

Municipal Stormwater Management Plan

for the

Borough of West Paterson

050084001

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INTRODUCTION

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of West Paterson to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

Overall this Plan relies on the existing regulatory framework as the basis for the management of stormwater. These regulatory requirements and the technical guidance documents on which they are based have been incorporated into this Plan. The Borough of West Paterson Stormwater Ordinance further strengthens the reliance on these technical specifications and provides the means for insuring implementation and ongoing evaluation.

A “build-out” analysis is not included in this plan because West Paterson does not have more than one square mile of vacant land or agricultural land. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought.

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;
- protect public safety through the proper design and operation of stormwater basins;
- meet with adjoining municipalities to cooperatively establish stormwater control measures; and
- meet with the county to ascertain regional stormwater planning goals and determine their impact on West Paterson.

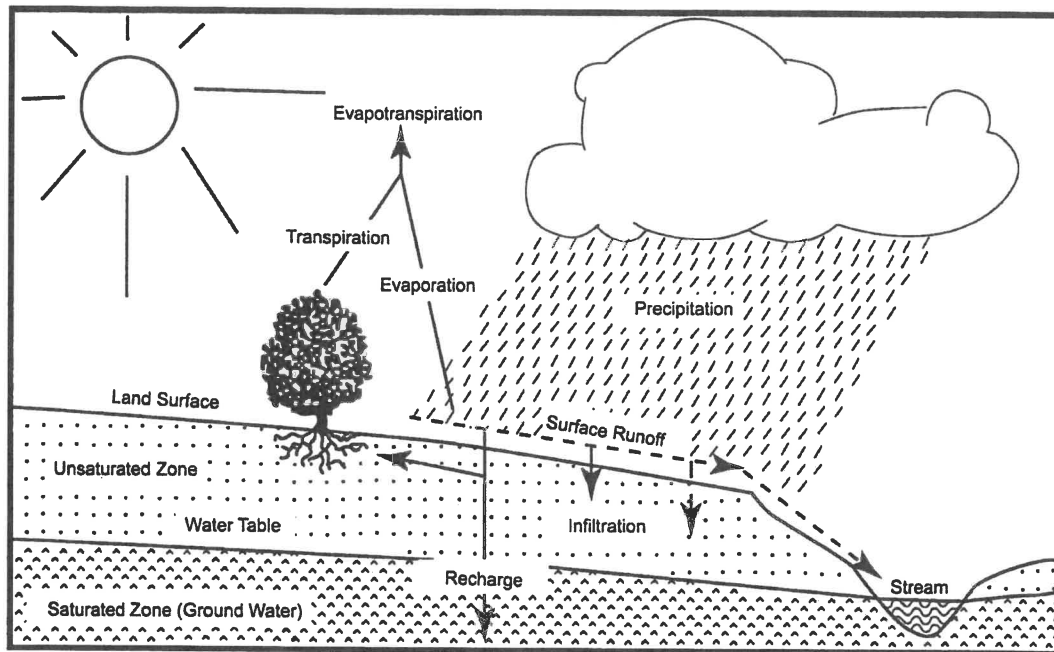
To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan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

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.

Figure C-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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 West Paterson encompasses a 3.0 square mile area in Passaic County, New Jersey. Although the borough nearly doubled in population during the 1950's and 1960's due to new housing developments on former farmlands, it was not until the construction of several townhouses and condominium complexes in the 1980's and 1990's that the population of the Borough has stabilized. The census data from 1990 and 2000 reinforces this trend as the Borough experienced a minor decrease in population from 10,982 in 1990, to 10,987 in 2000. Figure C-3 depicts the Borough boundary on the USGS quadrangle maps.

The Borough contains various waterways and associated waterbodies (Figure C-2), none of which are currently classified as C-1, as follows:

<u>Waterways</u>	<u>Associated Waterbodies</u>
Third River	Great Notch Reservoir
Slippery Rock Brook	Barbour Pond
	New Street Reservoir
	Highland Lake
Peckman River	
Dowling Brook	
Great Notch Brook	
Passaic River	
Pearl Brook	

Flooding issues within the Borough are primarily related to the Passaic River. As the Passaic River approaches flood stage, its associated tributaries begin flooding as well. The flooding affects roadways, residences, and public property, subsiding after the Passaic River flood stage begins to subside. The area with the worst flooding, related to the Peckman River and Dowling Brook, is evident on Figure C-4, as the 9.01 – 12.00 in/yr ground water recharge area. The Borough enforces the NJDEP guidelines for groundwater recharge as part of its development review process.

As indicted in Figure C-5, there are no wellhead protection areas within the Borough.

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.

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. The Peckman River at McBride Ave. is the only impaired waterbody within the boundaries of West Paterson. It has a low priority rank and is impaired for Benthic Macroinvertebrates. However, the Passaic River at Little Falls is a high priority impaired waterbody for Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Phosphorous, Silver, Thallium and Zinc. It should be noted that although the Passaic River runs through the Borough of West Paterson – the impaired designation is not associated with the Borough, but its southern bordering town.

DESIGN AND PERFORMANCE STANDARDS

The Borough will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

Non-structural measures to be considered first shall include site design and preventive source controls. To confirm the effectiveness of such measures, applicants must verify that control of stormwater quantity impacts as detailed in the Stormwater Management rules. The tests of assuring control of the quantity impacts as detailed in these rules have been incorporated into the Borough's Stormwater Ordinance

The general standards for structural measures are specified in the Stormwater Management rules and have been incorporated into the Borough of West Paterson Ordinance. These measures shall be incorporated as needed to meet the soil erosion, infiltration and runoff quantity standards included in the Borough's Stormwater Ordinance. The design standards for the specific structural stormwater management measures as those included in the New Jersey Stormwater Best Management Practices Manual. Other designs or practices may be used if they are approved by the Soil Conservation District. The design and construction of such facilities must comply with the Soil Erosion and Sediment Control Standards as well as any other applicable state regulation including the Freshwater Wetland Protection Act rules, the Flood Hazard Control rules, the Surface Water Quality Standards and the Dam Safety rules. The requirement to be consistent with all other applicable rules has been included in the Borough's Stormwater Ordinance. Stormwater runoff quality controls for total suspended solids and nutrient load shall meet the design and performance standards as specified in the Stormwater Management rules. The minimum design and performance standards for infiltration and groundwater recharge specified in the Stormwater Management Rules have

been incorporated into the Borough's Stormwater Ordinance and must be met for all applicable development. Consistent with the Stormwater Management Rules, the Ordinance allows for an exemption from this requirement where the applicant can demonstrate that it is not practicable to meet the standards but has taken all possible steps to meet all stormwater management measures.

During construction, Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Adequate long term operation as well as preventative and corrective maintenance of the selected stormwater management measures will be ensured by requiring the design engineer to prepare a maintenance plan for its stormwater management facilities incorporated into the design of the major development. The maintenance plan shall have specific preventative maintenance tasks, schedules and cost estimates as well as the responsible party for corrective and preventative maintenance.

Where the Borough assumes maintenance responsibility, preventative maintenance shall be performed on a regular basis and will be appropriate for the particular structural management measure being implemented. These maintenance measures shall be in accordance with N.J.A.C. 7:8-5 and may include: periodic inspections, vegetation management, sediment, debris and trash removal and mosquito control. Corrective maintenance shall be performed on an as needed basis for structure repairs or replacements, removal of outlet and pipe blockages, erosion restoration, snow and ice removal, etc. The person or persons responsible for maintenance shall keep a detailed log of all preventative and corrective maintenance for the structural management measures incorporated into the design of the development, including a record of all inspections and work orders.

PLAN CONSISTENCY

The Borough of West Paterson 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. 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. West Paterson 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 Borough's ordinances require 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 local Soil Conservation District.

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

Per NJAC 7:8- 4.2, if a municipality has less than one square mile of vacant or agricultural lands, it is at the option of the municipality to evaluate the extent to which the municipality's entire master plan, official map and development regulations implement the principles expressed in N.J.A.C. 7:8-5.3.

If the municipality chooses not to evaluate the above-mentioned documents, an existing land use map must be added to the SWMP including at an appropriate scale to display the land uses of each parcel within the municipality.

The Borough of West Paterson has less than one square mile of vacant/agricultural land and therefore is not required to complete a review of the Borough's nonstructural stormwater management strategies. See figure C-6 for land use map.

LAND USE/BUILD-OUT ANALYSIS

Per NJAC 7:8- 4.2, if a municipality has less than one square mile of vacant or agricultural lands, it is at the option of the municipality to include a map of the municipality showing projected land uses assuming full development under existing zoning; and the hydrologic unit code 14 drainage areas as defined by the United States Geological Survey; and an estimate, for each HUC 14 drainage area, of the total acreage in the municipality of impervious surface and associated future nonpoint source pollutant load assuming full build out of the projected land uses.

If the municipality chooses not to include the above-mentioned documents, an existing land use map must be added to the SWMP including at an appropriate scale to display the land uses of each parcel within the municipality.

The Borough of West Paterson has approximately less than one square mile of vacant/agricultural land and therefore is not required to complete a land use/build-out analysis. See figure C-6 for land use map.

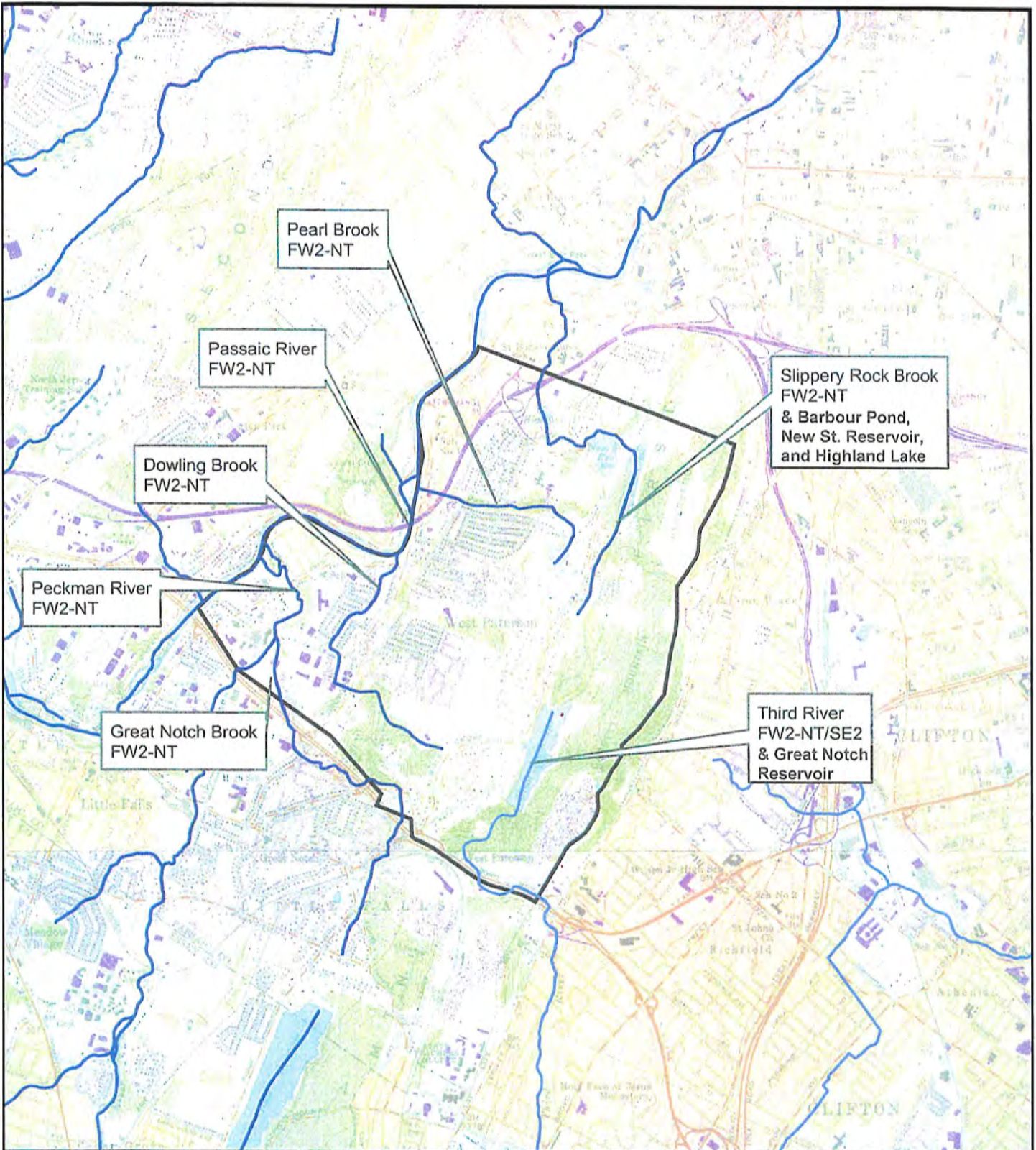
Figure C-6 indicates what appears to be over one acre of buildable open space when looking at the Green (Forest) coloring. Further analysis of Figure C-8, the Borough Zoning Map, shows that these areas are protected parks, such as the Garrett Mountain Reservation and Rifle Camp Park, as well as other parkland, athletic fields and school properties.

MITIGATION PLANS

This mitigation plan is provided for a proposed developments that are granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options. The applicant is required to propose a mitigation project that meets the requirement of item 1 below as the first option. If the applicant is unable to identify a suitable project that meets the requirements of item 1, as determined by the Borough of West Paterson, then the applicant must propose a project that meets the requirements of either item 2 or item 3 below. All mitigation projects proposed by an applicant must be approved by the Borough of West Paterson prior to implementation.

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.
2. If a suitable site cannot be located in the same drainage area as the proposed development, 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.
3. The Borough may allow a developer to provide funding or partial funding for an environmental enhancement project. 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.

The Borough intends to hold all applicants before its Boards to the entirety of its SWMP. No variances or exceptions are anticipated. In the event that a variance or exception is granted, the NJDEP document “guidance for Development of Mitigation Plans” will be utilized in the Borough’s review development review process. To date, there have been no variances granted, and therefore there are no specific examples of mitigation projects within the borough that can be included herein.



Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
C1 Waters	NJDEP	2003



Figure C-2
Borough and its Waterways



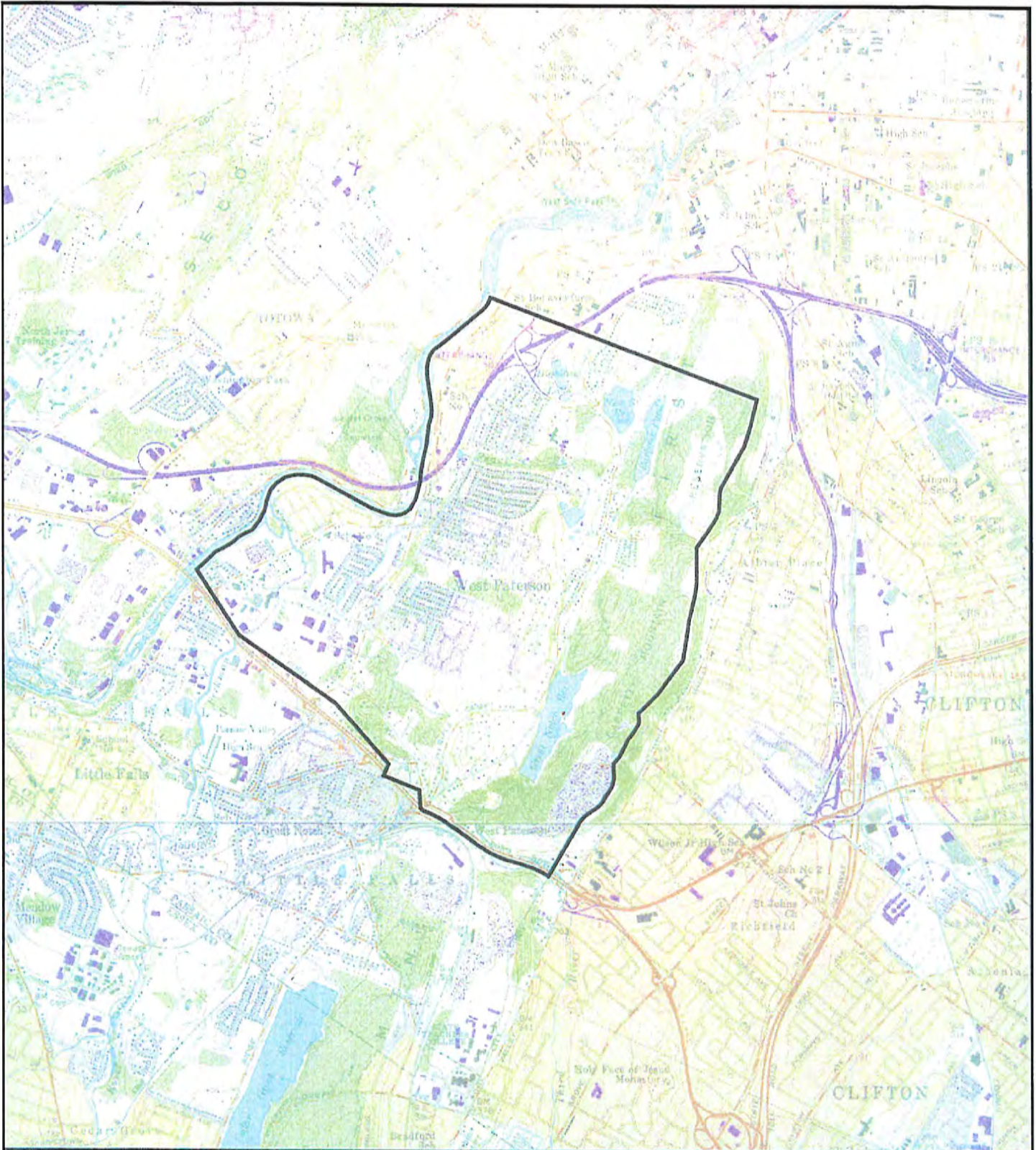
Symbol Legend

	Municipal Boundary
C1 Waters	
	FW2-NT
	FW2-NT/SE2

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Borough of West Paterson
Passaic County, New Jersey





Data Type	Source	Relevant Time Period
USGS Quadrangles	NJDEP	Feb-Apr 2002
Municipal Boundary		1989

Figure C-3

Borough Boundary on USGS Quadrangles

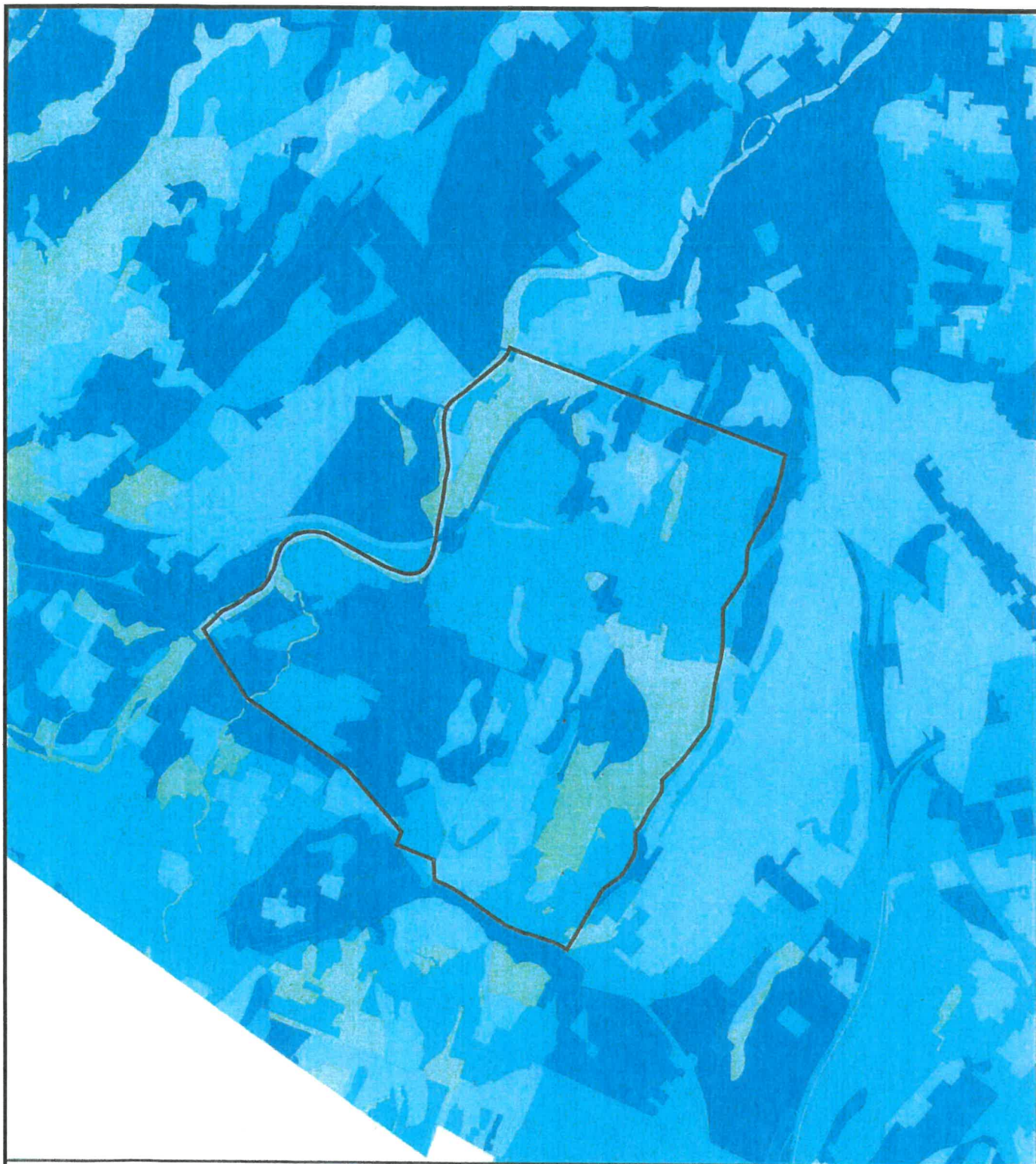
Borough of West Paterson
Passaic County, New Jersey



0 1,000 2,000
Feet

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.





Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Groundwater Recharge Areas	NJDEP	Various



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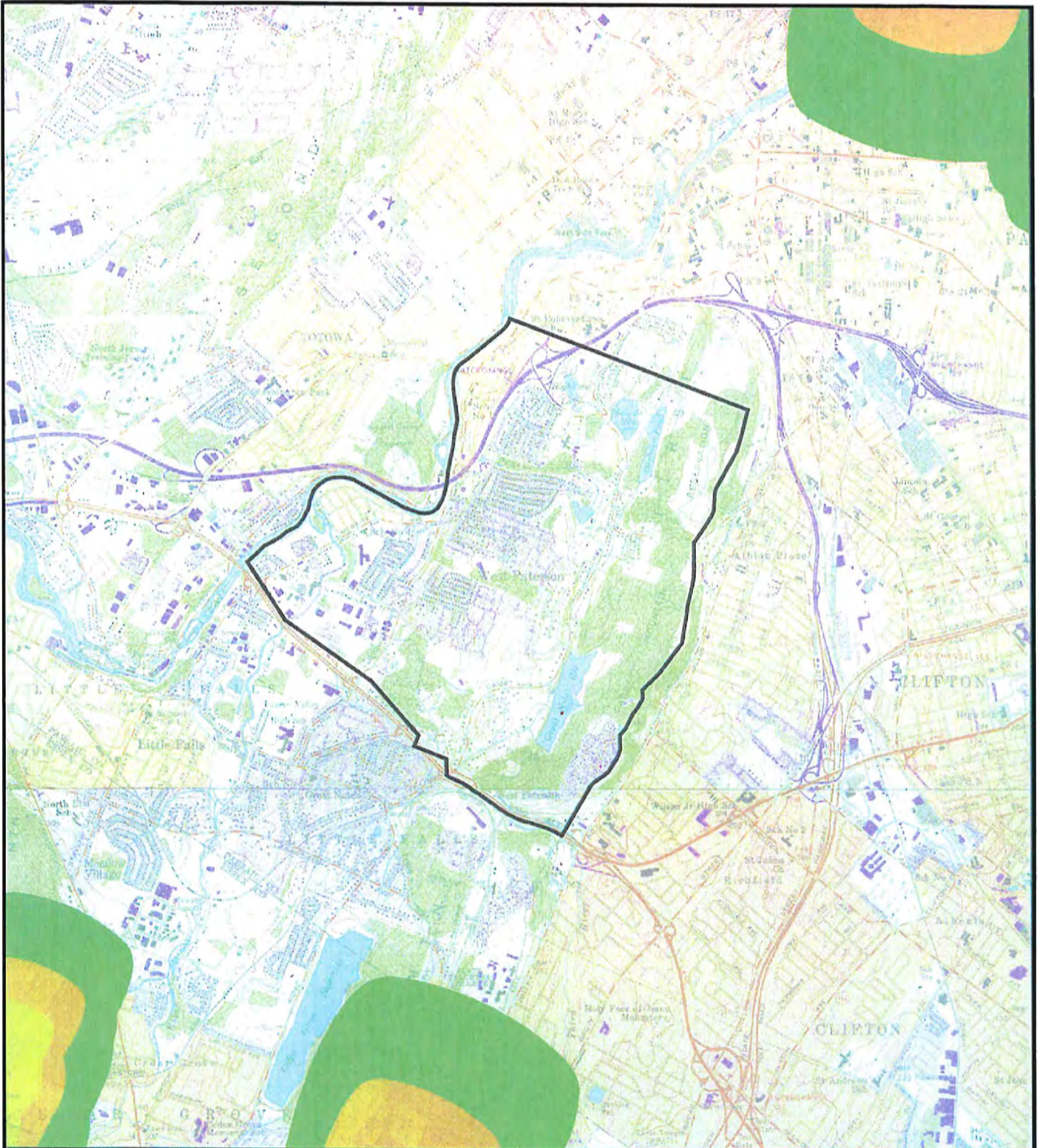
Figure C-4
Groundwater Recharge Areas in the Borough
 Borough of West Paterson
 Passaic County, New Jersey



Symbol Legend

	Municipal Boundary
Ground Water Recharge Areas	
	0.00 in/yr
	0.01 - 9.00 in/yr
	9.01 - 12.00 in/yr
	12.01 - 16.00 in/yr
	16.01 - 22.74 in/yr





Data Type	Source	Relevant Time Period
USGS Quadrangles	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wellhead Protection Areas	NJDEP	2004 (Updated)

0 1,000 2,000
Feet





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Figure C-5

Wellhead Protection Areas in the Borough

Borough of West Paterson
Passaic County, New Jersey

Symbol Legend

-  Municipal Boundary
- Wellhead Protection Areas**
-  2 Year
-  5 Year
-  12 Year





Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Land Use/ Land Cover	NJDEP	1995/1997



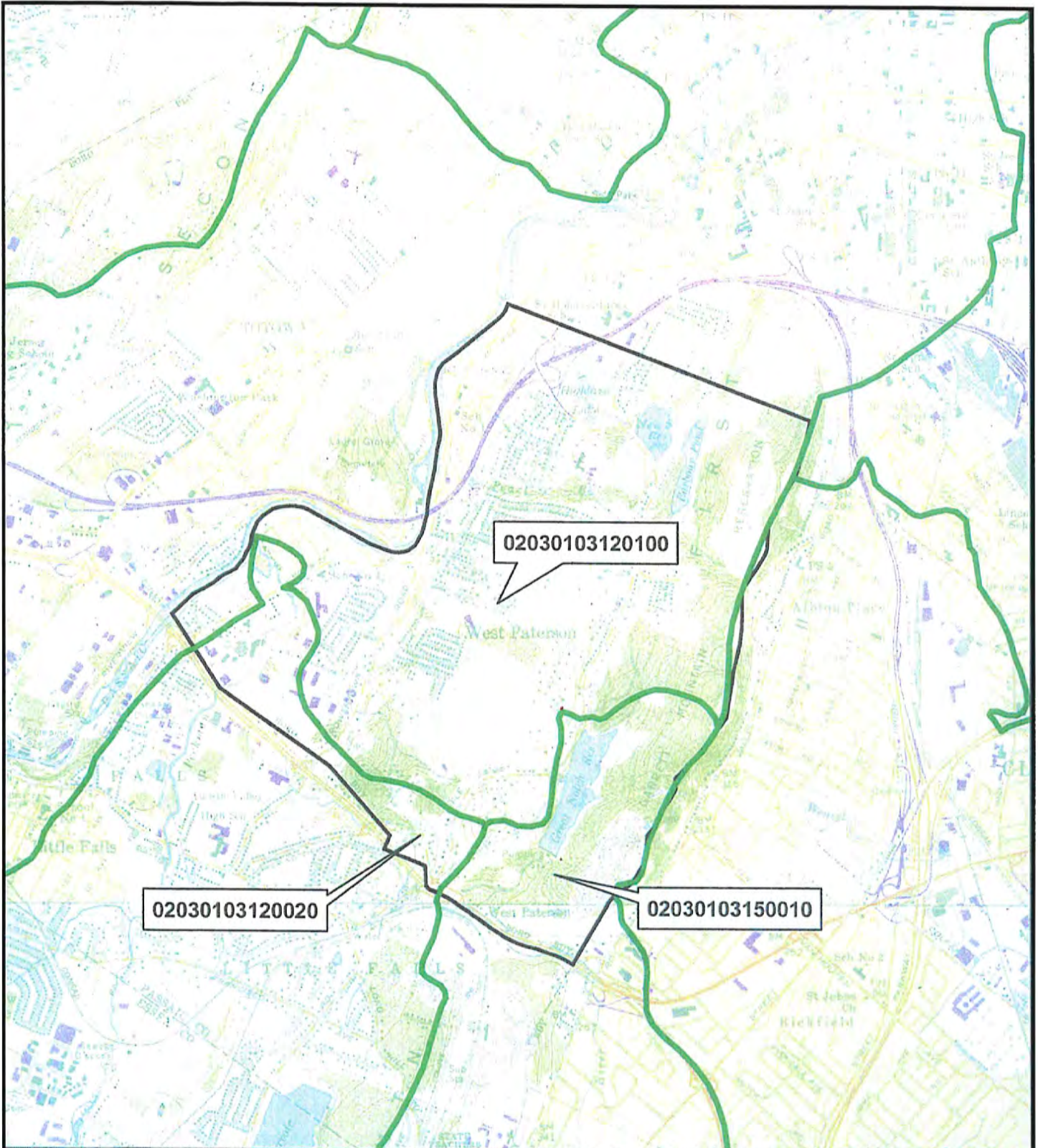
This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure C-6
Borough's Existing
Land Use
 Borough of West Paterson
 Passaic County, New Jersey



Symbol Legend

	Municipal Boundary
Land Use	
	AGRICULTURE
	BARREN LAND
	FOREST
	URBAN
	WATER
	WETLANDS



Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
HUC14	NJDEP	2000



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Figure C-7
Hydrologic Units (HUC14)
Within the Borough
 Borough of West Paterson
 Passaic County, New Jersey



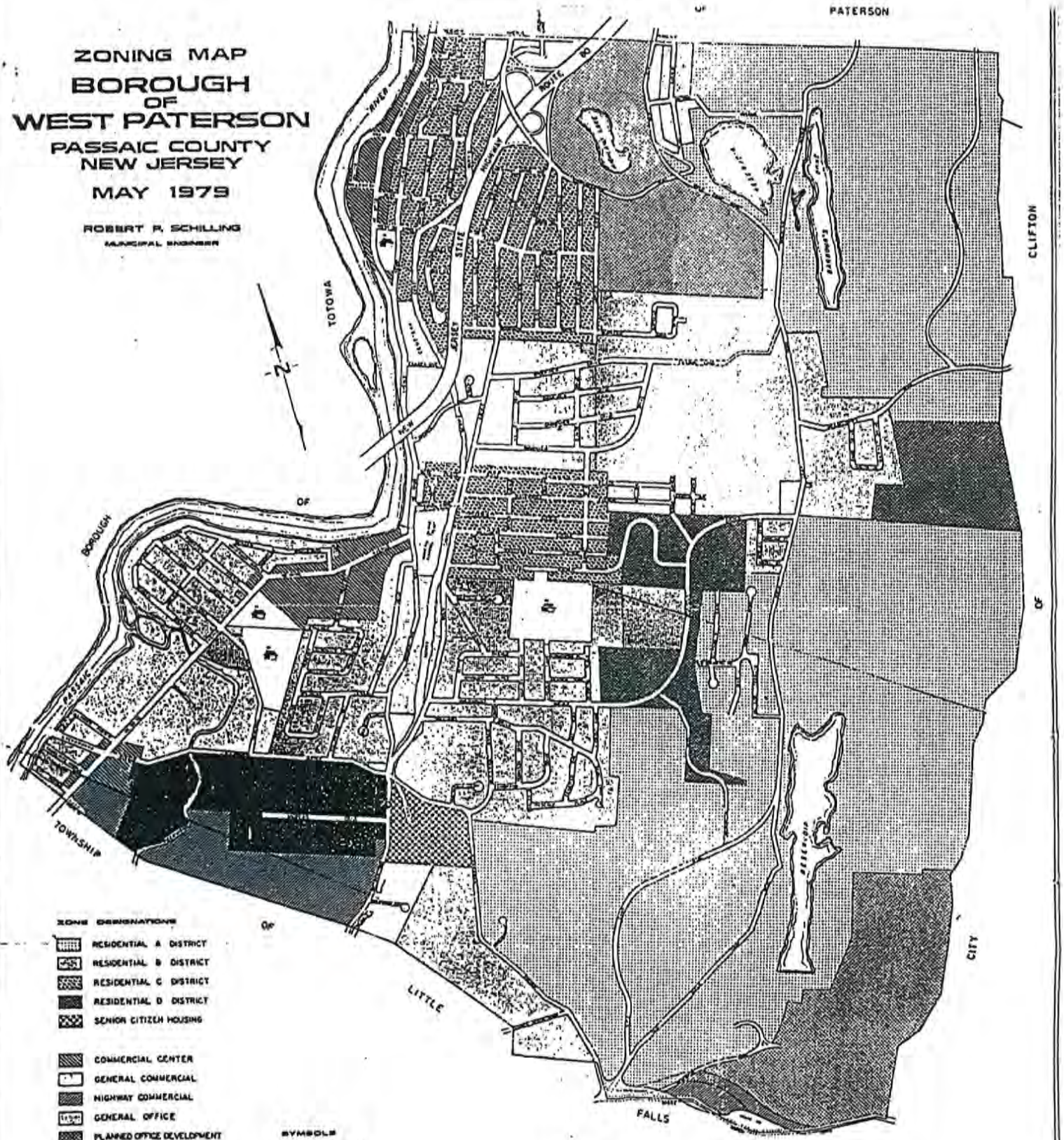
Symbol Legend

	NJDEP Huc 14
	Municipal Boundary



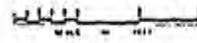
**ZONING MAP
BOROUGH
OF
WEST PATERSON**
PASSAIC COUNTY
NEW JERSEY
MAY 1979

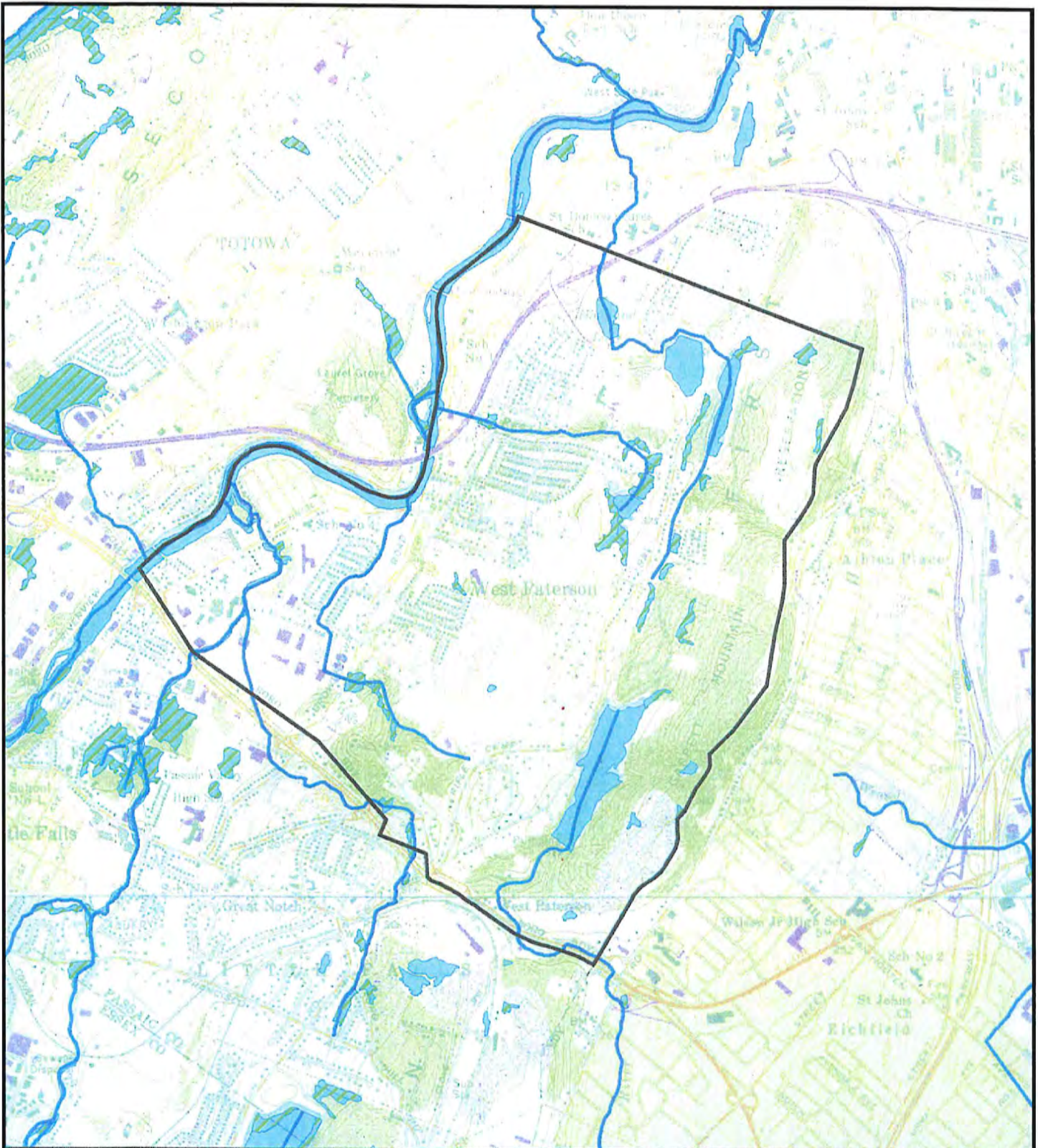
ROBERT P. SCHILLING
MUNICIPAL ENGINEER



- ZONE DESIGNATIONS**
- RESIDENTIAL A DISTRICT
 - RESIDENTIAL B DISTRICT
 - RESIDENTIAL C DISTRICT
 - RESIDENTIAL D DISTRICT
 - SENIOR CITIZEN HOUSING
 - COMMERCIAL CENTER
 - GENERAL COMMERCIAL
 - HIGHWAY COMMERCIAL
 - GENERAL OFFICE
 - PLANNED OFFICE DEVELOPMENT
 - PLANNED UNIT DEVELOPMENT
 - INDUSTRIAL

- SYMBOLS**
- FIRE HOUSE
 - SCHOOL





Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wetlands	NJDEP	1986
Lakes	NJDEP	1986
Streams	NJDEP	1998



Figure C-9

Wetlands and Water Land Uses within the Borough

Borough of West Paterson
Passaic County, New Jersey

Symbol Legend

- Streams
- Lakes
- Wetlands
- Municipal Boundary



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