

**NORTH HANOVER TOWNSHIP**

**MUNICIPAL**

**STORMWATER MANAGEMENT PLAN  
(MSWMP)**

**MARCH 2005  
REVISED OCTOBER 2007**



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DAVID J. HODER, P.E., P.P.  
N.J.P.E. NO. 27825

(Required By NJPDES Permit Number NJGO148156)

Prepared In Accordance With NJAC 7:8-4.2,  
“Stormwater Management Rules”

## **Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the North Hanover Township (“the Township”) to address stormwater-related impacts. The creation of this plan is required by NJAC 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in NJAC 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 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

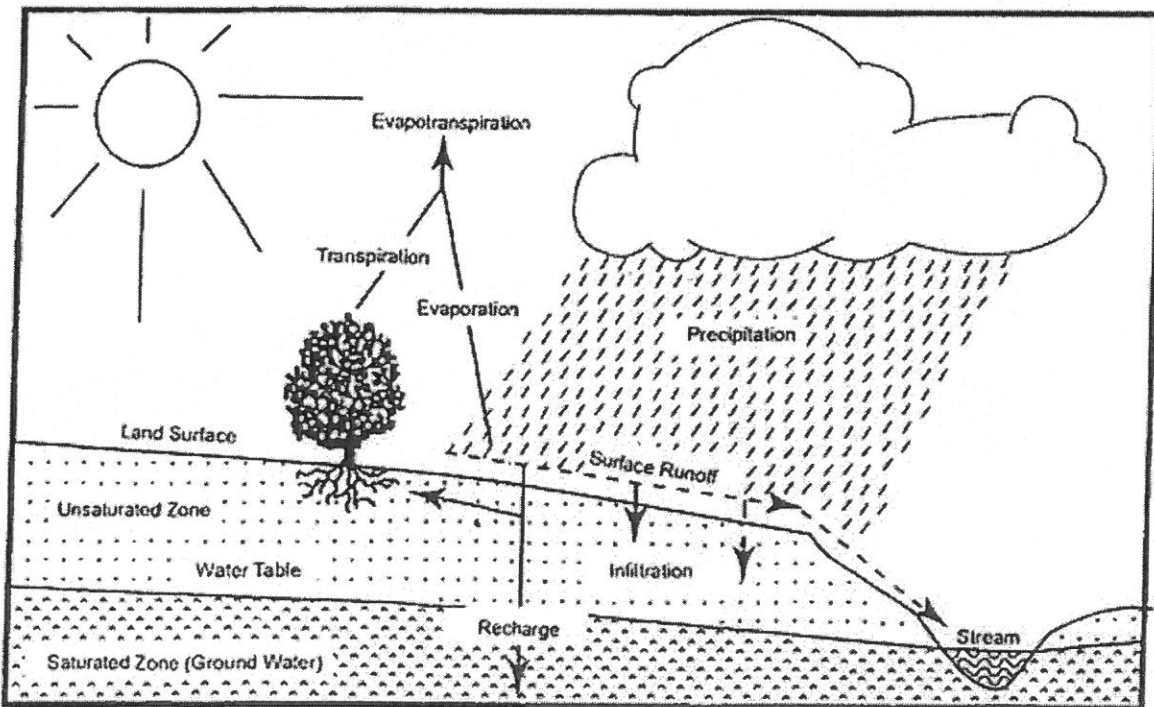
- protect public safety through the proper design and operation of stormwater basins.

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

Figure C-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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 17.38 square mile area in Burlington County, New Jersey. The population of the Township has decreased from 9,050 in 1980 to 7,347 in 2000. Figure C-2 illustrates the waterways in the Township. Figure C-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 nonimpaired, 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.

There is only one (1) AMNET sampling site which is adjacent to North Hanover Township where North Run crosses through the center of Cookstown. Table 2 of the 1998 Delaware River Supplement AMNET Study indicates that this creek is moderately impaired for benthic macroinvertebrates and fecal coliform impaired with a score of 15. A total maximum daily load (TMDL) would not have to be required to be developed for this waterway at this time, since at this time the State has not adopted a TMDL for this stream. A future revision to this plan may be needed if a TMDL is adopted by the State in the future. These revisions may include specific measures and/or ordinances to reduce the fecal coliform load in the future.

The Township has not exhibited major flooding problems or stream bank erosion during heavy storm events. The vast majority of the main roadways within the Township are in the jurisdiction of the County and would be the County's responsibility. Some of the municipally owned culverts may be undersized but do not overly impact flooding during major storm events. The Township, for the most part, is extremely rural with large open space tracts throughout. This allows for significant groundwater recharge throughout the Township.

A map of the groundwater recharge areas is shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-2.

The Township is situated in the Delaware River Basin. It is located in the Crosswicks Creek Watershed Management Area (WMA).

The water bodies that are present in North Hanover are as follows:

<u>HUC Code</u>	<u>Creek</u>	<u>Location</u>
02040201050050	Crosswicks Creek (lower)	North and east portions
02040201050050	Doctors Creek (tributary to Crosswicks)	Central
0204020108010	Blacks Creek	Central
02040201040060	North Run	East and South
02040201050030	Deep Run	Central and East

### **Design and Performance Standards**

The Township will adopt design and performance standards for stormwater management measures 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 will include language for maintenance of stormwater management measures consistent with the stormwater management rules Maintenance Requirements, and language for safety standards. The ordinances will be submitted to the country 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, and no TMDLs have been developed for waters within the Township; therefore, this plan does not need to be consistent with any regional stormwater 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 NJAC 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 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.



This Municipal Stormwater Management Plan is consistent with the 2000 Master Plan, but is especially consistent with the August 2006 Master Plan Update, in that it is the intent of the update to follow NJDEP Stormwater regulations and to further work with County, State and federal agencies to control flooding and develop strategies to control erosion, all of which are main goal of the State Municipal Stormwater Management Program.

In the Environmentally Sensitive/Pinelands Area, the State Plan's intention is to:

- accommodate growth in Centers
- protect and enhance the existing character of Pinelands island communities;
- minimize the risks from natural hazards;
- provide access to environmental resources for public use and enjoyment; and
- maintain and improve environmental resource quality.

Operation and maintenance will be assured because the Township will revise by job description the work product of both the Director of Public Works and his/her employees. As a relatively small town, North Hanover has an efficient public works crew and can easily absorb the tasks required under the rules. The Public Works Department will be assisted by the Township Engineer and the Land Use Board Engineer.

## **Nonstructural Stormwater Management Strategies**

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township and use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. 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. A list of revisions is below:

**Chapter 14-16** of the Township Code, entitled "**Land Use Procedures**", was reviewed in regard to incorporating non-structural stormwater management strategies. Several changes are recommended to **Articles VII, VIII and IX** of this chapter, to incorporate these strategies.

### **ARTICLE VII Area, Bulk and Use Requirements**

**Section 15-070E.1 (Watercourses)** "when a stream is proposed for alteration..." *This section should be amended to include language that encourages such features to be left in its natural state wherever possible.*

**Section 16-170.7.A (Buffer Strips and Screening)** "Along back property line..." *Language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.*

**Section 16-180** This district shall represent the area lying within the special flood hazard areas. *This section should include reference to the Nonstructural Stormwater Management Strategies per the Stormwater Management Ordinance.*

**Section 15-080-9 (Environmental Impact Report)** *This section should be revised to reflect the new Stormwater Management Rules in regard to water quality and flow.*

**Section 16-230.6 (Drainage)** *This section should be amended to reference the Township's Stormwater Management Ordinance, which should be updated to include all requirements outlined in N.J.A.C.7:8. These changes were presented earlier in this document.*

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

A detailed land use analysis for the Township was conducted. Figure C-5 illustrates the existing land use in the Township based on 1995/97 GIS information from NJDEP. The Township zoning map is shown in Figure C-6. The build-out calculations for impervious cover are shown in Table C-1.

The build-out analysis indicates the impervious cover at full buildout given the tables allowed impervious. This impervious course will be further reduced by agriculture lands that have provided no build use restrictions in the form of farmland preservation. Approximately 2,800 acres of land so far have been restricted by Farmland Preservation Easements which translates into 336 acres of less impervious. This represents approximately one-quarter of the impervious listed in the table.

The providing of proper Stormwater Management strategies will help mitigate the remaining impervious coverage impacts. The use of water quality devices and flow reduction techniques will provide the ability to reduce the impact of the future commercial, industrial and residential buildout.

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



## **Mitigation Plan**

The Township of North Hanover will not identify available mitigation sites in the Township. Rather the following discussion will be helpful in assisting a developer if he or she is exploring the idea of providing mitigation.

The Stormwater Management Rules provide standards which are to be met on the site of the proposed development to the maximum extent practicable, using nonstructural stormwater management strategies. A municipality may waive one or more of the design and performance standards for projects reviewed under the Municipal Land Use Law, or for projects undertaken by the municipality that are not subject to MLUL. Further, the municipality may choose to require mitigation for projects receiving a waiver from the Department of Environmental Protection, State of New Jersey. A situation may arise in which the design and performance standards may be impossible to meet on the site of a proposed project because of site constraints such as soils or slope or lack of land. The discussion below provides a method for mitigation if such a situation develops.

Selection of an appropriate mitigation project for a requested waiver/exemption must adhere to the following requirements:

The project must be within the same area that would contribute to the receptor impacted by the project. If there are no specific sensitive receptors that would be impacted as the result of the grant of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality, and should be selected to provide the most benefit relative to an existing stormwater problem in the same category. Legal authorization, current and future, must be obtained and the location should be close to the location of the original project.

The municipality 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 costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

In areas adjacent to a creek or river, a hydrologic and hydraulic analysis can be performed to determine if increasing storage capacity would offset the additional volume of runoff and associated peak increase from sites upstream of the storage area. Increases in the storage capacity of an existing structure, such as upstream of a bridge or culvert, can also be considered, provided that it is demonstrated that such an increase does not exacerbate flooding in other areas. All work in regulated areas, such as floodplains and wetlands must be performed in accordance with applicable regulations such as the Flood Hazard Area Control Act Rules and the Freshwater Wetlands Act Rules.

Stormwater quality is regulated for the purpose of minimizing/preventing nonpoint source pollution from reaching the waterway. Mitigation for stormwater quality can be achieved either by directing the runoff from the water quality design storm into a natural area where it can be filtered and/or infiltrated into the ground, by constructing a new BMP to intercept previously

untreated runoff or by retrofitting existing stormwater system that previously did not provide sufficiently for water quality.

Groundwater recharge will normally be encouraged in North Hanover. The applicant will need to prove adequate depth to water table to provide groundwater recharge.

### **Well Head Protection**

According to the 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-, five-, and twelve-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. At this time, there are no public wells in North Hanover. All residents and businesses are serviced by private wells or fed by other towns or the Federal Government.

### **Stream Corridors**

The streams and rivers of North Hanover have been described previously in this report. North Hanover contains the headwaters for these streams generally, and therefore has a special responsibility in their care. The Public Works Department should inspect every stream once a year for erosion or evidence of foreign contaminants. Furthermore, the streams should be sampled either by the state, the county or Township forces.

In addition to the rivers and streams that run through and along the Township, there are a number of wetland areas. These wetland areas, shown in C-4, provide flood storage, nonpoint pollutant removal and habitat for flora and fauna.

Review of development applications near streambeds should provide mitigation for any changes to the quantity or quality of flow into the flood plains.

### **Recommended Implementing Stormwater Control Ordinances**

The Borough has recently implemented the following ordinances:

- Stormwater Management Ordinance (No. \_\_\_\_\_)

## **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. A 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 the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. Project to be determined by the Township Engineer.
2. The municipality 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 costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

**Table C-1 NORTH HANOVER TOWNSHIP BUILD-OUT  
CALCULATIONS  
FOR TWO HUC14S**

HUC14 and Zone	Total Area (Acres)	Wetlands/ Water Area (Acres)	Developable Area (Acres)	Allowable Impervious (%)	Build-Out Impervious (Acres)
<b>02040201050050</b>					
Residential/Agriculture (R-A)	83.67	19.20	64.47	12%	7.74
<b>TOTALS</b>	<b>83.67</b>	<b>19.20</b>	<b>64.47</b>	<b>12%</b>	<b>7.74</b>
<b>02040201050060</b>					
Residential-1 (R-1)	40.20	0.86	39.34	15%	5.90
Residential/Agriculture (R-A)	975.58	240.49	735.09	12%	88.21
<b>TOTALS</b>	<b>1,015.78</b>	<b>241.35</b>	<b>774.43</b>	<b>12%</b>	<b>94.11</b>
<b>02040201080020</b>					
Residential/Agriculture (R-A)	17.33	0.00	17.33	12%	2.08
<b>TOTALS</b>	<b>17.33</b>	<b>0.00</b>	<b>17.33</b>	<b>12%</b>	<b>2.08</b>
<b>02040201080010</b>					
Residential-1 (R-1)	124.09	3.26	120.83	15%	18.12
Residential/Agriculture (R-A)	3,898.99	458.11	3,440.88	12%	412.91
<b>TOTALS</b>	<b>4,023.08</b>	<b>461.37</b>	<b>3,561.71</b>	<b>12%</b>	<b>431.03</b>
<b>02040201050030</b>					
Commercial-2 (C-2)	31.15	3.00	28.15	65%	18.30
Residential-1 (R-1)	183.16	5.78	177.38	15%	26.61
Residential-2 (R-2)	18.38	0.00	18.38	15%	2.76
Residential/Agriculture (R-A)	903.75	231.45	672.30	12%	80.68
<b>TOTALS</b>	<b>1,136.44</b>	<b>240.23</b>	<b>896.21</b>	<b>14%</b>	<b>128.34</b>
<b>02040201040070</b>					
Commercial-1 (C-1)	89.40	15.08	74.32	65%	48.31
Commercial-2 (C-2)	39.31	5.19	34.12	65%	22.18
Industrial (IND)	106.22	16.78	89.44	75%	67.08
Residential-1 (R-1)	232.65	24.85	207.80	15%	31.17
Residential-2 (R-2)	519.09	32.15	486.94	15%	73.04
Residential/Agriculture (R-A)	2,017.02	598.57	1,418.45	12%	170.21
<b>TOTALS</b>	<b>3,003.69</b>	<b>692.62</b>	<b>2,311.07</b>	<b>18%</b>	<b>411.99</b>
<b>02040201040060</b>					
Commercial-1 (C-1)	62.47	0.05	62.42	65%	40.57
Commercial-2 (C-2)	70.31	9.42	60.89	65%	39.58
Industrial (IND)	96.33	1.70	94.63	75%	70.97
Residential-1 (R-1)	164.87	20.51	144.36	15%	21.65
Residential-2 (R-2)	64.91	4.34	60.57	15%	9.09
Residential/Agriculture (R-A)	1,434.35	219.78	1,214.57	12%	145.75
<b>TOTALS</b>	<b>1,893.24</b>	<b>255.80</b>	<b>1,637.44</b>	<b>20%</b>	<b>327.61</b>

Table C-2: Pollutant Loads by Land Cover

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

Source: NJDEP Stormwater BMP Manual 2004.



TABLE C-3: NONPOINT SOURCE LOADS AT BUILD-OUT FOR NORTH HANOVER TOWNSHIP FOR TWO HUC 14S

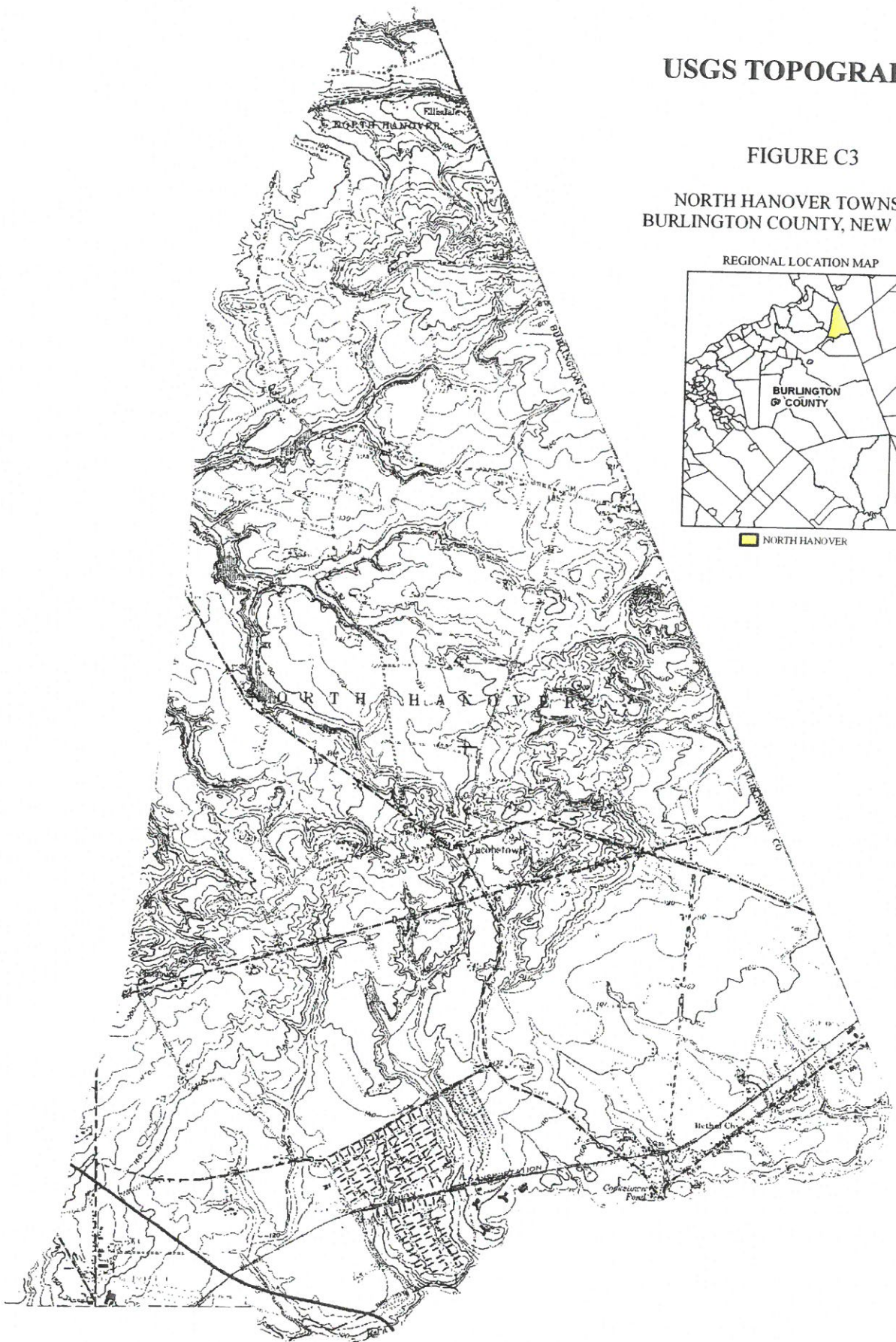
HUC14 and Zone	Build-Out Zoning	Developable Area (Acres)	TP (lbs/acre/yr)	TN (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
<b>02040201050050</b>								
Residential/Agriculture (R-A)	Low Density, Rural Residential	64.47	0.6	5	38.68	322.35	100	6,447.00
<b>TOTALS</b>		<b>64.47</b>			<b>38.68</b>	<b>322.35</b>		<b>6,447.00</b>
<b>02040201050060</b>								
Residential-1 (R-1)	Low Density, Rural Residential	39.34	0.6	5	23.60	196.70	100	3,934.00
Residential/Agriculture (R-A)	Low Density, Rural Residential	735.09	0.6	5	441.05	3,675.45	100	73,509.00
<b>TOTALS</b>		<b>774.43</b>			<b>464.66</b>	<b>3,872.15</b>		<b>77,443.00</b>
<b>02040201080020</b>								
Residential/Agriculture (R-A)	Low Density, Rural Residential	17.33	0.6	5	10.40	86.65	100	1,733.00
<b>TOTALS</b>		<b>17.33</b>			<b>10.40</b>	<b>86.65</b>		<b>1,733.00</b>
<b>02040201080010</b>								
Residential-1 (R-1)	Low Density, Rural Residential	120.83	0.6	5	72.50	604.15	100	12,083.00
Residential/Agriculture (R-A)	Low Density, Rural Residential	3,440.88	0.6	5	2,064.53	17,204.40	100	344,088.00
<b>TOTALS</b>		<b>3,561.71</b>			<b>2,137.03</b>	<b>17,808.55</b>		<b>356,171.00</b>
<b>02040201050030</b>								
Commercial-2 (C-2)	Commercial	28.15	2.1	22	59.12	619.30	200	5,630.00
Residential-1 (R-1)	Low Density, Rural Residential	177.38	0.6	5	106.43	886.90	100	17,738.00
Residential-2 (R-2)	High, Medium Density Residential	18.38	1.4	15	25.73	275.70	140	2,573.20
Residential/Agriculture (R-A)	Low Density, Rural Residential	672.30	0.6	5	403.38	3,361.50	100	67,230.00
<b>TOTALS</b>		<b>896.21</b>			<b>594.66</b>	<b>5,143.40</b>		<b>93,171.20</b>
<b>02040201040070</b>								
Commercial-1 (C-1)	Commercial	74.32	2.1	22	156.07	1,635.04	200	31,214.40
Commercial-2 (C-2)	Commercial	34.12	2.1	22	71.65	750.64	200	14,330.40
Industrial (IND)	Industrial	89.44	1.5	16	134.16	1,431.04	200	26,832.00
Residential-1 (R-1)	Low Density, Rural Residential	207.80	0.6	5	124.68	1,039.00	100	12,468.00
Residential-2 (R-2)	High, Medium Density Residential	486.94	1.4	15	681.72	7,304.10	140	95,440.24
Residential/Agriculture (R-A)	Low Density, Rural Residential	1,418.45	0.6	5	851.07	7,092.25	100	85,107.00
<b>TOTALS</b>		<b>2,311.07</b>			<b>2,019.35</b>	<b>19,252.07</b>		<b>265,392.04</b>
<b>02040201040060</b>								
Commercial-1 (C-1)	Commercial	62.42	2.1	22	131.08	1,373.24	200	12,484.00
Commercial-2 (C-2)	Commercial	60.89	2.1	22	127.87	1,339.58	200	12,178.00
Industrial (IND)	Industrial	94.63	1.5	16	141.95	1,514.08	200	18,926.00
Residential-1 (R-1)	Low Density Rural Residential	144.36	0.6	5	86.62	721.80	100	14,436.00
Residential-2 (R-2)	High, Medium Density Residential	60.57	1.4	15	84.80	908.55	140	8,479.80
Residential/Agriculture (R-A)	Low Density Rural Residential	1,214.57	0.6	5	728.74	6,072.85	100	121,457.00
<b>TOTALS</b>		<b>1,637.44</b>			<b>1,301.05</b>	<b>11,930.10</b>		<b>187,960.80</b>



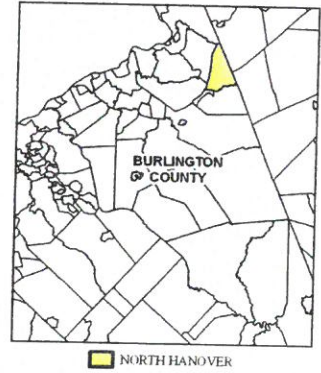
# USGS TOPOGRAPHY

## FIGURE C3

NORTH HANOVER TOWNSHIP  
BURLINGTON COUNTY, NEW JERSEY



REGIONAL LOCATION MAP



PREPARED BY



OCTOBER 2007



MAP SCALE - 1" = 4000' AT 8.5"x11" PRINT

### SOURCE INFORMATION

USGS TOPOGRAPHIC QUAD MAPS FOR  
NEW EGYPT, COLUMBUS, & ALLENTOWN

"THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY  
PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT STATE AUTHORIZED"



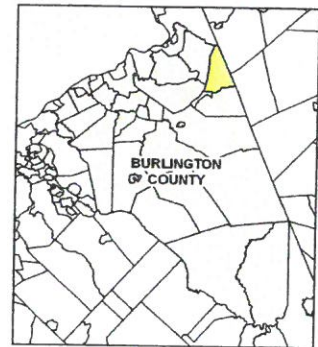
# GROUNDWATER RECHARGE RATES & WETLANDS

FIGURE C4

NORTH HANOVER TOWNSHIP  
BURLINGTON COUNTY, NEW JERSEY



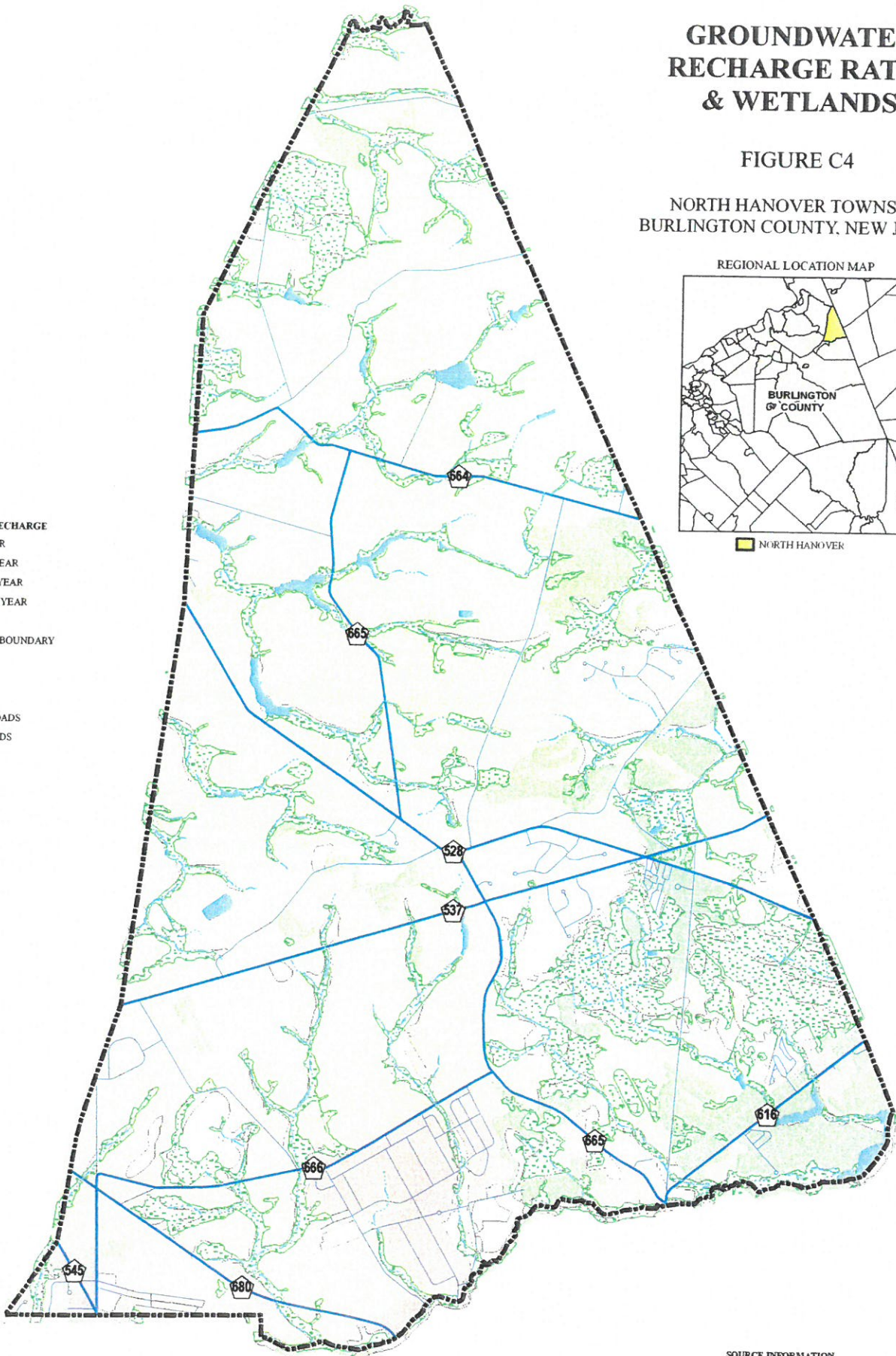
REGIONAL LOCATION MAP



NORTH HANOVER

## LEGEND

- NJGS GROUNDWATER RECHARGE
  - 0 INCHES PER YEAR
  - 1 - 7 INCHES PER YEAR
  - 7 - 10 INCHES PER YEAR
  - 11 - 14 INCHES PER YEAR
- NJDEP WETLANDS
- NJDEP MUNICIPAL BOUNDARY
- PARCELS
- STREAMS
- WATER BODIES
- NJDOT COUNTY ROADS
- NJDOT LOCAL ROADS



## SOURCE INFORMATION

ROAD LAYER CREATED BY THE NJDOT  
 PARCEL DATA FROM NJ PINELANDS COMMISSION  
 ZONING LAYER CREATED BY THE BURLINGTON COUNTY  
 DEPARTMENT OF ECONOMIC DEVELOPMENT AND REGIONAL PLANNING  
 GROUNDWATER RECHARGE CREATED BY THE NEW JERSEY GEOLOGICAL SURVEY  
 \*THIS MAP WAS DEVELOPED USING NJDEP GIS DIGITAL DATA. THIS SECONDARY  
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PREPARED BY:



OCTOBER 2007

0 1,000 2,000 4,000 6,000  
Feet

MAP SCALE = 1" = 4000' AT 8.5"x11" PRINT



# SUBWATERSHEDS, WATERWAYS, & PUBLIC COMMUNITY WELLS

FIGURE C2

NORTH HANOVER TOWNSHIP  
BURLINGTON COUNTY, NEW JERSEY

REGIONAL LOCATION MAP

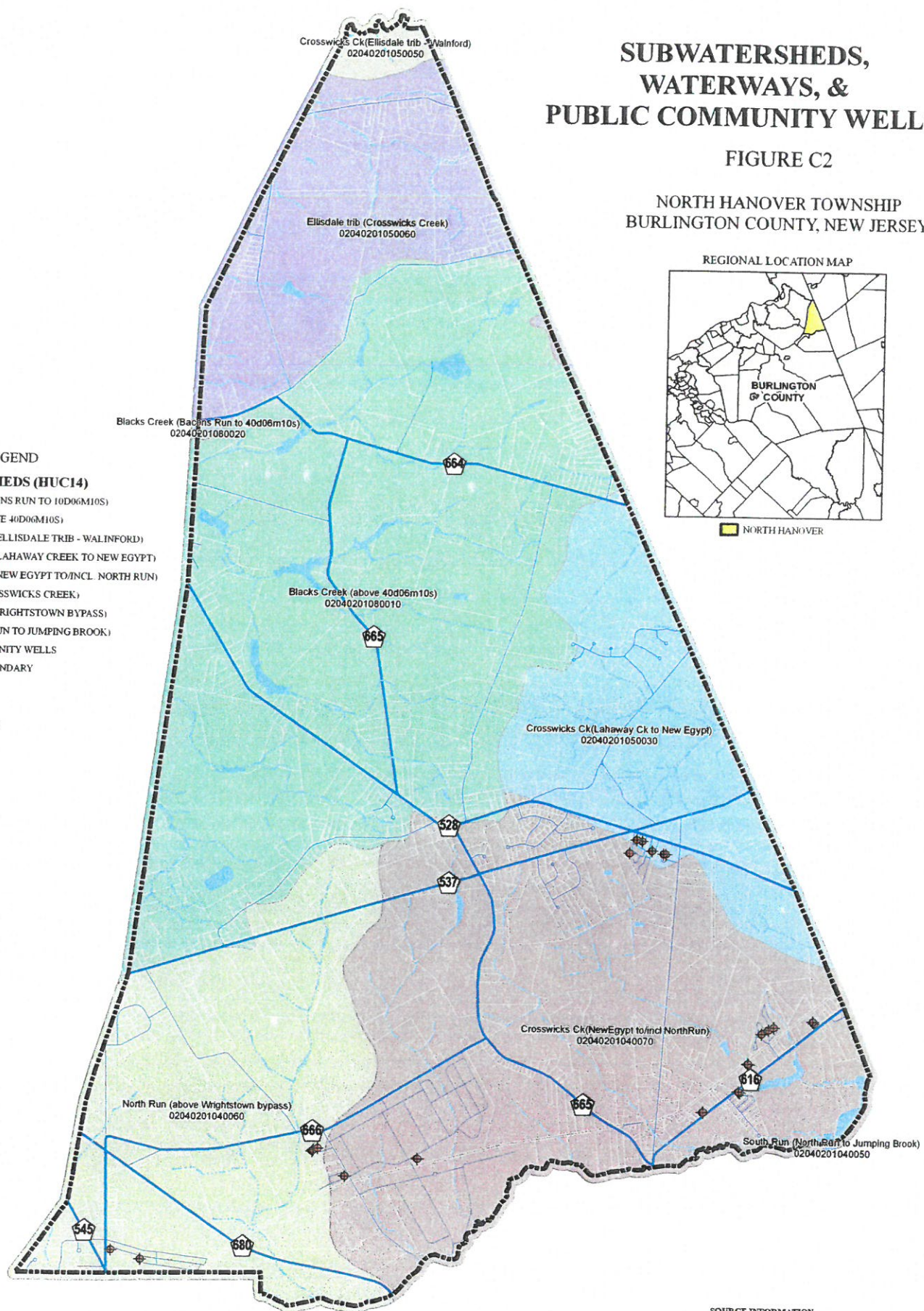


LEGEND

NJDEP SUBWATERSHEDS (HUC14)

- BLACKS CREEK (BACONS RUN TO 10D06M10S)
- BLACKS CREEK (ABOVE 40D06M10S)
- CROSSWICKS CREEK (ELLISDALE TRIB - WALINFORD)
- CROSSWICKS CREEK (LAHAWAY CREEK TO NEW EGYPT)
- CROSSWICKS CREEK (NEW EGYPT TO INCL. NORTH RUN)
- ELLISDALE TRIB. (CROSSWICKS CREEK)
- NORTH RUN (ABOVE WRIGHTSTOWN BYPASS)
- SOUTH RUN (NORTH RUN TO JUMPING BROOK)

- NJDEP PUBLIC COMMUNITY WELLS
- NJDEP MUNICIPAL BOUNDARY
- STREAMS
- WATER BODIES
- NJDOT COUNTY ROADS
- NJDOT LOCAL ROADS
- PARCELS



PREPARED BY:  
**MASER**  
CONSULTING P.C.  
OCTOBER 2007

0 1,000 2,000 4,000 6,000 Feet  
MAP SCALE = 1" = 4000' AT 8.5"x11" PRINT

**SOURCE INFORMATION**  
ROAD LAYER CREATED BY THE NJDOT  
PARCEL DATA FROM NJ PINELANDS COMMISSION  
ZONING LAYER CREATED BY THE BURLINGTON COUNTY DEPARTMENT OF ECONOMIC DEVELOPMENT AND REGIONAL PLANNING  
GROUNDWATER RECHARGE CREATED BY THE NEW JERSEY GEOLOGICAL SURVEY  
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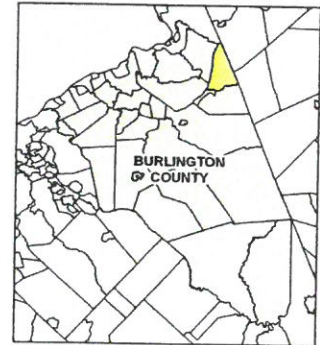


# LAND USE MAP

FIGURE C5

NORTH HANOVER TOWNSHIP  
BURLINGTON COUNTY, NEW JERSEY

REGIONAL LOCATION MAP



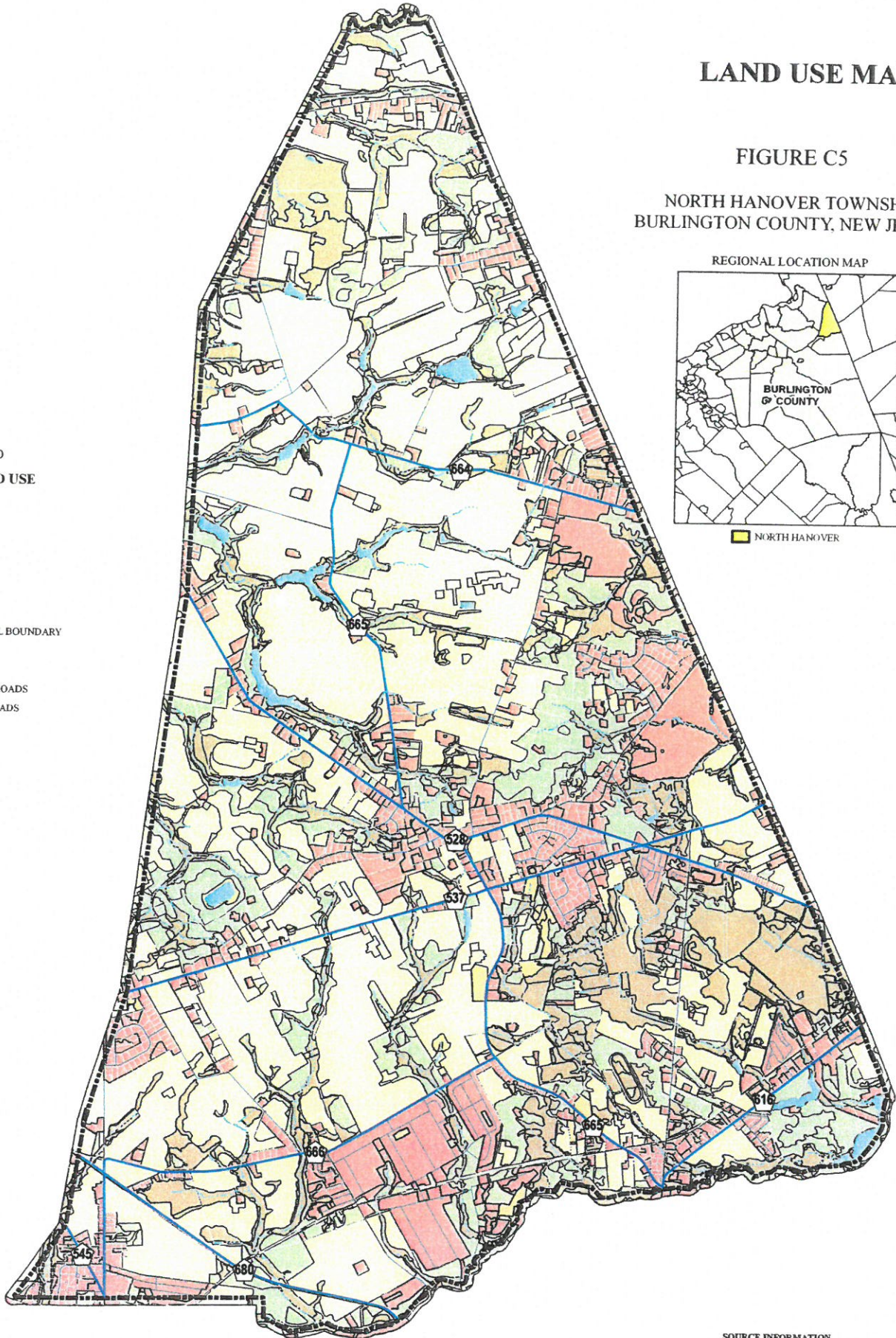
NORTH HANOVER



LEGEND

NJDEP 2002 LAND USE  
(BY TYPE)

- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS
- NJDEP MUNICIPAL BOUNDARY
- STREAMS
- WATER BODIES
- NJDOT COUNTY ROADS
- NJDOT LOCAL ROADS
- PARCELS



PREPARED BY:



OCTOBER 2007

0 1,000 2,000 4,000 6,000  
Feet

MAP SCALE = 1" = 4000' AT 8.5"x11" PRINT

SOURCE INFORMATION

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# ZONING MAP

FIGURE C6

NORTH HANOVER TOWNSHIP  
BURLINGTON COUNTY, NEW JERSEY

REGIONAL LOCATION MAP



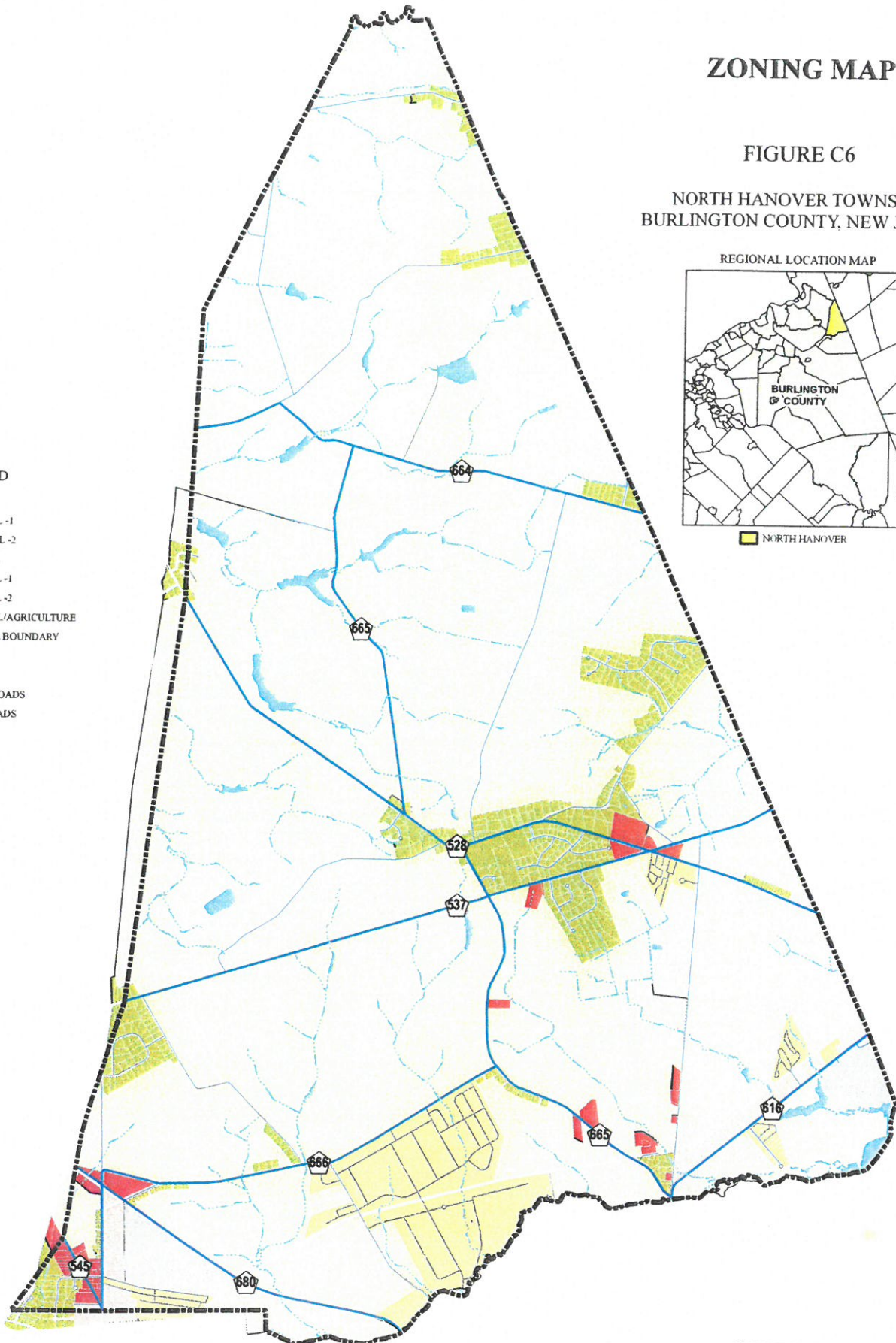
NORTH HANOVER



## LEGEND

### ZONING

- C-1 COMMERCIAL -1
- C-2 COMMERCIAL -2
- IND INDUSTRIAL
- R-1 RESIDENTIAL -1
- R-2 RESIDENTIAL -2
- R-A RESIDENTIAL/AGRICULTURE
- NJDEP MUNICIPAL BOUNDARY
- STREAMS
- WATER BODIES
- NJDOT COUNTY ROADS
- NJDOT LOCAL ROADS
- PARCELS



PREPARED BY:



OCTOBER 2007

0 1,000 2,000 4,000 6,000  
Feet

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### SOURCE INFORMATION

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