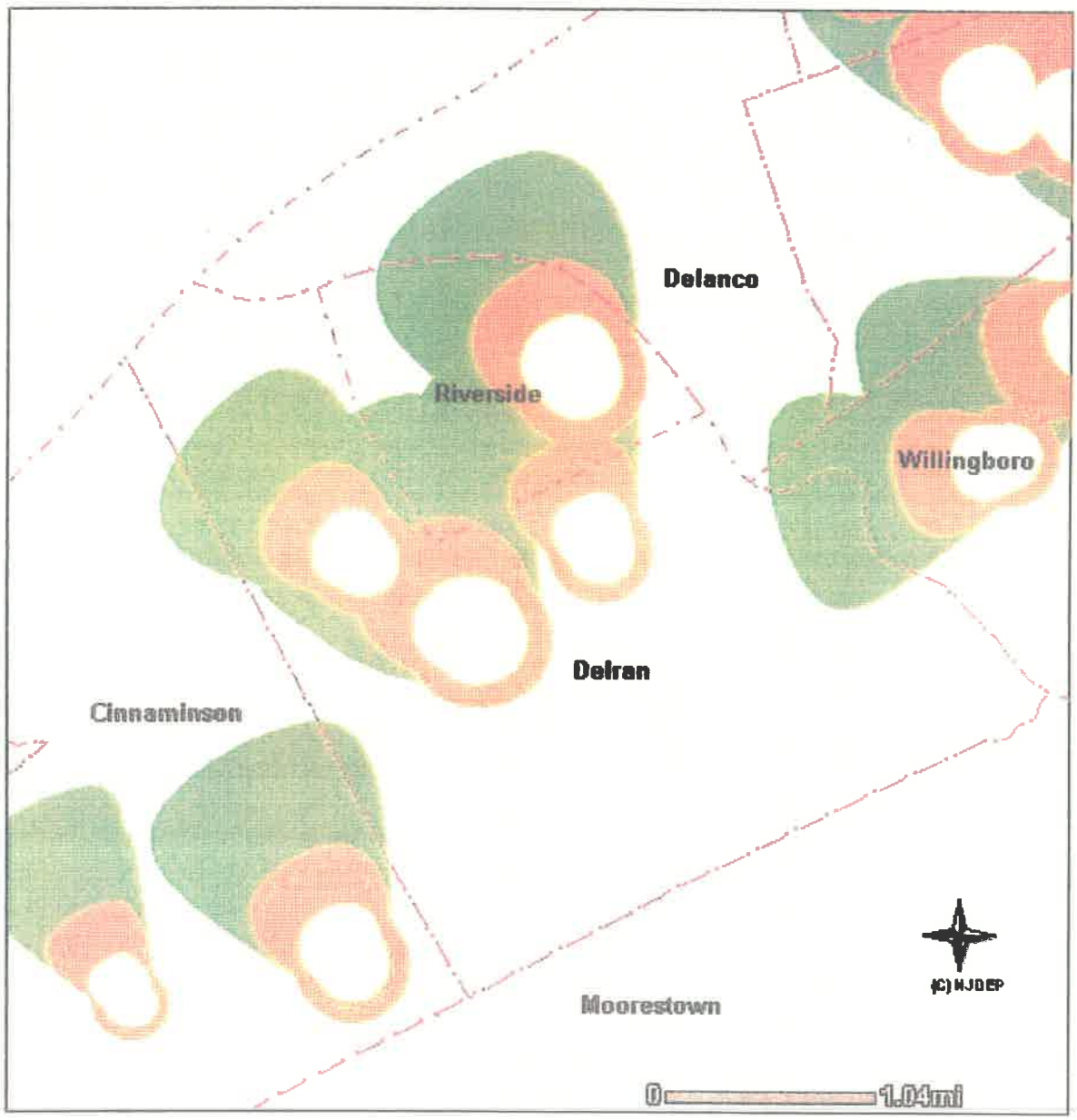
# Figure 3: Township Waterways



# Figure 4: Ground Water Recharge



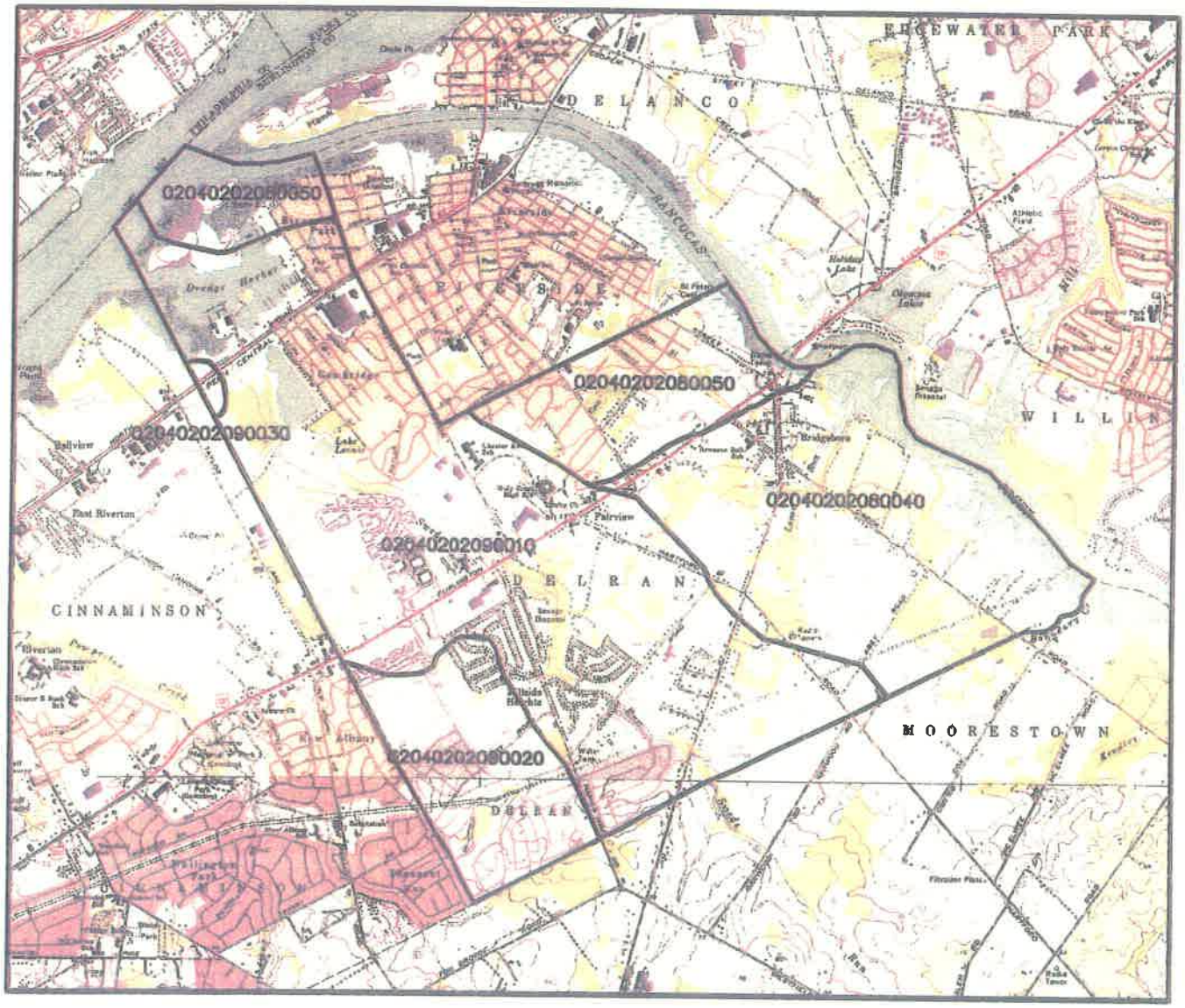
# Figure 5: Wellhead Protection Areas




Tier 1: 2 Year
Tier 2: 5 Year
Tier 3: 12 Year

# Figure 6: Hydrologic Units (HUC14s) Within Township

# Figure 7: HUC14s on USGS Quadrangle




## ZONES:

| | |
|---|---|
| A-1 | AGRICULTURAL |
| R-1 | SINGLE FAMILY RESIDENCE |
| R-2 | ONE & TWO FAMILY RESIDENCE |
| R-3 | MULTI-FAMILY RESIDENCE |
| M-1 | LIMITED INDUSTRIAL & OFFICE |
| M-2 | GENERAL INDUSTRIAL & COMMERCIAL |
| M-3 | SPECIAL INDUSTRIAL & COMMERCIAL |
| C-1 | LIMITED RETAIL & SERVICES |
| C-2 | GENERAL COMMERCIAL |
| C-3 | LIMITED COMMERCIAL & INSTITUTIONAL |
| PCD | PLANNED COMMERCIAL DEVELOPMENT |
| H | HARBOR |
| NC-1 | NEIGHBORHOOD COMMERCIAL 1 |
| NC-2 | NEIGHBORHOOD COMMERCIAL 2 |
| O-1 | OFFICE 1 |

Figure 8

# ZONING MAP 7/2003

## DELRAN TOWNSHIP

BURLINGTON COUNTY
NEW JERSEY

GRAPHIC SCALE

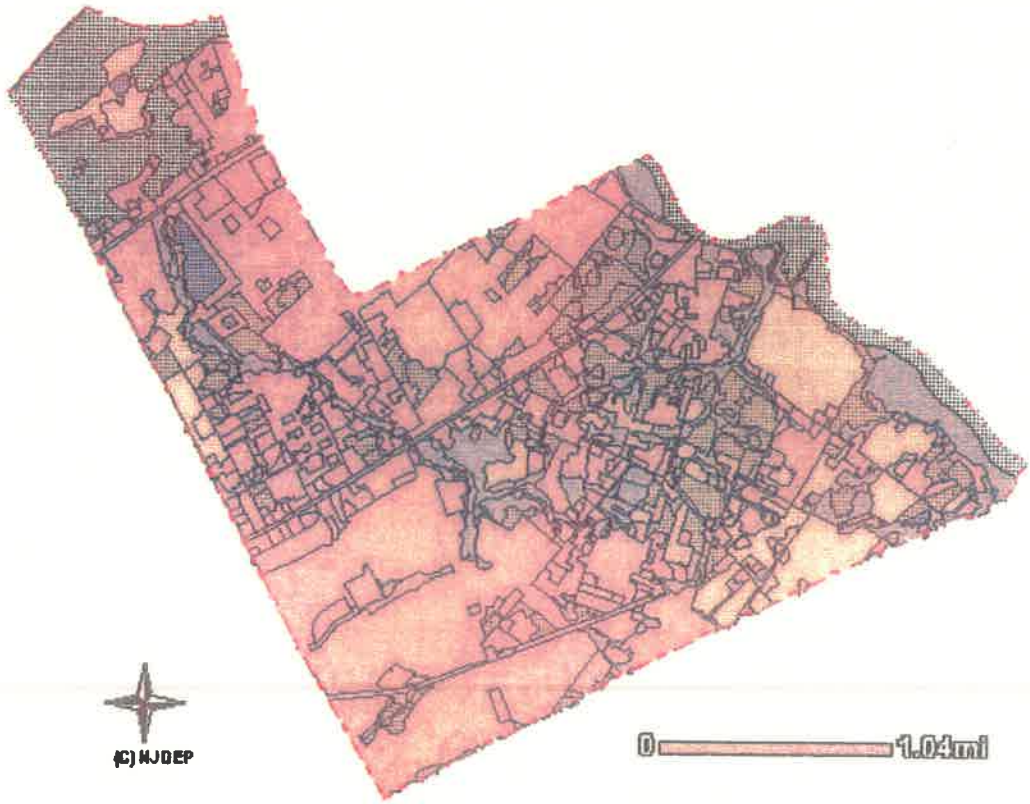
1000 0 500 1000 2000 4000

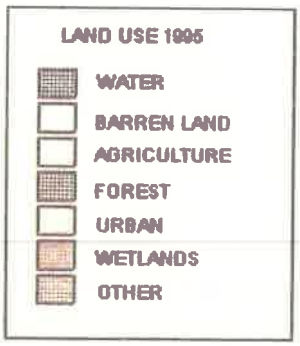
( IN FEET )
1 inch = 1000 ft.

PREPARED BY
RICHARD A. ALAIMO ASSOCIATES
MOUNT HOLLY, NEW JERSEY

M-130-111 ZONINGMAP 2003.DWG ZONEMAP.SCR 4-1-03

# Figure 9: Land Use Map



## Table 1: Build-Out Analysis for HUC14 Zones

| HUC 14 and Zone | Total Area (Acres) | Existing Impervious (%) | Existing Impervious (Acres) | Constrained Land (Acres) | Developable Area (Acres) | Allowable Impervious (%) | Build-out Impervious (Acres) |
|---|---|---|---|---|---|---|---|
| 02040202080050 - *Rancocas Creek* | | | | | | | |
| R-1 | 324.75 | 20.00% | 64.95 | 19.80 | 304.95 | 50% | 152.48 |
| R-2 | 52.48 | 20.00% | 10.50 | 21.42 | 31.06 | 60% | 18.64 |
| C-1 | 10.83 | 60.00% | 6.50 | 0.25 | 10.58 | 60% | 6.35 |
| C-2 | 72.71 | 40.00% | 29.08 | 1.65 | 71.06 | 60% | 42.63 |
| H | 142.60 | 5.00% | 7.13 | 133.31 | 9.29 | 80% | 7.43 |
| O-1 | 9.74 | 0.00% | 0.00 | 0.00 | 9.74 | 60% | 5.84 |
| **TOTALS** | **613.10** | **12.31%** | **75.44** | **41.21** | **436.67** | **53.44%** | **233.36** |
| 02040202090030 - *Delware River Tributaries* | | | | | | | |
| M-3 | 7.17 | 50.00% | 3.59 | 0.00 | 7.17 | 60% | 4.30 |
| H | 7.22 | 0.00% | 0.00 | 0.00 | 7.22 | 80% | 5.77 |
| **TOTALS** | **14.39** | **24.92%** | **3.59** | **0.00** | **14.39** | **70.03%** | **10.08** |

## Table 1: Build-Out Analysis for HUC14 Zones

| HUC 14 and Zone | Total Area (Acres) | Existing Impervious (%) | Existing Impervious (Acres) | Constrained Land (Acres) | Developable Area (Acres) | Allowable Impervious (%) | Build-out Impervious (Acres) |
|---|---|---|---|---|---|---|---|
| 02040202090020 - *Pompeston Creek* | | | | | | | |
| R-1 | 400.57 | 20.00% | 80.11 | 51.87 | 348.70 | 50% | 174.35 |
| R-3 | 8.19 | 70.00% | 5.73 | 8.19 | 0.00 | N/A | 5.73 |
| C-2 | 1.77 | 75.00% | 1.32 | 0.00 | 1.77 | 60% | 1.06 |
| **TOTALS** | **410.52** | **21.23%** | **87.17** | **60.05** | **350.47** | **51.69%** | **181.14** |
| 02040202080040 - *Laurel Run* | | | | | | | |
| A-1 | 960.78 | 10.00% | 96.08 | 153.71 | 807.07 | 60% | 484.24 |
| R-2 | 171.88 | 25.00% | 42.97 | 0.59 | 171.29 | 60% | 102.77 |
| C-2 | 64.15 | 50.00% | 32.08 | 0.00 | 64.15 | 60% | 38.49 |
| C-3 | 0.64 | 0.00% | 0.00 | 0.00 | 0.64 | 60% | 0.38 |
| PCD | 45.88 | 10.00% | 4.59 | 0.00 | 45.88 | 70% | 32.11 |
| NC-1 | 30.87 | 20.00% | 6.17 | 0.00 | 30.87 | 60% | 18.52 |
| **TOTALS** | **1,274.20** | **14.27%** | **181.89** | **154.30** | **1,119.90** | **60.41%** | **676.53** |

## Table 1: Build-Out Analysis for HUC14 Zones

| HUC 14 and Zone | Total Area (Acres) | Existing Impervious (%) | Existing Impervious (Acres) | Constrained Land (Acres) | Developable Area (Acres) | Allowable Impervious (%) | Build-out Impervious (Acres) |
|---|---|---|---|---|---|---|---|
| 0204020209001O - *Swede Run* | | | | | | | |
| A-1 | 354.55 | 10.00% | 35.46 | 27.59 | 326.96 | 60% | 196.18 |
| R-1 | 616.72 | 20.00% | 123.34 | 10.09 | 606.63 | 50% | 303.31 |
| R-2 | 100.35 | 20.00% | 20.07 | 0.00 | 100.35 | 60% | 60.21 |
| R-3 | 15.73 | 70.00% | 11.01 | 0.00 | 15.73 | N/A | 11.01 |
| M-1 | 111.83 | 70.00% | 78.28 | 0.00 | 111.83 | 60% | 67.10 |
| M-2 | 239.87 | 50.00% | 119.93 | 0.00 | 239.87 | 60% | 143.92 |
| M-3 | 238.90 | 60.00% | 143.34 | 175.26 | 63.64 | 60% | 38.18 |
| C-2 | 184.63 | 70.00% | 129.24 | 0.00 | 184.63 | 60% | 110.78 |
| C-3 | 122.67 | 10.00% | 12.27 | 0.00 | 122.67 | 60% | 73.60 |
| PCD | 39.03 | 15.00% | 5.85 | 0.00 | 39.03 | 70% | 27.32 |
| H | 217.49 | 60.00% | 130.50 | 174.62 | 42.87 | 80% | 34.30 |
| NC-2 | 17.57 | 25.00% | 4.39 | 0.00 | 17.57 | 80% | 14.06 |
| O-1 | 64.86 | 15.00% | 9.73 | 0.00 | 64.86 | 60% | 38.92 |
| Open Space | 86.12 | 0.00% | 0.00 | 0.00 | 86.12 | 0% | 0.00 |
| **TOTALS** | **2,410.31** | **34.16%** | **823.41** | **387.56** | **2,022.75** | **55.31%** | **1,118.88** |

## Table 2: Projected 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/year) |
|---|---|---|---|
| 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 | 10 | 120 |
| Agricultural | 1.3 | 10 | 300 |
| Forest, Water Wetlands | 0.1 | 3 | 40 |
| Barrenland/ Transitional Area | 0.5 | 5 | 60 |

# Table 3: Nonpoint Source Loads at Build-out

| HUC 14 and Zone | Land Cover | Developable Area (Acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/year) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|---|---|---|---|---|---|---|---|---|
| 02040202080050 - *Rancocas Creek* | | | | | | | | |
| R-1 | Low Density, Rural Residential | 304.95 | 0.60 | 182.97 | 5.00 | 1,524.75 | 100.00 | 30,495.00 |
| R-2 | Low Density, Rural Residential | 31.06 | 0.60 | 18.64 | 5.00 | 155.30 | 100.00 | 3,106.00 |
| C-1 | Commercial | 10.83 | 2.10 | 22.74 | 22.00 | 238.26 | 200.00 | 2,166.00 |
| C-2 | Commercial | 71.06 | 2.10 | 149.23 | 22.00 | 1,563.32 | 200.00 | 14,212.00 |
| H | Industrial | 9.29 | 1.50 | 13.94 | 16.00 | 148.64 | 200.00 | 1,858.00 |
| O-1 | Commercial | 9.74 | 2.10 | 20.45 | 22.00 | 214.28 | 200.00 | 1,948.00 |
| **TOTALS** | | **436.93** | | **407.96** | | **3,844.55** | | **53,785.00** |
| 02040202090030 - *Delaware River Tributaries* | | | | | | | | |
| M-3 | Industrial | 7.17 | 1.50 | 10.76 | 16.00 | 114.72 | 200.00 | 1,434.00 |
| H | Industrial | 7.22 | 1.50 | 10.83 | 16.00 | 115.52 | 200.00 | 1,444.00 |
| **TOTALS** | | **14.39** | | **21.59** | | **230.24** | | **2,878.00** |

# Table 3: Nonpoint Source Loads at Build-out

| HUC 14 and Zone | Land Cover | Developable Area (Acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/year) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|---|---|---|---|---|---|---|---|---|
| 02040202090020 - *Pompeston Creek* | | | | | | | | |
| R-1 | Low Density, Rural Residential | 348.70 | 0.60 | 209.22 | 5.00 | 1,743.50 | 100.00 | 34,870.00 |
| R-3 | High, Medium Density Rural | 8.19 | 1.40 | 11.47 | 15.00 | 122.85 | 140.00 | 1,146.60 |
| C-2 | Commercial | 1.77 | 2.10 | 3.72 | 22.00 | 38.94 | 200.00 | 354.00 |
| **TOTALS** | | **358.66** | | **224.40** | | **1,905.29** | | **36,370.60** |
| 02040202080040 - *Laurel Run* | | | | | | | | |
| A-1 | Agricultural | 807.07 | 1.30 | 1,049.19 | 10.00 | 8,070.70 | 300.00 | 242,121.00 |
| R-2 | Low Density, Rural Residential | 171.29 | 0.60 | 102.77 | 5.00 | 856.45 | 100.00 | 17,129.00 |
| C-2 | Commercial | 64.15 | 2.10 | 134.72 | 22.00 | 1,411.30 | 200.00 | 12,830.00 |
| C-3 | Commercial | 0.64 | 2.10 | 1.34 | 22.00 | 14.08 | 200.00 | 128.00 |
| PCD | Commercial | 45.88 | 2.10 | 96.35 | 22.00 | 1,009.36 | 200.00 | 9,176.00 |
| NC-1 | Commercial | 30.87 | 2.10 | 64.83 | 22.00 | 679.14 | 200.00 | 6,174.00 |
| **TOTALS** | | **1,119.90** | | **1,449.20** | | **12,041.03** | | **287,558.00** |

# Table 3: Nonpoint Source Loads at Build-out

| HUC 14 and Zone | Land Cover | Developable Area (Acres) | TP (lbs/acre/yr) | TP (lbs/yr) | TN (lbs/acre/year) | TN (lbs/yr) | TSS (lbs/acre/yr) | TSS (lbs/yr) |
|---|---|---|---|---|---|---|---|---|
| 02040202090010 - *Swede Run* | | | | | | | | |
| A-1 | Agricultural Low Density, Rural | 326.96 | 1.30 | 425.05 | 10.00 | 3,269.60 | 300.00 | 98,088.00 |
| R-1 | Residential Low Density, Rural | 606.63 | 0.60 | 363.98 | 5.00 | 3,033.15 | 100.00 | 60,663.00 |
| R-2 | Residential High, Medium Density | 100.35 | 0.60 | 60.21 | 5.00 | 501.75 | 100.00 | 10,035.00 |
| R-3 | Rural | 15.73 | 1.40 | 22.02 | 15.00 | 235.95 | 140.00 | 2,202.20 |
| M-1 | Industrial | 111.83 | 1.50 | 167.75 | 16.00 | 1,789.28 | 200.00 | 22,366.00 |
| M-2 | Industrial | 239.87 | 1.50 | 359.81 | 16.00 | 3,837.92 | 200.00 | 47,974.00 |
| M-3 | Industrial | 63.64 | 1.50 | 95.46 | 16.00 | 1,018.24 | 200.00 | 12,728.00 |
| C-2 | Commercial | 184.63 | 2.10 | 387.72 | 22.00 | 4,061.86 | 200.00 | 36,926.00 |
| C-3 | Commercial | 122.67 | 2.10 | 257.61 | 22.00 | 2,698.74 | 200.00 | 24,534.00 |
| PCD | Commercial | 39.03 | 2.10 | 81.96 | 22.00 | 858.66 | 200.00 | 7,806.00 |
| H | Industrial | 42.87 | 1.50 | 64.31 | 16.00 | 685.92 | 200.00 | 8,574.00 |
| NC-2 | Commercial | 17.57 | 2.10 | 36.90 | 22.00 | 386.54 | 200.00 | 3,514.00 |
| O-1 | Commercial | 64.86 | 2.10 | 136.21 | 22.00 | 1,426.92 | 200.00 | 12,972.00 |
| Open Space | Forest, Water Wetlands | 86.12 | 0.10 | 8.61 | 3.00 | 258.36 | 40.00 | 3,444.80 |
| **TOTALS** | | **2,022.76** | | **2,467.58** | | **24,062.89** | | **351,827.00** |

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