# Atlantic Coastal Watershed Program Grant: Stormwater Basin and Storm Drain Retrofitting Projects in support of the Barnegat Bay Watershed
**RP03-036**

## Table of Contents

# Project Overview

Stormwater runoff has been identified as the leading threat to the water quality in the Barnegat Bay National Estuary. As population and development continue to increase within the watershed, more contaminants find their way into the Bay, impacting the County's resources and quality of life.

Ideally, rain water should recharge into the soil and groundwater. The purpose of stormwater facilities is to collect and infiltrate stormwater runoff back into the groundwater, however, because of current design and construction practices, many stormwater basins have been recognized as not operating effectively. Soils can become compacted during construction and hold water instead of draining. The water may discharge through the basin outfall directly to the piped stormwater collection system, collecting contaminants that eventually discharge directly into the Bay. Water flowing under these conditions is also subject to warming above natural temperatures not conducive to supporting organisms, creating "thermal pollution". In addition, a number of basins with infiltration problems have been identified by the Mosquito Commission as problem basins.

Another benefit of restoring the infiltration functions in stormwater basins is to enhance the wetlands within the watershed. Wetlands serve many functions including peak reduction, reducing eutrophication, habitat, protection of downstream areas and groundwater supply. Through this project, wetlands are being enhanced by restoring infiltration that sustains dry period flow in the local streams. It also helps to provide sufficient pollution dilution and flow for aquatic life.

This was an opportunity for Ocean County to establish a pilot program to explore methods of increasing infiltration in its owned and maintained stormwater facilities. The goals were to increase infiltration at the site, reduce flooding, minimize non-point source pollution and restore each basin to a more natural system. Successful methods could be identified and recommendations developed for planning, design and construction practices that would prevent compaction and the need for future restoration. These guidelines could be incorporated into the County Engineering Department's *Supplemental Specifications* (See Appendix D) and into training and outreach programs.

The County of Ocean entered into an agreement with the NJ Department of Environmental Protection in July 2002 and subsequently with the County Soil Conservation District to restore these impaired basins and create attractive and efficient "Rain Gardens". The Ocean County Department of Planning administered the grant, and coordinated with the Departments of Engineering and Roads, which respectively provided engineering design and heavy construction and with the Ocean County Soil Conservation District, which provided valuable soils expertise and planting installation and supervision.

The Stormwater Basin Retrofit Implementation Project officially took place between July 2002 and July 2008. Because of the success of the project, the County will be pursuing additional grants and funding to continue to restore County basins and to provide training workshops to educate public officials and private developers on these methods.

In the past six years, the County and the Soil Conservation District have worked to restore sixteen stormwater basin facilities, in many cases with dramatic success. Many basins that were previously identified as flooding and mosquito-breeding problems have been restored and completely re-vegetated, producing zero runoff. A summary of each basin is provided in this report.

# Significant Activities

## On-site Stormwater Basin inspections included, but not limited to the following:

1. In June 2004, the Soil Conservation District conducted a demonstration tour of stormwater detention basins in the Toms River Watershed. The tour highlighted the basins selected for this restoration project. Tour attendees include representatives from the NJDEP, Pinelands Commission, NRCS, various Soil Conservation Districts, and County Parks, Engineering, and Planning.
2. In Fall 2005, the New Jersey Natural Resources Conservation Service (NRCS) assembled a disciplinary team to inspect successful stormwater retrofit projects and to look at extending the success in basin infiltration to cropland applications, based on the draft *Interim Conservation Practice Standard* entitled *"Soil Management"*. Participants included representatives from the NRCS, Ocean County Soil Conservation District, Ocean County Engineering Department, and the Technology Transfer and Assistance Team from the East National Technology Support Center (ENTSC). See Appendix B for the complete report: *Trip Report – Soil Management*.
3. In June 2006, David Friedman, Director of the Ocean County Soil Conservation District, joined State Resource conservationist, Chris Smith, for a site visit to Ocean County College. The purpose of the visit was to identify and evaluate areas of the College for surface stormwater runoff and provide recommendations to reduce and improve the quality of the runoff. In 2008, the College approached the Barnegat Bay National Estuary Program for a rain garden landscaping design for the foundation a new building. Vicki Pecchioli and David Friedman are involved on this task force and will be drawing on their experiences with this project.

## Education and Outreach Activities included:

1. In October 2004, two educational tours were conducted by the Ocean County Soil Conservation District and included stops at several of the subject basins. The District led a tour for the Ocean Nature and Conservation Society on October 2, 2004. The second tour was held on October 13 and focused on design and construction needs for stormwater basins. There were 54 attendees at this second tour, including representatives from the NJDEP, the Pinelands Commission, the NRCS, and area municipalities.
2. In March 2005, the Soil Conservation Service gave a presentation to Ocean County engineers and inspectors regarding the stormwater project and "lessons learned".
3. In March 2006, David Friedman of the Soils Conservation District gave a presentation at the 15th Annual Ecological Restoration Symposium on the Stormwater Basin Restoration Project.
4. Also beginning in March 2006, the Ocean County Soils Conservation District developed a series of soil training workshops entitled, "Blue Card for the Blue Crab, a Soil and Watershed Health Training Initiative" These workshops were funded by minigrants through the Barnegat Bay National Estuary Program. The program was designed to train participants to recognize, rectify and prevent many of the soil compaction and runoff problems that come with site development and typical landscape maintenance practices.

   The trainings involved identifying soil properties and mitigating compaction and were conducted in a classroom and in the field. The first workshop was for county personnel, the second targeted municipal and school personnel. Personnel and officials attended from the Departments of Parks and Recreation, Building and Grounds, Planning, Engineering, Roads and maintenance. Feedback response indicated that the workshops were hugely successful.

5. In September 2007, a stormwater brochure (attached) was developed by the Planning Department to inform the public about County activities to prevent polluted stormwater runoff, featuring the Stormwater Basin Retrofit Project and Rain Gardens. The brochure also provided information on how residents could minimize their impacts.

## Miscellaneous

1. In January 2008, a soil ripper was purchased through this grant. The single tooth ripper has 54" penetration and is designed to fit existing equipment for working with compacted soils.
2. In 2008, the Engineering Department has revised the stormwater basin guidelines in the *Supplemental Specifications* to recommend wet-site tolerant plant species only to improve survivability in stormwater basin facilities.
3. The OCSCD has collected GPS coordinates for basins within a number of Barnegat Bay subwatersheds, including the Long Swamp Creek, which is plagued by severe water quality degradation. The locations have been mapped by Planning Department GIS staff and will be used to identify and track future stormwater basin projects to locate future restoration sites and to assist the County in watershed planning.
4. In 2008, twelve (12) retrofit catch basin covers with maximum 2" openings were purchased to prevent debris from entering the stormwater collection systems at inlets throughout the County.
5. Also in 2008, the County contracted with Key-Tech to do bulk density testing at the project basins to establish a final evaluation.

# Project Recommendations and Guidelines

1. Pre-construction
   a. The pre-construction evaluation phase should include basin history such as: when and how the basin was constructed, what kind of equipment was used in the basin excavation, grading, etc. The basin should be observed after a rainfall to determine if it is infiltrating properly, how long it takes to completely drain and how much water is retained.
   b. To determine restoration strategy for each individual basin, it is important to define where the compacted soil layer is within the soil profile. One effective way is to evaluate soil bulk densities at depths of 0-6"; 6-12", 12-18" and 18-24". This provides information to the Road Department or to the contractors to determine staffing and equipment needs.
2. Basin Bottom Preparation
   a. Basin should be excavated an additional 6" below the final basin bottom, avoiding any compaction of the soils. The area should then be evenly covered with a layer of organic material and then covered with "Oceangro" organic fertilizer, gypsum and lime as indicated by the soil tests.

   b. The materials should be mixed in place to a depth of four feet. Then the soil mixture should be aerated by lifting it to a height of 7 to 8 feet and dumping it in place ("Dig and Drop"). The basin bottom should be tilled and dumped in segments, beginning with the areas farthest from the road. After each segment is completed, neither equipment nor machinery should be allowed on the prepared bottom to prevent re-compacting the soil. The prepared bottom will be left with a hummocky rather than smooth condition.
   c. In some cases, recycled glass pits were necessary to increase infiltration. These pits were mulched over for stabilization planting.
3. Basin Bottom Seeding and Planting
   a. The basin bottom and side slopes should be fertilized and seeded for stabilization. The seeding should be by hand and/or broadcast so as to have no equipment or machinery on it. Seed mixtures should be chosen for dry sites and sites that stay wet for a few days[1].
   b. Basin bottoms can also be planted with naturalization grasses, such as Gamma Grass (*tripsacum dactyloides)*.

4. Suggested plantings
   a. Plants for the bottom of the basin should be a combination of native facultative wetlands tree seedlings and naturalization grasses. All bottom planting should be done by hand so as not to unnecessarily compact the basin bottom.
5. Maintenance
   a. The plantings should be allowed to become established and the site to go to succession. Our most successful basins have become completely reforested. These basins do not require mowing or maintenance. Heavy equipment should be kept out of the basin to avoid re-compacting the soils. The basins should be inspected with respect to whether water is infiltrating properly.
6. Many of these recommendations have been incorporated into the *Supplemental Specifications*. For more detail, see Appendix D.
7. For new stormwater facilities, it should be noted that in many cases, an undisturbed natural wooded depression may be the best stormwater facility solution over an engineered facility.

[1] Recommended seed mixture: Redtop @ 7.5 lbs./acre, Tall Fescue @ 120 lbs./acre, Annual Ryegrass @25 lbs./acre.

# Stormwater Basin Summaries

## BARNEGAT TOWNSHIP

### Lighthouse Drive (2 basins)

Nearest waterbody: Double Creek Wide Point

There are two basins at this location. The construction on these two basins was completed in March 2006. An abundance of clay was found in the bottom of both of these basins. The clay was excavated and replaced with fill/compost and the basins were lowered to allow for more volume. Recycled glass drainage pits were installed at the inlet pipes and mulched. These basins are successfully no longer holding water.

Lighthouse Drive South (2008)

Lighthouse Drive North (2008)

### Barnegat Boulevard

Nearest waterbody: Lochiel Creek

The construction on this basin was completed in March 2006. The bottom of the basin was excavated and lowered to allow for more volume. The soil was replaced with mulch and mixed using the dig/drop method. Recycled glass drainage pits were installed at the inlet pipes and mulched. This basin is successfully no longer holding water and has revegetated into a meadow.


Barnegat Boulevard (2006)

Barnegat Boulevard (2008)

Barnegat Boulevard (2008)

## BEACHWOOD TOWNSHIP

### Mizzen Avenue

Nearest waterbody: Toms River

Trees and vegetation at the mouth of the inlet pipes were causing water to back up the drainage system, subsequently flooding streets in Beachwood. This basin had also been holding water for several years. Trees and a thick mat of vegetation in the bottom of the basin were removed. Sumps were dug in front of each of the inlet pipes and filled with recycled glass. Soil was removed from the basin and replaced with compost using the dig/drop method. The bottom of the basin was found to be composed of clay and rather than remove it, we dug through it in an attempt to break up the compaction of the clay. This basin is prone to flooding due to groundwater but is dry at this time.

Mizzen Ave. (2008)

## BRICK TOWNSHIP

### Drum Point Village East, Drum Point Road

Nearest waterbodies: Reedy Creek and the Metedeconk River

Although this basin is not a County-owned facility, it was originally designed in the 1980's to accept overflow from Drum Point Road, a County road. It was constantly holding water and causing flooding on Drum Point Rd. In addition, because of increased development in the area, the capacity of this basin needed to be increased.

River rock was removed and the basin was excavated approximately 4-6 feet to remove clay. The clay was replaced with a sand mix back to the original grade. A trench was dug from the inlet pipe to the outfall pipe and filled with recycled glass. The basin was lined with filtration cloth and a layer of river rock. This basin no longer holds water.

## MANCHESTER TOWNSHIP

### Clearstream Court / Ridgeway Road (County Route 571)

Nearest waterbody: Ridgeway Branch of the Toms River

This 2002 basin was expanded by the developer. After grading and soil loosening procedures had been completed, the basin was still holding water and was not allowing infiltration due to a seasonally high water table. The County held the developer's performance bond contingent upon the basin construction and planting being completed. The County will be responsible for maintaining the basin after the bond is released. County Engineering Department worked with the developer on developing a solution to improve infiltration and plant recommendations. Gabion walls were constructed, and in June 2007 the basin was planted with gamma grass and other native grasses at the toe of its slope and on the bottom to improve soil structure and infiltration.


Clearstream Court/ Ridgeway Road (2006)

Clearstream Court/ Ridgeway Road (Cty. Rte. 571) (2008)

### County Route 571 (3 basins)

Nearest waterbody: Ridgeway Branch of the Toms River

These three basins are located in close proximity to one another on the south side of Route 571, east of Route 547. As usual, the strategy for restoring these basins was based on preliminary investigations by the Soil Conservation District and the NRCS. Soils borings were done to identify areas of compaction and depth to seasonal high water table.

The Route. 571 basins were constructed circa 2002 using "traditional" construction techniques. Despite their recent construction, they were not draining properly. These basins are excellent examples of why alternate construction methods are necessary to address stormwater control. The soils in this area are classified as Downer and Hammonton and are well drained under natural conditions. However, standard construction practices destroyed the soil structure.

## Route 571 East

Nearest waterbody: Ridgeway Branch of the Toms River

Since the basin's construction in 2002, it has consistently had a problem with holding a large volume of water, although the water table is several feet below the the surface. Throughout the grant period, unsuccessful attempts were made to dewater the basin in order to grade the basin and construct the glass infiltration pits.

Ridgeway Road East Basin (Cty. Rte. 571) (2008)

Although the basin continues to hold water, wetlands vegetation has become established and it has become a wetlands habitat for a number of species, including a white egret sighted during a recent site visit.


Ridgeway Road East Basin (Cty. Rte. 571) (2004)

## Route 571 – Middle and West Basins

Nearest waterbodies: Ridgeway Branch of the Toms River

Compost was incorporated and mixed in using the dig/drop method. Pits of recycled glass were also installed at these locations. The construction of these basins was completed Fall 2004 and was stabilized with plantings of native woody seedlings in Spring 2006.

Ridgeway Road Middle Basin (Cty. Rte. 571) (2008)

Ridgeway Road West Basin (Cty. Rte. 571) (2008)

## 11th Ave / Bismark / Commonwealth

Nearest waterbody: Union Branch of the Toms River


11th Ave. / Bismark / Commonwealth (2002)

This basin was constructed around 1970. Due to compacted soils, the basin did not function properly and held water even during drought conditions. There was little if any recharge to groundwater. It was a breeding ground for mosquitoes which plagued area residents for years. Pesticides had to be applied twice a month by the Mosquito Commission to control the problem.

Construction began Fall 2002 and completed May 2003. An excavator was used to dig down approximately 10 feet to penetrate the compacted soil layer. Chunks of compacted soil resembling rocks were unearthed during the process. The excavator worked from the back of the basin to the front to ensure that its weight did not re-compact the basin.


11th Ave. / Bismark / Commonwealth (2005)

Approximately 260 tons of leaf compost from the County's Northern Recycling Center in Lakewood were mixed into the soil to provide organic matter and to encourage the return of biological activity to the soil. The material was applied approximately 12" thick across the basin. Limestone was mixed in to the soil at a rate of 2 tons per acre to attain a pH range of between 5.5 and 6.0.


11th Ave. / Bismark / Commonwealth (2008)

The basin was seeded with native grasses, ie Tall Fescue, Annual Rye and Grain Rye and woody plantings Red Maple, Pitch Pine, Sweet Gum saplings were installed in the basin Spring 2003. This basin has been successfully restored as a forested natural wooded depression.

## TOMS RIVER TOWNSHIP

### Sunset Avenue and Whitesville Road (County Route 527)

Nearest waterbody: Main Branch of the Toms River

Sunset Ave. (2004)

This basin is located across Sunset Avenue from the Rutgers Cooperative Extension Office in Toms River Township. The basin was originally constructed in 1995/6. Work on the basin began in December 2004 and was completed in April 2005. Work included grading and final stabilization plantings of native woody seedlings. This basin was recently disturbed with unauthorized maintenance and needs to be remediated.


Sunset Ave. (2008)

### Silverton and Old Freehold Roads

Nearest waterbodies: Long Swamp Creek / Ridgeway Branch of the Toms River / Polhemus Branch of the Kettle Creek

In 2000, this basin held water and was reengineered in 2003. Although it then did not hold water, most of the stormwater was not recharged as it was carried away by the low flow channels. In addition, the County Engineering Department was concerned about a future increase in flow to the basin from a proposed large residential development.

Silverton and Old Freehold Rds. (2000)


Silverton and Old Freehold Rds. (2003)

Subsoil tests revealed compacted layers 5 inches and up to 10 feet below the surface. In Spring 2004, work was begun. The soil was loosened to a depth of 5-6 feet and deeper where necessary. Compost and lime were mixed into the soil and the low-flow channel permanently removed.


Silverton and Old Freehold Rds. (2008)

After the excavation work was completed, the basin was found to continue to flood the roadway during significant rain events. To correct the flooding and infiltration issues, the bottom of this basin was excavated and lowered roughly 3-4 feet to allow for more water capacity. Recycled glass drainage pits were installed. Composted materials and gypsum were incorporated into the soil through the dig and drop method. A gabion wall was installed to stabilize the steep slopes. The basin was seeded with a warm season grass mixture and native woody seedlings were planted in Spring 2005.

**Garden Avenue and State Hwy. 37**
Nearest waterbody: Toms River

Garden Ave. and State Hwy. 37. (2005)

In 2005, this basin was expanded by the Road Dept, including reconstruction of the slopes and the construction of gabion walls. Compost was mixed in during construction of the basin using the dig/drop method. Pits filled with recycled glass were installed in the center of the basin and in front of the outlet weir. It was stabilized with plantings in Fall 2005; however after a heavy rain, the basin was once again holding water. To address this, the weir on the outfall side of the basin was inverted to allow for positive drainage.

In August 2007, an AquaSwirl™[1] unit was installed at the Garden Street basin to address the serious sediment and debris problem, due to littering from Route 37. Although the debris problem seems to be mitigated, the basin in still holding water near the outlet and the project partners will continue to attempt to resolve this problem.


Garden Ave. and State Hwy. 37. (2008)

[1] "The Aqua-Swirl™ Concentrator provides for the removal of sediment (TSS) and free-floating oil and debris. Swirl technology is a proven form of treatment utilized throughout the stormwater and wastewater industry. Constructed from high-density polyethylene (HDPE), the Aqua-Swirl™ is lightweight, durable, and easy to install (no crane required for installation)" per the US EPA New England Center for Environmental Industry and Technology (CEIS)."

**Vermont Avenue**
Nearest waterbody: Main Branch of the Toms River

The USDA-NRCS performed an evaluation of the soil conditions, areas of compaction and depth to seasonal high water table and has made recommendations on how to proceed with the restoration work. This basin bottom has compacted topsoil down to 20 inches.

This basin was not restored through this grant. However, it is noteworthy as the soil ripper demonstration took place here. A local contractor demonstrated the effectiveness of using the ripper to loosen the hard compacted basin bottom. Subsequently, the ripper was purchased January 2008.


Ripper Demonstration at Vermont Ave. (2005)

**Cox Cro Road and Whitesville Road**
Nearest waterbody: Main Branch of the Toms River

The USDA-NRCS performed an evaluation of the evaluation of the soil conditions, areas of compaction and depth to seasonal high water table and has made recommendations on how to proceed with the restoration work. This is a small basin with no topsoil and consisting of coarse dry sand. Restoration work would involve rototilling much compost and organic matter. Because of the size of this basin, it was not restored through this grant in favor of more significant basins.

## Division and Boyd Streets

Nearest waterbody: Toms River

Division and Boyd Streets (2005)

Due to flooding conditions in downtown Toms River, the Ocean County Engineering Department along with the OCSCD investigated the possibility of restoring this basin to reduce flooding on Dayton Avenue. Investigation confirmed that the basin was severely compacted.

The dig and drop method was used to loosen the compacted layer and organic material, gypsum and lime were incorporated to improve soil porosity and recharge capability. Excavation and grading were completed in December 2002. The basin was stabilized with seeding and planted with woody plant material in Spring 2003.

Division and Boyd Streets replanted (2008)

Following the completion of this work, the basin completely drained within 24 hours of a storm event. It was decided to install a biolog to divert the flow from the outlet elongating the flow path and increasing infiltration through the basin bottom and side slopes. Stormwater collected in the basin did not reach the outlet structure and it eliminated flooding problems at Dayton Avenue. The basin completely revegetated.

This basin was recently disturbed with unauthorized maintenance. However, bulk density tests revealed that it was not severely compacted from the maintenance and it was restored with topsoil and seeded with gamma grass in September 2008.

## New Hampshire Avenue

Nearest waterbody: Polhemus Branch of the Kettle Creek

Preliminary design work, bulk density testing, soil texture analysis and characterization study took place late Spring 2003.


New Hampshire Ave. (2003)

The dig and drop method was used to restore this large basin. Mulch, gypsum, lime and “Ocean Gro” were incorporated into the soil. The OCSCD seeded the basin and assisted in planting numerous woody native tree seedlings in the basin. Larger trees were planted to augment the restoration of the basin.

An obstruction was discovered and removed from the outlet pipe in May 2004. This obstruction was contributing to the drainage problems at the basin. Once excavation began, it was discovered that the compacted layer was only around 4 inches deep, as opposed to multiple feet in the other basins and therefore easily broken up. The basin was completed in June 2004. This basin was recently disturbed with unauthorized maintenance. However, bulk density tests revealed that it was not severely compacted from the maintenance and will revegetate.

New Hampshire Ave. (2005)

New Hampshire Ave. (2008)

**Gilbert / Division Streets**
Nearest waterbody: Head of tide of the Toms River

Preliminary assessment and characterization completed late 2002. Excavation on this basin began in the Fall of 2003. However, a large amount of junk and debris was soon unearthed. Prior to its construction as a County basin, the site had been used as a parking lot with an adjacent residential structure.

Remaining debris was removed from the basin and disposed of at the Ocean County Landfill and a local concrete recycling facility. Lime and compost were brought in and integrated into the soil. The basin was completed in June 2004 and restored to a forested rain garden.

Gilbert / Division Streets (2003)


Gilbert / Division Streets (2008)

**Bay Avenue (County Route 571)**
Nearest waterbody: Goose Creek

This basin held water for many years. It is a small regional county facility that receives runoff from the adjacent Baptist Church and road runoff from Bay Avenue. Due to severe soil compaction, this basin held over five (5) feet of water for several months of the year. It was drained down by the Ocean County Road Department and several truck loads of composted mulch, gypsum and Ocean Gro were incorporated into the soil through the dig/drop method. While this basin still holds about one (1) foot of water in a small portion of the basin, it is believed that it is functioning much better.

Native grasses, trees and shrubs have been planted and it appears today as a natural wooded depression. A rain garden sign has been installed at this basin, and the adjacent neighbors have expressed their appreciation for reducing potential mosquito habitat. Work was completed in June 2004.

Bay Avenue (2000)

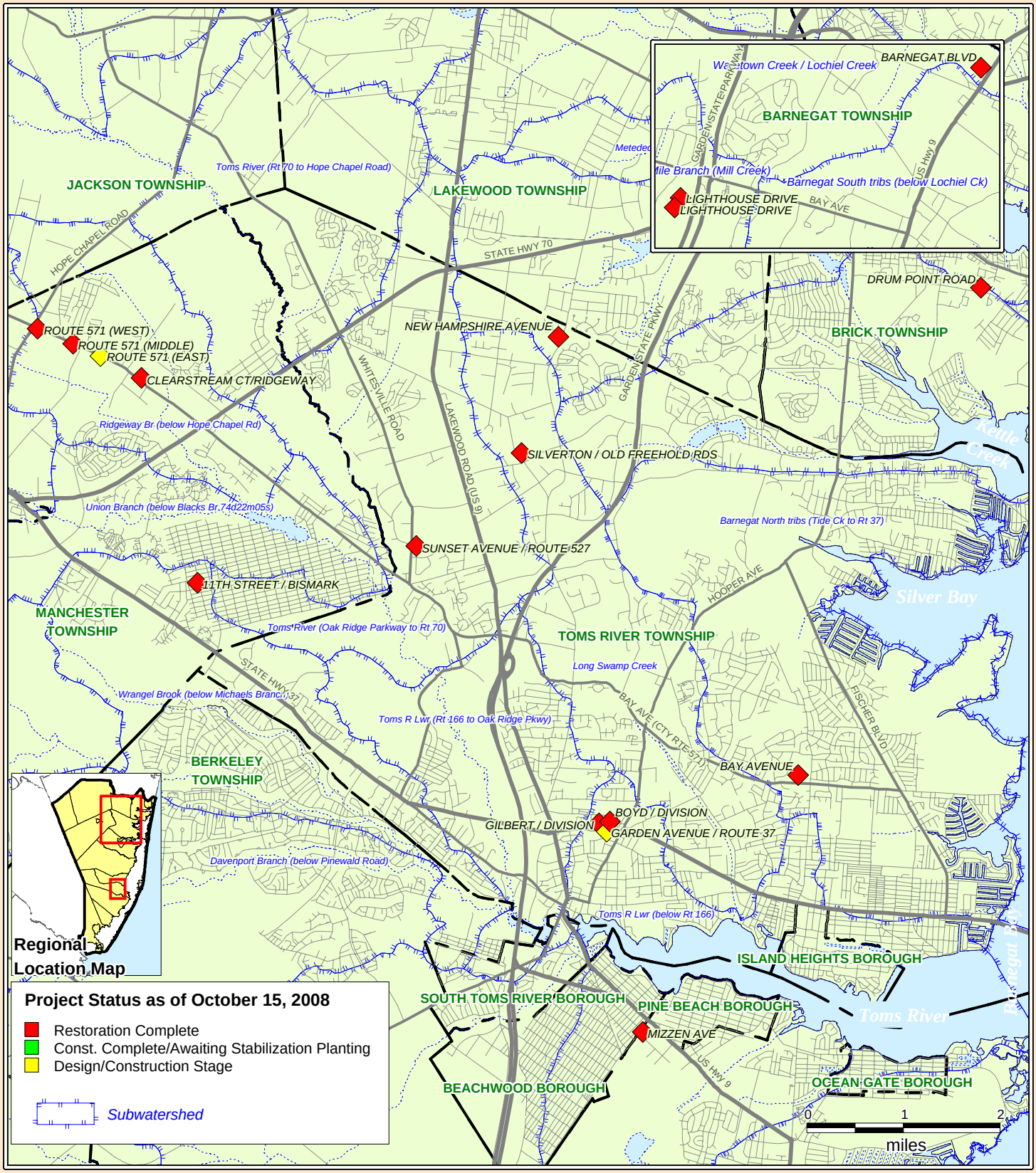

Bay Avenue (2008)

# Atlantic Coastal Watershed Program Grant:
# Stormwater Basin and Storm Drain Retrofitting Projects in support of the Barnegat Bay Watershed
# RP03-036

| | BASIN | STATUS | DATE STARTED | DATE COMPLETED | SIZE IN ACRES | APPROX. YEAR BASIN CONST. | COMMENTS | NEAREST WATERBODY | GIS LOC | LAT | LONG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BARNEGAT TOWNSHIP** | | | | | | | | | | | |
| 1 | **LIGHTHOUSE DR** (2 BASINS) | COMPLETED | 2005 | MAR 06 | | | BASIN LOWERED, GLASS DRAINAGE PITS | MILL CREEK | GIS | 39.7567 | -74.2541 |
| 2 | **BARNEGAT BLVD** | COMPLETED | MAR 06 | MAR 06 | | | BASIN LOWERED, GLASS DRAINAGE PITS | WARETOWN/LOCHIEL CREEKS | GIS | 39.7703 | -74.2133 |
| **BEACHWOOD TOWNSHIP** | | | | | | | | | | | |
| 3 | **MIZZEN AVE** | COMPLETED | OCT 06 | DEC 06 | | | HOLDING WATER, DIG & DROP | TOMS RIVER | GIS | 39.9322 | -74.1836 |
| **BRICK TOWNSHIP** | | | | | | | | | | | |
| 4 | **DRUM POINT ROAD** | COMPLETED | 2005 | MAY 06 | | 1980's | BASIN LOWERED, RECYCLED GLASS DRAINAGE PITS | REEDY CREEK | GIS | 40.0437 | -74.1176 |
| **MANCHESTER TOWNSHIP** | | | | | | | | | | | |
| 5 | **ROUTE 571-EAST** | STILL HOLDING WATER; NEEDS FURTHER STUDY | NOV 04 | | | 2002 | RE-EVALUATE AS A WETLANDS HABITAT; REVEGETATED | RIDGEWAY BRANCH OF THE TOMS RIVER | EAST GATE | 40.0335 | -74.2896 |
| 6 | **ROUTE 571-MIDDLE** | COMPLETED | OCT 04 | 2nd QTR 2006 | | 2002 | RECYCLED GLASS PITS; SUCCESSION | RIDGEWAY BRANCH OF THE TOMS RIVER | MIDDLE GATE | 40.0353 | -74.2949 |
| 7 | **ROUTE 571-WEST** | COMPLETED | OCT 04 | 2nd QTR 2006 | | 2002 | RECYCLED GLASS PITS; SUCCESSION | RIDGEWAY BRANCH OF THE TOMS RIVER | WEST GATE | 40.0376 | -74.3019 |
| 8 | **11TH AVE / BISMARK / COMMONWEALTH** | COMPLETED | FALL 02 | MAY 03 | | 1969 | MOSQUITO COMM. PROBLEM BASIN, NOW COMPLETELY RESTORED. | UNION BRANCH OF THE TOMS RIVER | MOB | 40.0002 | -74.2708 |
| 9 | **CLEARSTREAM CT / RIDGEWAY ROAD** | COMPLETED | 2004 | JUNE 07 | | 2002 | PREVIOUSLY FLOODING; GABION WALLS; CONSTRUCTED | RIDGEWAY BRANCH OF THE TOMS RIVER | GIS | 40.0302 | -74.2815 |
| **TOMS RIVER TOWNSHIP** | | | | | | | | | | | |
| 10 | **NEW HAMPSHIRE AVENUE** | COMPLETED | MAY 03 | JUNE 04 | 3 | 2000 | SHALLOW COMPACTED LAYER. OBSTRUCTION. | POLHEMUS BRANCH OF THE KETTLE CREEK | GATE | 40.0347 | -74.2008 |
| 11 | **GILBERT / DIVISION** | COMPLETED | 2002 | JUNE 04 | | | BASIN WAS PREVIOUSLY FILLED WITH DEBRIS / GARBAGE, ETC., NOW FORESTED | HEAD OF TIDE OF THE TOMS RIVER | GATE | 39.9647 | -74.1923 |
| 12 | **DIVISION / BOYD** | COMPLETED | NOV 02 | JUNE 03 | | | FLOODING CORRECTED, DISTURBED AND REMEDIATED. | HEAD OF TIDE OF THE TOMS RIVER | MOB | 39.9649 | -74.1896 |
| 13 | **BAY AVENUE** | COMPLETED | 2002 | JUNE 04 | | | ADJACENT TO BAPTIST CHURCH | GOOSE CREEK | MOB | 39.9707 | -74.1533 |
| 14 | **SUNSET AVENUE / ROUTE 527** | COMPLETED | DEC 04 | APR 05 | | 1995/6 | ACROSS FROM RUTGERS COOP. EXT. | MAIN BRANCH OF THE TOMS RIVER | MOB | 40.005 | -74.2279 |
| 15 | **SILVERTON ROAD / OLD FREEHOLD ROAD** | COMPLETED | 2003 | 2nd QTR 2005 | 2 | 1995 | BASIN LOWERED, GLASS DRAINAGE PITS, GABION WALL | LONG SWAMP CREEK | GATE | 40.019 | -74.2073 |
| 16 | **GARDEN AVENUE / ROUTE 37** | COMPLETED | FEB 05 | AUG 2007 | | | RECONSTRUCTED AND GRADED SLOPES/GABIONS; AQUASWIRL INSTALLED 2007. | HEAD OF TIDE OF THE TOMS RIVER | MOB | 39.9631 | -74.1903 |

Sources: Ocean County Soil Conservation Service, Ocean County Departments of Roads, Engineering and Planning, October 2008.
Prepared by: Ocean County Department of Planning, October 2008.

10/22/2008




N

Projection: NJ State Plan
NAD 83 - Feet

# Atlantic Coastal Watershed Program Grant: Stormwater Basin and Storm Drain Retrofitting Projects in support of the Barnegat Bay Watershed RP03-036

**Sources:**
Stormwater basin locations as provided by the Ocean County Soil Conservation Service.
TIGER file Basemap as provided by the US Census Bureau.

**Prepared by:**
Ocean County Department of Planning, October 2008
PO Box 2191, Toms River, NJ 08754-2191
732-929-2054
www.planning.co.ocean.nj.us