New Jersey Stormwater
Best Management Practices Manual

August 20, 2024

Last Revised: March 13, 2025

Municipal Stormwater Management Plan

(MSWMP)

Borough of Pine Beach

Ocean County, NJ

Table of Contents

Table of Figures

1. Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Pine Beach ("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 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.

2. Goals

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- Protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

3. Stormwater Discussions

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.

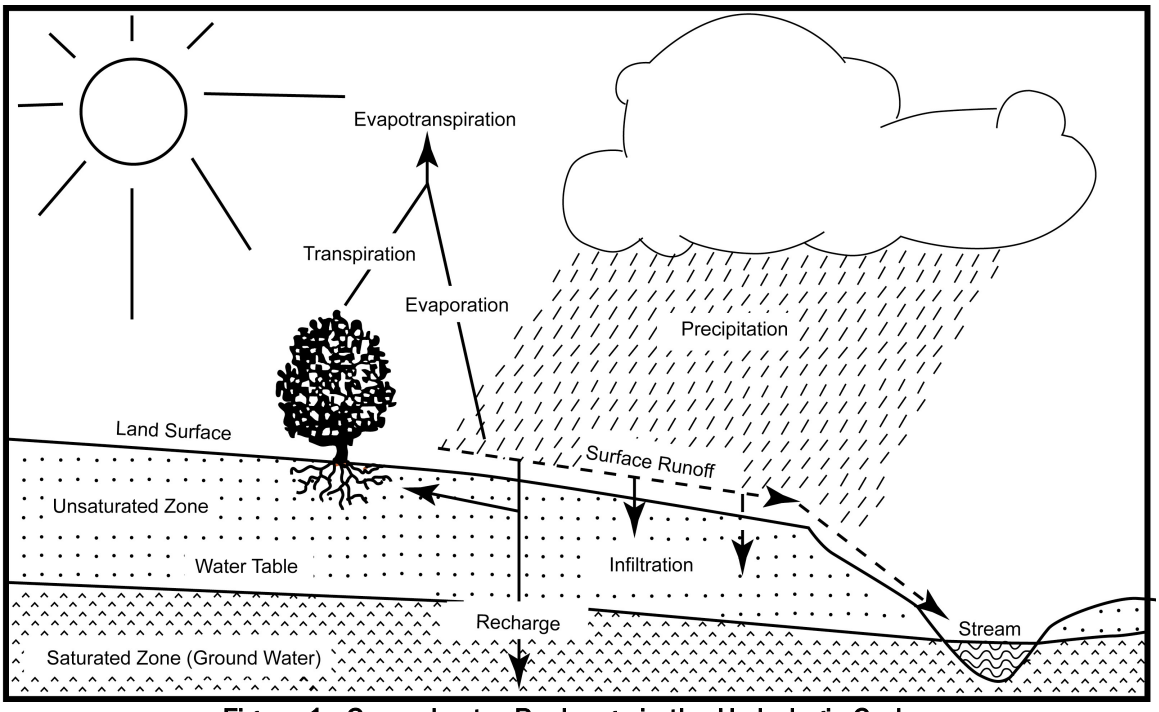

Figure 1 - Groundwater Recharge in the Hydrologic Cycle

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.

4. Background

The Borough of Pine Beach was incorporated in 1925 and encompasses a 0.64 square mile area in northeastern Ocean County, New Jersey. The Borough is bounded on the north by Toms River, on the south and east by Berkeley Township, and on the west by the Borough of Beachwood.

In recent years, the Borough has seen a slight population growth. The population of the Borough increased from 1,796 in 1980 to 1,954 in 1990, decreased to 1,950 in 2000, increased to 2,127 in 2010, and increased to 2,139 in 2020.

This population increase has resulted in demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure 2 illustrates the waterways in the Borough. We note that there are no waterways within the Borough of Pine Beach. However, the stormwater system within the Borough collects rainfall & runoff; the collected water gets distributed through the network of stormwater pipes, and discharges to outfalls at the edge of the Toms River. Figure 3 illustrates the approximate location of the outfalls. Additionally, the Borough is within the Coastal Area Facility Review Act (CAFRA) jurisdiction. Figure 4 depicts the Borough boundary on the USGS quadrangle maps.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as 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 major river that borders the Borough to the north, the Toms River, is moderately impaired. However, there are no tributaries that flow through the Borough to the Toms River. In addition, there have not been AMNET sampling locations within Pine Beach Borough. No additional impairment data has been located for Pine Beach Borough.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on streams in the state. This data is located on Sub-list 5 of New Jersey's Integrated List of Water bodies; the NJDEP data shows that the dissolved oxygen levels of the Atlantic Ocean and the total coliform levels of the Barnegat Bay and the Toms River frequently exceed the state's criteria. This means that these bodies of water are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway. The Toms River estuary is impaired for arsenic, copper, lead, nickel and zinc. In addition, the Toms River estuary is listed as impaired for shellfishing per the NJDEP's 2004 Integrated List of Water bodies.

A TMDL (Total Daily Maximum Daily Load) is the amount of a pollutant that can be accepted by a water body without exceeding water quality standards or interfering with the ability to use a water body 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 non-point 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, and reforestation of stream corridors, retrofitting stormwater systems, and other BMPs. In order to comply with the TMDL, the amount of total coliform in the waterways must be reduced. The following reduction is necessary to comply; Toms River estuary, a 74% reduction is proposed.

It is important to note that Pine Beach Borough does not have development conditions or uses within the above estuaries that traditionally contribute to total coliform exceedances (ex., agricultural farms, malfunctioning septic systems, etc.).

Pine Beach Borough will address stormwater point sources through existing best Management Practices (BMPS) of the MS4 program, as practicable, and in accordance with its MS4 permit obligations.

It should be noted that as part of the Borough's Municipal Separate Storm Sewer Permit, as outlined in the Stormwater Pollution Prevention Plan, existing inlets and stormwater management facilities are inspected annually and repairs/maintenance are made. At that time, existing water quantity and erosion problems (if any) are assessed and abated to the maximum extent possible. Additionally, the adoption of Stormwater ordinances have occurred and are listed on the Borough's website.

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.

Based on the mostly residential composition of the community, sources of the coliform are typically pet and wildlife waste along with other runoff sources and direct discharges from boating activities. The Borough has extensively been educating the population on reducing sources of impairment, along with improvements in infrastructure to reduce impairments within the storm sewer systems.

Currently the Borough experiences very few non-tidal flooding problems. The two locations which flood are adjacent to the Toms River and consequently only flood during times of severe tidal action. Since all future development will comply with the stringent Borough and state regulations regarding water quality, quantity and ground recharge will minimize if not prevent any aggravation of these locations and reduce the likelihood of new problems arising.

The Borough has consistently been addressing stormwater management issues as shown in part by the receipt of a grant in 1996 for "Barnegat Bay Watershed Demonstration Project Storm Drain Maintenance & Education Programs" in the amount of $75,000; this grant along with other projects demonstrates the Borough's aggressive efforts to improve the health of the Toms River and Barnegat Bay.

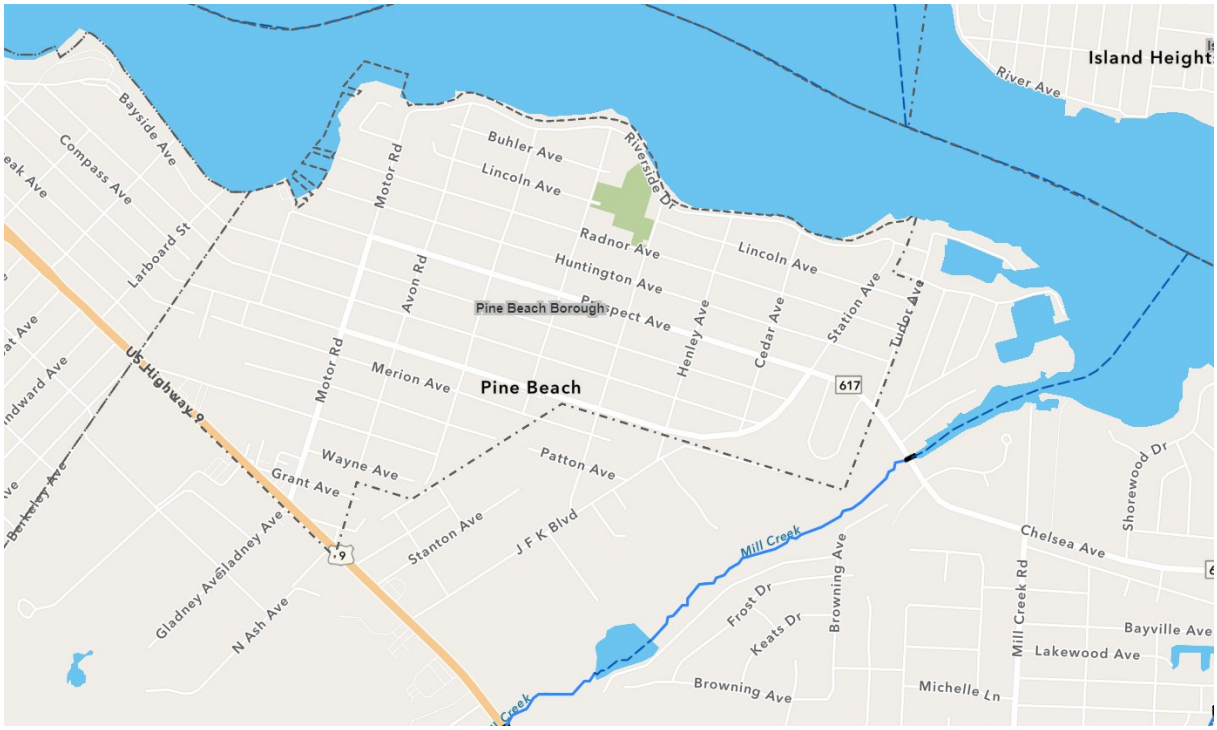

Figure 2 - Borough and Its Waterways

Figure 3 - Outfalls

Figure 4 – Borough Boundary on USGS Quadrangles

5. Design and Performance Standards

The Borough continues to adopt the latest rules and regulations from the NJDEP for 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.]

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

6. Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area, but TMDLs have been developed for waters within the Borough; If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent. NJDEP has developed adopted Total Coliform TMDL's per September 27, 2006 Report, entitled "The Fourteen Total Maximum Daily Loads (TMDLs) for Total Coliform" to address Shellfish impaired waters in Watershed Management Area 13, located in the Atlantic Coastal Water Region".

One major waterbody that is present in the Borough is the Toms River Estuary, which forms the Borough's northern border. The water body is classified nonimpaired waterway based on AMNET but is montored by the NJDEP Coastal Monitoring and Shallfish Monitoring.

One impaired waterbody transverses on the east side of the Borough of Pine Beach and is monitored through AMNET testing and data which is Barnegat Bay.

The AMNET data lists this impaired water body with the following Total Maximum Daily Load Information for the Borough of Pine Beach:

1. **Applicable Stream TMDL(s)**
   None
2. **Applicable Lake TMDL(s)**
   None
3. **Applicable Shellfish TMDL(s)**
   Fourteen Total Maximum Daily Loads (14 TMDLs) for Total Coliform to Address Shellfish-Impaired Waters in Watershed management Area 13 Total coliform – 2006 : Barnegat Bay-L, Toms River-A.

The report established 14 TMDL's for total coliform to address the impaired shellfish water in the WM #13 for the Barnegat Bay.

The Borough has identified the Total Maximum Daily Load (TMDL) levels and has implemented the following strategies:

1. Annually ensure that any newly developed TMDL will be identitied by looping up the NJDEP Look up Tool annually. The TMDL Look-up Tool is available at https://dep.nj.gov/njpdes-stormwater/municipal-stormwater-regulation-program/tmdl/
2. Implemented MS4 Program requirements.
3. Maintain and repair stormwater infrastructure to address specific pollutant sources.
4. Adding additional education programs.
5. Adopted strict enforced Ordinances.
6. Adopted strict and more conservative post construction stormwater management standards.

Furthermore, all future development in the Borough of Pine Beach shall utilize the best available technology to minimize off-site stormwater runoff, increase on-site infiltration, simulate natural drainage systems, encourage green infrastructure, minimize off-site discharge of pollutants to ground or surface water, and enhance natural filtration functions. Aside from efforts to reduce daily

pollutant loads, Pine Beach will continue to implement the adopted Stormwater Pollution Prevention Plan, Stormwater Control Ordinances, and the Stormwater Management Plan.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the 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 Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

7. Nonstructural Stormwater Management Strategies

The Borough has reviewed the master plan and ordinances, and has provided a list of the sections in the Borough land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within [24 months of the effective date of the Stormwater Management A copy will be sent to the Department of Environmental Protection at the time of submission.

The following are excerpts from the Borough's Ordinances:

- Sections 175-18: Performance Standards; provide pollution source control. It prohibits materials or wastes to be deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. It also requires that all materials and wastes that might create a pollutant or a hazard be enclosed in appropriate containers.

- Section 175-27: Natural Features; requires that natural features, such as trees, brooks, swamps, hilltops, and views, be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. This section was amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

- Section 175-37: Nonconforming Uses, Structures or Lots; requires a variance for existing single family homes proposing additions that exceed the maximum percent impervious. The homeowner must mitigate the impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge.

- Section 175-43: Driveways and Accessways; describes the procedure for construction of any new driveway or accessway to any street. This section was amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

- Section 175-43: Off-street Parking and Loading; details off-street parking and loading requirements. All parking lots with more than 10 spaces and all loading areas are required to have concrete or Belgian block curbing around the perimeter of the parking and loading areas. This section also requires that concrete or Belgian block curbing be installed around all landscaped areas within the parking lot or loading areas. This section was amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, language was 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 minimum parking space requirements. These requirements are based on the number of dwelling units and/or gross floor area. The section allows a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. This section was amended to allow pervious paving to be used in areas to

provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

- **Section 175-71: Stormwater Runoff**; addresses stormwater runoff by referencing Chapter 135, the Borough's Surface Water Management Ordinance, which was updated to include all requirements outlined in N.J.A.C. 7:8-5. These changes were presented earlier in this document.

- **Section 175-71: Streets;** describes the requirements for streets in the Borough. The Borough has several street classifications, ranging from "Arterial," which has a minimum right-of-way of 80 feet, to "Secondary Local," which has a minimum right-of-way of 50 feet. 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 on-site topographical constraints allow design flexibility. Depending on these factors, paving width for secondary local streets has a range from 20 to 32 feet. This section was amended to 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. Language was added to this section to reduce the minimum radius of cul-de-sac designs. Cul-de-sacs with landscaped islands, cul-de-sacs with flush curbs, with a reinforced shoulder to accommodate larger equipment and emergency vehicles.

- **Section 175-71D: Curbs and Gutters**; requires that concrete curb and gutter, concrete curb, or Belgian block curb be installed along every street within and fronting on a development. This section was 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.

- **Section 175-74: Off-site and Off-tract Improvements**; describes essential off-site and off-tract improvements. Language was added to this section 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.

Several changes were made to Article X of the Borough Code entitled "Zone District Regulations." Although each zone has a maximum allowable percent impervious surface, the Borough Code was amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures. The Borough is evaluating the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. The Borough is also evaluating a maximum percent of disturbance for each zone, for those areas identified as natural features. Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge.

8. Land Use/Build-Out Analysis

If a municipality can document that it has a combined total of less than one square mile of vacant or agricultural lands, the municipality is not required to complete the following build-out analysis.

As the Borough of Pine Beach is 0.64 Square miles total and the majority of the Borough is improved, a Land Use/Build-Out Analysis is not required.

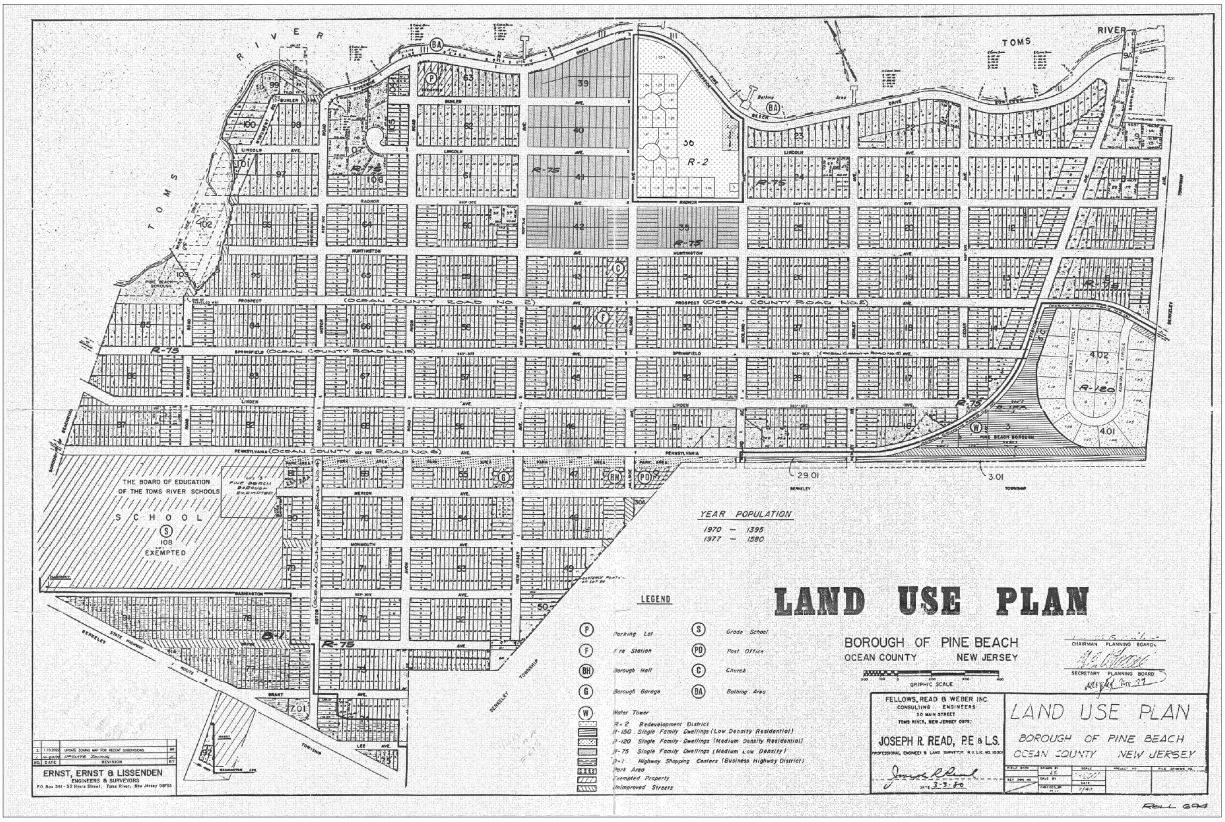

Figure 5 - Existing Land Use Map (on file in Borough)

9. 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. An issuance of a waiver from these or other related mitigation requirements by the NJDEP or other agency, does not relieve the developer from the requirements imposed through municipal review. The applicant must obtain all required permits for the mitigation project prior to municipal approval.

MITIGATION PROJECT REQUIREMENTS

All mitigation projects shall comply with the NJDEP's "Guidance for the Development of Municipal Mitigation Plans" last published in February 2006. At a minimum, the mitigation project must be implemented in the same drainage area as the proposed development. The mitigation effects must be in the same category as the waiver and must benefit the same receptor water body. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from a 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.

MITIGATION PROJECT SELECTION

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. Listed below are general projects that can be used to address the mitigation requirement, in various categories, the applicant must select a project that is in the same category in which the relief is being sought and the project.

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

- The project must be within the same area that would contribute to the receptor impacted by the project. Note that depending on the specific performance standard waived, the sensitive receptor and/or the contributory area to that receptor may be different. If there are no specific sensitive receptors that would be impacted as the result of the grant of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality and should be selected to provide the most benefit relative to an existing Stormwater problem in the same category (quality, quantity or recharge).

- Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance, permits and any access needs for the project in the future.

- The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor. For example, if the project for which a waiver is obtained discharges to a tributary, but the closest

location discharges to the main branch, it may be more beneficial to identify a location discharging to the same tributary.

- For ease of administration, if multiple sensitive receptors are addressed, it is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard. Although, multiple sites may be selected if the proposed benefits from this selection will be significantly greater than the benefit at one location. All requests for utilizing multiple sites must be approved by the Borough Engineer.

- It must be demonstrated that implementation of the mitigation project will result in no adverse impacts to other properties.

- Mitigation projects that address stormwater runoff quantity can provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction.

GROUNDWATER RECHARGE

- No proposed projects, funding for a study of appropriate projects is necessary first.

Figure 6 - Groundwater Recharge Areas

WATER QUANTITY

- No proposed projects, funding for a study of appropriate projects is necessary first.

WATER QUALITY

- Create goose control measures via vegetation or education at the beaches, athletic fields and recreation areas.
- Those projects contained in Stormwater and Water Quality Management Report of December 23, 2002.
- Retrofit existing storm drain infrastructure to provide water quality control throughout the Borough.

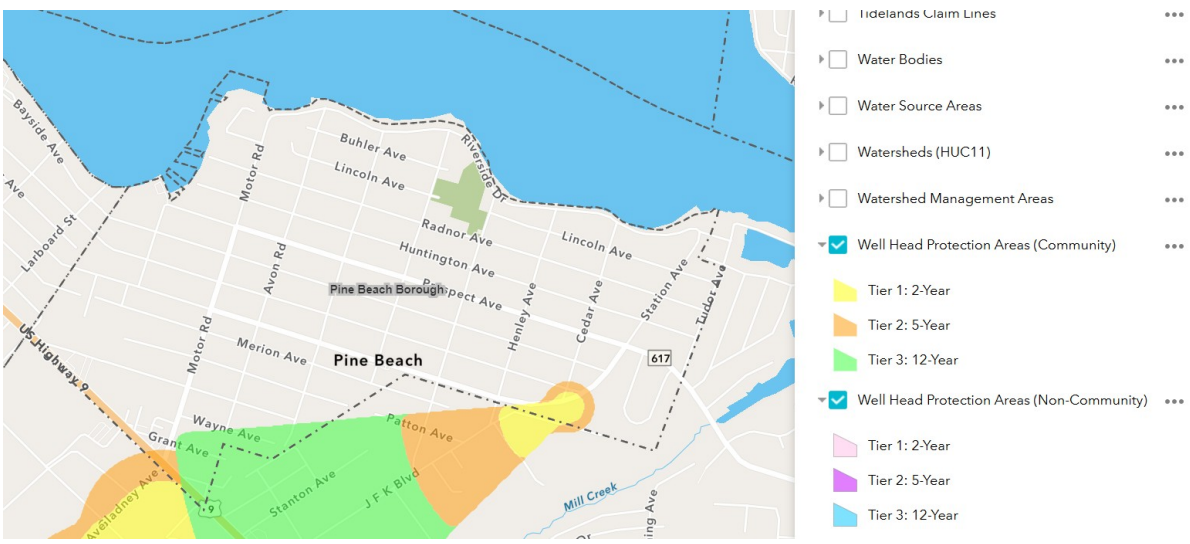

Figure 7 - Well Head Protection Areas

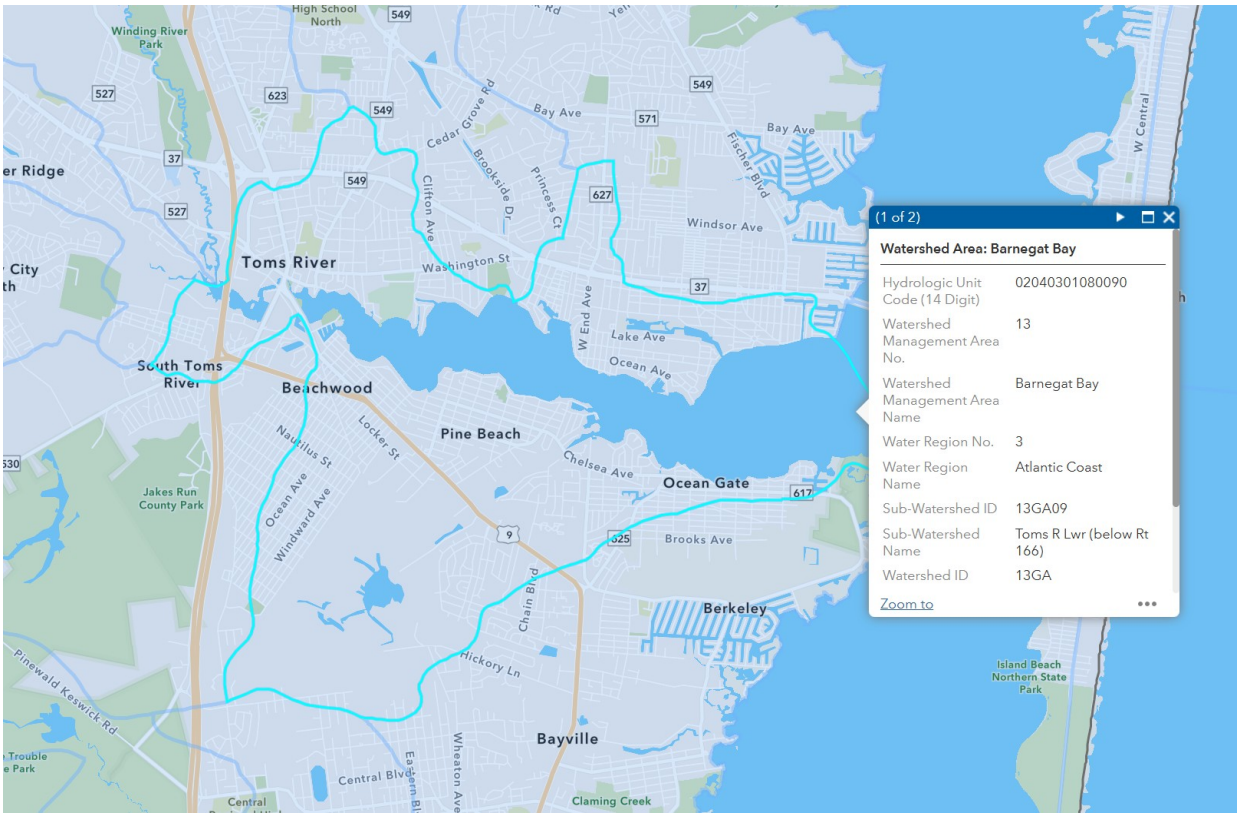

Figure 8 - HUC14 Area Map

Figure 9 - Impervious Surface Areas (%)

OTHER ALTERNATIVES

- If a suitable site cannot be located in the same drainage area as the proposed development, as discussed above, the mitigation project may provide mitigation that is not equivalent to the impacts for which the Variance or example is sought, but that addresses the same issue. For example, if a Variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to fecal impairment and such addresses issues within the water quality category.
- If a suitable site cannot be located within the Borough and the development will have no measurable impact to flooding, erosion, water quality degradation, etc.., the Borough may elect to allow the developer to contribute to a fund. From this fund the Borough may conduct future analysis to identify future mitigation projects, allow for the funding of larger mitigation projects than that of the developer or undertake municipality wide projects as necessary. The funding must be equal to or greater than the cost to implement the mitigation required, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure. In addition, the Borough shall utilize the contribution within 5 years.