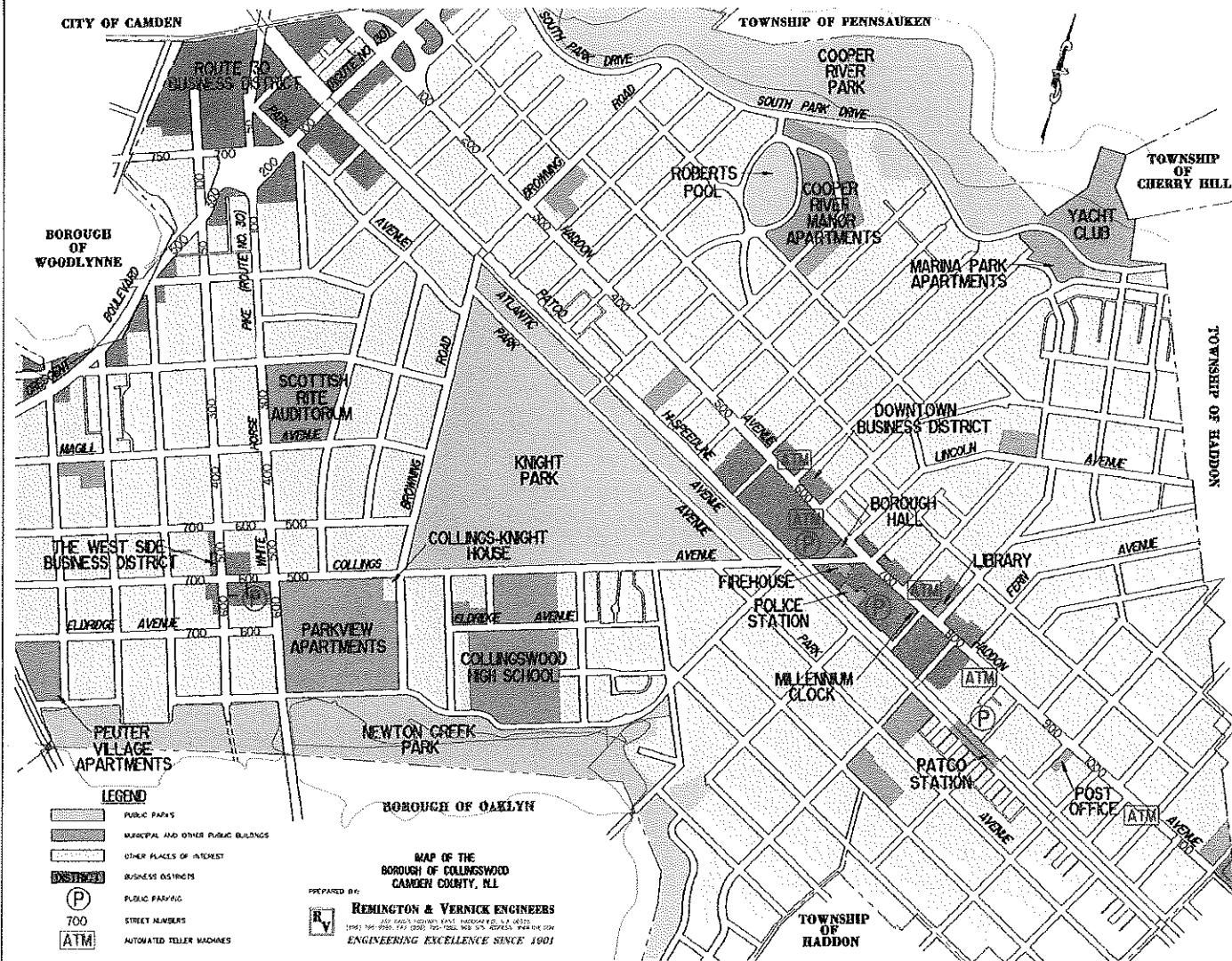


MAY 2006



Municipal Stormwater Management Plan

Borough of Collingswood

Camden County, New Jersey

Prepared By

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**REMINGTON
& VERNICK
ENGINEERS**

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Municipal Stormwater
Management Plan
Borough of Collingswood

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I. Introduction

The following Municipal Separate Stormwater System (MS4) stormwater plan was prepared by Remington & Vernick, Engineers for the Borough of Collingswood. The NJDEP "Sample Municipal Stormwater Management Plan" was used as a basis for preparation of the plan, as modified to provide specific information germane to Collingswood.

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

The plan contained herein 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/quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

In addition, this plan describes long-term operation and maintenance measures for existing and future stormwater facilities. In accordance with NJAC 7:8, a waiver from performing a build-out analysis will be obtained upon Borough adoption and filing of this plan, on the basis that there is less than one (1) square mile of buildable, undeveloped land within the Borough (**see Development Constraints Map, Appendix A**). The plan also addresses the review and update of existing ordinances, the Borough 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 are sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

II. Goals

The goals of this MSWMP are as follows:

- 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, 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, protect public health, safeguard fish and aquatic life and scenic and ecological values, 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 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.

III. Stormwater Discussion

Land development can dramatically alter the hydrologic cycle 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.

In addition, 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 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.

IV. Background

The Borough of Collingswood encompasses approximately 1.92 square miles of land within Camden County. The Borough of Collingswood is bordered by Camden City and Pennsauken Township to the north, Haddon Township to the east and south, Oaklyn Borough to the south, and Camden City and Woodlynne Borough to the west. Collingswood is located between the Cooper River to the north and Newton Lake to the south. The Borough of Collingswood is located approximately several miles east of Philadelphia.

The Borough is developed to near maximum build-out per available land use and environmental regulations (**refer to Appendix A, Existing Conditions and Development Constraints Maps**). As indicated on the enclosed mapping, virtually all land within the Borough is either previously-developed or environmentally-constrained.

The Borough has a population of approximately 14,326 residents (based on 2000 census data as cited from the U.S. Census Bureau). Population has decreased moderately since 1960, with resident populations of 17,370, 17,422, 15,838, and 15,289 for census years 1960, 1970, 1980 and 1990, respectively. Between the census years 1960 and 2000, population decreased by 3,044 residents (approximately 20%). It should be noted that population peaked during the census year 1970 with approximately 17,422 residents.

The Borough of Collingswood is predominantly developed with almost all remaining undeveloped land consisting of wetlands and threatened species habitat. It should be noted that a significant amount of wetlands, as shown on the enclosed "Existing Conditions", "Freshwater Wetlands", and "Development Constraints" maps (**Appendix A of Report**), is along the Cooper River which traverses the northern border of the Borough and Newton Lake which traverses the southern border of the Borough; and constrained by freshwater wetlands and threatened species habitat. As such, there is limited remaining developable land within the Borough.

Per review of United States Geological Survey (USGS) topographic mapping and available NJDEP-GIS data, the Cooper River, Newton Lake, and a lake located in Knight Park are the only surface water bodies within the Borough. Cooper River traverses the northern border of the Borough, Newton Lake traverses the southern border of the Borough, and a lake is located in Knight Park.

The 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 benthic macroinvertebrate community dynamics. Per review of NJDEP AMNET data, there are no AMNET biomonitoring sites within the Borough.

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, retrofitting stormwater systems, and other BMPs. 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. 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 TMDLs are needed. It should be noted that as part of the Borough's Municipal Separate Storm Sewer (MS4) regulations, existing inlets and outfalls will be inspected and repairs/maintenance will be made. At that time, existing water quantity and erosion problems (if any) will be assessed and abated to the maximum extent practicable.

Since there is limited remaining developable land within the Borough, the potential for additional surface and groundwater degradation in the long-term will be via redevelopment and limited development. Any future major development will comply with the new NJDEP Stormwater design standards (NJAC 7:8), including the average annual recharge. As such, future development/redevelopment will be controlled to the maximum extent practicable with respect to stormwater management, Total Suspended Solids (TSS) minimization and stormwater recharge to the maximum extent practicable.

V. Design and Performance Standards

The Borough has adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality/quantity and loss of groundwater recharge in receiving water bodies. This will be implemented by adoption of the NJDEP Model Stormwater ordinance, as amended for use and enforcement within the Borough of Collingswood.

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 by January 5, 2006 (i.e., within 24 months of the effective date of the Stormwater Management Rules).

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

VI. Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Borough; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs at this time. It should be noted that Camden County is working on a Regional Plan for the Cooper River watershed.

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 storm water management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Borough'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, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Camden County Soil Conservation District.

VII. Nonstructural Stormwater Management Strategies

Non-structural stormwater strategies for design of **new** developments, or redevelopment, as defined per the NJDEP Stormwater design Regulations (NJAC -5.3(b)), include the following objectives:

- A. Protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
- B. Minimizing impervious surfaces and breakup or disconnecting the flow of runoff over impervious surfaces.
- C. Maximum protection of natural drainage features and vegetation.
- D. Minimizing the decrease in the "time of concentration" from pre-construction conditions to post-construction conditions.
- E. Minimizing land disturbance during clearing and grading.
- F. Minimizing soil compaction.
- G. Providing low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides.
- H. Providing vegetated open channel conveyance systems discharging into and through stable vegetative areas.
- I. Providing other source controls to prevent or minimize.

It should be noted that due to less of one (1) square mile of vacant or developable lands, outside of environmentally-constrained areas remaining in the Borough, that Collingswood Borough is exempt from the requirement to evaluate the extent to which the Borough's Master Plan implements the non-structural strategies referenced above.

However, as indicated previously, Collingswood Borough will adopt the NJDEP model stormwater control ordinance, as amended for use and enforcement within the Borough of Collingswood. This ordinance includes methodologies for incorporating non-structural stormwater strategies identified above, in design, "to the maximum extent practicable".

If an applicant (or his/her Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies identified in (b) below into the design of a particular project, the applicant will identify the strategy and provide a basis for the contention. It is understood that any project requiring NJDEP Land Use Regulation Program permitting or approvals will also be subject to a similar stormwater review by the appropriate agency.

Once the ordinance text is finalized, it will be submitted to the Camden County Planning Board for review and approval by January 5, 2006 (i.e., 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.

VIII. Land Use/Build-Out Analysis

As stated previously, there is less of one (1) square mile of vacant or developable lands, outside of environmentally-constrained areas remaining in the Borough, that Collingswood is exempt from the requirement to evaluate the extent to which the Borough’s Master Plan implements the non-structural strategies referenced above (refer to **Appendix A, Existing Development and Development Constraints Map** for verification).

In the event that development does occur in environmentally sensitive areas; then in accordance with the Borough’s Master Plan, developers will be required to create new wetlands to off-set losses due to development. This requirement will apply to all land use zones within the Borough.

IX. 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 the 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 one of the following projects 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 Borough Engineer. Listed below are specific (SAMPLE) projects that can be used to address the mitigation requirement.

Groundwater Recharge

- Retrofit the L.B. Middle School site and detention basin to provide an additional 300,000 cf of average annual groundwater recharge.
- Replace the existing deteriorated 20,000 sf overflow impervious parking lot at Children's Memorial Soccer Complex with permeable paving to provide 150,000 cf of additional average annual groundwater recharge.

Water Quality

- Retrofit the existing stormwater management facility at Matisse Elementary School to provide the removal of 80 percent of total suspended solids from the parking lot runoff.
- Retrofit the existing parking area at the West Side Municipal Complex to provide the removal of 80 percent of total suspended solids. Due to site constraints, the retrofit BMP must be installed underground and cannot reduce the existing number of parking spaces.

Water Quantity

- Install stormwater management measures in the open space in the Woodlot Development to reduce the peak flow from the upstream development on the receiving stream by 20 cfs, 35 cfs, and 100 cfs for the 2, 10, and 100-year storms respectively.

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 a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

Water Quality

- Re-establish a vegetative buffer (minimum 50 foot wide) along 1,500 linear feet of the shoreline at Sunshine Pond as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- Provide goose management measures, including public education at Central Park.

Options 1 and 2 would be available only if the MSWMP includes a list of environmental enhancement projects that provide groundwater recharge, control flooding, or control nonpoint source pollution. These are fictitious projects for the purposes of providing examples for this plan. Although only a brief description of each project is presented here, it is important for the municipality to have sufficient information on each project, including size of the project, permit requirements, land ownership, and estimated project costs (i.e., permitting fees, engineering costs, construction costs, and maintenance costs).

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.

X. Stream Corridor Protection Plan (Optional)

It should be noted that there are no Special Water Resource protection areas designated Category One (NJAC 7:9B) or upstream perennial or intermittent streams of said waters within the Borough of Collingswood. If such water bodies are found or designated at a later date, future major development within 300 feet of said waters will be regulated in accordance with NJAC 7:8-5.5(h) as outlined in the model stormwater ordinance.

Appendix A -- Mapping

Figure 1 – U.S.G.S. Quadrangle/ Hydrologic Units (HUC14s)

Figure 2 – Wellhead Protection Areas/Groundwater Recharge Areas

Figure 3 – Zoning Districts

Figure 4 – Wetlands

Figure 5 – Soils

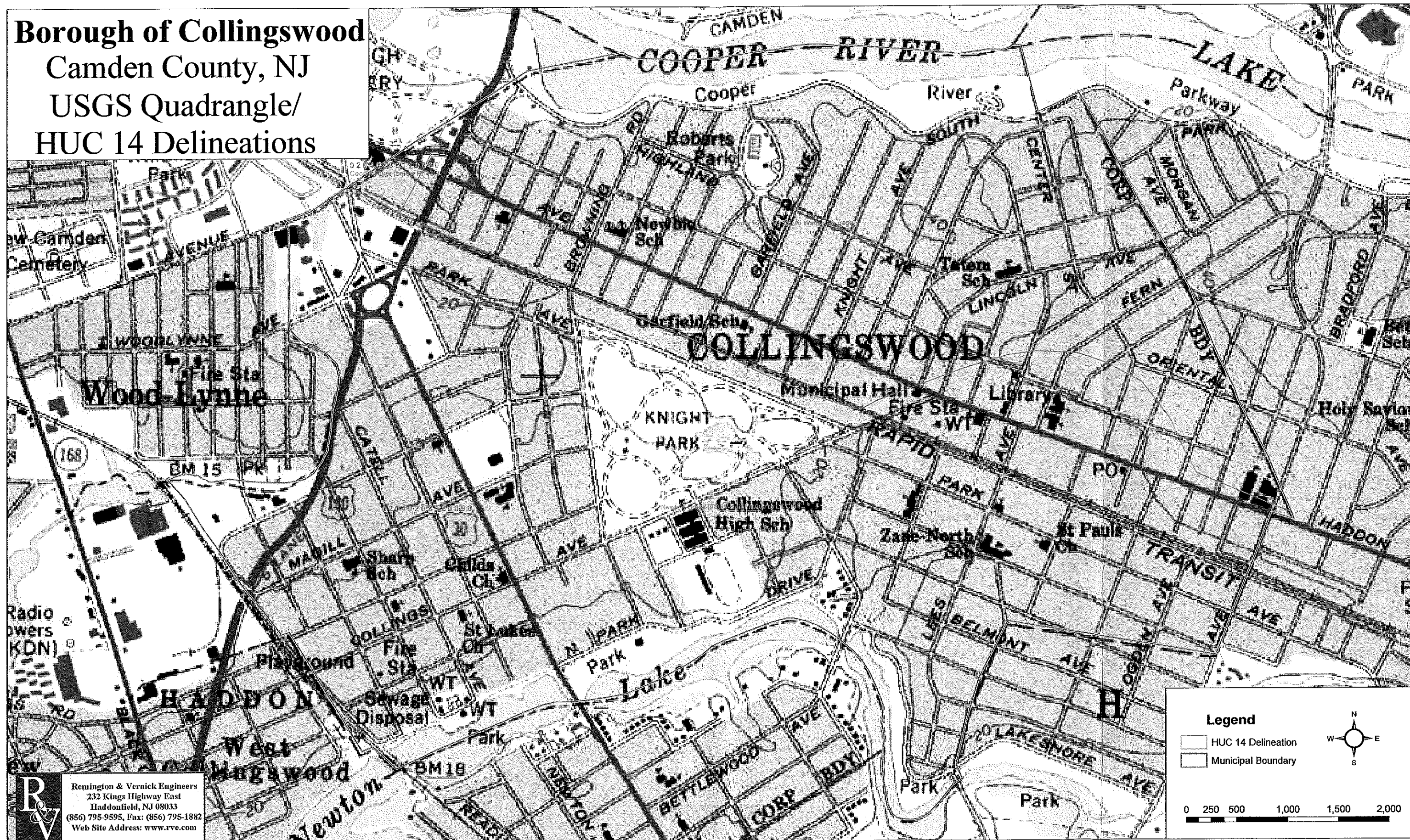
Figure 6 – Floodprone Areas

Figure 7 – Aerial Photo of Existing Conditions

Figure 8 – Development Constraints Map

Borough of Collingswood

Camden County, NJ
USGS Quadrangle/
HUC 14 Delineations



Borough of Collingswood
Camden County, NJ
Groundwater Recharge/
Well Head Protection Areas

Legend

Well Head Protection Areas


- TIER 1
- TIER 2
- TIER 3

NJGS Groundwater Recharge Values

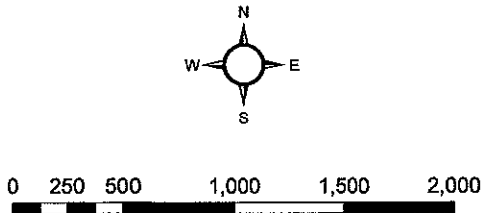
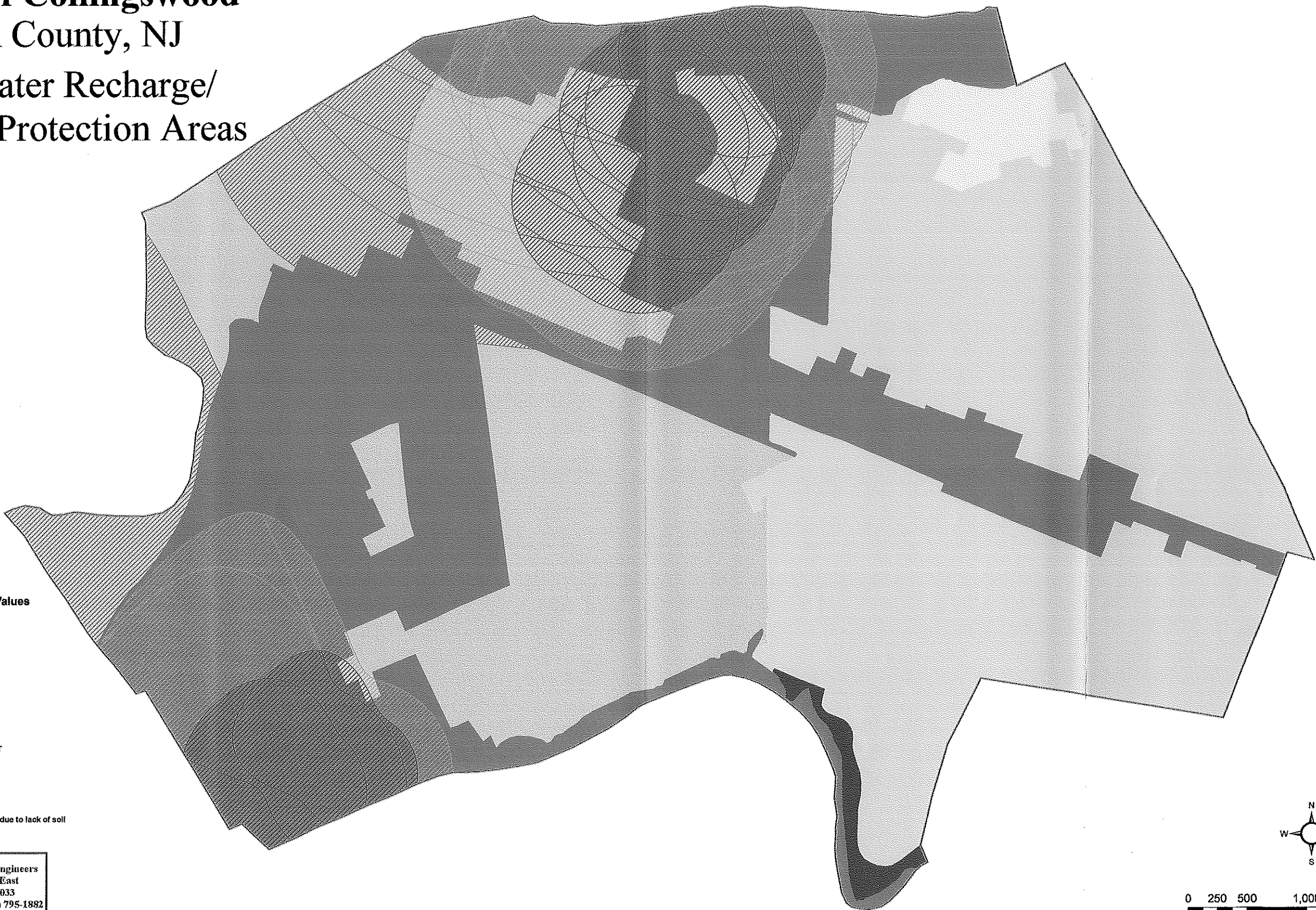
- 15 to 16 in/yr
- 10 to 14 in/yr
- 8 to 9 in/yr
- 1 to 7 in/yr
- 0 in/yr
- Hydric Soils
- Wetlands and Open Water
- No Recharge Calculated

Municipal Boundary

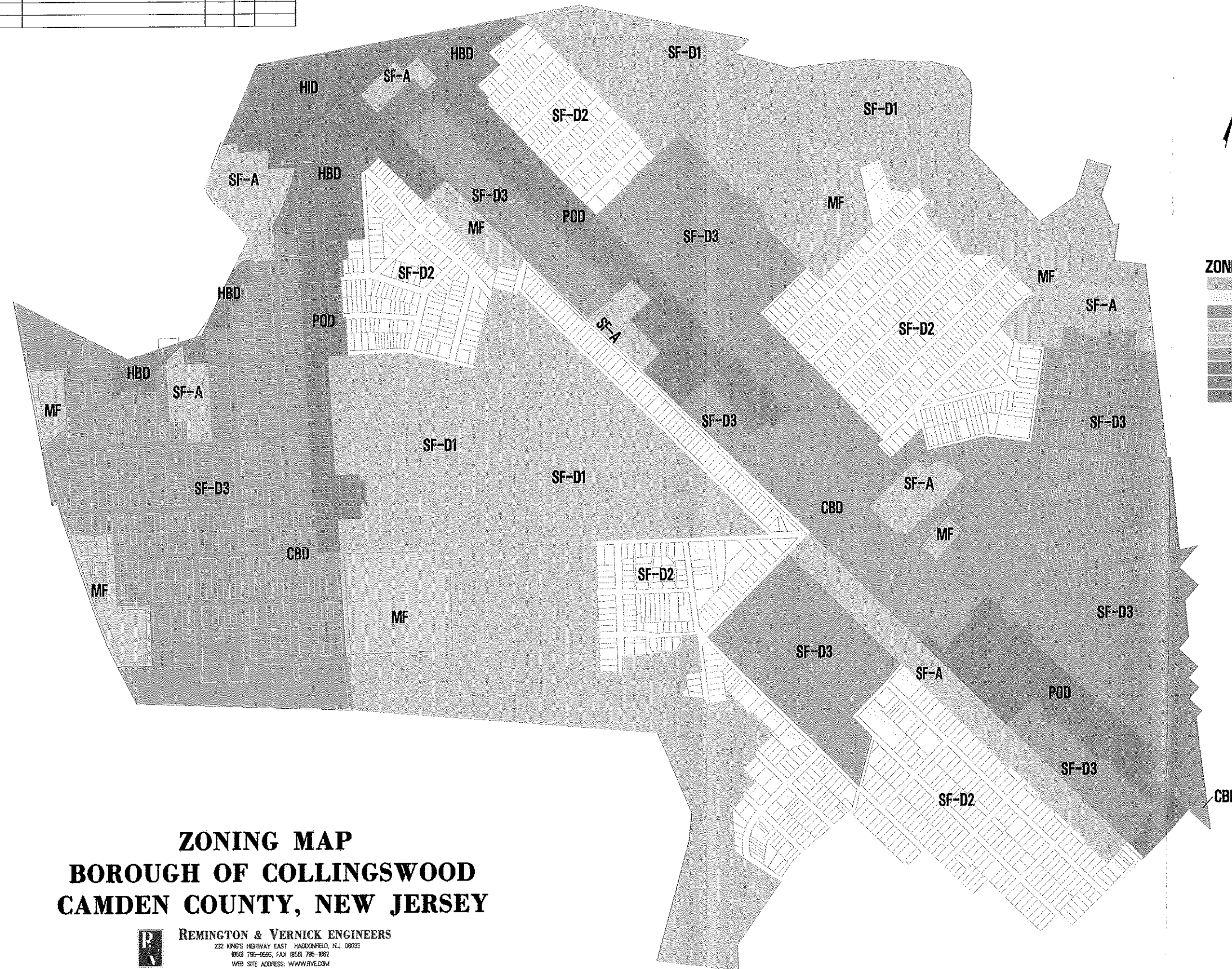
*Note: Incomplete Groundwater Recharge data due to lack of soil survey for entire borough.



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NO.	REVISION	DATE	BY	CHK. BY



ZONING DESIGNATIONS

- SF-D1 - SINGLE FAMILY, DETACHED RESIDENTIAL DISTRICT ONE
- SF-D2 - SINGLE FAMILY, DETACHED RESIDENTIAL DISTRICT TWO
- SF-D3 - SINGLE FAMILY, DETACHED RESIDENTIAL DISTRICT THREE
- SF-A - SINGLE FAMILY, ATTACHED RESIDENTIAL DISTRICT
- MF - MULTI-FAMILY, RESIDENTIAL DISTRICT
- CBD - CENTRAL BUSINESS DISTRICT
- POD - PROFESSIONAL BUSINESS DISTRICT
- HBD - HIGHWAY BUSINESS DISTRICT
- HID - HIGHWAY INDUSTRIAL DISTRICT

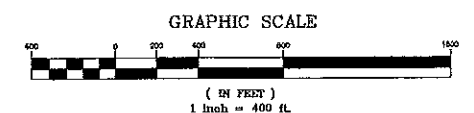
ZONING MAP BOROUGH OF COLLINGSWOOD CAMDEN COUNTY, NEW JERSEY



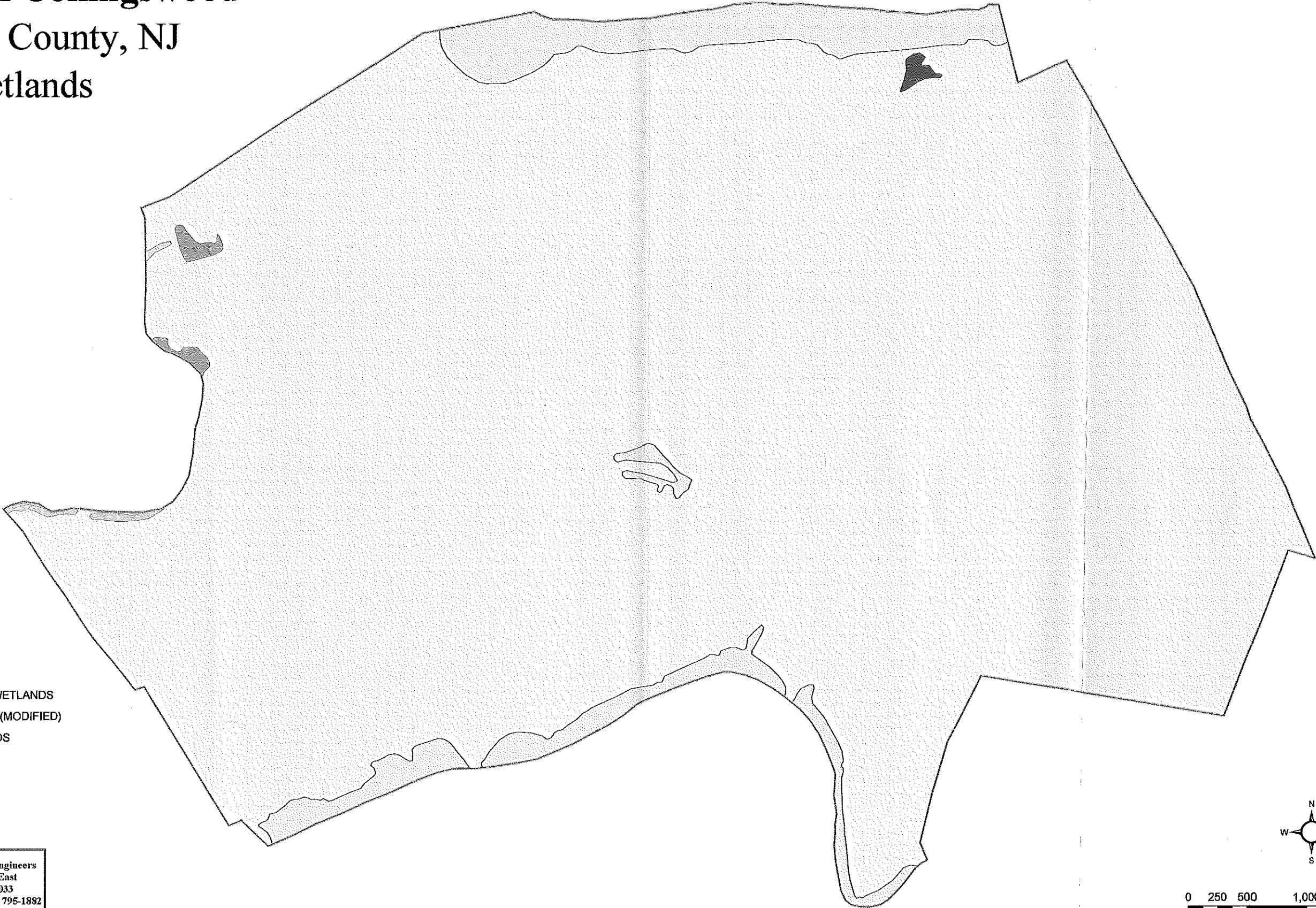
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SCALE: 1"=400' DATE: 07/19/2000 DWG.NO.: Z-0412T128-01 SHEET: 1 OF 1



Borough of Collingswood
Camden County, NJ
Wetlands

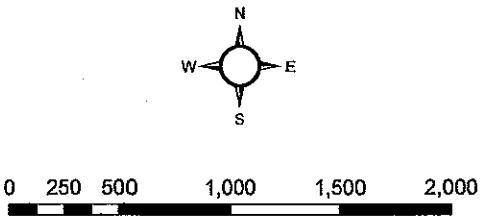


Legend

- Wetlands**
- ARTIFICIAL LAKES
 - DECIDUOUS WOODED WETLANDS
 - DISTURBED WETLANDS (MODIFIED)
 - HERBACEOUS WETLANDS
 - STREAMS AND CANALS
 - UPLANDS
 - Municipal Boundary

R
V

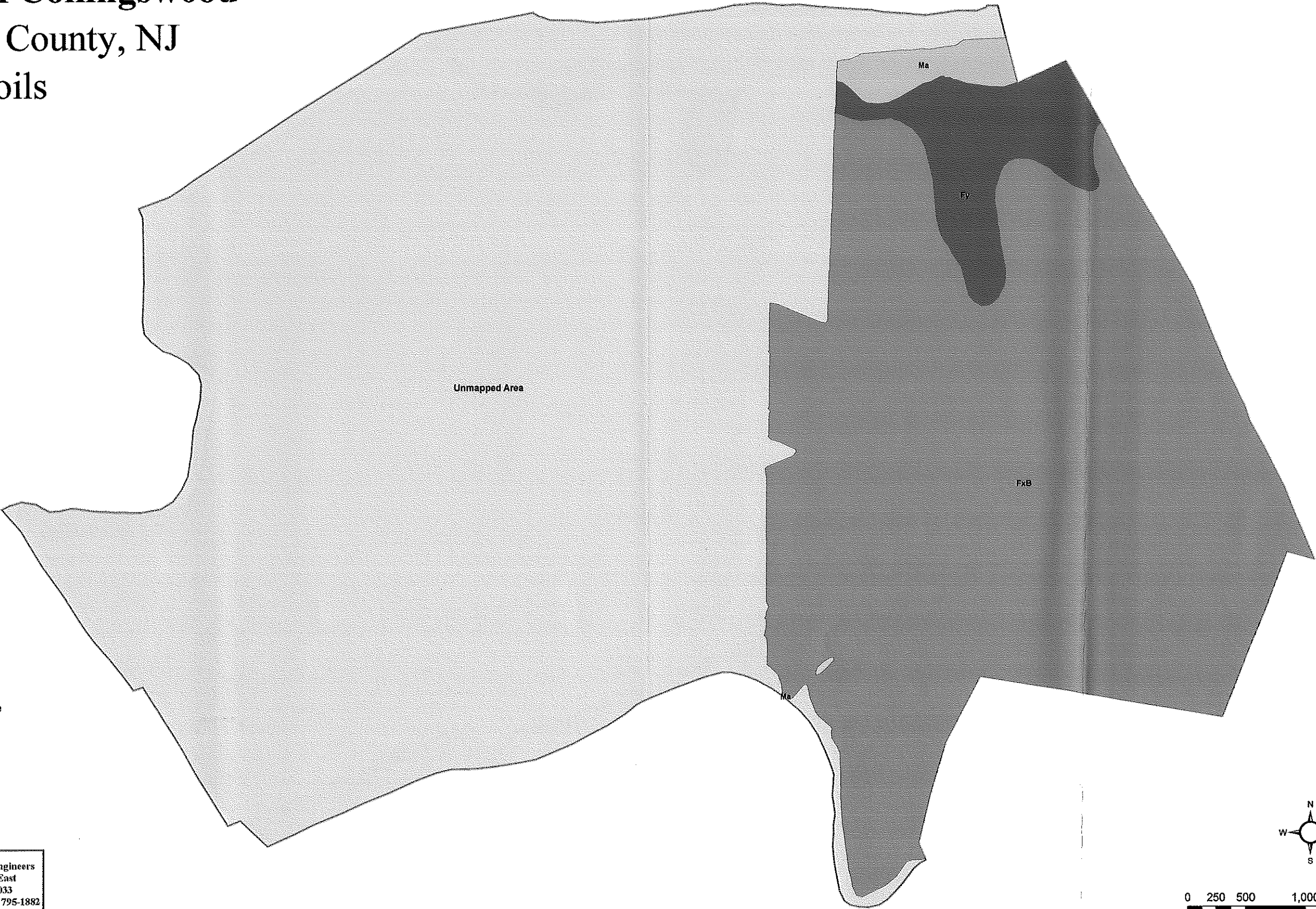
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Borough of Collingswood

Camden County, NJ

Soils

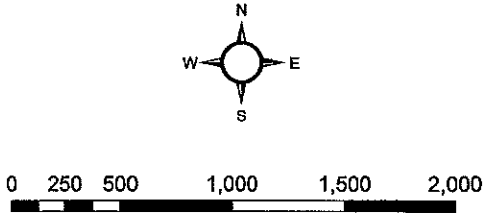


Legend

- Soil Types**
- No Soil Survey Available
 - Water
 - FxB
 - Fy
 - Ma
 - Municipal Boundary

R
V

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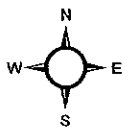
Borough of Collingswood

Camden County, NJ

Existing Conditions



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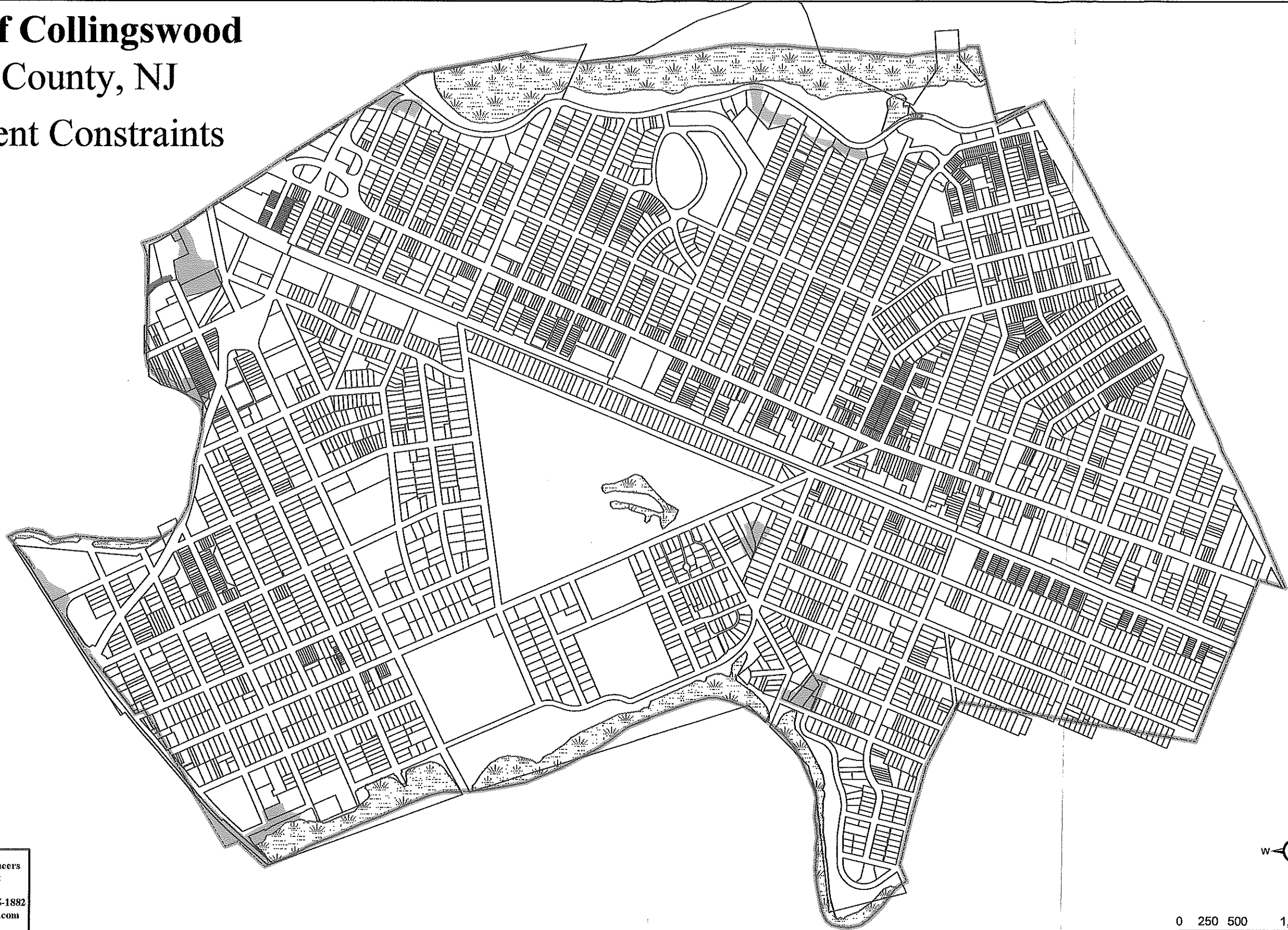


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Borough of Collingswood

Camden County, NJ

Development Constraints

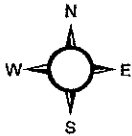


Legend

- Parcels
- Municipal Boundary
- NJDFW Habitat Areas
- RANK**
- Suitable Habitat (1)
- Priority Species (2)
- Wetlands



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0 250 500 1,000 1,500 2,000