

**MUNICIPAL STORMWATER
MANAGEMENT PLAN FOR THE
BOROUGH OF BOGOTA
BERGEN COUNTY, NEW JERSEY**

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Table of Contents

Introduction.....	3
Goals	3
Stormwater Discussion	6
Background.....	7
Design and Performance Standards	9
Plan Consistency.....	10
Nonstructural Stormwater Management Strategies	11
Land Use / Build-Out Analysis and Wellhead Protection Areas.....	14
Mitigation Plans.....	15
List of Figures	
Figure C-1: Groundwater Recharge in the Hydrologic Cycle	6
Exhibit 1: USGS Topographic Map.....	17
Exhibit 2: Waterbody and Watershed.....	18
Exhibit 3: Flood Prone Areas.....	19
Exhibit 4: Wellhead Protection Areas.....	20
Exhibit 5: Existing Land Use.....	21
Exhibit 6: Parks / Recreation / Open Space	22

Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Bogota (“the Borough”) 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 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 acres of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for future stormwater facilities.

A “build-out” analysis has not been included as the Borough does not have one square mile of agricultural or vacant land. 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 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:

1. Reduce flood damage, including damage to life and property
This occurs through the adoption of the Stormwater Control Ordinance. This ordinance governs stormwater quantity, stormwater quality, and groundwater recharge thereby reducing flooding impacts. This is accomplished through flow and suspended solids reduction to watercourses and stormwater conveyance systems. In addition, the Hackensack River is tidally influenced and therefore reduction of flood damage is best achieved through good land use management practices, such as designation of flood prone areas for recreation or open space.
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development
This occurs through the adoption of the Stormwater Control Ordinance. This ordinance allows no increase in stormwater runoff from any new development or re-development that disturbs one or more acre of land. The applicant is required to provide hydrologic and hydraulic calculations demonstrating one of the following:
 - Post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events.
 - No increase, as compared to the pre-construction condition, in the peak runoff rate of stormwater leaving the site for the two, 10 and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site.

- Design stormwater management measures so that the post-construction peak runoff rates for the two, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates.
3. Reduce soil erosion from any development or construction project
This goal is achieved through adherence to the New Jersey's Soil Erosion and Sediment Control standards. Borough of Bogota Stormwater Management Ordinance requires all new development and redevelopment plans to comply with State's Soil Erosion and Sediment Control Standards.
 4. Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures
The adequacy of existing and proposed culverts and bridges, and other in-stream structures is assured by adherence to N.J.A.C. 7:13 "Flood Hazard Area Control Act Rules". The NJDEP regulations under this chapter specify all the requirements needed to assure the adequacy of existing and new structures, without causing any adverse effects upstream or downstream, for the regulatory flood and more frequent events. An NJDEP Land Use Permit for any new bridge or modifications/alterations to existing structures as defined in NJAC 7:13, is required. In addition, inadequate culverts that were constructed prior to the Stormwater Control Ordinance may be updated through the Mitigation Plan section (see below).
 5. Maintain groundwater recharge
This goal is achieved through the adoption of the design and performance standards for Stormwater Management Measures as presented in N.J.A.C. 7:8-5. Subsections 7:8-5.4 "Erosion Control, Groundwater Recharge and Runoff Quantity Standards" and 7:8-5.6 "Calculation of Stormwater Runoff and Groundwater Recharge" describe the specific standards and calculation technique to maintain the groundwater recharge.
 6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution
Nonpoint pollution is generally attributed to stormwater runoff from agricultural and residential areas. By requiring residential developments to conform with the RSIS regulations regarding water quality, and by further adopting the design and performance standards for Stormwater Management Measures as presented in N.J.A.C. 7:8-5., Subsection 7:8-5.5 "Stormwater Runoff Quality Standards", which describes the stormwater management measures to achieve water quality and provides guidance to achieve the same, this goal shall be achieved.

The Borough maintains a pro-active approach to keeping its streets, parks, and public facilities in a clean and safe condition. Street sweeping is conducted on its miles of local and county roads and all inlets in the Borough are cleared at least once per calendar year, if necessary. Deicing salt and grit storage is contained within a structure to reduce runoff, and all public works equipment is maintained within a closed garage. Grit is swept from the streets as soon as weather conditions permit after snowstorm events.

7. Maintain the integrity of stream channels for their biological functions, as well as for drainage
This occurs through the adoption of the Stormwater Control Ordinance. This ordinance will govern stormwater quantity, stormwater quality, and groundwater recharge thereby reducing pollutants within the flow which affect biological function and drainage conveyance ability of stream channels. This goal is furthermore achieved by adhering to N.J.A.C. 7:13 “Flood Hazard Area Control Act Rules” and Waterfront Development Permit process.

8. 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
This goal is achieved through the adoption of the design and performance standards for Stormwater Management Measures as presented in N.J.A.C. 7:8-5, Subsection 7:8-5.5 “Stormwater Runoff Quality Standards”. These standards require the reduction of the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80 percent of the anticipated load from the redeveloped/developed site. This subsection includes the list of Best Management Practices, and the TSS Percent Removal Rate achieved through implementation.

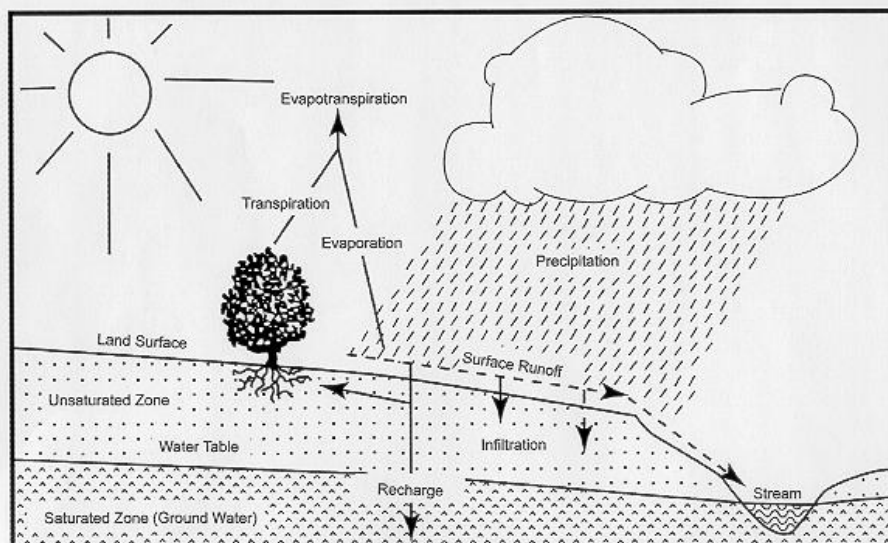
9. Protect public safety through the proper design and operation of stormwater basins.
This goal is achieved through the adoption of the design and performance standards for Stormwater Management Measures as presented in N.J.A.C. 7:8-5, Subsection 7:8-5.8: “Maintenance Requirements”, and Subsection 7:8-6 “Safety Standards for Stormwater Management Basins”. The latter subchapter sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. New developments are required to provide a “Stormwater Management and Maintenance Plan” in which the responsible party for maintenance of the facility is identified and detailed schedules and procedures pursuant to NJAC 7:8-5.8 “Maintenance Requirements” are included therein. The existing facilities maintained by the Borough or privately, will continue to be maintained by same.

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 (see Mitigation Plans section). Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities (see Design and Performance Standards section). The plan also outlines safety standards for stormwater infrastructure to be implements 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. In addition, these increases can create new flooding conditions and aggravate existing downstream flooding and erosion problems along with increasing 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 Borough of Bogota is an almost fully developed suburban community in Bergen County that is comprised of 0.76 Square miles all within the PA-1, Metropolitan Planning Area as shown on Exhibit 1- Borough Boundary on USGS Quadrangles.

The Borough borders three municipalities: Teaneck Township to the north and east, the Village of Ridgefield Park to the south, and the City of Hackensack to the west. Interstate Route I-80 generally forms the Ridgefield Park border, and The Hackensack River provides the Hackensack border. Over 52 percent of the land use in Bogota is residential (Borough of Bogota Master Plan, January 17, 2003).

Bogota’s current population exceeds 8,200 residents. The largest land use is residential with over 50% of the Borough comprised of single- or two-family dwellings. Public or exempt properties comprise over 6% of the Borough’s acreage, commercial uses comprise over 4% of Borough properties, and industrial properties comprise 6% of Borough properties.

Approximately 21.6 acres of land are used as parks, recreation, or open space (see Exhibit 6). The Borough of Bogota contains significantly less than 640 acres of developable land. There is less than two percent or about 10 acres of the Borough which consists of vacant land. In addition, approximately 134 acres, or 27% of the Borough’s lands are comprised of streets and railroad properties.

As shown in the table below, the Borough of Bogota’s 2010 census population was 8,187persons. The 1970 census showed the largest Borough population of 8,960 people. Table 1 also shows that the Borough had over 2,773 housing units in the Year 2010 (see Exhibit 5– Existing Land Use).

Table 1 Borough of Bogota Population & Housing Units 1900-2000		
<i><u>Year</u></i>	<i><u>Population</u></i>	<i><u>Housing Units</u></i>
1900	337	N.A.
1910	1,125	N.A.
1920	3,906	N.A.
1930	7,341	N.A.

1940	7,346	N.A.
1950	7,662	2,347
1960	7,965	2,440
1970	8,960	2,902
1980	8,344	2,894
1990	7,824	2,844
2000	8,249	2,874
2010	8,187	2,773
Source: Bergen County Data Book and US Census		

The Borough of Bogota is located in Watershed Management Area (WMA5) which is tributary to the Hackensack River along the extreme western edge of the Borough, west of River Road. Approximately 35 acres of land are considered flood prone, with 30.5 acres under tidal influence (see Exhibit 3).

The entire Borough is served by municipally owned sanitary sewers. There are no individual homeowner septic systems in the Borough. Sanitary sewers are metered and discharged into the Bergen County Utility Authority BCUA trunk lines. In addition, the Borough is also serviced by a potable water supply system under franchise agreement with Suez, formerly the Hackensack Water Company.

All the Borough’s waterways are located within Watershed Management Area 5 (WMA5) (see Exhibit 2). The major waterways in Bogota are as follows:

Hackensack River (SEI – Saline Waters of Estuaries), HUC 02030103180030 above Ft. Lee Road, HUC 02030103180050 below Ft. Lee Road), which flows southerly through the Hackensack Meadowlands several miles to the south, to Newark Bay. The Hackensack River emanates in Rockland County, flows through the Oradell Reservoir system, and passes along Borough’s western border.

The lower Hackensack is heavily industrialized and economically tied to the ports on Newark Bay and to the industrial development on the nearby Passaic River. It is navigable by oceangoing vessels to Kearny, N.J., and by tugs and barges to Hackensack, N.J. The river’s upper course is dammed to form three reservoirs that supply water to Rockland (N.Y.) and Bergen (N.J.) counties.

There are no / limited Freshwater Wetlands or Groundwater Recharge Areas (see Exhibit 7) in the Borough of Bogota. This is per the Bergen County Department of Planning & Economic Development, “Preliminary NJ State Plan of Bogota”.

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 benthic macroinvertebrate community dynamics.

Watershed Management Area 5 (WMA5) includes eight AMNET sites in the Hackensack River watershed. The sampling shows that 25% of the sites were non-impaired; the majority of the sites (62.5%) were found to be moderately impaired, and the remaining sites (12.5%) were severely impaired. Based on a 1993 survey of similar sampling sites, a significant improvement was apparent at two sites while no sites exhibited a decline in impairment rating. Positive changes in scoring are exhibited in the current data relative to the 1993 data. Although the percentage of moderately impaired sites remains constant, the percentage of non-impaired sites has doubled while the proportion of severely impaired sites is reduced by half.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without exceeding 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 a New Jersey Pollutant Discharge Elimination System (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 (BMP's).

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards and identifies waters that are impaired. Sub-list 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

There are no waterways in the Borough that are designated as Category One (C1) Waters of the State, and none of the waterways are classified as either trout production or trout maintenance waters. None of the waterways are on the New Jersey Integrated Water Quality Monitoring and Assessment report (305(b) and 303(d)) (Integrated List). The Borough's wellhead protection areas are shown on Exhibit 4. The Borough has no formal groundwater assessment.

Design and Performance Standards

The Borough adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-5.6 Safety Standards for Stormwater Management Basins. The Stormwater Control Ordinance has been adopted by the Borough and has been approved by Bergen County.

During construction, Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. If the Borough determines that non-compliance is occurring, the Borough shall issue non-compliance citations, stop work orders, and fines to ensure compliance. Penalties are listed within the adopted Borough Stormwater Control Ordinance.

Once construction is completed, long-term maintenance is required for existing and future stormwater facilities to ensure long-term operation for all project governed by the requirements set forth within the Stormwater Control Ordinance. The ordinance will require a maintenance and repair plan that will provide specific preventative maintenance tasks and schedules along with the name of the person or people responsible for preventive or corrective maintenance. The person responsible for maintenance will be required to evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as necessary.

To ensure proper operation and maintenance and facility repair, the Borough will notify the responsible person in writing should a stormwater facility become a danger to public safety, public health, or require maintenance or repair. Upon receipt of the written notice, the responsible person will have fourteen days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer. The Borough, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost to the responsible person.

Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area, but TMDLs have been developed for waters within the Borough; therefore this plan does need to be consistent with the TMDLs. The TMDLs have been developed for fecal coliform due to waterfowl and pet waste. Should a Regional Stormwater Management Planning Area be created, this Plan would be revised to be consistent with the Area requirements.

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

The Borough's Stormwater Management Ordinance required all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. Projects with limits of disturbance greater than our equal to 5,000 SF require review by the Bergen County Soil Conservation District (excluding a one lot, single-family dwelling development). During construction, Borough inspectors will observe on-site erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

Nonstructural Stormwater Management Strategies

The Borough has reviewed the master plan and ordinances, and it has provided a list of the sections in the Borough land use and zoning ordinances that could be considered to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for potential revision. Should the ordinance texts be completed, they would be submitted to the county review agency for review and approval. A copy would be sent to the Department of Environmental Protection at the time of submission.

Pet Waste- Requires pet owners and keepers to immediately and properly dispose of their pet's solid waste deposited on any property.

Litter Control- Requires the proper disposal of litter on public or private property.

Disposal of materials into the storm drainage system- Prohibits the spilling, or disposal of materials other than stormwater to the municipal separate storm sewer system.

Wildlife Feeding- Prohibits the feeding of wildlife on any public property.

Yard Waste- Requires non-containerized yard waste to be placed no more than seen as prior to pickup by the Borough, but no closer than 10 ft. to any storm drain inlet.

Illicit Connections- Prohibits the connection of domestic sewerage, and other wastewater into the separate storm sewer system unless authorized by the New Jersey Department of Environmental Protection.

Fine and Penalties- Provides for the maximum amount of fines for persons violating the new stormwater management ordinances.

The Borough will also undertake several other procedural steps. These are:

Local Public Education- The Borough will distribute copies of information publications provided by the New Jersey Department of Environmental Protection to all residents and businesses within the Borough. The Borough shall also conduct at least once per year, an educational effort in the form of an informational "event" possibly in concert with a municipal festival, fair, or holiday celebration.

Storm Drain Labeling- The Borough shall label all storm drain inlets in streets or public parking areas to develop their long-term maintenance program and map the location of the inlets.

Storm Sewer Outfall Pipe Mapping- The Borough shall develop a map showing the location of the end of all MS4 outfall pipes operated by the Borough and given an alphanumeric identifier. The map shall be made available to the New Jersey Department of Environmental Protection upon request. The Borough shall also conduct and maintain a program to detect and eliminate illicit connections into the small MS4, which shall include an initial physical inspection of all outfall pipes for dry weather flow.

Storm Drain Inlets- When inlets are in direct contact with repaving, repairing, or reconstruction of facilities owned or operated by the Borough the inlets shall be fitted with solids and floatable control grates.

Stormwater Facility Maintenance- The Borough will develop and implement a stormwater facility maintenance program of the clearing and inspection of all stormwater facilities operated by the Borough, including inlets, detention facilities, stormwater management devices, etc.

Road Erosion Control Maintenance- A maintenance program will be developed to identify and control roadside erosion along Borough streets to ensure they do not contribute to sedimentation to receiving waters.

Outfall Pipe Stream Scouring Remediation- A program shall be developed to detect, prioritize, remediate, and prevent localized stream and bank scouring in the vicinity of outfall pipes operated by the Borough which is a result of stormwater discharges.

Chapters 21-13 and 21-14 of the Bogota Land Development Ordinance, entitled “Improvements and Design Standards or Subdivisions,” and “Site Plan” were reviewed to consider incorporating nonstructural stormwater management strategies in the future.

Amendments to the ordinances may include changing the **Vegetated buffer** areas to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language may include allowing buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

Curbs and gutters are generally required of concrete curb and gutter, concrete curb, or Belgian block curb be installed along every street within and fronting on a development. These requirements could be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

Watercourses and Flood Hazard Areas require that all streets be provided with inlets and pipes where the same are necessary for proper drainage. This section could be amended to encourage the use of natural vegetated swales in lieu of inlets and pipes.

Paved driveways and accessways are required for construction of any new driveway or accessway to any street. The Borough might consider adopting an impervious coverage requirement for any lot in the Borough. This ordinance would encourage the use of more pervious pavements and pathways by allowing a discount in coverage for pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Homeowners must mitigate the impact of the additional **impervious surfaces** unless the stormwater management plan for the development provides for these increases in

impervious surfaces. This mitigation effort must also address water quality, flooding, and groundwater recharge. A detailed description of how to develop a mitigation plan will be provided in the land use ordinance.

Language could be added to **Section 21-15.7 “Off-Site Improvements”** to require that any off-site and off-tract stormwater management and drainage improvements must conform to the “Design and performance Standards” described in this plan.

Under **Section 21A-10.10d. “Off-Street Parking,”** all parking areas are to be curbed. Curing is also required for subdivision under **Section 21-13.3 “Curbs and Gutters.”** These sections can be amended to allow for flush curbs with curb stops or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, supplemental language could be added to allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers. This section also provides guidance on the minimum of parking spaces requirements. These requirements are based on the number of dwelling units and/or gross floor area. The section could be amended to allow a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. Paragraph d. could also be amended to allow pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

The Borough could consider adoption of a **shade tree replacement ordinance** under **Section 21-13.5 “Shade Trees and Planting Strips”** and **21-14.7 (10) “Minimum Standards for Site Plan Approval”** which could require a reforestation quota for each tree removed plus outline penalties for any additional trees removed that were not approved by the Planning or Zoning Board. Such an ordinance recognizes that the preservation of mature trees and forested areas is a key strategy in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling.

Sidewalk construction is a requirement of the R.S.I.S. and Section 21-13.4 “Sidewalks” for subdivisions. Although sidewalks are not always required along all streets, the standard does require them in areas where the probable volume of pedestrian traffic or proximity to schools, the Developments’ location in relation to other populated areas and high vehicular traffic, pedestrian access to bus stops, schools, parks, and other public places, and the general type of improvement intended indicate the advisability of providing a pedestrian way. Sidewalks are to be a minimum of 4 ft. wide and constructed of durable materials. Language could be added to **Sections 21-14.7 and 21-13.4** to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces or use permeable paving material where appropriate.

Soil erosion and sediment control measures are generally addressed in major developments by the County Soil Conservation District where over 5,000 square feet of disturbance occurs. The local land use ordinance requires developers to comply with the

New Jersey Soil Erosion and Sediment Control Standards and outlines some general design principles, including: whenever possible, retain and protect natural vegetation; minimize and retain water runoff to facilitate groundwater recharge; and, install diversions, sediment basins, and similar required structures prior to any on-site grading or disturbance.

Stormwater management is addressed under **Section 21-14.7(3)** of land use ordinance. These sections will be updated to include all requirements outlined in N.J.A.C.7:8-5.

Street hierarchy is provided in the R.S.I.S. which describes the requirements for streets in all municipalities. **Street paving widths** are a function of the number of units served, whether a street is curbed, whether on-street parking is permitted, whether the interior streets serve lots of two acres or larger, and whether onsite topographical constraints allow design flexibility. Depending on these factors, paving width for secondary local streets has a range from 20 to 30 ft. The Borough can encourage developers to limit on-street parking to allow for narrower paved widths. This section also required that cul-de-sacs have a minimum radius of 50 feet. The reviewing Board could allow the reduction in the minimum radius of cul-de-sac designs on an application basis.

The Borough could also consider limiting the quantity of impervious surfaces via the Zoning Ordinance. Each district could have a maximum value of impervious surfaces which would vary by district to control the areas of dwellings, driveways, sidewalks, and patios. The Borough's commercial zoning ordinance could also include a maximum percent impervious surface allocation. These zones could be amended to provide a maximum limit and amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with other design and performance standards for stormwater management contained in other sections of the ordinance.

Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the Board should require the developer to mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in Site Plan Ordinance. An overview description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

Land Use / Build-Out Analysis and Wellhead Protection Areas

As per an analysis of the existing land use per the NJDEP GIS, Bogota is a fully developed community and contains less than one square mile of vacant and agricultural area. For this reason, a land use / building-out analysis is not required for the Borough of Bogota. (See discussion under "Background" and Exhibit 5).

Tier 1, 2, & 3 Well Head Protection Areas are designated by the State within the Borough (Exhibit 4). These lands are currently developed with residential and commercial uses and have the potential for re-development.

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 (1 and 2). These possible project options provide the Borough with the means to address impacts from existing development as they relate to stormwater control.

Mitigation Project Criteria

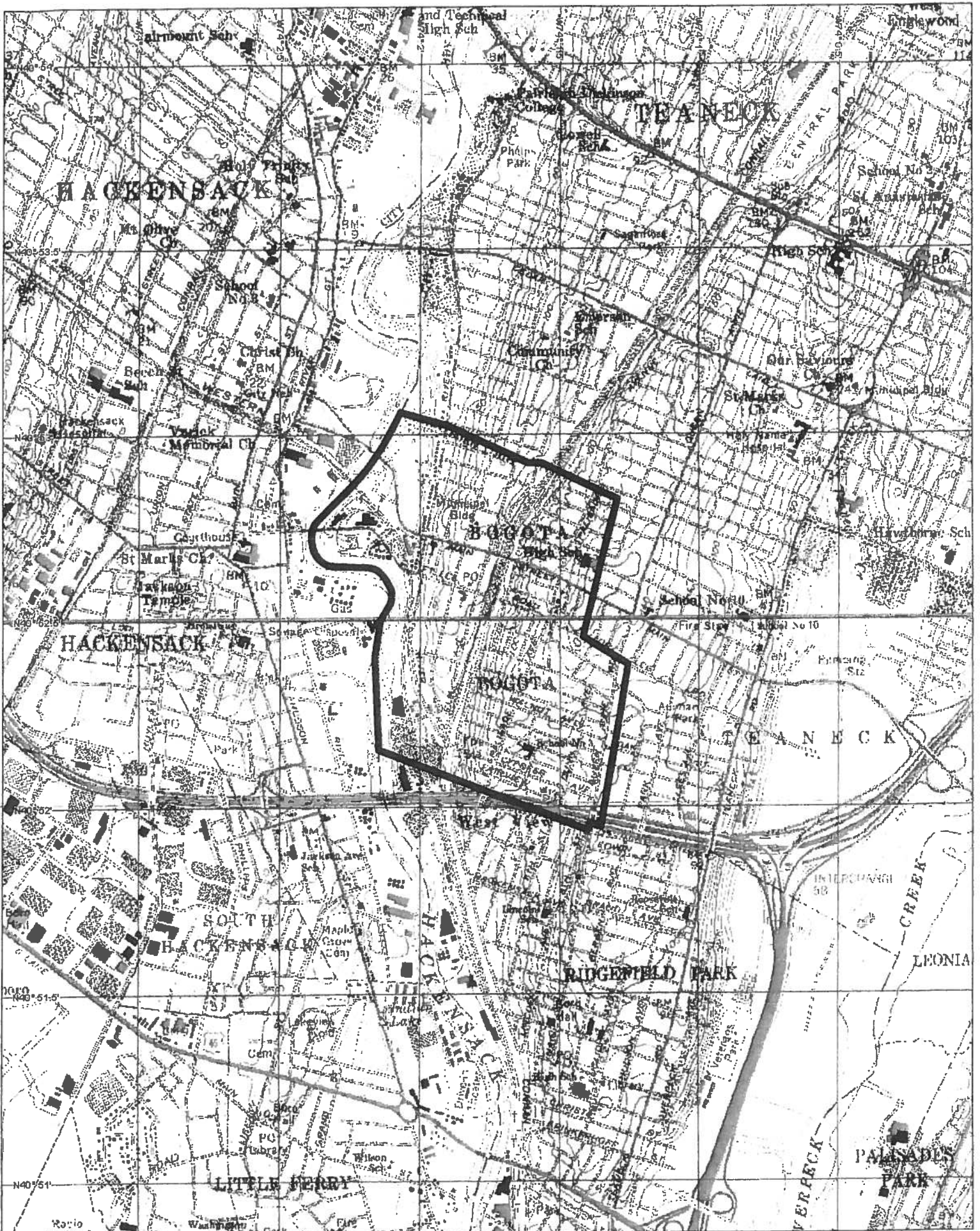
1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design 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.

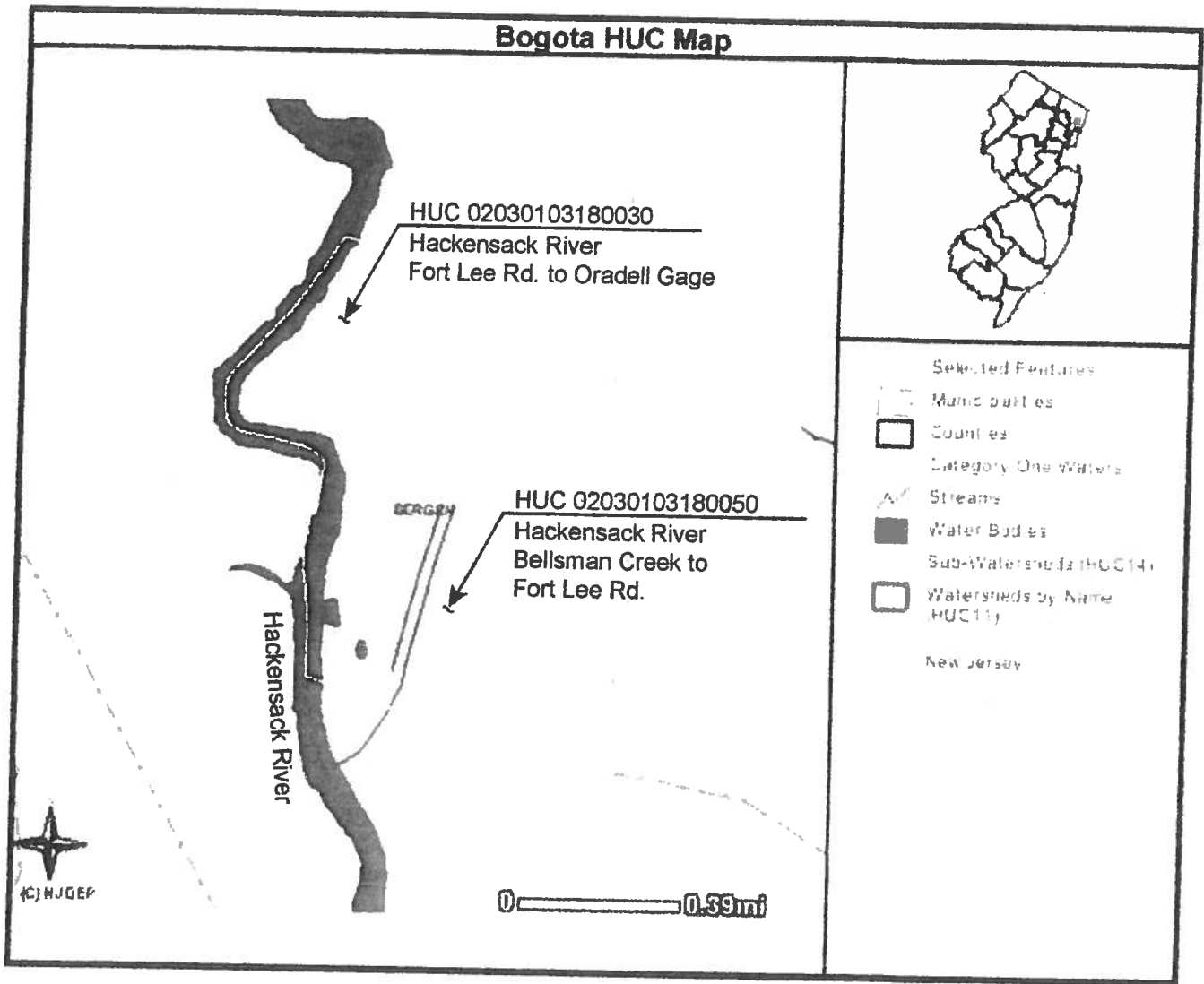
The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects and a list of additional projects can be obtained from the Borough Engineer. Listed below are some specific projects that can be used to address the mitigation requirement.

- Groundwater Recharge
 - a. Permit the retrofitting of existing detention basins or subsurface seepage pits to provide additional storage for annual groundwater recharge.
 - b. Replace existing deteriorated impervious parking areas at municipal/governmental complexes with permeable paving to provide additional groundwater recharge.
- Water Quality
 - a. Retrofit existing municipal stormwater management facilities to provide the removal of 80 percent of total suspended solids from the parking lot runoff using structured or non-structured devices or methods. These projects could include the Bogota Swim Club, any merchant parking lots, and the various parks.
 - b. Install stormwater management measures in available open space areas to reduce the peak flow from the upstream development on the receiving stream for the 2, 10, and 100-year storms. This could include the various municipal and county parks.
 - c. The planting of native trees and/or vegetation with the Borough's right-of-way, or various parks.
- Water Quantity
 - a. Stormwater management facilities to reduce the quantity or rate of stormwater discharged to the Hackensack River and its tributaries

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 requirements are 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.
 - Groundwater Recharge, Water Quality, and Water Quantity
 - a. Re-establish a vegetative buffer (minimum 50 foot wide) along the Hackensack River as a waterfowl control measure and to filter stormwater runoff from the high waterfowl traffic areas.
 - b. Provide waterfowl management measures including public education at a Borough Park and / or field
 - c. Incorporate seepage pits, infiltration trenches, and bioretention ponds in existing public parking areas at the schools and the Borough recreations areas. Other off-tract improvements could include new curbing to prevent roadside erosion, inlet conversions with floatable guards, and storm drain pipe outlet protection.

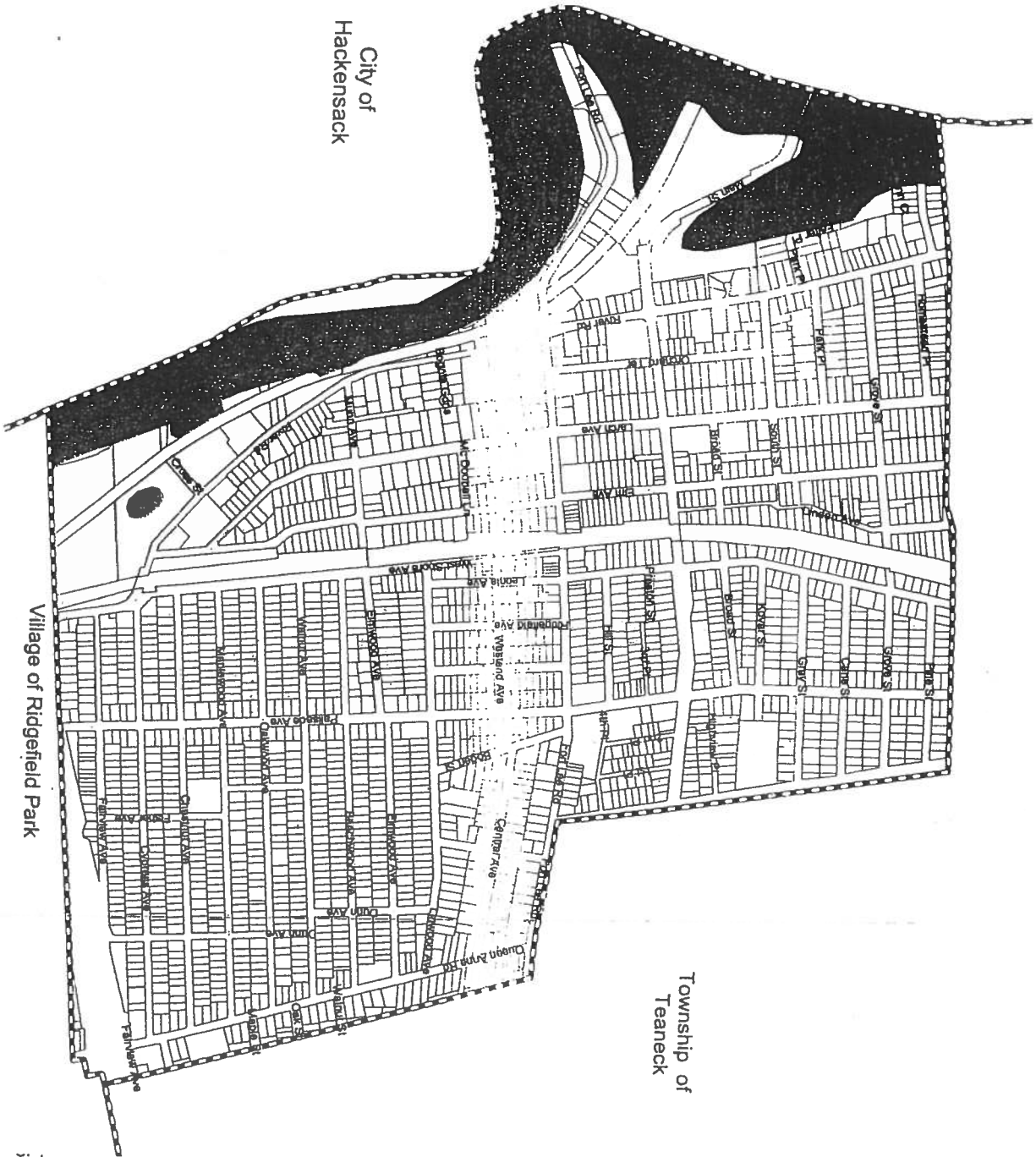
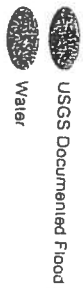
The Borough of Bogota can permit the perspective development to provide funding or partial funding for an environmental enhancement project that has been identified in the Municipal Stormwater Management Plan or towards an environmental enhancement project that has been deemed by the Borough as an environmentally sensitive area. The funding can be equal to or greater than the cost to implement the mitigation outlined above or in subsequent environmental reports, including costs associated with but not limited to purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.





SOURCES: NJ Division of Watershed Management,
Bergen County Soil Survey Map

Flood Prone Areas



City of Hackensack

Township of Teaneck

Village of Ridgefield Park



Kasler Associates,
29 Pangborn Place - Hackensack, NJ
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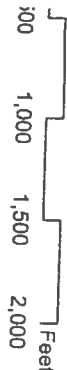


EXHIBIT 3: FLOOD PRONE AREAS

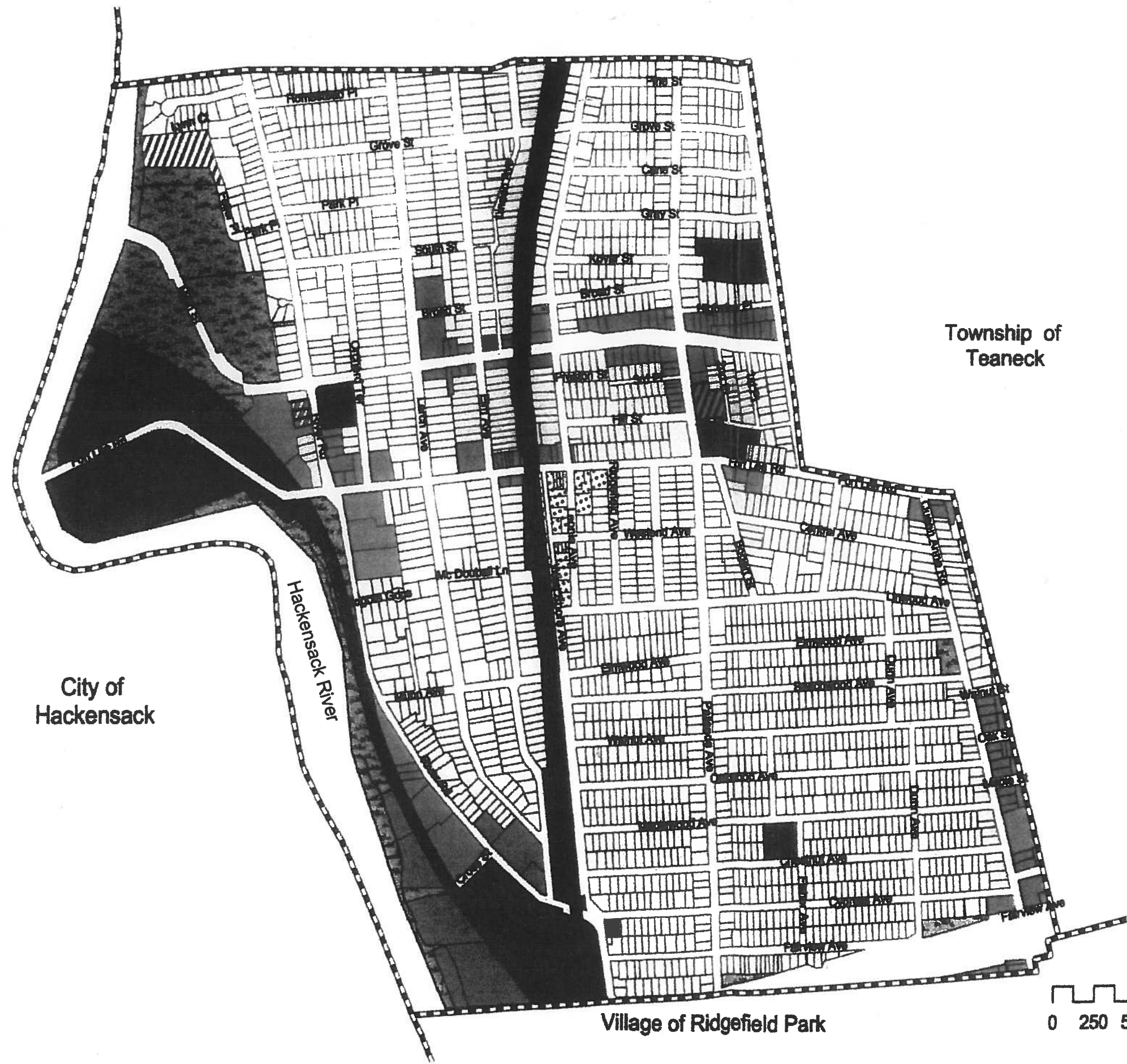
Borough of Bogota



- Municipalities
- Counties
- Streams
- Water Bodies
- Well Head Protection Areas
- Ter 1 2 road
- Ter 2 5 road
- Ter 3 12 road
- Sub-Watersheds (HUC14)
- Watersheds by Name (HUC11)
- Watershed Management Areas

Aerial Photos 2002
New Jersey

SOURCE: NJ Division of Watershed Management



Land Use Plan Legend

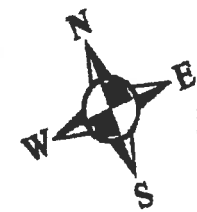
- Residential - Low Density
- Residential - Medium Density
- Residential - Moderate Density
- Community Shopping
- Retail / Services
- Mid Rise Office
- Industrial
- Schools
- Public
- Semi Public
- Parks, Recreation and Open Space
- House of Worship
- Municipal
- Railroad
- Proposed Redevelopment - Commercial
- Proposed Redevelopment - Senior Housing

Township of Teaneck

City of Hackensack

Village of Ridgefield Park

Hackensack River





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Parks, Recreation, and Open Space Plan

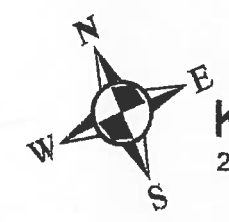
-  Existing Parks and Open Space
-  Proposed Parks and Open Space

Township of
Teaneck

City of
Hackensack

Village of Ridgefield Park

Legend



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