

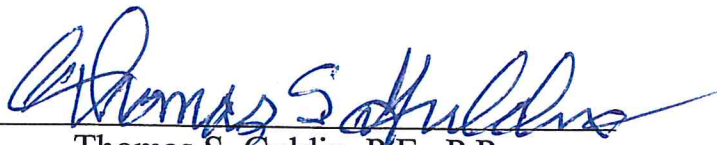
MUNICIPAL STORMWATER MANAGEMENT PLAN

For:

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MUNICIPAL STORMWATER MANAGEMENT PLAN
(MSWMP)

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Mantoloking ("the Borough") to address Stormwater-related impacts. The creation of this plan 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 base flow 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 mitigations 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:

- 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;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of Barnegat Bay for its 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 in regard to proper design, maintenance and operation of stormwater facilities. (Stormwater sewer systems, outfall pipe, etc.)

The goals of the Plan will be implemented through design and performance standards for new development, retrofitting existing stormwater management measures, and establishing operational and maintenance standards for existing development. The Plan will also establish long-term monitoring procedures for quality control and quality assurance of new and existing stormwater management facilities. The plan 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 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

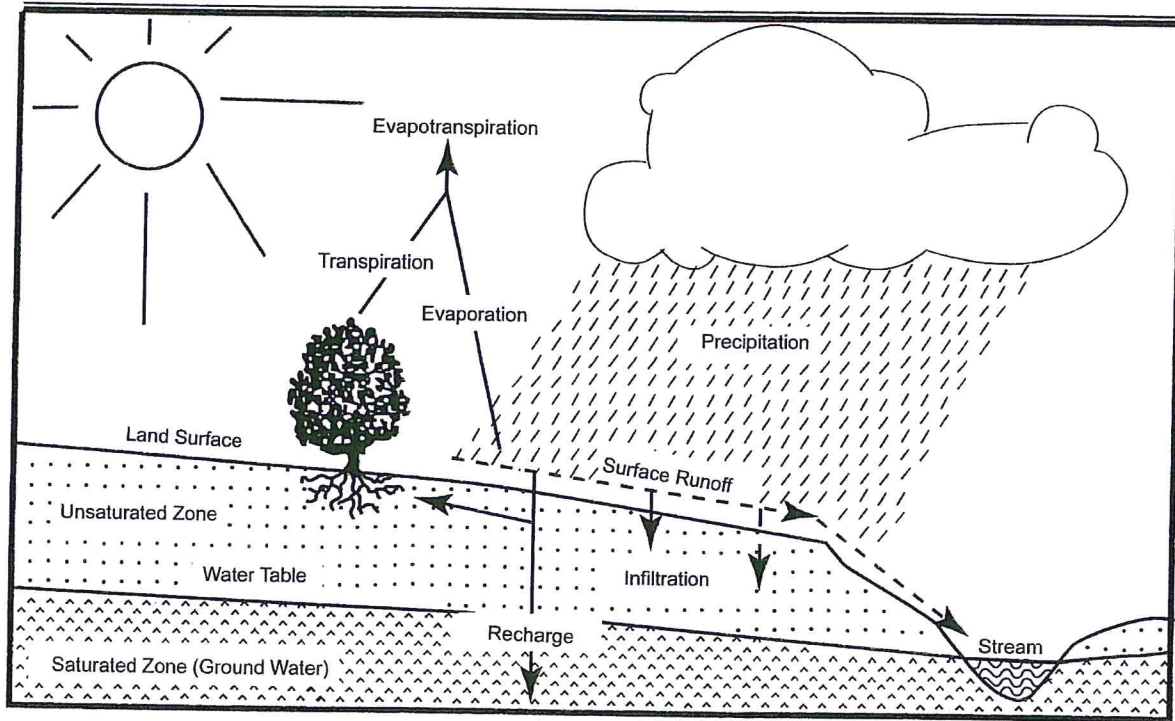


rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through 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 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, erosions and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens and nutrients. In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

The above is general discussion about stormwater, which holds true for the vast majority of New Jersey's land types. However, the Borough of Mantoloking is a barrier island community; which has no streams, groundwater, recharge potential nor downstream flooding problems to be aggravated by increased runoff. The primary concerns for barrier island communities are water quality issues and maintaining the ecological health of Barnegat Bay. As a result, this MSWMP, while requiring compliance with NJDEP water quantity regulations, will primarily focus on water quality issues.

Figure C-1: Groundwater Recharge in the Hydrologic Cycle





Background

The Borough of Mantoloking encompasses a 0.7 square mile area in ocean County, New Jersey, of which 0.44 square miles is land area. In recent years, the Borough's official population has fluctuated slightly. The population of the Borough had decrease from 433 in 1980 to 334 in 1990, and increased to 450 in 2005. (<http://www.planning.co.ocean.nj.us>) Despite the increase in population over the last 10 years, only 10 new residential lots have been created over that period of time.

There are no streams within the Borough of Mantoloking as illustrated on Figure C -2. The Borough is a barrier island community bordered by the Borough of Bay Head to the north, the island portion of the Township of Brick to the south, Barnegat Bay to the west and the Atlantic Ocean to the east. Figure C-3 depicts the Township boundary on the USGS quadrangle maps.

Although there are no TMDL levels developed for Barnegat Bay, the Borough appreciates the need to maintain a high water quality for the health and enjoyment of the citizens of not only the Borough but also those who come to use these waters for recreational purposed from other areas of the State and the country. To that end, the Borough has been diligent in making sure that the new stormwater inlets are fitted with NJDEP-approved castings to control the quantity of floatables that will be able to make their way into these waters and that existing inlets with non-compliant castings are retro-fitted during reconstruction of the roadways in which they are located, pursuant to NJDEP requirements.

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 (<http://www.state.nj.us/dep/wmm/bfbm/downloads.html#at100>). 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. Two major water bodies are present in the Borough, the Atlantic Ocean, which forms the Borough's eastern border and the Barnegat Bay (Swan Point State Natural Area) which forms the Borough's western border, both of which are not currently monitored by AMNET but are monitored by the NJDEP Shellfish Monitoring and the Bureau of Marine Water Monitoring.

These water bodies are classified as nonimpaired waterways based on AMNET data. 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 Sublist 5 of New Jersey's Integrated List of Waterbodies (<http://www.state.nj.us/dep/wmm/sgwqt/wat/integratedlist/integratedlist2004.html>). It shows that the total coliform levels of the Barnegat Bay North and the dissolved oxygen levels of the Atlantic Ocean have exceeded the state's criteria. This means that these are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for the waterways.

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, 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 or vegetative buffers, retrofitting stormwater systems, and other BMPs.

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

With regard to non-point source pollution prevention, there is little that can be done to prevent sediment, such as road salt and sand, which enters the Borough's storm water sewer system from being transported through the system and eventually into Barnegat Bay. This is due to the fact that the Borough's storm water system is typically full of water and there is no place in the Borough where it may be held in order to settle out suspended solids prior to discharging to the bay. However, since Barnegat Bay is a salt-water body, the introduction of minor amounts of additional salt will not result in adverse effects on the bay. A greater threat is the continuous deposition of solids, such as sand, which decrease. This decrease in water depth may lead to an increase in localized water temperature, which could potentially lead to detrimental effects on the immediate ecosystem. In order to prevent this and also to prevent the need for dredging at some point in the future, the Borough will require all storm drain inlets installed as a result of major development to be fitted with twelve-inch sumps which should catch much of the solids which enter the system. The Public Works Department of the Borough of Mantoloking shall vacuum these sumps out twice annually in order to allow them to function properly in perpetuity.

In addition to water quality issues, the Borough is subject to water quantity problems, i.e. flooding. However, this flooding is due to rising levels of the ocean and bay and the relative flatness of the terrain. Due to the uniqueness of being a barrier island community, the Borough is limited as to what it may do with increased runoff due to development; due to the high water table associated with being surrounded by tidal waters, detention basins are not feasible, especially since most residential lots in the Borough are much less than one acre in size. The Borough requires developers of single-family lots to provide underground storage in an infiltration trench sufficient to hold the increase in stormwater generated by the 2-year storm due to the increase in impervious coverage on that lot. Again, due to the relatively small size of lots within the Borough, requiring the developers to store the volume generated by larger storms is unfeasible due to space constraints and depth constraints due to the high water table.

One of the most vital issues raised in the new stormwater management rules is the need to maintain the current levels of groundwater recharge, thereby maintaining the base stream flows during dry weather periods and eliminating negative impacts of reduced base flows on instream habitat during the summer months. A map of the groundwater recharge area for the Borough with



any groundwater recharge capability is the beachfront along the Atlantic Ocean. Borough ordinance, as well as numerous other regulations, strictly prohibits development of these areas, so groundwater recharge degradation is not an issue in the Borough of Mantoloking.

Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-5. Again, due to the Borough's location, none of these areas exist within the Borough and this requirement is not applicable.

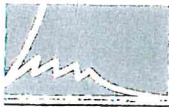
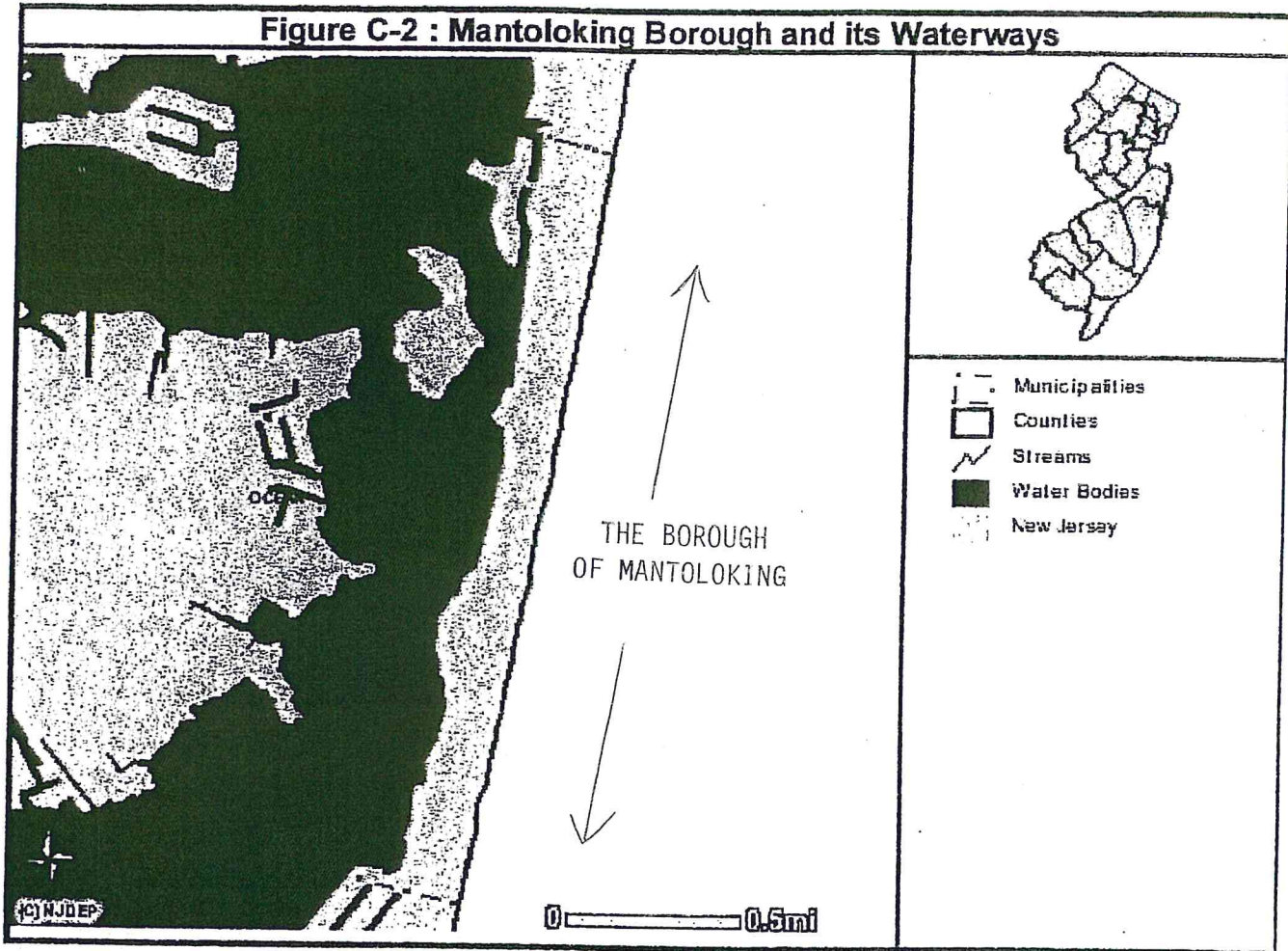


Figure C-2 : Mantoloking Borough and its Waterways



Data Type	Source	Relevant Time Period
Municipal Boundary	NJDEP	1989
C1 Waters	NJDEP	2003

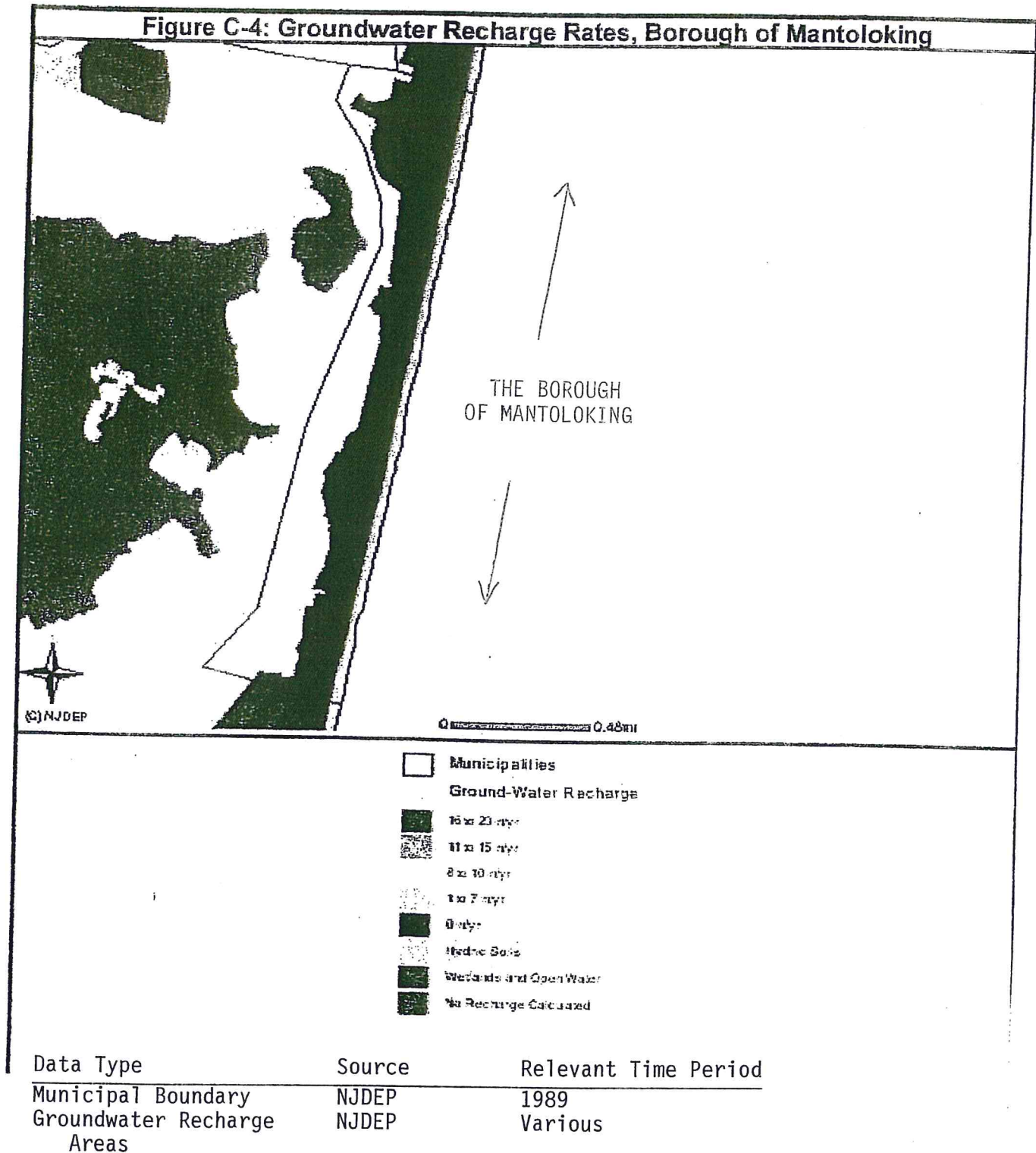


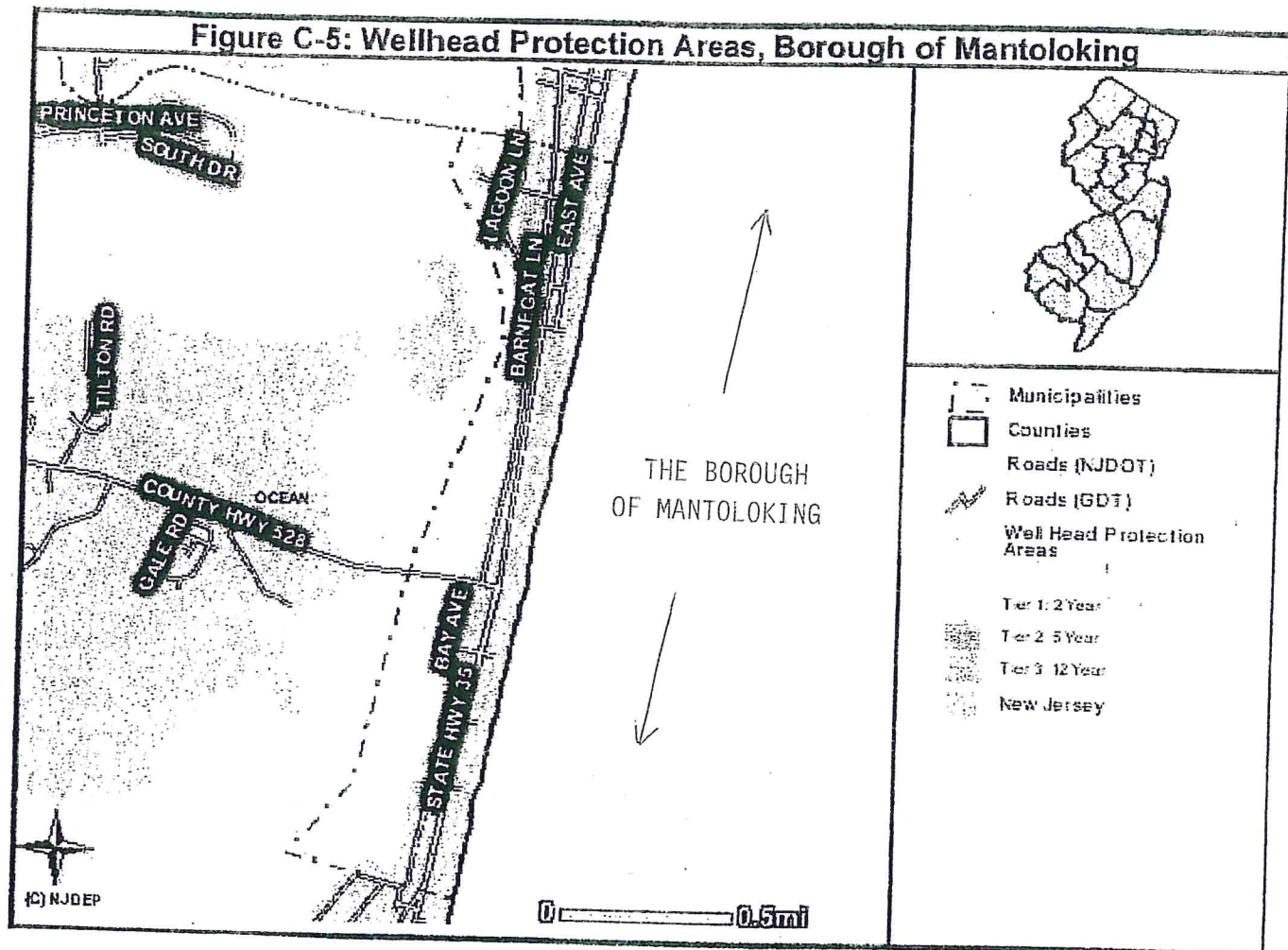
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Location: 040° 02' 38.1" N 074° 02' 56.3" W
Caption: Figure C-3
Borough of Mantoloking
USGS Map



Figure C-4: Groundwater Recharge Rates, Borough of Mantoloking





Data Type	Source	Relevant Time Period
Municipal Boundary	NJDEP	1989
Wellhead Protection Areas	NJDEP	2004 (Updated)



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, as much as is practicable within a barrier island community. 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 but not language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins because, for the reasons previously discussed, these standards will not be applicable in the Borough.

The current land development ordinance of the Borough of Mantoloking has been amended to address stormwater quantity, water quality and stormwater facility safety.

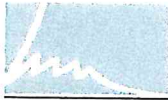
The Borough is also amending the current stormwater design and performance standards to address groundwater recharge, maintenance of stormwater measures and implementation of non-structural development strategies in accordance with the NJ Stormwater Best Management Practices Manual.

The stormwater management measures include structural and non-structural stormwater management measures known as low impact development (LID-BMPs), which will be incorporated into the Borough of Mantoloking stormwater ordinances. These measures shall be implemented as needed to meet the soil erosion, infiltration, water quality, and runoff quantity standards included in the Borough's stormwater ordinances. The design standards for low impact development measures are those included in the NJ Stormwater Best Management Practice Manual. The design of such facilities must comply with the Soil Erosion and Sediment Control Standards as well as with applicable state regulations, including the NJDEP Freshwater Wetlands Protection Act rules, Flood Hazard Control rules, the Surface Water Quality Standards, the Coastal Area Facilities Review Act (CAFRA), and the Waterfront Development and Harbor Facilities Act.

The CAFRA regulations have been incorporated, by reference, in the Stormwater Management Regulation NJAC 7:8-5. An applicant submitting a CAFRA application and has requested a waiver from performance standards may be required by the NJDEP to develop a mitigation plan even if the Borough does not.

The Borough of Mantoloking assumes all maintenance responsibility of all stormwater facilities within the municipality owned properties, road right-of-ways and dedicated drainage easements. Furthermore, there are no existing basin facilities within the Borough boundaries. To ensure adequate long-term operation, as well as specific preventive and corrective maintenance of stormwater management measures, the Borough has developed a maintenance plan. The maintenance plan shall contain specific maintenance tasks, schedules, cost estimates and identifies the Borough to submit an annual report and certification that the stormwater management measures are functioning as designed.

The stormwater facility maintenance measures will be in accordance with NJAC 7:8-5 and include annual inspections of the Boroughs storm sewer system, sediment removal, vegetation



maintenance of vegetative filters and buffer, debris and trash removal. Preventive and corrective maintenance shall be performed on an as needed basis for structure repair's or replacements, outfall pipe remediation or scouring, pipe obstructions, inlet cleaning, bulkhead restoration, snow and ice removal and erosion restoration. The Borough personnel responsible for maintenance shall keep a detailed, written maintenance log of all preventive and corrective maintenance performed for the stormwater structural management measures, including a record of all inspections and work orders.

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

Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Borough; therefore this plan does neither 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. 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 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

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 prior to February 2, 2006. A copy will be sent to the Department of Environmental Protection at the time of submission.

Ordinance No. 465, *The Land Use Ordinance of the Borough of Mantoloking*, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes were made to Article IV of this Ordinance, entitled *General Provisions* and Article VII of this Ordinance, entitled *Design Standards*, to incorporate these strategies.

Section 4.3 Surface Water Management requires that developers submit a Surface Water Management Plan, which demonstrates that the rate and velocity of runoff from the site following development shall not exceed that of the pre-development condition for the SCS Type III, 2-year 24-hour storm at a minimum. This section of the ordinance also requires that vegetated area with



indigenous species shall be protected to the maximum extent possible and/or vegetated areas shall be planted, preferably, with indigenous species. This section shall be amended to add to the Data Required under Section 4.3.D. detailed mapping of existing vegetation on-site. These areas shall be field-verified by Borough personnel prior to the issuance of construction permits and shall be protected to the maximum extent practicable. In the event that some of the existing vegetation will unavoidably be removed in order to install the proposed improvements, an equivalent area must be replaced with similar indigenous vegetation with similar water quality enhancing properties.

Section 4.4 Off Street Parking Design requires screening and landscaping of off street parking areas for four (4) or more vehicles on the sides, which abut residential lots. The screening vegetation is currently left to the discretion of the Land Use Officer, but will be amended to require the planting of native species, which require less fertilization and watering than non-native species. The off street parking requirements are currently in conformance with the Residential Site Improvement Standards for Single-Family Detached units. In the Business zone, parking is currently required at the rate of 1 space per 200 square feet of gross floor area. The feasibility of lowering this requirement to 300 square feet per parking space will be investigated and implemented if deemed feasible.

Section 4.6 Screening requires lots other than those used for single-family residences to be screened from the view of adjoining residential properties along all applicable property lines. Currently, the type of vegetation is left to the discretion of the Land Use Officer, but will be amended to require the planting of native vegetation.

Section 7.4 Streets requires dead-end streets to have a turn around with a minimum radius of fifty feet (50') at the street end (subsection B.), but will be amended to reduce the minimum width to forty feet (40'). Subsection H. requires that all streets be curbed, but shall be amended to allow developers the opportunity to demonstrate that the terrain is such that stormwater can be adequately conveyed using vegetated swales, thus disconnecting impervious surfaces as pertains to stormwater runoff.

Land Use / Build-Out Analysis

The Borough of Mantoloking has a total land area of 0.44 square miles. Therefore, there is less than one square mile of vacant or agricultural lands and a build-out analysis is not required.

Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options.

Mitigation Project Criteria

1. The project must provide protection from stormwater runoff quality and/or 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 project can be obtained from the Borough Engineer. Listed below is a specific project that can be used to address the mitigation requirement.

Water Quality

- Retrofit non-conforming existing drainage inlets within the Borough with grates and/or curb pieces, which conform to current NJDEP standards for floatables control. The number of grates to be retrofitted will be commensurate with the cost estimate for the required stormwater management improvements for which the variance or exemption was granted.

The issuance of a waiver under a Land Use Permit by NJDEP does not automatically waive the requirement for mitigation to be performed under the municipal review. The applicant must obtain all required permits for the mitigation project prior to municipal approval. The mitigation should be addressed on site as much as possible before looking off site.