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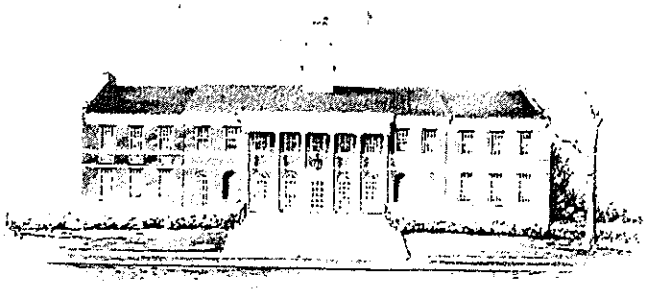

Township of Verona

#10 Commerce Court
VERONA, NEW JERSEY 07044

OFFICE OF THE TOWNSHIP ENGINEER

Telephone: (973) 857-4803 Fax: (973) 239-7837

April 19, 2005

Mr. Sanjeev Varghese, P.E., P.P.
County Engineer
County of Essex
Department of Public Works
Division of Engineering
900 Bloomfield Avenue
Verona, New Jersey 07044-1393

RE: Municipal Stormwater Management Plan (MSWMP)

Dear Mr. Varghese:

Enclosed please find a copy of the Township of Verona's Municipal Stormwater Management Plan (MSWMP), which we are required to submit under the Stormwater General Permit. A copy was also sent to the County Planning Board under separate cover.

If you have any questions, please contact our office.

Sincerely,

Noreen M. Jones

Noreen M. Jones, P.E.
Assistant Township Engineer

RECEIVED-
ENGINEERING
2005 APR 19 P 3:05

Addendum #5
Township of Verona Master Plan
Adopted

The following amendment to the Master Plan has been adopted by the Planning Board of the Township of Verona based upon a Public Hearing held on March 24, 2005. The amendment completely supercede the corresponding sections in the June 25, 1992 Master Plan.

STORMWATER MANAGEMENT PLAN

TOWNSHIP OF VERONA

ESSEX COUNTY, NEW JERSEY

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Figures

INTRODUCTION

This Municipal Stormwater Plan (MSWMP) documents the strategy for the Township of Verona ("the 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 final section includes mitigation strategy for when a developer applies for and is granted a variance from the design and performance standards. The mitigation section identifies specific stormwater management measures to lessen the impact of the proposed development.

GOALS

The goals of this Municipal Stormwater Plan 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 culvert and bridges and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater runoff from new and existing development to restore, enhance and maintain the chemical, physical and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values and to enhance the domestic, municipal, recreational, industrial and other uses of water;
- Protect public safety through the proper design and operation of stormwater basins.

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

STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and ultimately an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also impact 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 sewer 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.

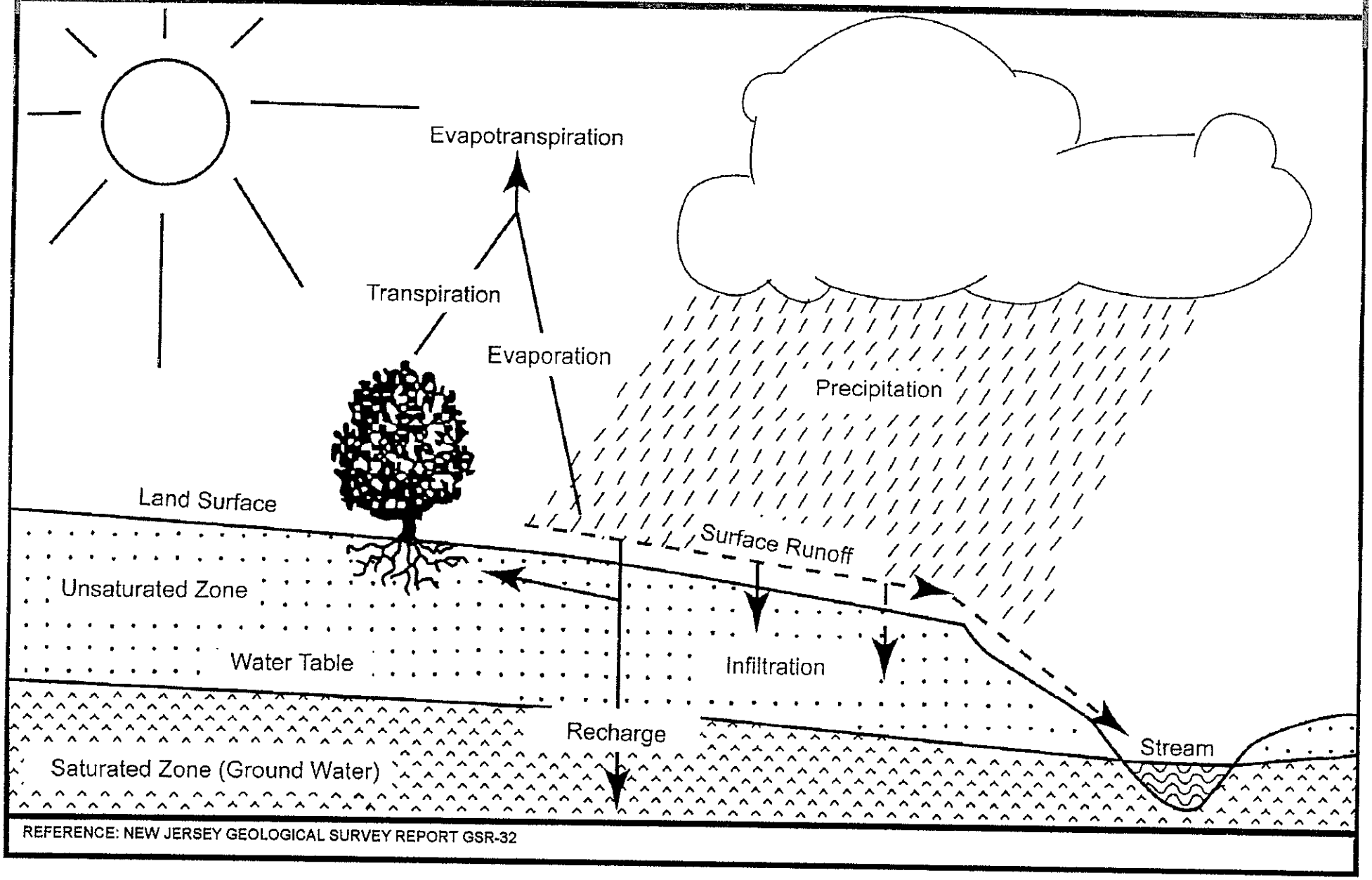
In addition to increases in runoff peaks, volumes and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a 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.

BACKGROUND

The Township encompasses a 2.77 square mile area in the northwestern portion of Essex County, New Jersey. Figure 3 depicts the Township boundary on the USGS quadrangle

FIGURE 1 – GROUNDWATER RECHARGE IN THE HYDROLOGIC CYCLE



REFERENCE: NEW JERSEY GEOLOGICAL SURVEY REPORT GSR-32

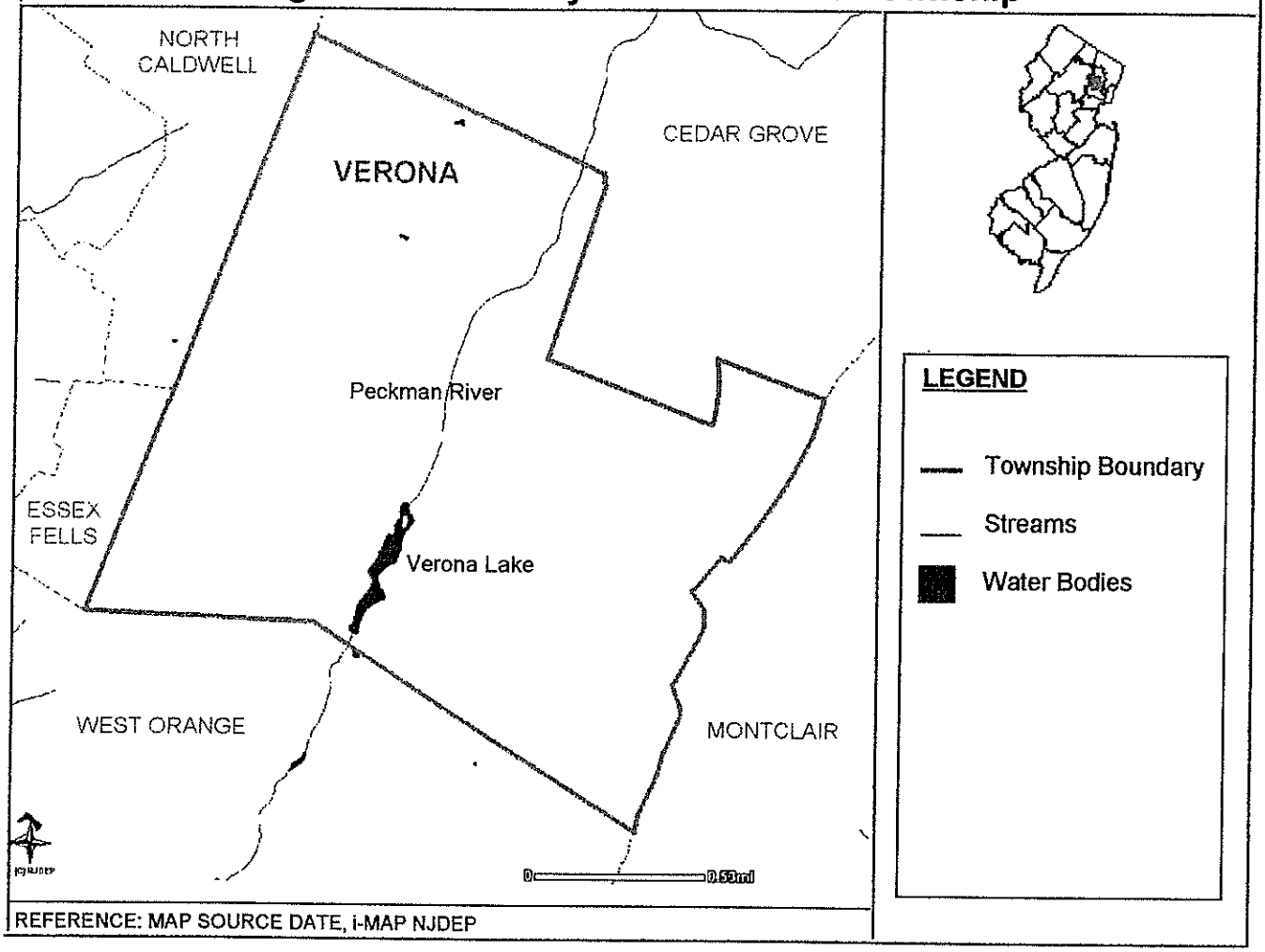
map. The Township is an older established community with a majority of the applications for construction received involving redevelopment of existing properties. The Township does contain one large tract of undeveloped land in the northwest end of the Township, where it meets the borders of North Caldwell and Cedar Grove. This area is know as the Hilltop and also includes the area containing the Essex County Jail, which will also be redeveloped. The current plan for the portion of the Hilltop within the Township involves the construction of recreation fields by the Township, housing units constructed by a private developer and areas that are designated Green Acres which will be left in their natural state due to steep slopes and other environmental constraints. The population of the Township has remained relatively the same from 13,597 in 1990 to 13,533 in 2000. However, the demographics of the Township have changed over the years from a community containing a majority of retirees to a community of younger families. This has increased the need for affordable senior housing in the community. Redevelopment in the Township, which includes additional impervious areas, has most likely increased stormwater runoff volumes and pollutants loads to the waterways in the municipality. The majority of the Township is located within NJDEP Watershed Management Area 4, Lower Passaic and Saddle, while a portion in the northwest corner is located in NJDEP Watershed Management Area 6, Upper Passaic, Whippany and Rockaway. The existing waterways contained in the Township are illustrated in Figure 2.

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 site throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as a 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.

A TMDL Total Maximum Daily Load 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 NJDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems and other BMP's.

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

Figure 2 - Waterways Within Verona Township



REFERENCE: MAP SOURCE DATE, i-MAP NJDEP

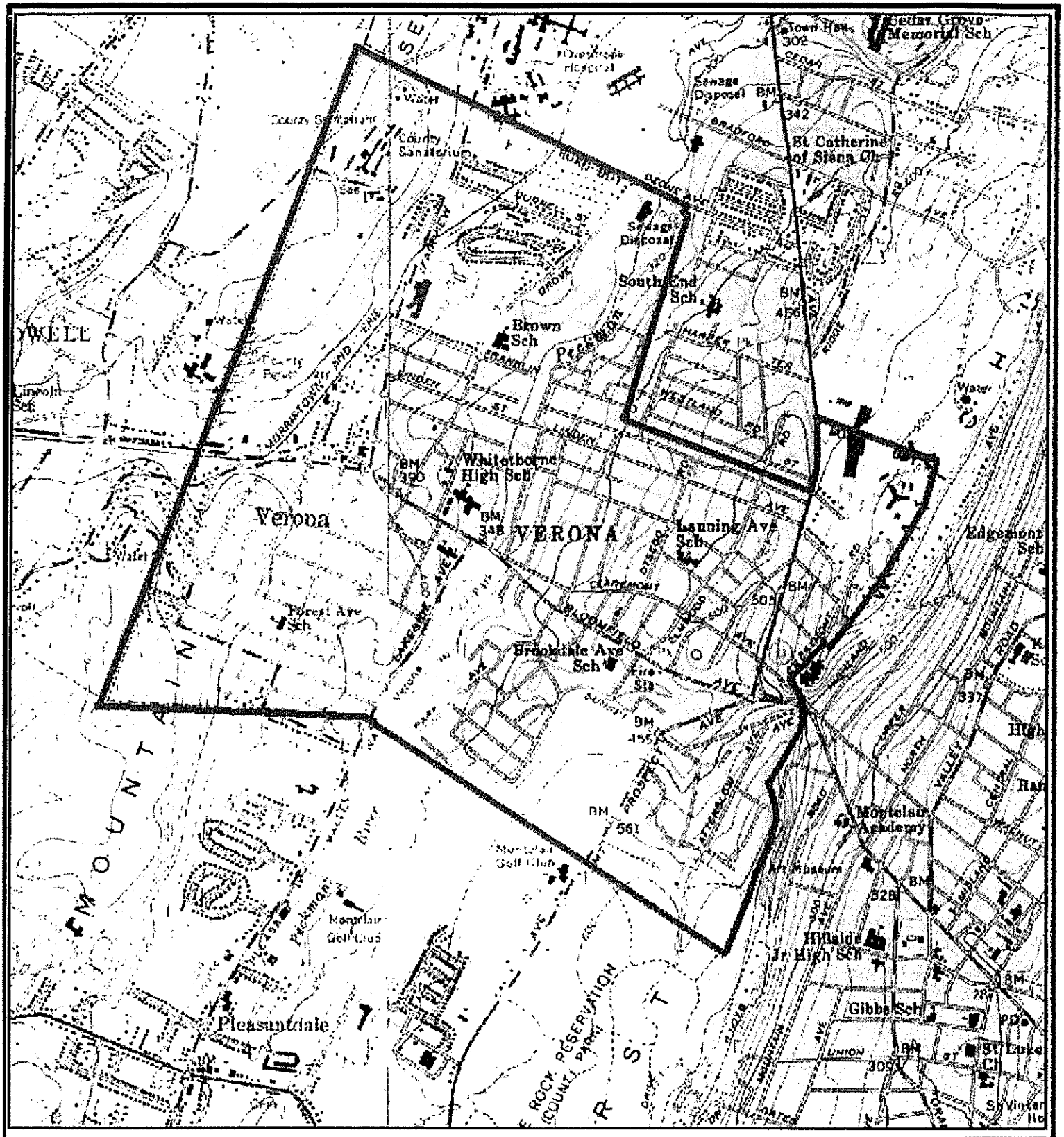


FIGURE 3 - TOWNSHIP BOUNDARY ON USGS QUADRANGLES

LEGEND

TOWNSHIP BOUNDARY

0 2,000 Feet

Hatch Mott MacDonald

TOWNSHIP OF VERONA
ESSEX COUNTY, NEW JERSEY
USGS LOCATION MAP

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

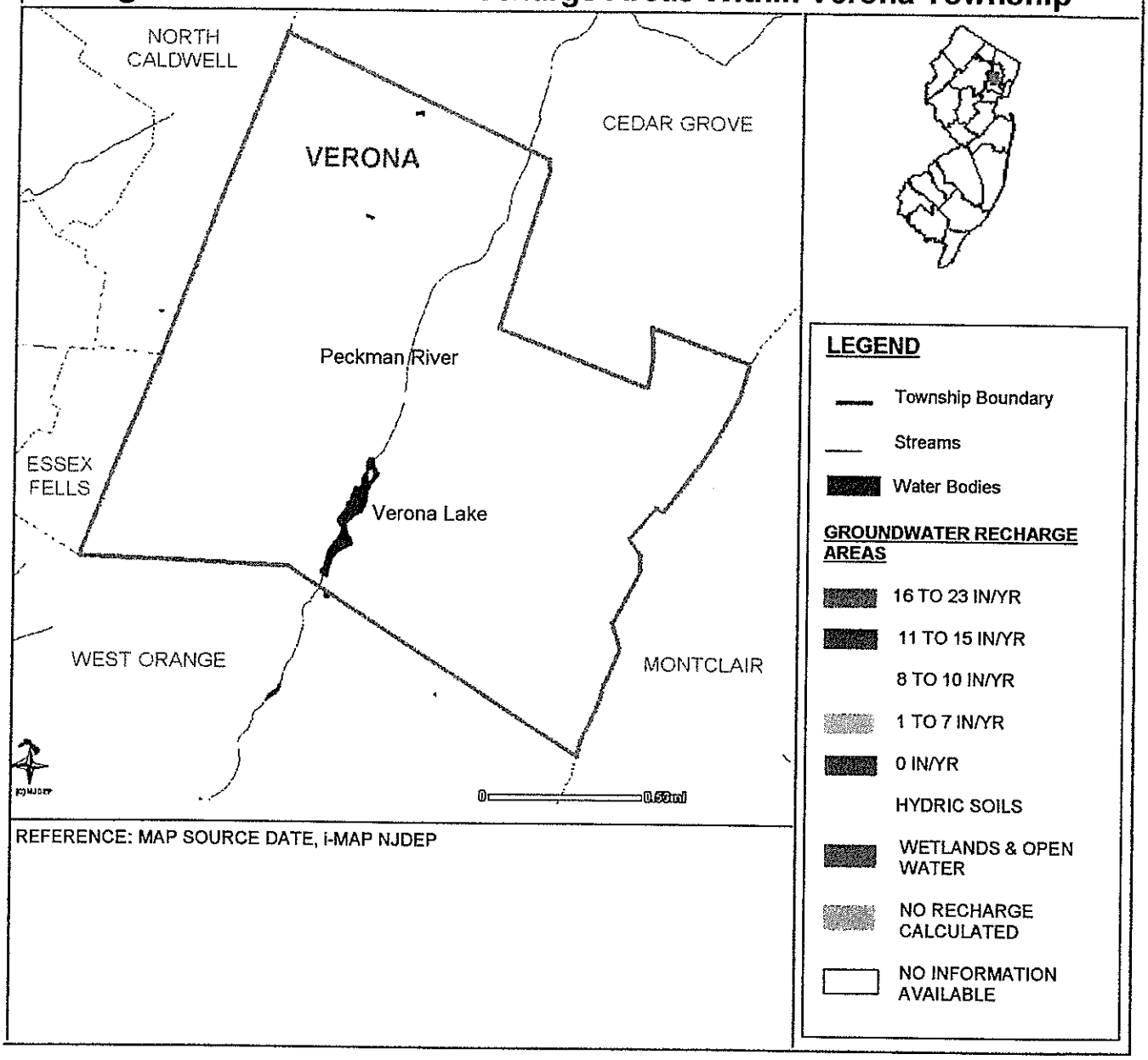
The major river that flows through the Township is the Peckman River. Although there are no water quality or macroinvertebrate monitoring data for the river within Verona Township, there is an existing AMNET Station for the Peckman River downstream at McBride Avenue in West Paterson (Site ID#AN0275). The water quality data for this station lists impairment for macroinvertebrates. In addition to the AMNET data, the NJDEP along with other regulatory agencies collect water quality chemical data on the streams within the state. The data shows that the instream fecal coliform concentrations within the Peckman River at West Paterson (Site ID# 03189600) often exceed the state's criteria. This means that the river is impaired and that the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for the pollutant. Fecal coliform management measures in the Township could include proper pet waste disposal as well as Canadian Geese control.

Verona Lake is a 13-acre lake, located within the Township, which drains into the Peckman River and is classified as FW2-NT. The lake was created in the early 1800's as a mill pond and has a north and a south basin. The watershed of Verona Lake is highly developed. Over the years, silt and nutrient laden stormwater runoff from residential sites, commercial sites and other recreational uses has resulted in excessive sediment and nutrient loading in the Lake. NJDEP also collects water quality chemical data on Verona Lake (Site ID Verona Lake). The data shows that the instream total phosphorus concentrations of Verona Lake frequently exceed the state's criteria, which results in the Lake being labeled impaired. As previously stated, this requires the NJDEP to develop a Total Maximum Load (TMDL) for the pollutant. According to the State of New Jersey's Proposed 2004 Integrated List of Waterbodies, a TMDL approved by the USEPA for fecal coliform has been approved for the Lake. The Township, through meetings with NJDEP, is in the process of developing strategies to comply with the TMDL of 98% nutrient removal.

In addition to water quality problems, the Township has exhibited water quantity problems including flooding, stream bank erosion and diminished base flow in its streams. During severe storm events, some undersized culverts do not have adequate capacity, thereby causing a backwater effect and flooding upstream.

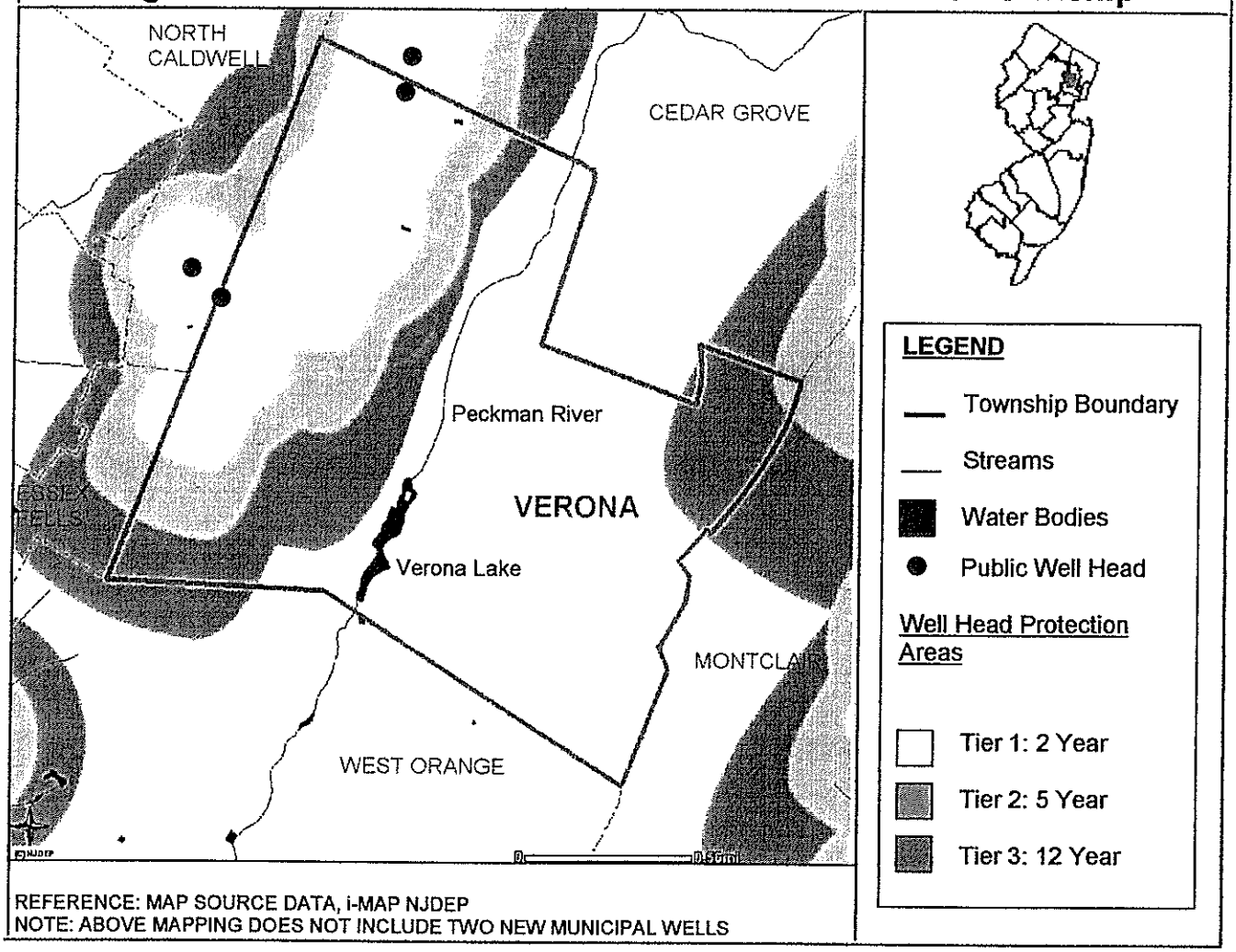
These culverts were designed for much different hydrological conditions (i.e., less impervious area) than presently exist in the Township. As the imperviousness increased in the Township, the peak volumes of stream flows also increased. The increased amount of water resulted in stream bank erosion, which resulted in unstable areas at roadway/bridge crossings and degraded stream habitats. The high imperviousness of the Township has significantly decreased 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. As seen in Figure 4, there is no information available on groundwater recharge within the Township. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure 5.

Figure 4 – Groundwater Recharge Areas Within Verona Township



REFERENCE: MAP SOURCE DATE, i-MAP NJDEP

Figure 5 – Well Head Protection Areas Within Verona Township



REFERENCE: MAP SOURCE DATA, i-MAP NJDEP
NOTE: ABOVE MAPPING DOES NOT INCLUDE TWO NEW MUNICIPAL WELLS

DESIGN AND PERFORMANCE STANDARDS

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the 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 ordinance will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

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

PLAN CONSISTENCY

The Township is not within a Regional Stormwater Management Planning Area. Therefore this plan does not need to be consistent with any Regional Stormwater Management Plans (RSWMPs). If any Regional Stormwater Management Plans are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

There is currently a TMDL in place for Verona Lake. The Township, through meetings with NJDEP, is in the process of developing strategies to comply with the TMDL of 98% nutrient removal.

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

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

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Township has reviewed the Master Plan and Ordinances and has provided a list of the sections in the Township Land Use and Zoning Ordinances that can be modified to

incorporate nonstructural stormwater management strategies. These are the Ordinances identified for revision. Once the Ordinance texts are completed, they will be submitted to the county review agency for review and approval within 24 months of the effective date of the Stormwater Management Rules. A copy will be sent to the Department of Environmental Protection at the time of submission.

Chapter 150 of the Township Codes, entitled Zoning, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes can be made to incorporate these strategies.

Section 150-3B Definitions – Buffer Strip is defined as "Land area made up of a dense planting of shrubs and trees, and which may include berms and/or fencing, the purpose of which is to visibly separate one use from another and to assist in shielding or blocking noise, lights or other nuisances." Buffer strips are required in several sections of the regulations to separate nonresidential use from either a residential use or residential zoning district lines. The landscape requirements for the buffer strips do not recommend the use of native vegetation. The language of this section can be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language can be included to allow buffer strips to be used for stormwater management by disconnecting impervious surfaces and treating runoff from impervious surfaces.

Section 150-12D(1)(a) Off-street parking – Access requires all access drives to be paved. This section can be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Section 150-12E(1) Off-street parking – Standards for areas for three vehicles or more requires parking areas for three or more vehicles to be paved. This section can be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Section 150-12E Off-street parking – Standards for areas for three vehicles or more describes requirements for parking areas for three or more vehicles. Language can be added 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 can be added to allow for the use of natural vegetated swales for the water quality storm, with overflow for larger storm events into storm sewers.

Several changes can be made to Chapter 150 – "Zoning". The Township has nine types of residential districts. Each district has a maximum improved lot coverage based on new site area, ranging from 35 percent in the R-1 District, which has a minimum lot area of 30,000 square feet for detached single family dwellings to 60 percent for the R-O District, which have a minimum lot area of 10,000 square feet. The Township has five nonresidential districts. Each of these districts has a maximum improved lot coverage based on new site area ranging from 65 percent in the C-2 District, which has a minimum

lot area of 15,000 square feet, to 100 percent in the CBD District, which does not have a minimum lot area. Although each zone has a maximum improved lot coverage based on new site area, the Township Code can be amended to remind developers that satisfying the maximum improved lot coverage does not relieve them of the responsibility for complying with the Stormwater Management Plan. The Township is evaluating the maximum improved lot coverage for each zone to determine whether a reduction in impervious cover is appropriate. The Township is also evaluating requiring a developer that is granted a variance to exceed the maximum improved lot coverage to mitigate the impact of the additional impervious coverage. The mitigation may address water quality, flooding and groundwater recharge.

An important nonstructural stormwater management component that is required in the Tier A Municipal Stormwater General Permit is local public education. The Township, as a Tier A municipality, is required to annually distribute educational information to residents and businesses explaining "the impact of their day-to-day activities on stormwater quality." Topics include such things as proper use and disposal of fertilizers and pesticides, using native or well-adapted vegetation that requires little or no fertilization and properly disposing of pet waste, used motor oil and household hazardous wastes. The Division of Watershed Management, Office of Outreach and Education offers numerous materials and programs that can assist the Township in developing and implementing a Local Public Education program.

LAND USE/BUILD-OUT ANALYSIS

The Township does contain one large tract of undeveloped land in the northwest corner of the Township, where it meets the borders of North Caldwell and Cedar Grove. This area is known as the Hilltop and includes the area that contains the abandoned Essex County Jail Women's Detention Center. This area will be redeveloped into recreation facilities for the Township. Further up the hill a private developer plans to construct new residential dwelling units. The remaining areas are designated Green Acres and will be left in their natural state due to steep slopes and other environmental constraints. Since the developable area within the Township is less than one square mile, a Land Use/Build-out analysis is not required. See Figures 6, 7, 8 and 9.

MITIGATION PLANS

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options

Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits or protection from stormwater runoff quality and quantity from previously developed

property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

a. The applicant can select a project from the following categories listed 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.

Groundwater Recharge

- Install infiltration basins
- Replace deteriorated pavement at select locations with permeable pavement

Water Quality

- Planting of additional native vegetation around Verona Lake in order to restrict access of Canadian geese
- Install streambank erosion controls at select locations along the Peckman River

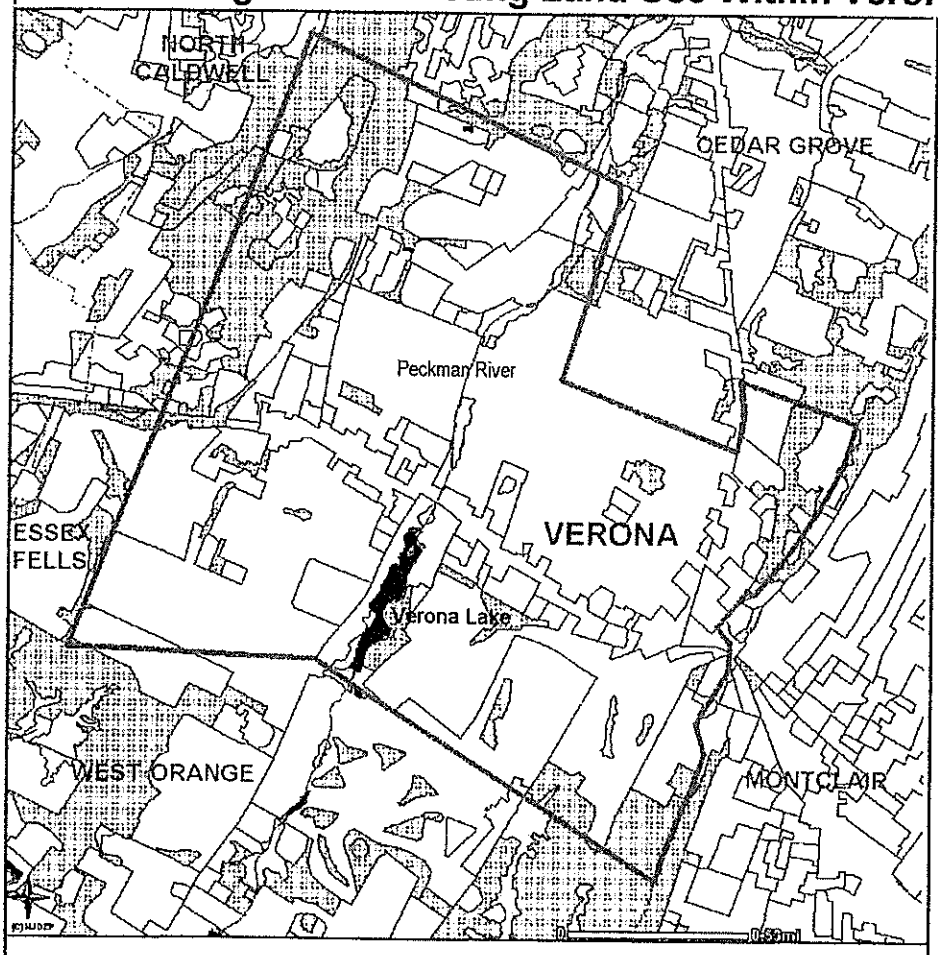
Water Quantity

- Stream cleaning at select locations along the Peckman River to allow additional stormwater to pass

2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to fecal impairment.

The Township may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including cost associated with the long-term maintenance requirements of the mitigation measure.

Figure 6 – Existing Land Use Within Verona Township



LEGEND

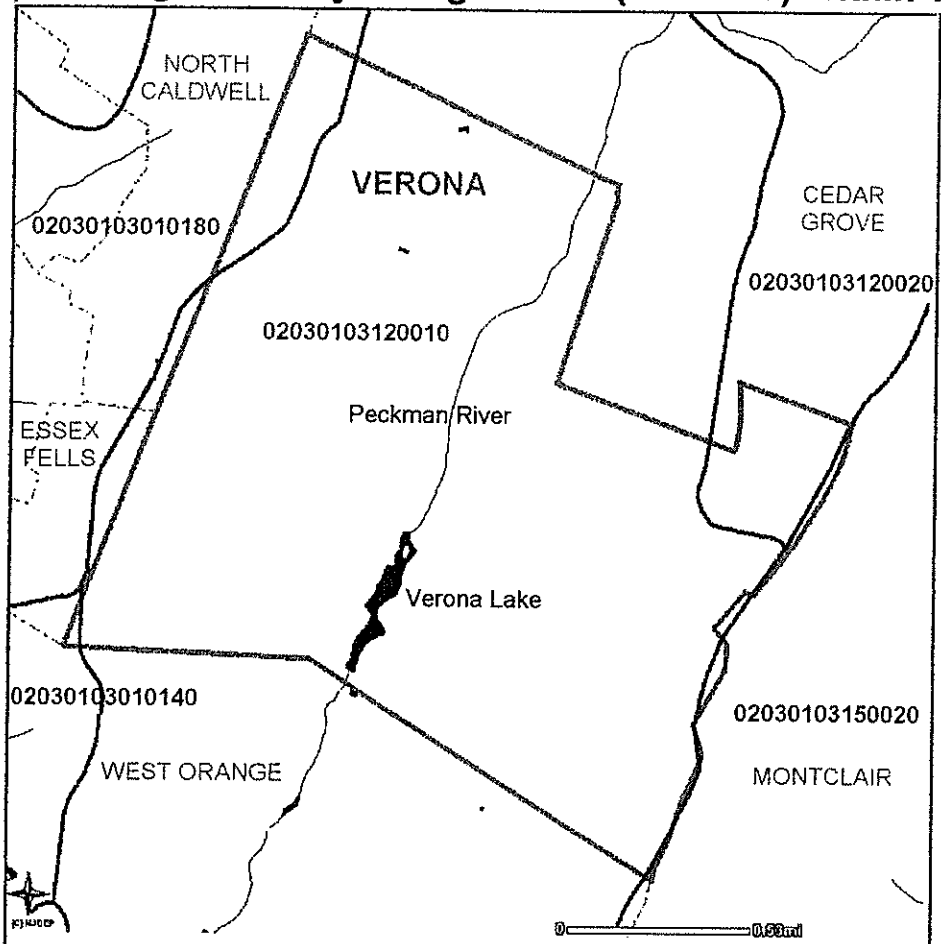
- Township Boundary
- Streams
- Water Bodies

LAND USE

- Urban
- Forest
- Wetlands

REFERENCE: MAP SOURCE DATE, i-MAP NJDEP – LAND USE MAP 1995

Figure 7 – Hydrologic Units (HUC14's) Within Verona Township



LEGEND

- Township Boundary
- Streams
- HUC14 Boundary
- Water Bodies

REFERENCE: MAP SOURCE DATE, i-MAP NJDEP

LEGEND - SUB-WATERSHEDS (HUC-14)

SUB-WATERSHED NAME	HYDROLOGIC UNIT CODE (14 DIGIT)
PECKMAN RIVER (ABOVE CG RES. TRIB)	02030103120010
PECKMAN RIVER (BELOW CG RES. TRIB)	01030103120020
UPPER PASSAIC RIVER (PINE BROOK TO ROCKAWAY RIVER)	02030103010180
SECOND RIVER	02030103150020
CANOE BROOK	02030103010140

Figure 8 - Zoning Districts Within Verona Township

ZONING MAP TOWNSHIP OF VERONA

ESSEX COUNTY, NEW JERSEY

ORIGINAL BASE MAP BY: CANDEUB, FLEISSIG & ASSOCIATES

UPDATED BASE MAP BY: GUEALE & LYNCH, INC.

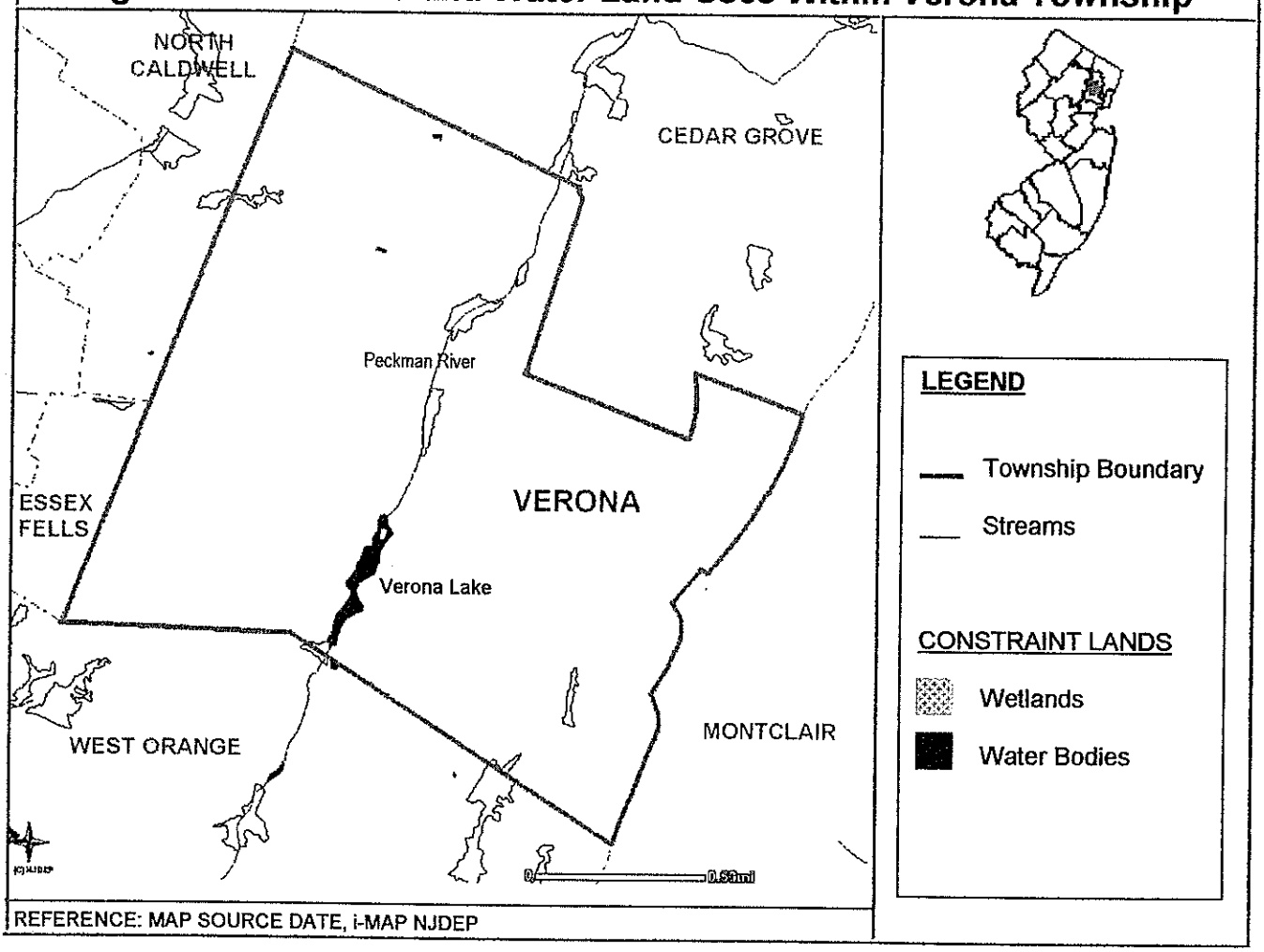
TOWNSHIP OF VERONA
800 BLOOMFIELD AVENUE
VERONA, NEW JERSEY 07044

BASE MAP SOURCE: TOWNSHIP OF VERONA TAX MAPS 1988

JAMES M. HELB, PE, LS, PP
TOWNSHIP ENGINEER

3-25-95

Figure 9 – Wetlands and Water Land Uses Within Verona Township



REFERENCE: MAP SOURCE DATE, i-MAP NJDEP