



Consulting, Municipal & Environmental Engineers  
Planners ■ Surveyors ■ Landscape Architects

43A Newburgh Road, Suite 100, Hackettstown, NJ 07840  
Tel: 908.684.5500 ■ Fax: 908.684.5580  
www.maserconsulting.com

# M u n i c i p a l S t o r m w a t e r M a n a g e m e n t P l a n

For the Township of White  
Warren County, New Jersey  
March 2005  
Adopted April 12, 2005

**Prepared By:**

A handwritten signature in black ink that reads 'Paul M. Sterbenz'.

---

**Paul M. Sterbenz, P.E., P.P**  
**N.J.P.E. License No. 32549**

**And**

A handwritten signature in black ink that reads 'Joseph J. Layton'.

---

**Joseph J. Layton, P.P., AICP**  
**N.J.P.P. License No. LI01443**

MC Project No. WHT-021

The original of this report was signed and sealed in accordance with N.J.S.A. 45:14a-12



## TABLE OF CONTENTS

Introduction	Page 3
Goals	Page 3
Stormwater Discussion	Page 4
Background	Page 6
Design and Performance Standards	Page 12
Plan Consistency	Page 15
Nonstructural Stormwater Management Strategies	Page 15
Land Use / Build - Out Analysis	Page 18
Mitigation Plans	Page 25

### List of Tables

Table 1	Sublist 5 Sites for the Township of White	Page 9
Table 2	Build – Out Calculations for HUC14s	Page 21
Table 3	Pollutant Loads by Land Cover	Page 23
Table 4	Nonpoint Source Loads at Build – Out for HUC14s	Page 23

### List of Figures

Figure 1	Ground - Water Recharge in the Hydrologic Cycle	Page 5
Figure 2	Waterways Map	Page 7
Figure 3	USGS Quadrangle	Page 8
Figure 4	Existing Land Use	Page 10
Figure 5	Zoning Districts	Page 11



Figure 6	Ground - Water Recharge Areas	Page 13
Figure 7	Wellhead Protection	Page 14
Figure 8	Hydrologic Units (HUC 14s)	Page 19
Figure 9	Wetlands and Water Land Uses	Page 20



## **Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for White Township (“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 or increases impervious coverage by one-quarter acre or more. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

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, specific 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 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; and

- protect public safety through the proper design and operation of stormwater basins.

In addition to the goals, the first goal in the Township's recently adopted Master Plan is to preserve and enhance the rural character of White Township, including minimizing stormwater impacts on the Township's high quality surface waters, protecting and preserving environmentally sensitive areas, etc.

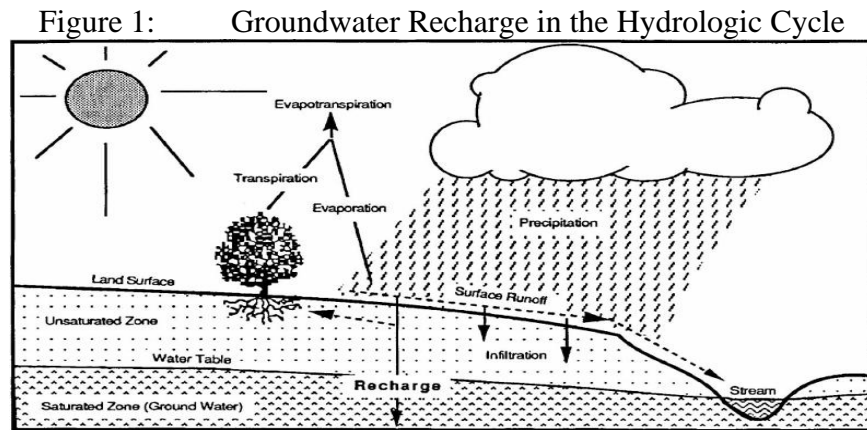
To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in this plan 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, the 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, 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 fluctuation between normal and storm flow rates, which 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.



Source: New Jersey Geological Survey GSR-32

In addition to increase 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 28.6 square miles in Warren County, New Jersey. The Township has experienced steady growth over the last twenty years. The population of the Township has increased from 2,748 in 1980, to 3,603 in 1990, to 4,245 in 2000. This population



increase has resulted in considerable new development. The changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads in the waterways of the municipality. Figure 2 illustrates the waterways in the Township. The major streams in the Township include the Delaware River, which flows along the northwest corner of the Township, and the Pequest River, which flows through the northerly portion of the Township. Buckhorn Creek, Furnace Brook and Pophandusing Brook are major tributaries. Figure 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 macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to the benthic macroinvertebrate community dynamics.

The *New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report* ("the Report") (305(b) and 303(d))(Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more Total Maximum Daily Load ("TMDL") standards are needed. Table 1 shows the AMNET data for Sublist 5 sites within the Township.









Table 1  
Sublist 5 Sites for White Township

<b>Station Name / Waterbody</b>	<b>Site ID</b>	<b>Parameters</b>	<b>Data Source</b>
Furnace Brook at Pequest Rd in White	AN0042	Benthic Macroinvertebrates	NJDEP AMNET
Pequest River at Pequest Furnace Road	01445500, 1-PEQ-2	Phosphorus, pH, Total Suspended Solids	NJDEP/USGS Data, EWQ, Metal Recon

Source: *New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report* prepared by NJDEP  
<http://www.state.nj.us/dep/wmm/sgwqt/wat/integratedlist/docs/Appendix%201A%20Sublists%201-5.xls>

The AMNET data show that the Pequest River and its tributaries (Furnace Brook) may not have acceptable total benthic macroinvertebrates concentrations. According to Appendix 1B: Sublist 5 with Priority Ranking of the Report, the development of a TMDL for phosphorous, total suspended solids and pH levels are at a medium priority, and according to Appendix 1C: TMDL or Other Responses to be Completed by 2006 of the Report, a TMDL response for phosphorous should be done by 2006.

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 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 Best Management Practices (BMPs).

The Township is approximately 10% developed. The existing land use, based on 2002 aerial photography, is shown in Figure 4. The existing zoning is shown in Figure 5. The vast majority of the developed land is residential. The ground water recharge rates for native soils in







this area are generally between 10 and 22 inches annually. The average annual groundwater recharge rates are shown graphically in Figure 6.

According to NJDEP, “A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two- (Tier 1), five- (Tier 2), and twelve- (Tier 3) year period of time for unconfined wells. The confined wells have a fifty foot radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations (see NJAC 7:10 – 11.7 (b)1).”

WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP. As shown in Figure 7, the Township has seven wellhead protection areas. The total area involved encompasses very little of the Township land area with five of the wellhead protection areas clustered in and around the Town of Belvidere municipal boundary.

### **Design and Performance Standards**

The Township will adopt the design and performance standards for stormwater management measures as present 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 ordinances 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 site improvements, including drainage, 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 and no TMDLs have been developed to date 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. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential projects. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the 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 are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revisions. Once the ordinance texts are completed, they will be submitted to the county review agency for 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 submissions.

It should be noted that the Master Plan adopted in September 2004 requires the preparation of several ordinance modifications that will help control stormwater runoff including





a ridgeline protection ordinance, steep slope ordinance, etc. These ordinances are currently being revised by the Township Planner and should be prepared and processed later in 2005.

Section 71-69 of the Code of the Township Of White, entitled “Design Standards” was reviewed with regard to incorporating nonstructural storm water management strategies. The following standards are in place:

#### **Section 71-69A2 Streets**

Streets are required to have a right-of-way sufficient to carry anticipated traffic, but the right-of-way shall be no less than 50 feet.

**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. In addition, the street design criteria in the RSIS will be referenced since more flexibility in the cross-section of a street is offered. For example, curbs are not always required and can be replaced by roadside swales, which will help treat runoff and promote recharge.**

#### **Section 71-69A4 Lots**

This section indicates that lots shall be suitable for their intended use, giving particular attention to the suitability of a lot due to factors such as poor drainage conditions or flood conditions.

**This section should be amended to require that development occur on lands that are suitable and that environmentally sensitive areas such as floodplains, wetlands, steep slopes, hydric soils, etc. be avoided.**

#### **Section 71-69A5 Public Use and Service Areas**

This section indicates that subdivisions are required to have drainage easements where a subdivision is traversed by a watercourse, drainageway, or channel. In addition, a stormwater easement or drainage right-of-way must be provided that conforms substantially with the lines of such watercourse, and of sufficient width or construction, or both, as will be adequate for the purpose, and no less than 25 feet. Natural features should be preserved in any easements to the extent possible.

**The section should be amended to increase the minimum width of the drainage easement around a stream corridor so that lands on either side of the banks are protected.**

#### **Section 71-69A6 Open Space or Residential Cluster Development**

This section contains standards for when open space or residential cluster development is used. This cluster option is an excellent tool for reducing the extent of impervious roads and driveways.



The cluster option should be amended to require that a minimum percentage of the total tract be preserved as open space. The percentage will depend on the zoning district. In addition, the open space lands should encompass all environmentally sensitive features.

#### **Section 71-69B (2 – 5) Off-Street Parking**

This section outlines the design of parking and loading areas in the Township.

**This section should be amended to allow flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas to reduce total suspended solids (TSS), lessen runoff rates, and encourage recharge. In addition, pervious paving materials should be permitted to minimize stormwater runoff and promote groundwater recharge.**

#### **Section 71-69B9 Architectural Design**

This section contains design criteria for enclosed parking and loading facilities.

**This section must be amended to refer to the new stormwater design standards.**

#### **Section 71-69C Storm Drainage Design and Stormwater Management**

This section contains the design criteria for stormwater management and drainage systems in the Township.

**These standards must be replaced in their entirety by the design and performance standards for stormwater management in N.J.A.C. 7:8-5, the safety standards for stormwater management basins in N.J.A.C. 7:8-6, and the drainage design criteria in the R.S.I.S. (N.J.A.C. 5:21-7.1)**

#### **Section 71-69D Lot Grading and Land Disturbance Standards**

This section contains standards for the grading of lots to promote positive drainage and lot usability.

**This section should be amended to include provisions to minimize land disturbance and better protect forested areas from disturbance, which is a nonstructural stormwater management strategy. In addition, the use of native vegetation should be encouraged where disturbance does occur and the drainage provision must be made consistent with the new drainage standards in Section 71-69C.**

There are also some provisions in Article X entitled “Zoning” that require amendments including:

#### **Section 71-76 General Provisions**

#### **Section L “Buffer, Screening and Landscaping”**



This section outlines buffer requirements on single-family lots.

**This section should be amended to include requirements to encourage the incorporation of existing wooded areas into buffers and tree replacement requirements for residential lots of at least 12 trees per disturbed acre.**

#### **Section W “Standards for Conforming Lots”**

This section contains criteria for developing lots with critical areas.

**This section should be rewritten to severely restrict any disturbances to critical areas. In addition, various ordinances relative to the preservation of environmentally sensitive features should be incorporated into the ordinance as previously referenced.**

In addition, Chapter 60 of the Code of the Township entitled “Driveways” and Chapter 86 “Road Construction” must be amended to comply with the stormwater regulations of the State. Chapter 60 should be revised to encourage the use of pervious paving materials to lessen stormwater runoff and promote groundwater recharge. Chapter 86 should be required to provide consistency between the roadway design provisions in the Land Use Code, which includes drainage.

#### **Land Use / Build – Out Analysis**

A detailed land use analysis for the Township was conducted. Figure 4 illustrates the existing land use in the Township based on current GIS information from NJDEP. Figure 8 illustrates the HUC14s (watersheds) within the Township. The Township zoning map is shown in Figure 5. Figure 9 illustrates wetlands within the Township. The build-out calculations for impervious coverage are shown in Table 2. The Total Acres, Existing Impervious (%), Existing Impervious (Acres), Critical Areas (Acres), and Existing Developed Areas (Acres) were provided by the Warren County Planning Department. It is important to note that this Build – Out Calculation provides only an estimate for potential additional impervious coverage. A portion of the critical areas has been developed, thus the remaining developable areas may also be somewhat underestimated and the total of Critical Areas (Acres) and Existing Developed Areas underestimated and the total of Critical Areas (Acres) and Existing Developed Areas (Acres) may exceed the Total Acres of a given zone within a HUC14 location. Under this circumstance, a negative number appears in the Remaining Developable Areas (Acres) column, which leads to the assumption that no additional impervious coverage will result. In any case,







when developing agricultural and forestlands, the build-out of these HUC14s will result in a significant increase in impervious surfaces.

Table 3 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table 4.

Table 2: Build – Out Calculations for HUC14s

HUC14 and Zone*	Total Acres*	Existing Impervious (%)*	Existing Impervious (Acres)*	Critical Areas (Acres)*	Existing Developed Areas (Acres)*	Remaining Developable Areas (Acres) <sup>1</sup>	Allowable Impervious (%) <sup>2</sup>	Build-Out Impervious (Acres) <sup>3</sup>
2040105060020 - Delawanna Creek (incl UDRV)								
CC	1.625	0.00%	0.000	0	0	1.625	0.5	0.8125
HD	12.117	8.12%	0.984	11.862	6.007	(5.752)	0.4	0
I	972.324	1.07%	10.412	299.021	154.918	518.385	0.5	259.1925
O-B	36.619	1.69%	0.619	0	2.269	34.350	0.3	10.305
R-1	313.742	1.39%	4.368	184.333	23.508	105.901	0.100	10.5901
<b>Totals</b>	1,336.427		16.383	495.216	186.702	660.261		280.9001
2040105090030 - Pequest R (Furnace Bk to Cemetary Road)								
I	7.004	50.36%	3.527	4.350	3.938	(1.284)	0.500	0
R-1	315.362	1.46%	4.601	187.757	22.804	104.801	0.1	10.4801
<b>Totals</b>	322.366		8.128	192.107	26.742	104.801		10.4801
2040105090040 - Mountain Lake Brook								
R-1	982.752	2.05%	20.174	389.512	122.431	470.809	0.100	47.0809
<b>Totals</b>	982.752		20.174	389.512	122.431	470.809		47.0809
2040105090050 - Furnace Brook								
N-C	9.476	30.88%	2.926	1.556	5.422	2.498	0.5	1.249
R-1	1,042.094	2.06%	21.479	270.030	136.829	635.235	0.1	63.5235
<b>Totals</b>	1,051.570		24.405	271.586	142.251	637.733		64.7725
2040105090060 - Pequest R (below Furnace Brook)								
CC	180.593	10.11%	18.264	7.688	65.053	107.852	0.5	53.926
H-D	230.515	13.86%	31.956	48.119	96.651	85.745	0.4	34.298
I	423.244	4.31%	18.252	31.973	92.077	299.194	0.5	149.597
I-2	128.439	0.41%	0.533	1.039	12.246	115.154	0.5	57.577
LI	2.192	63.23%	1.386	0	1.945	0.247	0.5	0.1235
O-B	22.203	1.30%	0.288	0	0.823	21.380	0.3	6.414
R-1	2,510.840	2.09%	52.542	480.312	479.779	1550.749	0.1	155.0749
R-1C	142.823	1.46%	2.085	2.575	15.480	124.768	0.1	12.4768
R-2	72.588	2.76%	2.005	3.078	16.700	52.810	0.2	10.562
<b>Totals</b>	3,713.437		127.311	574.784	780.754			480.0492
2040105100040 - Beaver Brook (below Hope Village)								



H-D	9.073	13.37%	1.213	6.855	4.159	(1.941)	0.400	0
I	0.357	28.85%	0.103	0.336	0.129	(0.108)	0.500	0
O-B	10.609	0.33%	0.035	0.000	0.104	10.505	0.300	3.1515
R-1	2,099.132	1.24%	25.936	560.424	165.076	1373.632	0.100	137.3632
<b>Totals</b>	2,119.171		27.287	567.615	169.468	1384.137		140.5147
2040105110010 - Pophandusing Brook								
I	50.088	5.13%	2.571	5.935	11.137	33.016	0.500	16.508
I-2	229.498	0.35%	0.794	106.893	118.481	4.124	0.500	2.062
R-1	2,364.330	1.45%	34.266	521.111	314.279	1528.940	0.100	152.894
R-1B	140.306	0.96%	1.351	18.847	4.345	117.114	0.400	46.8456
R-1C	255.722	0.67%	1.714	7.281	8.938	239.503	0.1	23.9503
R-2	95.181	2.91%	2.770	0.000	5.543	89.638	0.100	8.9638
<b>Totals</b>	3,135.125		43.466	660.067	462.723	2012.335		242.2599
2040105110020 - Buckhorn Creek (incl UDRV)								
I	877.948	2.54%	22.310	77.967	171.214	628.767	0.500	314.3835
LDI	637.867	0.26%	1.683	99.422	10.188	528.257	0.500	264.1285
N-C	99.624	4.37%	4.357	10.890	37.508	51.226	0.500	25.613
R-1	2,800.051	1.07%	30.088	1211.557	177.278	1411.216	0.100	141.1216
R-1C	20.775	0.00%	0.000	0.000	0.000	20.775	0.1	2.0775
R-2	45.926	12.56%	5.767	0.000	15.164	30.762	0.100	3.0762
R-3	34.253	20.50%	7.022	8.050	37.062	(10.859)	0.200	0
R-4	58.777	14.89%	8.749	0.000	37.062	21.715	0.150	3.25725
<b>Totals</b>	4,575.221		79.976	1407.886	485.476	2692.718		753.65755
2040105140020 - Pohatcong Ck (Brass Castle Ck to Rt 31)								
R-1	549.807	1.67%	9.169	104.551	55.932	389.324	0.100	38.9324
<b>Totals</b>	549.807		9.169	104.551	55.932	389.324		38.9324
<b>Total Existing Impervious Coverage</b>			<b>356</b>	<b>Potential Additional Impervious Coverage</b>				<b>2,059</b>
* Information Provided by Warren County Planning Department								
<b>1</b> Remaining Developable Areas (Acres) = Total Acres - Critical Areas (Acres) - Existing Developed Areas (Acres)								
<b>2</b> Allowable Impervious (%) is the Maximum Impervious Coverage permitted by the Zoning Ordinance								
<b>3</b> Build - Out Impervious (Acres) = Remaining Developable Areas (Acres) x Allowable Impervious (%)								



Table 3: Pollutant Loads by Land Cover

Land Cover	Total Phosphorous 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	1.0	10	120
Agricultural	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland / Transitional Area	0.5	5	60

Source: NJDEP Stormwater BMP Manual 2004

Table 4: Nonpoint Source Loads at Build – Out for HUC14s

HUC14 and Zone	Build - Out Zoning	Acres	Total Phosphorous lbs/acre/year	Total Phosphorous lbs/year	Total Nitrogen lbs/acre/year	Total Nitrogen lbs/year	Total Suspended Solids lbs/acre/year	Total Suspended Solids lbs/year
2040105060020 - Delawanna Creek (incl UDRV)								
CC	Commercial	1.625	2.1	3	22	36	200	325
I	Industrial	518.385	1.5	778	16	26	200	103,677
O-B	Commercial	34.350	2.1	72	22	36	200	6,870
R-1	Low Density / Rural Residential	105.901	0.6	64	5	8	100	10,590
<b>Totals</b>				917		106		121,462
2040105090030 - Pequest R (Furnace Bk to Cemetary Road)								
R-1	Low Density / Rural Residential	104.801	0.6	63	5	8	100	10,480
<b>Totals</b>				63		8		10,480
2040105090040 - Mountain Lake Brook								
R-1	Low Density / Rural Residential	470.809	0.6	282	5	8	100	47,081
<b>Totals</b>				282		8		47,081
2040105090050 - Furnace Brook								
N-C	Commercial	2.498	2.1	5	22	36	200	500
R-1	Low Density / Rural Residential	635.235	0.6	381	5	8	100	63,524
<b>Totals</b>				386		44		64,023
2040105090060 - Pequest R (below Furnace Brook)								
CC	Commercial	107.852	2.1	226	22	36	200	21,570
H-D	Commercial	85.745	2.1	180	22	36	200	17,149
I	Industrial	299.194	1.5	449	16	26	200	59,839





I-2	Industrial	115.154	1.5	173	16	26	200	23,031
LI	Industrial	0.247	1.5	0	16	26	200	49
O-B	Commercial	21.380	2.1	45	22	36	200	4,276
R-1	Low Density / Rural Residential	1,550.749	0.6	930	5	8	100	155,075
R-1C	Low Density / Rural Residential	124.768	0.6	75	5	8	100	12,477
R-2	Low Density / Rural Residential	52.810	0.6	32	5	8	100	5,281
<b>Totals</b>				2,110		210		298,747
2040105100040 - Beaver Brook (below Hope Village)								
O-B	Commercial	10.505	2.1	22	22	36	200	2,101
R-1	Low Density / Rural Residential	1,373.632	0.6	824	26	42	100	137,363
<b>Totals</b>				846		78		139,464
2040105110010 - Pophandusing Brook								
I	Industrial	33.016	1.5	50	16	26	200	6,603
I-2	Industrial	4.124	1.5	6	16	26	200	825
R-1	Low Density / Rural Residential	1,528.940	0.6	917	5	8	100	152,894
R-1B	Low Density / Rural Residential	117.114	0.6	70	5	8	100	11,711
R-1C	Low Density / Rural Residential	239.503	0.6	144	5	8	100	23,950
R-2	Low Density / Rural Residential	89.638	0.6	54	5	8	100	8,964
<b>Totals</b>				1,241		85		204,948
2040105110020 - Buckhorn Creek (incl UDRV)								
I	Industrial	628.767	1.5	943	16	26	200	125,753
LDI	Industrial	528.257	1.5	792	16	26	200	105,651
N-C	Commercial	51.226	2.1	108	22	36	200	10,245
R-1	Low Density / Rural Residential	1,411.216	0.6	847	5	8	100	141,122
R-1C	Low Density / Rural Residential	20.775	0.6	12	5	8	100	2,078
R-2	Low Density / Rural Residential	30.762	0.6	18	5	8	100	3,076
R-4	High / Medium Density Residential	21.715	1.4	30	15	24	140	3,040
<b>Totals</b>				2,751		137		390,965
2040105140020 - Pohatcong Ck (Brass Castle Ck to Rt 31)								
R-1	Low Density / Rural Residential	389.324	0.6	234	5	8	100	38,932



<b>Totals</b>	234		8		38,932
<b>Total Non-Point Source Loads At Build-Out</b>	8,831		682		1,316,103

### **Mitigation Plans**

Due to the significance of the Delaware and Pequest Rivers, and the major tributaries including Buckhorn Creek, Furnace Brook and Pophandusing Brook from recreation and aesthetic perspectives, water quality must be safeguarded from development activities. The safeguarding of the Township's high quality surface waters, and the preservation and enhancement of the rural character of White Township was the first goal in the Township's recently adopted Master Plan

Because of the language in the Master Plan, the Township does not believe it is in their interest to vary the design and performance standards in the stormwater rules. Thus, no variances and exemptions from the standards shall be granted. Applicants for development will be expected to mitigate the impacts of development on stormwater at their own site or other sites within the subject watershed that it controls.

It should also be noted that there is little or no land area within the Township at strategic locations and owned by the municipality or other governmental agencies that would even allow for a flood control or water quality enhancement projects if mitigation were to be allowed in the plan by the municipality. The majority of the remaining developable lands within the Township are scattered within a forest area or is currently agriculturally used. Hence, it is more practical for any new development to provide on-site stormwater facilities rather than implementing a municipal system that would disrupt the existing built environment.