

# Stormwater Management Plan



## **BOROUGH OF LAKE COMO** **Monmouth County, New Jersey**

**Prepared By: Leon S. Avakian, Inc.**  
**Municipal Engineer**

**April 28, 2025**

**Revised September 3, 2025**

A handwritten signature in blue ink, appearing to read "S. Avakian", is written over a horizontal line.

Samuel J. Avakian, P.E., P.L.S., P.P.  
Borough Engineer, NJ License No. 42589

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## Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Lake Como (“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 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.

The plan also addresses the review and update of existing ordinances, the 2019 Borough Master Plan Reexamination Report, 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

Several minimum goals for Tier A municipal stormwater management plans were identified in N.J.A.C. 7:8-2.2. These include:

- 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;

- Encourage incorporation of Low Impact Development Strategies into new and future site development plans, to ensure nonstructural stormwater management requirements are met; and
- Protect public safety through the proper design and operation of stormwater basins.

In addition to the minimum goals required by the NJPDES General Permit, consideration should be given to complying with the goals and objectives set forth in the current municipal Master Plan.

## **Stormwater Discussion**

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

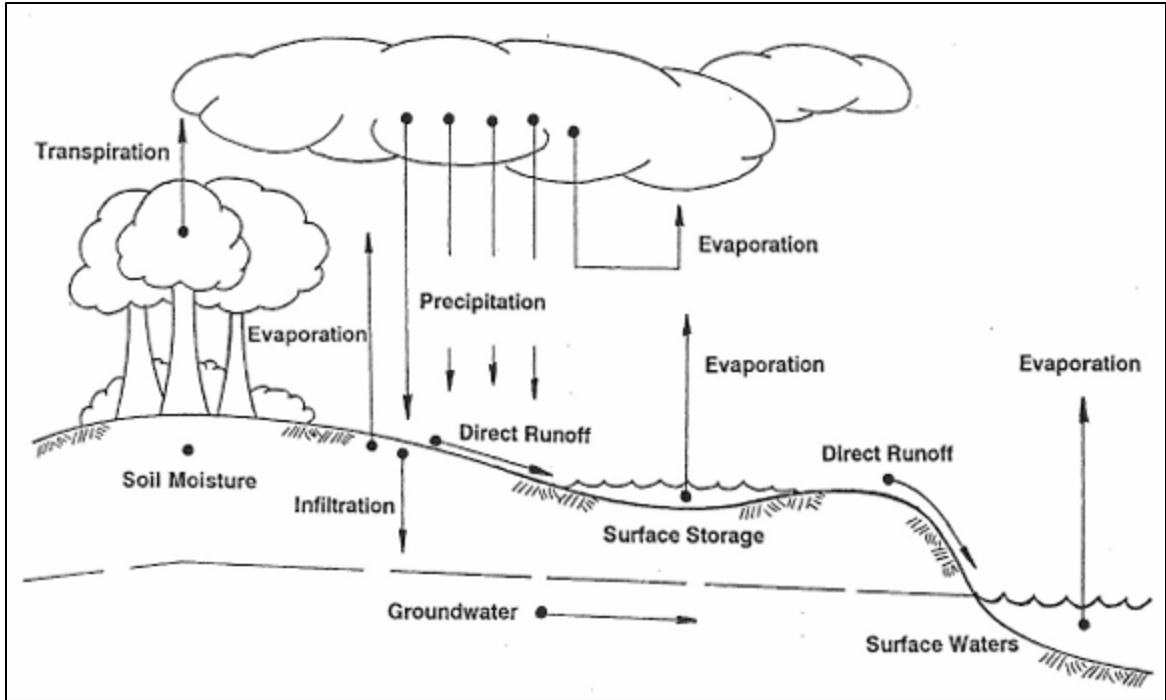


Figure 1 – Hydrologic Cycle

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 Lake Como is located on the Jersey Shore coastline in the southern portion of Monmouth County. The Borough contains a land area of approximately 0.2 square miles. Despite growth resulting from the close proximity to both the New York and Philadelphia metropolitan areas, Lake Como maintains a historic and tranquil character of a residential shorefront community. The Borough is surrounded by the

municipalities of the Borough of Belmar to the north and east, the Borough of Spring Lake to the south, and the Township of Wall to the west. The Borough partially borders Lake Como and Polypod Brook to the south. The Borough's location and municipal borders are shown in Figure 2.

As per the 2020 US census, the population of the Borough was 1,697 (slightly lower than the 2010 US census population of 1,759). Due to the very limited amount of land available for development in the Borough, the population has and will likely continue remain similar.

The Borough of Lake Como lies entirely within the geographic area known as the Outer Coastal Plain, which is the portion of the Atlantic Coastal Plain which lies south and southeast of the Highlands of the Navesink. The Borough is relatively flat, with no unusual topographic features. The low-lying areas are formed on unconsolidated and semi-consolidated marine alluvial sediments. These sediments include clay, silt, sand, and gravel which were deposited as the sea level rose and fell during the end of the Cretaceous Period of the Mesozoic Era and the Tertiary Period of the Cenozoic Area. The USGS Quadrangle map of the Borough is shown in Figure 3.

The Borough falls in Watershed Management Area (WMA) 12 which extends from Perth Amboy to Point Pleasant Beach. WMA 12 is comprised of an assemblage of coastal sub-watersheds, all or a portion of which fall into 56 municipalities in the Raritan Bay and Atlantic Coastal drainage basins. The Borough contains portions of Hydrologic Unit Code (HUC-14) areas for two (2) areas. These HUC14 areas and associated waterbodies are shown in Figure 4.

The New Jersey Surface Water Quality Standards (N.J.A.C. 7:9B) establish the designated uses to be attained and specify the water quality (criteria) required to protect the State's waters. Designated uses include potable water, propagation of fish and wildlife recreation, agricultural and industrial supplies, and navigation. These are reflected in use classifications assigned to specific waters. The NJDEP has assigned a special level of protection known as Category One (C1) for a number of waterways within New Jersey. The C1 designation targets water bodies that provide drinking water, habitat for endangered and threatened species, and popular recreational and/or commercial species, such as trout or shellfish. The Category One designation provides increased protection to water bodies to help prevent water quality degradation and discourage development where it would impair or destroy natural resources and environmental quality. There are no C1 waterbodies within the Borough of Lake Como.

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 900 AMNET sites throughout New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as excellent, good, fair, or poor based on the AMNET data. The data is used to generate three regional indices: High Gradient Macroinvertebrate Index (HGMI), Coastal Plain Macroinvertebrate Index (CPMI), and Pinelands Macroinvertebrate Index (PMI). Allenhurst Borough falls within the Coastal Plain and thus uses CPMI results to determine

waterway health. The closest AMNET site to the Borough is located at Shark River on Remsens Mills Road and is designated as fair.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the instream total fecal coliform and total coliform concentrations in Shark River frequently exceed the state's criteria. This means the waterway is impaired and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source pollution, 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.

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 following waters are listed on Sublist 5 of the 2022 Integrated List (as of January 31<sup>st</sup>, 2025):

- Wreck Pond Brook (below Route 35) (HUC 02030104090080): arsenic, total phosphorus, fecal coliform
- Shark River (below Remsen Mill gage) (HUC 02030104090060): chlordane in fish tissue, DDT in fish tissue, dissolved oxygen, mercury in fish tissue, PCBs in fish tissue

The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps which identify 100 year and 500 year flood hazard areas and are on file with the Municipal Clerk for public information. These maps help delineate the sensitive environmental areas which extend along the collector streams and creeks within the Borough. These environmentally sensitive areas are located on lands near the Atlantic Ocean and bordering Lake Como in the Borough.

The Borough is almost fully developed. The existing Land Use/Land Cover Map is shown in Figure 5. The existing zoning is shown in Figure 6. The vast majority of land is urban land with little chance for groundwater recharge. The Borough has five (5) Zoning Districts and one (1) Overlay: Residential (R-60), Residential (R-50), Residential (R-40), Multi-Family (MF), General Business (GB), and Mixed Use Overlay. Figure 7 shows the groundwater recharge areas within the Borough.

Wetlands are crucial to maintaining biodiversity within our region. While current State regulations limit disturbance of wetland areas, we still see encroachment into these environmentally sensitive areas. Efforts should be made to further protect these areas from disturbance. As per the 2020 NJ Land Use/Land Cover data, a small amount of wetlands exist lining Lake Como as well as alongside part of Polypod Brook and the railroad line.

Potential wetlands control measures to be implemented include:

- Requiring conservation easements along wetland buffer line.
- Requiring conservation markers to be installed along easement to prevent homeowners from encroaching into wetland and/or buffer areas.
- Provide a NJDEP Wetland Map including property lot lines to the municipality. Educate Borough employees in the zoning and building departments to refer to the wetland map to determine if wetlands are located in the vicinity of a property proposing any construction, including decks, sheds garages, etc. If wetlands are in the vicinity of the property, require a Letter of Interpretation prior to issuance of a permit.
- Strict enforcement of the NJDEP imposed wetland buffer for construction activity on all proposed building sites.
- Restrict tree clearing in wetland and/or buffer areas to dead, diseased, or hazard trees only.

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

WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP. As shown in Figure 8, there are no well head areas within Lake Como Borough.

## **Design and Performance Standards**

The Borough of Lake Como 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 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. Any additional ordinances required in the future will be submitted to the County for review and approval.

The Borough, through its Department of Public Works (DPW), will be inspecting outfalls, performing street erosion edge inspections, and catch basin inspections. These inspections cover the entire town with no exceptions. If a violation is found or an area of need is located, the responsible party will be notified and the situation will be rectified. If the party does not respond, a summons will be issued and the situation corrected.

## **Plan Consistency**

The Borough is not within a Regional Stormwater Management Planning Area and no Regional Stormwater Management Plans (RSWMPs) have been developed for waters within the Borough at this time. If any RSWMPs are developed in the future applicable to the Borough, this MSWMP will be updated to be consistent. The Municipal Stormwater Management Plan has been updated to be consistent with the following approved TMDLs:

- Shark River (below Remsen Mill gage) (HUC 02030104090060): total coliform, fecal coliform

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

The Borough Stormwater Management Plan 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 local Soil Conservation District (Freehold). All pertinent design calculations for stormwater management facilities should adhere to the new design rainfall depths for Monmouth County as revised by the Natural Resources Conservation Service as of September 2004 accordingly:

## **NRCS 24 Hour Design Storm Rainfall Depths**

as Revised September 2004

Storm Period	1 Year		2 Year		5 Year		10 Year		25 Year		50 Year		100 Year	
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
Monmouth County	2.8	2.9	3.4	3.4	4.4	4.4	5.3	5.2	6.0	6.6	6.5	7.7	7.5	8.9

This Stormwater Management Plan is consistent with the Monmouth County 2016 Master Plan's objectives for Natural Resources as follows:

1. Encourage county and municipal actions to identify, promote, and protect natural resources and significant natural features, unique areas, critical habitats, and the potential or known habitats of resident and migratory populations of rare, endangered, and threatened species, particularly those that have municipal, county, or statewide significance.
2. Protect, conserve, and enhance the county's significant, diverse, natural, and scenic resources utilizing sound ecological protection and restoration measures.
3. Protect habitat and ecological diversity by encouraging the preservation of large, contiguous tracts of land.
4. Encourage the sustainable use of public lands in concert with natural resource protection.
5. Encourage the protection and conservation of all water sources, including the reuse of water, through responsible water resource management planning.
6. Ensure high water quality through the implementation of Best Management Practices (BMPs).
7. Promote the consideration of such overarching issues as sea level rise, saltwater intrusion, and development impacts on aquifer recharge and stormwater management in decision making related to water supply and wastewater.
8. Promote public awareness of environmental issues through outreach and educational opportunities including the relationship between the protection and enhancement of natural resources and economic value to the community.
9. Support the creation of municipal land use regulations and programs that protect environmentally sensitive areas based on constraints, building suitability, natural resource value, and environmental criteria.

The Borough's Plan is consistent with the plans and policies of the State Redevelopment or Development Plan (SDRP), which was adopted in 2001. The SDRP places the entire Borough in the Metropolitan Planning Area (PA1). According to the State Plan, most of the communities within the PA1 planning area are fully developed or almost fully developed with little vacant land available for new development. This plan is consistent with the State Plan by preserving and protecting the established residential character, preserving and upgrading the existing utility infrastructure, providing adequate open space facilities, and preserving and protecting valuable natural features within the Borough. A new SDRP is in the process of being developed and is tentatively scheduled to be distributed in Fall 2025. When the SDRP is developed and approved, this Municipal Stormwater Management Plan will be updated to be consistent.

The Borough is consistent with NJDEP's most recent recommended Stormwater Control Ordinances as detailed in the Borough's annual Stormwater Pollution Prevention Plan (SPPP).

## **Nonstructural Stormwater Management Strategies**

The Borough of Lake Como has reviewed its master plan and ordinances, and has found that no ordinances require revision to incorporate nonstructural stormwater management strategies at this time. The Borough has continued to adopt the model stormwater management ordinances set forth by the NJDEP and required as part of the MS4 permit.

In the future, if ordinances are identified for further revision, once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 12 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.

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

The Borough of Lake Como is 0.20 square miles in overall size and has less than one square mile of vacant land based on NJDEP 2020 Land Use/Land Cover data. As such, the Borough meets the exemption criteria from the requirement for a land use/build out analysis under the NJPDES General Permit.

## **Mitigation Plans**

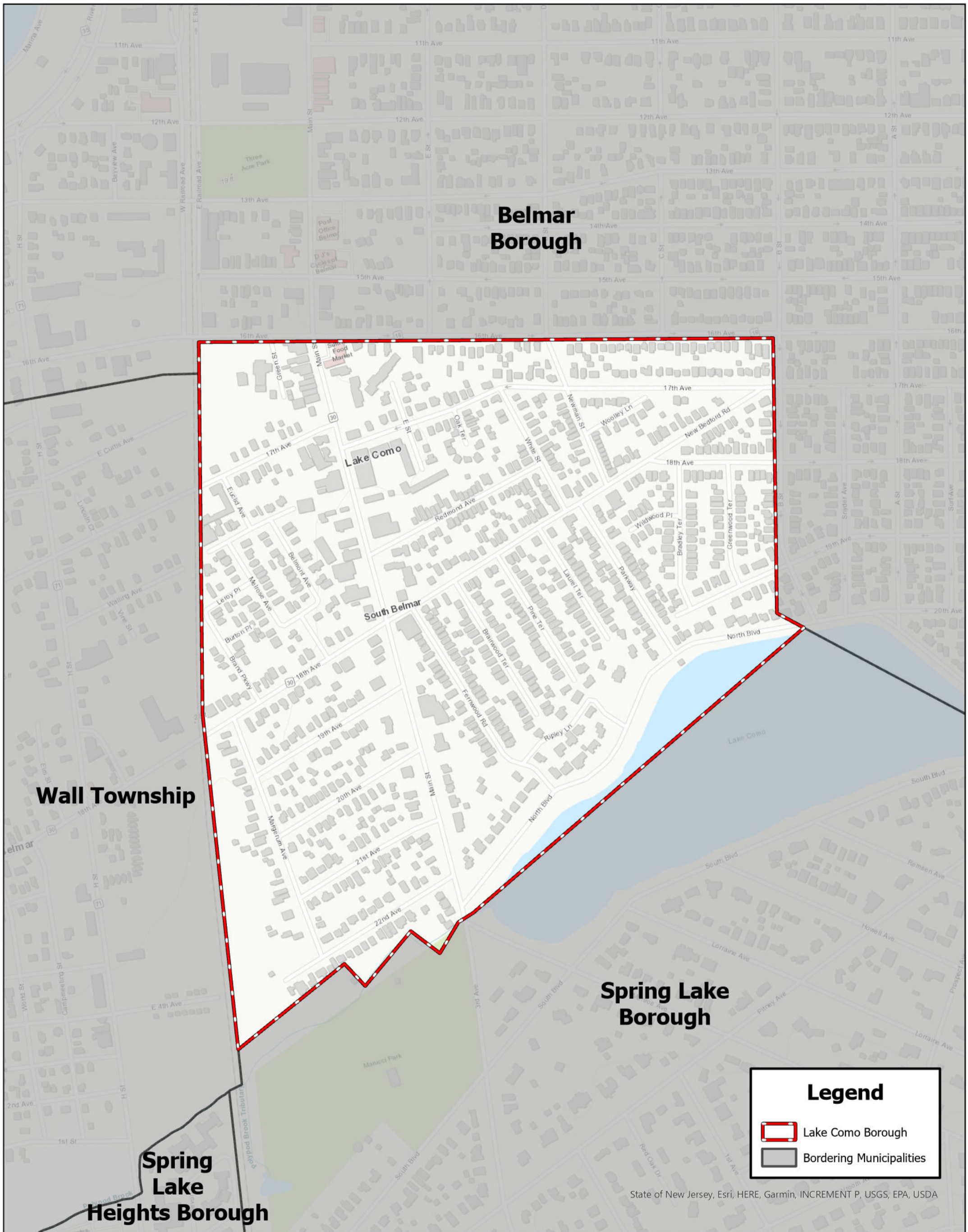
This mitigation plan is provided for proposed developments or redevelopment projects that seek a variance or exemption from the stormwater management design and performance standards set forth in this Municipal Stormwater Management Plan and N.J.A.C. 7:8-5 when stormwater criteria cannot be met. The Borough may consider granting variances or exemptions for 'major developments,' subject to the following NJDEP and municipal requirements:

- a. The mitigation project must be implemented in the same drainage area or watershed as the proposed development.

- b. The mitigation project must provide groundwater recharge benefits, or protection from stormwater runoff quality and quantity within previously developed property.
- c. The mitigation project must be completed for the performance standard for which the variance or exemption is requested and must provide comparable benefits to those being waived should the variance be granted.
- d. The developer must ensure the long term maintenance of the approved mitigation system, which include the maintenance requirements developed in the NJDEP BMP Manual.
- e. It shall be the developer's responsibility to prove to the satisfaction of the municipality that should the variance be granted and mitigation approved, there will be no detrimental impact on adjoining properties.
- f. The developer shall enter into a developer's agreement with the municipality, which addresses all issues related to the construction and maintenance of the mitigation project.

The Applicant may select one of the following strategies to be developed into potential mitigation projects. It is the developer's responsibility to provide a detailed study of any proposed mitigation project, and to provide the Borough with a proposed mitigation plan for review and approval.

- 1. Groundwater Recharge mitigation includes rehabilitation of existing detention or retention basins, installation of permeable pipe underdrains, and encouraging infiltration of runoff to groundwater recharge.
- 2. Water Quality and Water Quantity mitigation includes rehabilitation of culverts and/or ditches in major watershed basins; desilting and desnagging of stream corridors; rehabilitation of existing ponds, lakes, and waterways; installation of structural BMPs within the municipal drainage system and/or at outfall locations; and encouraging total suspended solid and nutrient load reduction.
- 3. Stream Corridor Protection mitigation includes stream bank stabilization, vegetative enhancement, and restoration of floodplain areas.



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**Figure 2: Location and Municipal Borders**  
 Municipal Stormwater Management Plan  
 Borough of Lake Como  
 Monmouth County, New Jersey

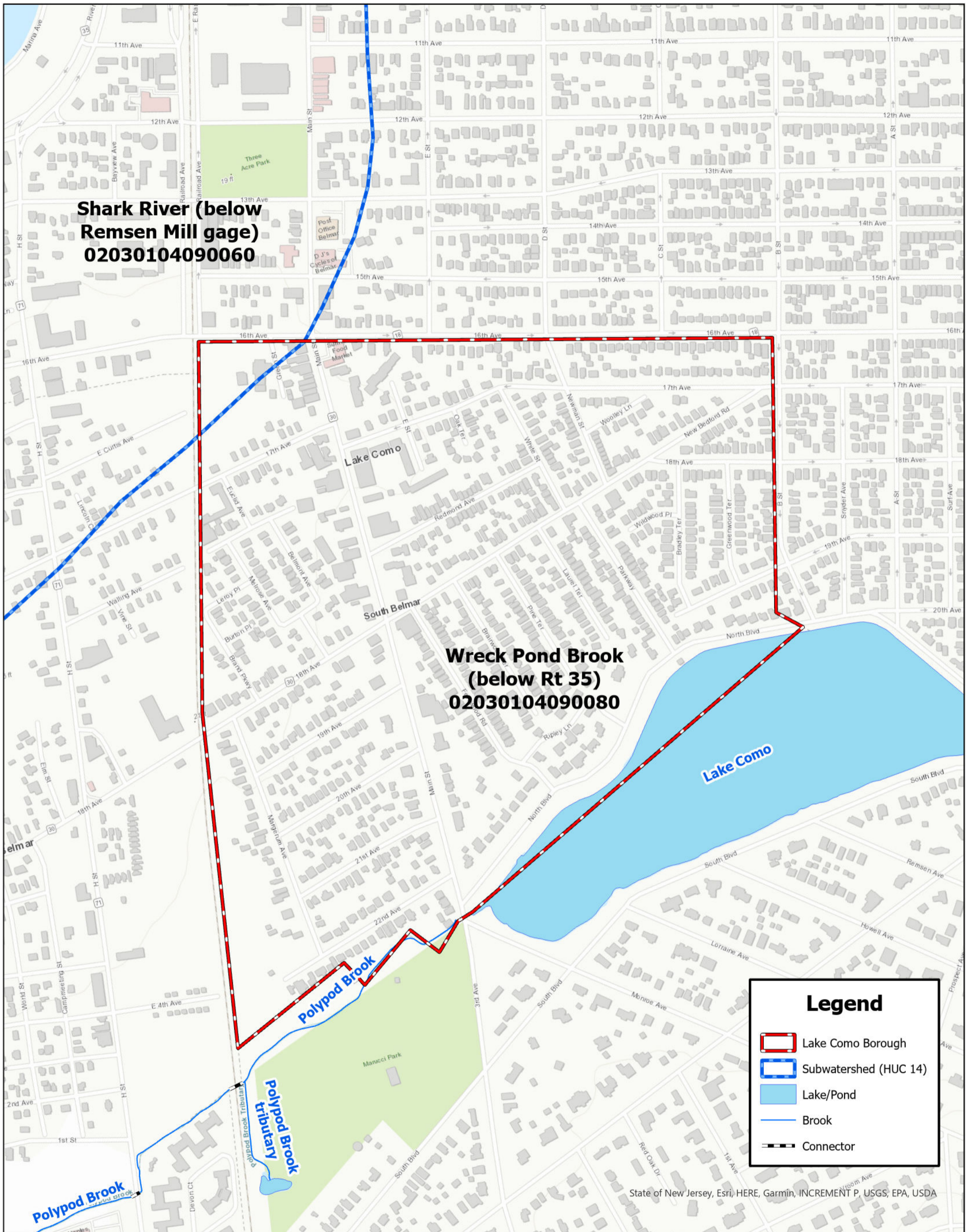
Source: LSA, NJGIN, and Monmouth County GIS.  
 Revised: April 16, 2025

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized or endorsed.

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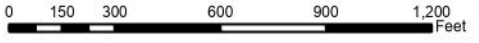


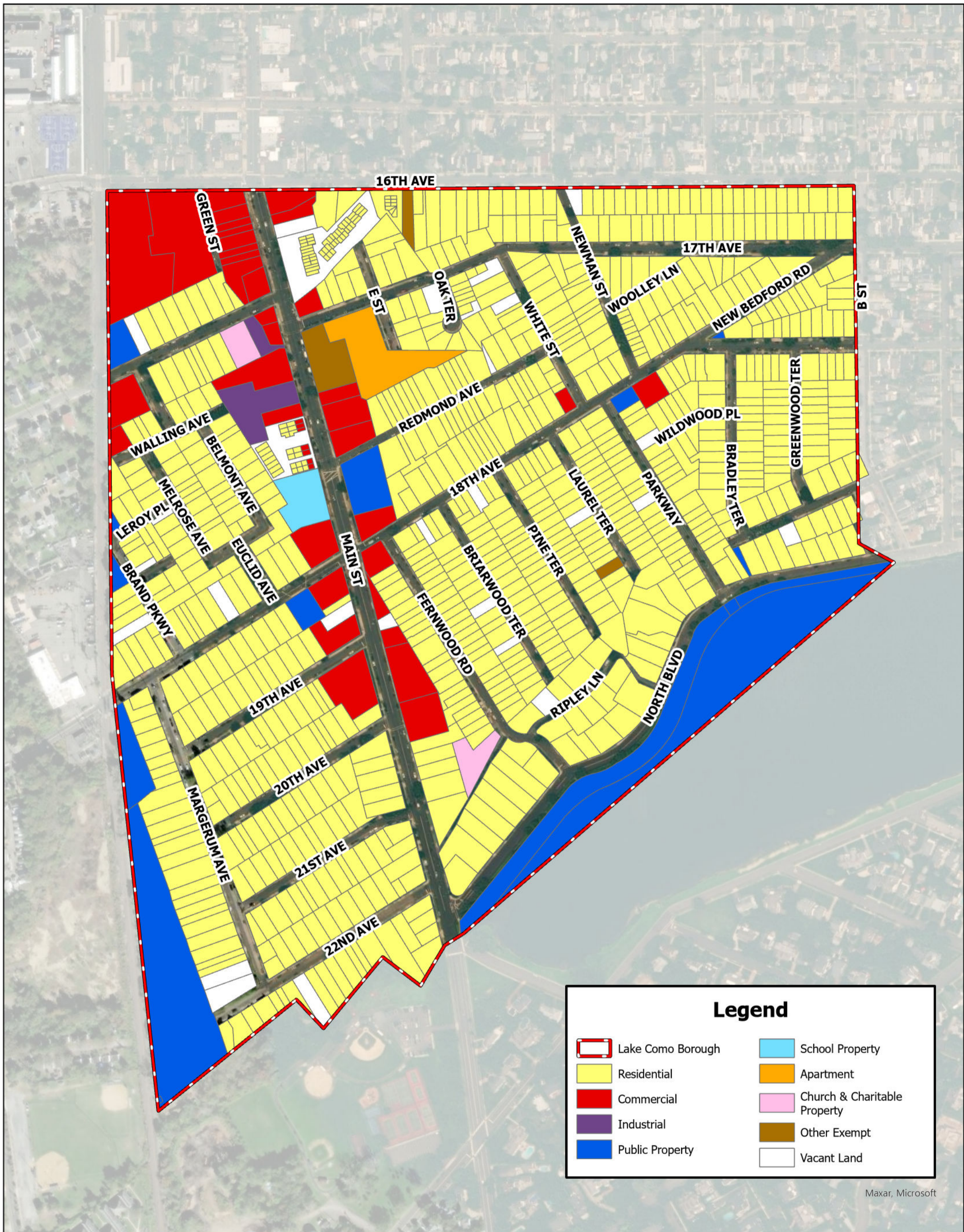
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**Figure 4: HUC 14 Drainage Area Map**  
Municipal Stormwater Management Plan  
Borough of Lake Como  
Monmouth County, New Jersey

Source: LSA, NJGIN, and Monmouth County GIS.  
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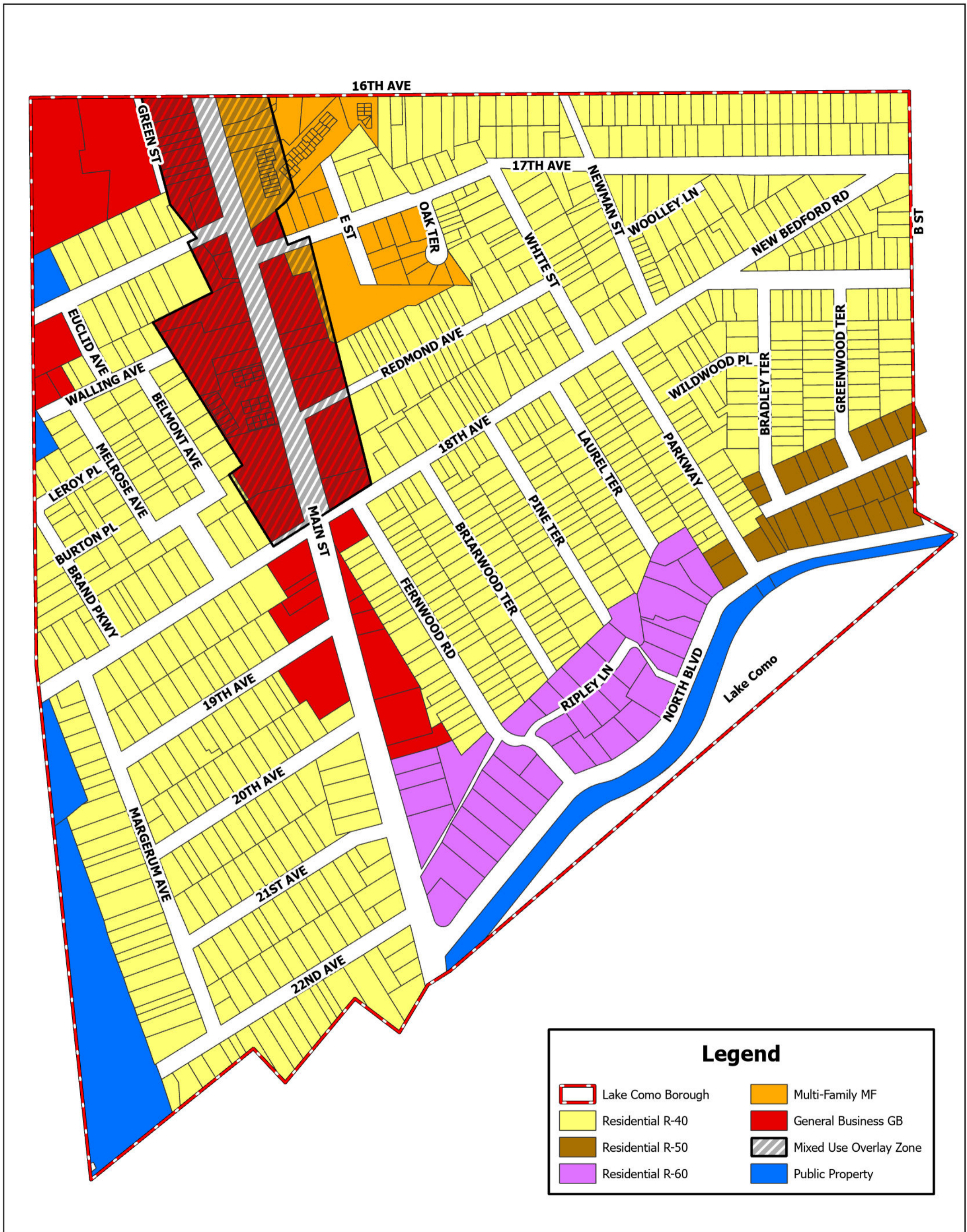
**Figure 5: Land Use**  
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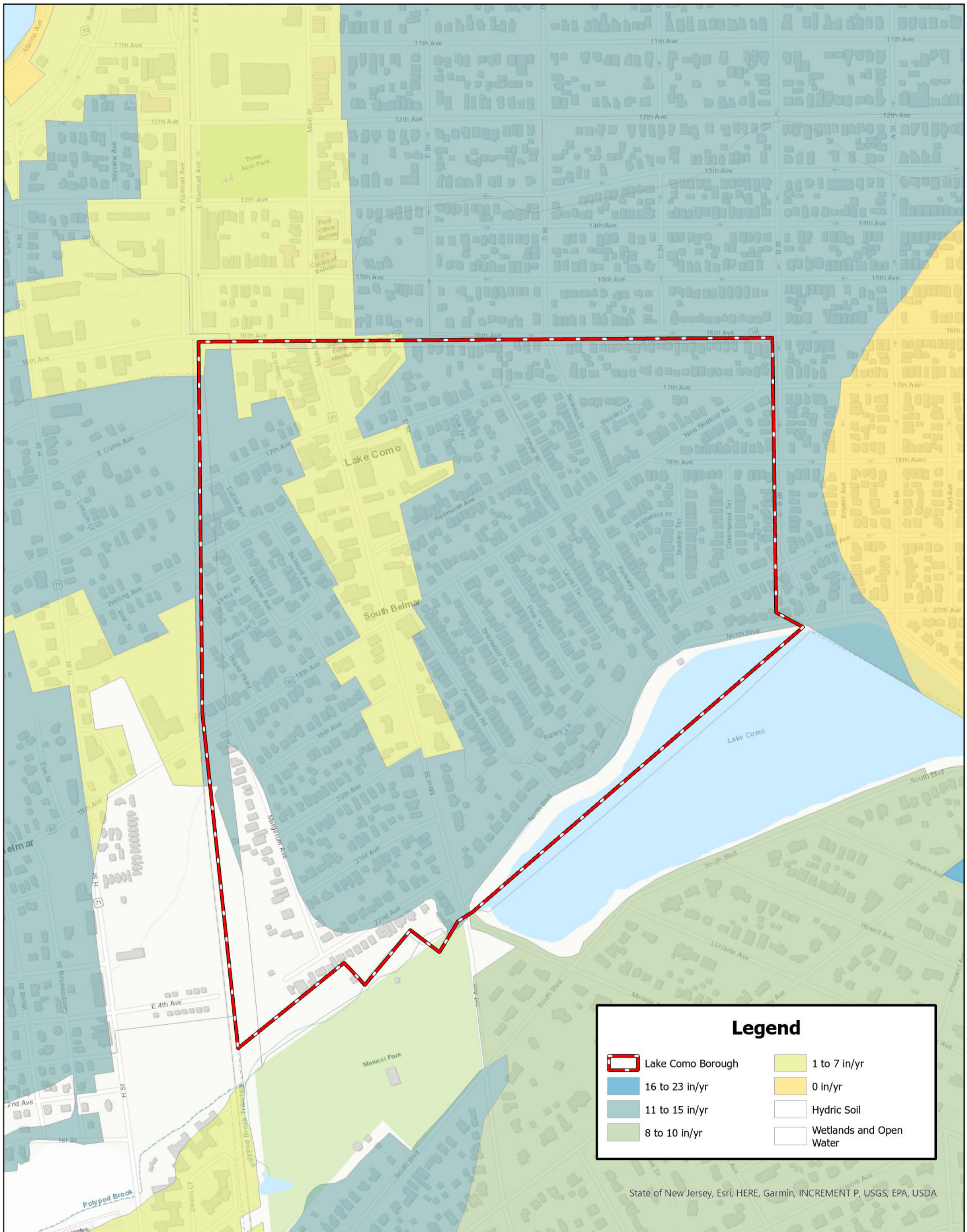
**Figure 6: Zoning Map**  
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**Figure 7: Groundwater Recharge Areas**  
 Municipal Stormwater Management Plan  
 Borough of Lake Como  
 Monmouth County, New Jersey

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**Figure 8: Well Head Protection Areas**  
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 Monmouth County, New Jersey

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