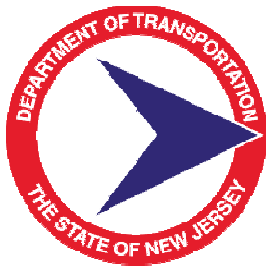


REPORT TO  
THE GOVERNOR AND LEGISLATURE

# Study of Stormwater Basins in the Barnegat Bay Watershed

**SUMMARY OF  
TECHNICAL ANALYSIS  
AS MANDATED BY P.L. 2010, CHAPTER 114**





NEW JERSEY DEPARTMENT OF TRANSPORTATION

REPORT TO THE GOVERNOR AND LEGISLATURE

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## Summary of Technical Analysis

AS AUTHORIZED BY P.L. 2010, CHAPTER 114

June 2014

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## 1. Purpose of Study

In January 2011, Governor Christie signed into law Bill A-3606, which requires the New Jersey Department of Transportation (NJDOT) to inventory and assess state-owned stormwater basins in the Barnegat Bay Watershed.

Known as Public Law 2010, Chapter 114 (P.L. 2010, c. 114), the Act specifically requires the NJDOT, in consultation with the Department of Treasury, to conduct a study of all state stormwater basins located in the Barnegat Bay Watershed to identify those that are malfunctioning. NJDOT is further directed to submit to the Governor and the Legislature a list of the malfunctioning basins prioritized to indicate the order in which they should be repaired and the estimated cost for each repair.

In addition, the Act requires NJDOT, the New Jersey Transit Corporation (Transit) and the New Jersey Turnpike Authority (NJTA) to include the repair of malfunctioning stormwater basins identified in the report in their annual plans for capital projects based upon the priority order outlined in the study. The full text of the Act can be found in *Appendix 1*.



**One of the stormwater basins evaluated**

*Source: McCormick Taylor, Inc.*

## 2. Assessment of Condition

Work began by locating the stormwater basins in the Barnegat Bay Watershed that are owned by NJDOT, Transit and the NJTA. Each basin was inspected to determine the type of facility and its features. A visual inspection of each basin was undertaken to assess its condition. Surveys were performed to determine the boundary and cross-section of each basin, as well as the location of inlet and outlet structures. The drainage area for each basin was defined and land use within the drainage area (which affects infiltration rates) was mapped.

## Inventory of Basins

One hundred twenty-five (125) stormwater basins have been inventoried and mapped. Of these, one is owned by Transit, thirty (30) are owned by the NJTA and ninety-four (94) are owned by the NJDOT. The basins are located along seven principal highways and at a rail yard:

**Table 1 – Location of Inventoried Stormwater Basins**

Location	Number of Basins
Bay Head Rail Yard	1
Garden State Parkway	30
I-195	11
NJ Route 37	14
NJ Route 70	63
NJ Route 72	4
NJ Route 88	1
U.S. 9	1

The locations of these basins are shown on the *Location Map* found in *Appendix 2*.

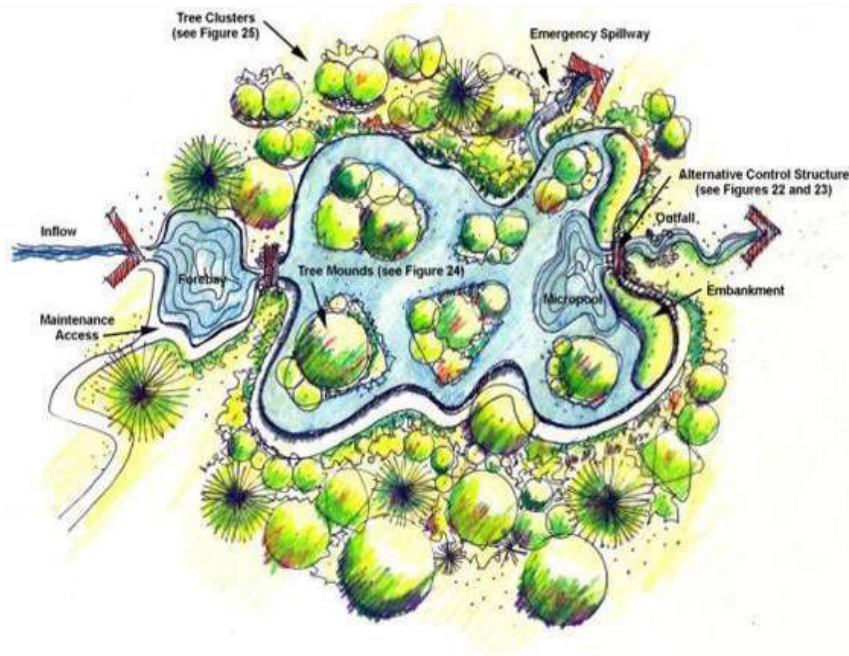
## Type and Function

As defined in the *New Jersey Stormwater Best Management Practices Manual*, there are four general types of state-owned stormwater basins in the Barnegat Bay Watershed:

**Table 2 – Inventoried Stormwater Basins by Type**

Type	Number of Basins
Constructed Wetland Basins	4
Extended Detention Basins	68
Infiltration Basins	50
Wet Pond Basins	3

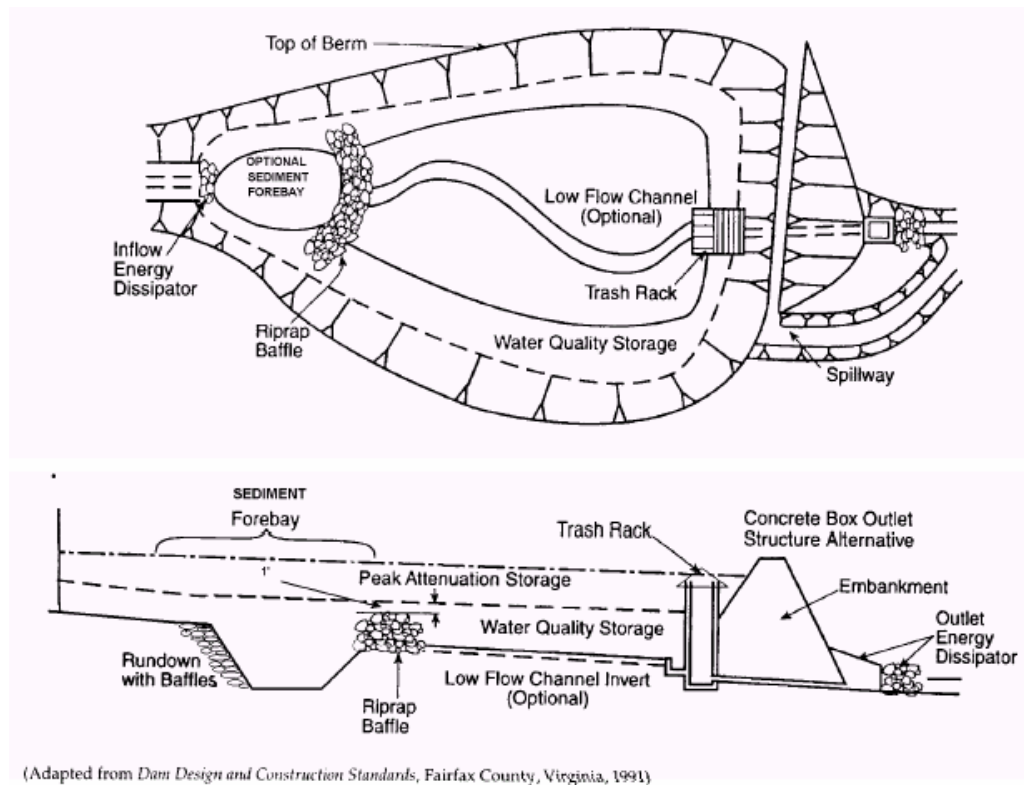
**Constructed wetland basins** temporarily store stormwater runoff within an area of wetland vegetation and slowly release it to downstream drainage systems through an outlet control structure. Such basins have been constructed to mitigate the loss of natural wetland areas disturbed by highway project construction. During dry weather, a constructed wetland typically retains a series of small pools.



**Figure 1 – Plan view of typical constructed wetland basin design**

*Source: VA DCR Stormwater Design Specification No. 13, January 1, 2013, pg.3.*

**Extended detention basins** temporarily store stormwater runoff above the ground surface during precipitation events and slowly release it to downstream drainage systems through an outlet control structure. During dry weather, an extended detention basin should be empty.

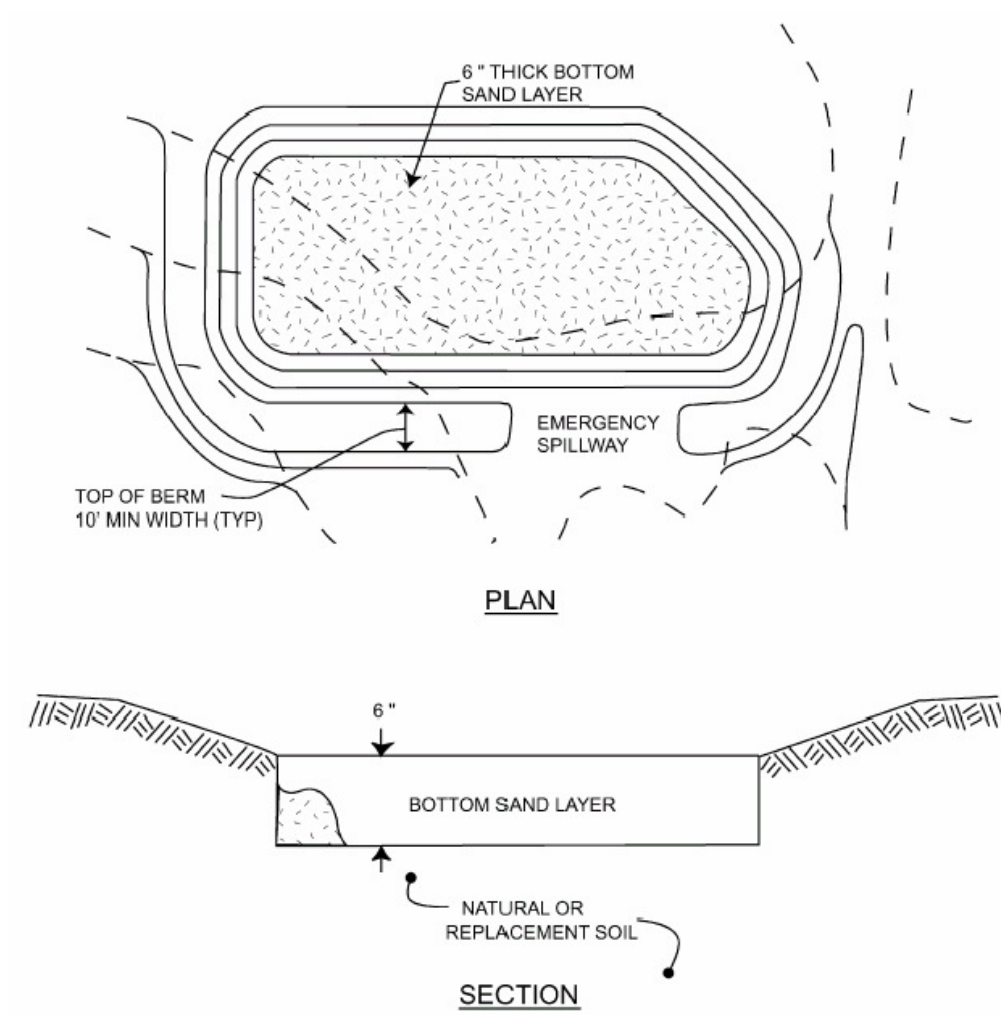


**Figure 2 – Plan view and cross section of typical extended detention basin design**

Source: *New Jersey Stormwater Best Management Practices Manual, Chapter 9.4: Standard for Extended Detention Basins, February 2004, Page 9.4-2.*



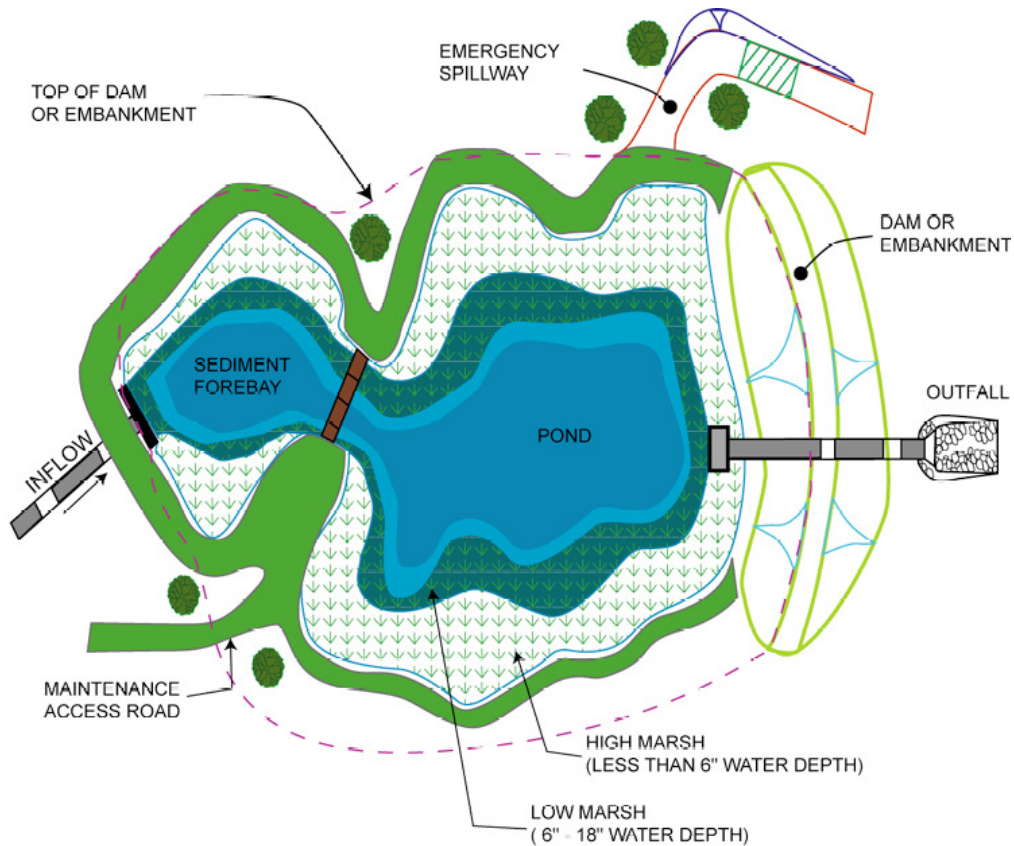
**Infiltration basins** temporarily store stormwater runoff above the ground surface during precipitation events and slowly infiltrate it into the ground below the basin. During dry weather, an infiltration basin should be empty.



**Figure 3 – Plan view and cross section of typical infiltration basin design**

Source: *New Jersey Stormwater Best Management Practices Manual, Chapter 9.5: Standard for Infiltration Basins, February 2004, Page 9.5-5.*

**Wet Pond Basins** temporarily store stormwater runoff above a permanent pool during precipitation events and slowly release it to downstream drainage systems through an outlet control structure. During dry weather, a wet pond retains its permanent pool.



**Figure 4 – Plan view of typical wet pond basin design**

Source: *New Jersey Stormwater Best Management Practices Manual • Chapter 9.2: Standard for Constructed Stormwater Wetlands, February 2004, Page 9.2-4.*

**Table 3** lists the inventoried basins by roadway location and type.

The basins studied have widely varying capacities. The smaller basins only have the capacity to accommodate the annual or 1-year storm event, while the largest capacity basins are able to accommodate a 25-year storm.

**Table 3 – Inventory of Basins**

<b>Bay Head Rail Yard Stormwater Management Basin</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
1	BHRY		Infield	Constructed Wetland
<b>Garden State Parkway Stormwater Management Basins</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
1	GSP – NB – 64.11	Route 72	Infield	Infiltration
2	GSP – SB – 64.11 #1	Route 72	Infield	Infiltration
3	GSP – SB – 64.11 #2	Route 72	Infield	Infiltration
4	GSP – SB – 64.11 #3	Route 72	Infield	Infiltration
5	GSP – SB – 64.11 #4	Route 72	Infield	Infiltration
6	GSP – SB – 64.11 #5	Route 72	Infield	Infiltration
7	GSP – NB – 66.20	Bay Avenue	Infield	Infiltration
8	GSP – NB – 67.81 #1	Bay Avenue	Infield	Extended Detention
9	GSP – NB – 67.81 #2	Bay Avenue	Infield	Extended Detention
10	GSP – NB – 67.81 #3	Bay Avenue	Infield	Extended Detention
11	GSP – NB – 67.81 #4	Bay Avenue	Infield	Extended Detention
12	GSP – SB – 67.81 #1	Bay Avenue	Infield	Infiltration
13	GSP – SB – 67.81 #3	Bay Avenue	Infield	Extended Detention
14	GSP – NB – 70.45 #1	Wells Mill Road	Infield	Extended Detention
15	GSP – NB – 70.45 #2	Wells Mill Road	Infield	Infiltration
16	GSP – SB – 70.45 #1	Wells Mill Road	Infield	Infiltration
17	GSP – SB – 70.45 #2	Wells Mill Road	Infield	Infiltration
18	GSP – SB – 75.34	Lacey Road	Infield	Infiltration
19	GSP – NB/SB – 76.10	Forked River Srvc Plza	Service Plaza	Infiltration
20	GSP – NB – 77.40 #1	Forest Hills Parkway	Infield	Infiltration
21	GSP – NB – 77.40 #2	Forest Hills Parkway	Infield	Infiltration
22	GSP – SB – 78.30 #1	Double Trouble Road	Infield	Infiltration
23	GSP – SB – 78.30 #2	Double Trouble Road	Infield	Infiltration
24	GSP – NB – 80.20	Birch Street	Roadside	Extended Detention
25	GSP – SB – 80.94	U.S. 9 – Exit 80	Infield	Extended Detention
26	GSP – NB – 90.18 #3	Cedar Bridge Avenue	Infield	Extended Detention
27	GSP – NB – 90.18 #4	Cedar Bridge Avenue	Infield	Extended Detention
28	GSP – SB – 90.18 #1	Cedar Bridge Avenue	Infield	Extended Detention
29	GSP – SB – 90.18 #2	Cedar Bridge Avenue	Infield	Extended Detention
30	GSP – NB – 92.62	Burnt Tavern Road	Roadside	Extended Detention

**Table 3 – Inventory of Basins (Continued)**

<b>I-195 Stormwater Management Basins</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
1	I-195 – EB – 16.71 #1	Monmouth Road	Infield	Extended Detention
2	I-195 – EB – 16.71 #2	Monmouth Road	Infield	Infiltration
3	I-195 – EB – 16.71 #3	Monmouth Road	Infield	Infiltration
4	I-195 – EB – 21.04 #1	Cedar Swamp Road	Infield	Extended Detention
5	I-195 – EB – 21.04 #2	Cedar Swamp Road	Infield	Extended Detention
6	I-195 – EB – 21.04 #3	Cedar Swamp Road	Infield	Extended Detention
7	I-195 – WB – 21.04	Cedar Swamp Road	Infield	Extended Detention
8	I-195 – WB – 22.99 #1	County Road 638	Infield	Extended Detention
9	I-195 – WB – 22.99 #2	County Road 638	Infield	Extended Detention
10	I-195 – EB – 27.17 #1	U.S. 9	Infield	Extended Detention
11	I-195 – EB – 27.17 #2	U.S. 9	Infield	Extended Detention

**NJ Route 37 Stormwater Management Basins**

<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
1	37 – EB – 0.61	Colonial Drive	Infield	Infiltration
2	37 – EB – 1.10	Bone Hill Road	Infield	Wet Pond
3	37 – WB – 1.10	Buckingham Drive	Infield	Infiltration
4	37 – EB – 1.77	Commonwealth Blvd.	Infield	Extended Detention
5	37 – EB – 2.57	Northhampton Road	Infield	Infiltration
6	37 – WB – 2.57	Northhampton Road	Infield	Infiltration
7	37 – WB – 3.11	Bimini Drive	Infield	Extended Detention
8	37 – EB – 3.47	St. Catherine Blvd.	Infield	Wet Pond
9	37 – WB – 3.47	St. Catherine Blvd.	Infield	Wet Pond
10	37 – EB – 4.02	Bananier Drive	Infield	Infiltration
11	37 – WB – 4.02	Romana Lane	Infield	Infiltration
12	37 – EB – 4.34	Germania Street	Behind BJ's	Extended Detention
13	37 – EB – 4.54	Mule Road	Infield	Extended Detention
14	37 – WB – 5.76	Hospital Drive	Infield	Extended Detention

**NJ Route 70 Stormwater Management Basins**

<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
1	70 – WB – 45.44	Colonial Drive	Roadside	Infiltration
2	70 – EB – 48.40	Kettle Creek Road	Roadside	Infiltration
3	70 – WB – 48.62	Whitesville Road	Roadside	Infiltration
4	70 – WB – 48.80	Yale Avenue	Roadside	Infiltration
5	70 – WB – 48.85	Yale Avenue	Roadside	Infiltration
6	70 – EB – 48.90	Trailer Park	Roadside	Infiltration
7	70 – EB – 48.95	Trailer Park	Roadside	Infiltration
8	70 – WB – 49.02	Private Road	Roadside	Extended Detention

**Table 3 – Inventory of Basins (Continued)**

<b>NJ Route 70 Stormwater Management Basins (Continued)</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Nearest Intersection</b>	<b>Location</b>	<b>Basin Type</b>
9	70 – EB – 49.27	Massachusetts Ave.	Roadside	Extended Detention
10	70 – WB – 49.27	Massachusetts Ave.	Roadside	Infiltration
11	70 – EB – 49.30	Massachusetts Ave.	Roadside	Infiltration
12	70 – WB – 49.30	Massachusetts Ave.	Roadside	Infiltration
13	70 – EB – 49.90	U.S. 9	Infield	Extended Detention
14	70 – EB – 50.55	Vermont Avenue	Roadside	Infiltration
15	70 – WB – 50.57	Vermont Avenue	Infield	Extended Detention
16	70 – WB – 51.25	New Hampshire Ave.	Infield	Extended Detention
17	70 – WB – 51.26	New Hampshire Ave.	Infield	Constructed Wetland
18	70 – WB – 51.27	New Hampshire Ave.	Roadside	Constructed Wetland
19	70 – EB – 51.70	Towbin Avenue	Infield	Constructed Wetland
20	70 – WB – 51.75	Towbin Avenue	Roadside	Infiltration
21	70 – EB – 52.62	Ramp to GSP	Infield	Infiltration
22	70 – EB – 53.19	Shorrocks Street	Infield	Infiltration
23	70 – EB – 53.46	Shopping Center	Infield	Extended Detention
24	70 – WB – 53.46	Shopping Center	Infield	Extended Detention
25	70 – EB – 53.47	Shopping Center	Roadside	Extended Detention
26	70 – WB – 53.79	Shopping Center	Roadside	Extended Detention
27	70 – WB – 53.93	Cedar Bridge Road	Roadside	Infiltration
28	70 – WB – 54.02	Cedar Bridge Road	Roadside	Extended Detention
29	70 – WB – 54.03 #1	Cedar Bridge Road	Infield	Infiltration
30	70 – WB – 54.03 #2	Cedar Bridge Road	Infield	Infiltration
31	70 – WB – 54.04	Cedar Bridge Road	Infield	Infiltration
32	70 – WB – 55.69	Jack Martin Ramp	Roadside	Extended Detention
33	70 – WB – 55.71	Jack Martin Blvd.	Infield	Extended Detention
34	70 – EB – 56.07	Van Zile Road	Roadside	Infiltration
35	70 – EB – 56.08	Van Zile Road	Roadside	Extended Detention
36	70 – WB – 56.08	Van Zile Road	Roadside	Extended Detention
37	70 – EB – 56.10	Van Zile Road	Infield	Extended Detention
38	70 – WB – 56.10	Van Zile Road	Infield	Extended Detention
39	70 – EB – 56.11	Van Zile Road	Roadside	Extended Detention
40	70 – WB – 56.12	Van Zile Road	Roadside	Extended Detention
41	70 – EB – 56.15	Kentwood Boulevard	Roadside	Extended Detention
42	70 – WB – 56.27	Before Pello Road	Roadside	Extended Detention
43	70 – WB – 56.33	Industrial Way	Roadside	Extended Detention
44	70 – EB – 56.70	Morris Avenue	Infield	Extended Detention
45	70 – WB – 56.71	Morris Avenue	Roadside	Extended Detention
46	70 – EB – 56.72	Morris Avenue	Infield	Extended Detention
47	70 – WB – 56.72	Morris Avenue	Infield	Extended Detention
48	70 – WB – 56.85	Ramp to Morris Ave.	Roadside	Extended Detention

**Table 3 – Inventory of Basins (Continued)****NJ Route 70 Stormwater Management Basins (Continued)**

No.	Basin ID	Nearest Intersection	Location	Basin Type
49	70 – EB – 56.95	MacArthur Drive	Roadside	Extended Detention
50	70 – WB – 56.95	Westwood Place	Roadside	Extended Detention
51	70 – EB – 57.18	Burnt Tavern Road	Roadside	Infiltration
52	70 – EB – 57.19	Burnt Tavern Road	Infield	Infiltration
53	70 – WB – 57.19	Chestnut Drive	Roadside	Extended Detention
54	70 – WB – 57.22	Ramp to Chestnut Dr.	Infield	Extended Detention
55	70 – WB – 57.49	Chestnut Drive	Roadside	Extended Detention
56	70 – WB – 57.50	Chestnut Drive	Roadside	Extended Detention
57	70 – WB – 57.72	Herbertsville Road	Infield	Extended Detention
58	70 – WB – 57.73 #1	Herbertsville Road	Infield	Extended Detention
59	70 – WB – 57.73 #2	Herbertsville Road	Infield	Extended Detention
60	70 – EB – 57.90	Herbertsville Road	Roadside	Extended Detention
61	70 – WB – 57.90	Herbertsville Road	Roadside	Extended Detention
62	70 – EB – 58.11	River Road	Infield	Infiltration
63	70 – WB – 58.11	Riviera Drive	Infield	Infiltration

**NJ Route 72 Stormwater Management Basins**

No.	Basin ID	Nearest Intersection	Location	Basin Type
1	72 – EB – 21.00	Nautilus Drive	Infield	Infiltration
2	72 – EB – 21.37	Stafford Park	Roadside	Extended Detention
3	72 – EB – 21.44	Stafford Park	Roadside	Extended Detention
4	72 – EB – 21.45	Stafford Park	Infield	Extended Detention

**Route 88 Stormwater Management Basin**

No.	Basin ID	Nearest Intersection	Location	Basin Type
1	88 – WB – 8.88	Herbertsville Road (Beaver Dam Drive)	Infield	Extended Detention

**U.S. 9 Stormwater Management Basin**

No.	Basin ID	Nearest Intersection	Location	Basin Type
1	9 – SB – 91.05	GSP	Infield	Infiltration

The intent of this study was to identify “malfunctioning” state-owned stormwater basins in the Barnegat Bay Watershed. To assess malfunctioning basins, the study first identified issues affecting basin performance that can be remediated through repairs or maintenance.

## Required Remediation

Stormwater basins can experience operational problems due to a need for maintenance. Inflow measures and outlet control structures can deteriorate or be damaged and can become obstructed by runoff-borne sediment, vegetation and debris. Infiltration basin bottoms can become compacted or sealed by this same sediment and debris. This can result in a malfunctioning basin, which can lead to excessive outflows and downstream flooding or erosion.

All stormwater basins require at least regular maintenance. The degree of corrective or remedial maintenance needed depends upon the basin design, the quality of construction, and the frequency and extent of past maintenance efforts.

Operational and remedial maintenance needs were identified for each basin during field inspections. A host of solutions were also identified:

### *General Maintenance*

- Remove trash and leaf litter from basin bottom and side slopes
- Remove trash and leaf litter from inflow pipes and outlet structure
- Remove sediment from basin bottom and clogged pipes
- Remove overgrown vegetation, including tree stumps
- Restore eroded side slopes
- Restore grass on basin bottom and side slopes
- Clean and restore low flow channel
- Scarify sand bottom of basin
- Replace rip rap apron
- Repair concrete head wall
- Repair concrete outlet structure
- Repair broken trash rack
- Replace broken pipe or end section



**Clogged inlet pipe in urgent need of maintenance**

*Source: McCormick Taylor, Inc.*

### *Safety*

- Repair chain link fence
- Repair gate
- Provide gate lock

Based on field conditions, basins were placed into one of three categories of remediation:

**Table 4 – Inventoried Stormwater Basins  
by Need for Remediation**

Category of Need	Number of Basins
Urgent Need	14
Elevated Need	23
Routine Need	88

- **Urgent Need** – Deficiencies that require immediate attention (e.g., sediment blockage of pipes of over 70%, collapsed pipes, broken outlet structures, sinkholes, severe erosion of embankments) or any other problem that would impair the ability of the basin to properly function.
- **Elevated Need** – Deficiencies that are recommended for repair or modification in the near future, such as retrofitting or modifying the outlet structure. Basins were also placed in this category if there was sediment blockage of pipes between 30% and 70%, or if basin side slopes were eroded.
- **Routine Need** – Deficiencies that can be repaired by maintenance staff using agency owned equipment and materials, or by using an annual maintenance contract. This category encompasses routine maintenance and repair work, such as removing silt (sediment blockage of pipes less than 30%), trash or debris, or cutting the grass.

This study has determined that 30% or thirty-seven (37) of the 125 stormwater basins evaluated are deemed to be in need of either an urgent or elevated level of remedial maintenance. The maintenance needs of basins are shown in **Table 5**.

The required maintenance costs are based upon prior experience with state highway basins. Previous work includes cleaning, sediment removal, clearing of blocked pipes, tree removal and vegetation clearing. Cost estimates include equipment, manpower and disposal expenses.



**Table 5 – Basin Maintenance Needs**

<b>Bay Head Rail Yard Basin Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	BHRY	Routine	Monitor and perform regular maintenance.	–
<b>Garden State Parkway Basins Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	GSP – NB – 90.18 #3	Urgent	Remove sediment from pipes. Remove overgrown vegetation and trash from basin.	\$10,000
2	GSP – SB – 90.18 #1	Urgent	Remove sediment from pipes. Remove overgrown vegetation and trash from basin.	\$10,000
3	GSP – NB – 64.11	Elevated	Remove sediment from pipes. Remove overgrown vegetation and trash from basin.	\$10,000
4	GSP – NB – 70.45 #1	Elevated	Remove sediment from pipes. Remove overgrown vegetation and trash from basin.	\$10,000
5	GSP – SB – 70.45 #1	Elevated	Remove sediment from pipes. Remove overgrown vegetation and trash from basin.	\$10,000
6	GSP – SB – 75.34	Elevated	Remove sediment from pipes. Remove trash from basin.	\$5,000
7	GSP – NB – 77.40 #2	Elevated	Remove sediment from pipes. Remove trash from basin.	\$5,000
8	GSP – SB – 90.18 #2	Elevated	Restore eroded basin side slopes.	\$10,000
9	GSP – NB – 90.18 #4	Elevated	Restore eroded basin side slopes. Remove trash from basin.	\$10,000
10	GSP – SB – 64.11 #1	Routine	Monitor and perform regular maintenance.	–
11	GSP – SB – 64.11 #2	Routine	Monitor and perform regular maintenance.	–
12	GSP – SB – 64.11 #3	Routine	Monitor and perform regular maintenance.	–
13	GSP – SB – 64.11 #4	Routine	Monitor and perform regular maintenance.	–
14	GSP – SB – 64.11 #5	Routine	Monitor and perform regular maintenance.	–
15	GSP – NB – 66.20	Routine	Monitor and perform regular maintenance.	–
16	GSP – NB – 67.81 #1	Routine	Monitor and perform regular maintenance.	–
17	GSP – NB – 67.81 #2	Routine	Monitor and perform regular maintenance.	–
18	GSP – NB – 67.81 #3	Routine	Monitor and perform regular maintenance.	–
19	GSP – NB – 67.81 #4	Routine	Monitor and perform regular maintenance.	–
20	GSP – SB – 67.81 #1	Routine	Monitor and perform regular maintenance.	–
21	GSP – SB – 67.81 #3	Routine	Monitor and perform regular maintenance.	–
22	GSP – NB – 70.45 #2	Routine	Monitor and perform regular maintenance.	–
23	GSP – SB – 70.45 #2	Routine	Monitor and perform regular maintenance.	–
24	GSP – NB/SB – 76.10	Routine	Monitor and perform regular maintenance.	–
25	GSP – NB – 77.40 #1	Routine	Monitor and perform regular maintenance.	–
26	GSP – SB – 78.30 #1	Routine	Monitor and perform regular maintenance.	–
27	GSP – SB – 78.30 #2	Routine	Monitor and perform regular maintenance.	–

**Table 5 – Basin Maintenance Needs (Continued)**

<b>Garden State Parkway Basins Maintenance Needs (Continued)</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
28	GSP – NB – 80.20	Routine	Monitor and perform regular maintenance.	–
29	GSP – SB – 80.94	Routine	Monitor and perform regular maintenance.	–
30	GSP – NB – 92.62	Routine	Monitor and perform regular maintenance.	–
<b>I-195 Basins Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	I-195 – WB – 21.04	Urgent	Remove sediment from all pipes. Remove trash and leaf litter.	\$10,000
2	I-195 – EB – 16.71 #3	Elevated	Remove leaf litter. Restore eroded basin side slope near inflow pipe and re-establish ground cover. Install rip rap at inflow pipe.	\$15,000
3	I-195 – EB – 21.04 #1	Elevated	Remove trash and leaf litter. Remove sediment from all pipes.	\$6,000
4	I-195 – WB – 22.99 #1	Routine	Remove trash, leaf litter and dead branches from basin.	–
5	I-195 – EB – 27.17 #2	Routine	Remove trash and debris from basin.	–
6	I-195 – EB – 16.71 #1	Routine	Monitor and perform regular maintenance.	–
7	I-195 – EB – 16.71 #2	Routine	Monitor and perform regular maintenance.	–
8	I-195 – EB – 21.04 #2	Routine	Monitor and perform regular maintenance.	–
9	I-195 – EB – 21.04 #3	Routine	Monitor and perform regular maintenance.	–
10	I-195 – WB – 22.99 #2	Routine	Monitor and perform regular maintenance.	–
11	I-195 – EB – 27.17 #1	Routine	Monitor and perform regular maintenance.	–
<b>NJ Route 37 Basins Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	37 – EB – 1.10	Urgent	Remove sediment from bottom and inflow pipe. Remove overgrown vegetation.	\$10,000
2	37 – WB – 1.10	Urgent	Remove overgrown vegetation from inflow and outflow pipes. Remove trash from basin bottom.	\$10,000
3	37 – EB – 2.57	Urgent	Remove sediment from bottom and inflow pipe. Remove overgrown vegetation.	\$10,000
4	37 – WB – 2.57	Urgent	Remove sediment from bottom and inflow pipe. Remove overgrown vegetation.	\$10,000
5	37 – EB – 3.47	Urgent	Clean inflow and outflow pipes. Remove overgrown vegetation, including tree stump.	\$10,000
6	37 – WB – 3.47	Urgent	Clean inflow and outflow pipes. Remove overgrown vegetation, including tree stump.	\$10,000

**Table 5 – Basin Maintenance Needs (Continued)**

<b>NJ Route 37 Basins Maintenance Needs (Continued)</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
7	37 – EB – 4.02	Urgent	Remove sediment from inflow pipes. Repair outlet structure trash rack. Remove overgrown vegetation and cut trees.	\$15,000
8	37 – WB – 4.02	Urgent	Remove sediment from pipes. Replace broken pipe section. Remove leaf, trash and overgrown vegetation.	\$25,000
9	37 – EB – 4.54	Urgent	Clean pipes. Remove trash and debris from basin and outlet structure.	\$10,000
10	37 – WB – 5.76	Urgent	Clean pipes. Remove trash and debris from basin and outlet structure.	\$10,000
11	37 – WB – 3.11	Elevated	Replace broken inflow pipes. Remove sediment, trash and overgrown vegetation. Restore eroded side slope.	\$25,000
12	37 – EB – 0.61	Routine	Remove leaf litter and overgrown vegetation. Remove sediment from inflow pipe.	–
13	37 – EB – 1.77	Routine	Remove trash and sediment from pipes. Remove overgrown vegetation.	–
14	37 – EB – 4.34	Routine	Remove trash, sediment and overgrown vegetation.	–
<b>NJ Route 70 Basins Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	70 – EB – 53.19	Urgent	Remove sediment from inflow pipes. Remove overgrown vegetation and trash.	\$10,000
2	70 – WB – 45.44	Elevated	Remove sediment and leaf litter from inflow pipe.	\$10,000
3	70 – WB – 48.62	Elevated	Restore eroded basin side slope near inflow pipe and re-establish grass cover. Remove leaf litter. Install rip rap at inflow pipe.	\$25,000
4	70 – EB – 49.30	Elevated	Remove leaf litter. Restore eroded swale side slopes and re-establish grass cover. Remove sediment from swale bottom and pipes.	\$5,000
5	70 – WB – 50.57	Elevated	Remove trash and leaf litter from basin bottom, pipes and outlet structure. Remove dead and overgrown vegetation. Install rip rap at eroded inflow pipe area.	\$10,000
6	70 – EB – 52.62	Elevated	Remove sediment from inflow pipe.	\$5,000
7	70 – WB – 53.93	Elevated	Restore eroded basin slide slope.	\$10,000
8	70 – EB – 57.18	Elevated	Remove dead reeds from basin floor. Level and scarify sand on basin bottom.	\$10,000

**Table 5 – Basin Maintenance Needs (Continued)**

<b>NJ Route 70 Basins Maintenance Needs (Continued)</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
9	70 – EB – 57.19	Elevated	Remove dead reeds from basin floor. Level and scarify sand on basin bottom.	\$10,000
10	70 – WB – 57.72	Elevated	Remove leaf litter and sediment from low flow channel and outlet structure. Re-establish grass cover on basin bottom and side slopes.	\$10,000
11	70 – WB – 57.73 #1	Elevated	Remove leaf litter and sediment from low flow channel and inflow pipes. Re-establish grass cover on basin bottom and side slopes.	\$10,000
12	70 – WB – 57.73 #2	Elevated	Remove sediment from inflow pipe.	\$5,000
13	70 – EB – 48.40	Routine	Remove sediment from bottom and inflow pipes. Restore eroded basin side slopes and re-establish grass cover.	–
14	70 – WB – 49.02	Routine	Remove leaf litter.	–
15	70 – EB – 49.27	Routine	Remove leaf litter.	–
16	70 – WB – 49.30	Routine	Remove leaf litter.	–
17	70 – WB – 51.25	Routine	Remove trash, leaf litter and dead branches.	–
18	70 – WB – 51.26	Routine	Remove trash and debris from basin.	–
19	70 – WB – 51.27	Routine	Remove trash and debris from basin.	–
20	70 – EB – 51.70	Routine	Remove trash and debris from basin.	–
21	70 – EB – 53.46	Routine	Remove trash and sediment from basin low flow channel and outlet structure trash rack.	–
22	70 – WB – 53.46	Routine	Remove trash and sediment from basin low flow channel.	–
23	70 – EB – 53.47	Routine	Remove trash and sediment from basin low flow channel and outlet structure trash rack.	–
24	70 – WB – 53.79	Routine	Remove sediment and dead grass clippings from outlet grate.	–
25	70 – WB – 55.71	Routine	Remove leaf litter from inflow pipe and outlet structure. Repair bare spots on side slopes.	–
26	70 – EB – 56.08	Routine	Remove leaf litter from outlet structure trash rack.	–
27	70 – WB – 56.10	Routine	Remove leaf litter from inflow pipe and outlet structure trash rack.	–
28	70 – EB – 56.15	Routine	Remove sediment from inflow and outflow pipes.	–
29	70 – WB – 56.33	Routine	Remove leaf litter from inflow pipe and outlet structure. Repair bare spots on side slopes.	–

**Table 5 – Basin Maintenance Needs (Continued)**

<b>NJ Route 70 Basins Maintenance Needs (Continued)</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
30	70 – EB – 56.70	Routine	Remove trash and leaf litter from outlet structure.	–
31	70 – WB – 57.19	Routine	Remove dead reeds from basin bottom.	–
32	70 – WB – 57.50	Routine	Remove trash, leaves and sediment from basin bottom, low flow channel and outlet structure.	–
33	70 – WB – 48.80	Routine	Monitor and perform regular maintenance.	–
34	70 – WB – 48.85	Routine	Monitor and perform regular maintenance.	–
35	70 – EB – 48.90	Routine	Monitor and perform regular maintenance.	–
36	70 – EB – 48.95	Routine	Monitor and perform regular maintenance.	–
37	70 – WB – 49.27	Routine	Privately owned.	–
38	70 – EB – 49.90	Routine	Monitor and perform regular maintenance.	–
39	70 – EB – 50.55	Routine	Privately owned.	–
40	70 – WB – 51.75	Routine	Monitor and perform regular maintenance.	–
41	70 – WB – 54.02	Routine	Monitor and perform regular maintenance.	–
42	70 – WB – 54.03 #1	Routine	Monitor and perform regular maintenance.	–
43	70 – WB – 54.03 #2	Routine	Monitor and perform regular maintenance.	–
44	70 – WB – 54.04	Routine	Monitor and perform regular maintenance.	–
45	70 – WB – 55.69	Routine	Monitor and perform regular maintenance.	–
46	70 – EB – 56.07	Routine	Monitor and perform regular maintenance.	–
47	70 – WB – 56.08	Routine	Monitor and perform regular maintenance.	–
48	70 – EB – 56.10	Routine	Monitor and perform regular maintenance.	–
49	70 – EB – 56.11	Routine	Monitor and perform regular maintenance.	–
50	70 – WB – 56.12	Routine	Monitor and perform regular maintenance.	–
51	70 – WB – 56.27	Routine	Monitor and perform regular maintenance.	–
52	70 – WB – 56.71	Routine	Monitor and perform regular maintenance.	–
53	70 – EB – 56.72	Routine	Monitor and perform regular maintenance.	–
54	70 – WB – 56.72	Routine	Monitor and perform regular maintenance.	–
55	70 – WB – 56.85	Routine	Monitor and perform regular maintenance.	–
56	70 – EB – 56.95	Routine	Monitor and perform regular maintenance.	–
57	70 – WB – 56.95	Routine	Monitor and perform regular maintenance.	–
58	70 – WB – 57.22	Routine	Monitor and perform regular maintenance.	–
59	70 – WB – 57.49	Routine	Monitor and perform regular maintenance.	–
60	70 – EB – 57.90	Routine	Monitor and perform regular maintenance.	–
61	70 – WB – 57.90	Routine	Monitor and perform regular maintenance.	–
62	70 – EB – 58.11	Routine	Monitor and perform regular maintenance.	–
63	70 – WB – 58.11	Routine	Monitor and perform regular maintenance.	–

**Table 5 – Basin Maintenance Needs (Continued)**

<b>NJ Route 72 Basins Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	72 – EB – 21.00	Routine	Remove trash and overgrown vegetation from basin.	–
2	72 – EB – 21.37	Routine	Monitor and perform regular maintenance.	–
3	72 – EB – 21.44	Routine	Monitor and perform regular maintenance.	–
4	72 – EB – 21.45	Routine	Monitor and perform regular maintenance.	–
<b>NJ Route 88 Basin Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	88 – WB – 8.88	Elevated	Remove sediment from inflow pipe. Remove trash, leaf litter and overgrown vegetation.	\$10,000
<b>U.S. 9 Basin Maintenance Needs</b>				
<b>No.</b>	<b>Basin ID</b>	<b>Category</b>	<b>Required Maintenance</b>	<b>Repair Cost</b>
1	9 – SB – 91.05	Elevated	Remove sediment from inflow pipe. Remove trash, leaf litter and overgrown vegetation.	\$10,000

### 3. Findings

In response to P.L.2010, c.114, the New Jersey Department of Transportation evaluated state-owned stormwater basins in the Barnegat Bay Watershed. As required by law, this assessment first identified the needs, costs and priorities to address maintenance-related basin malfunctions. Of the 125 stormwater basins evaluated, thirty-seven (37) are in need of either an urgent or elevated level of maintenance, as shown in **Table 6**:

**Table 6 – Basin Maintenance Needs Summary**

Maintenance Priority	Number	Estimated Cost
Urgent Needs	14	\$160,000 in repairs
Elevated Needs	23	\$236,000 in repairs
Routine Needs	88	\$8,000 annually per basin



**Overgrown vegetation interfering with wet pond outlet**

*Source: McCormick Taylor, Inc.*

#### 4. Recommendations

The **recommendations** of this report are to:

1. Attend to the maintenance of the fourteen (14) basins in the Urgent Needs category:

**Table 7 – Basins in Urgent Need of Maintenance**

No.	Basin ID	Repair Cost
1	GSP – NB – 90.18 #3	\$10,000
2	GSP – SB – 90.18 #1	\$10,000
3	I-195 – WB – 21.04	\$10,000
4	37 – EB – 1.10	\$10,000
5	37 – WB – 1.10	\$10,000
6	37 – EB – 2.57	\$10,000
7	37 – WB – 2.57	\$10,000
8	37 – EB – 3.47	\$10,000
9	37 – WB – 3.47	\$10,000
10	37 – EB – 4.02	\$15,000
11	37 – WB – 4.02	\$25,000
12	37 – EB – 4.54	\$10,000
13	37 – WB – 5.76	\$10,000
14	70 – EB – 53.19	\$10,000
		<b>\$160,000</b>



2. Take steps to schedule maintenance of the twenty-three (23) basins in the Elevated Needs category:

**Table 8 – Basins in Elevated Need of Maintenance**

No.	Basin ID	Repair Cost
1	GSP – NB – 64.11	\$10,000
2	GSP – NB – 70.45 #1	\$10,000
3	GSP – SB – 70.45 #1	\$10,000
4	GSP – SB – 75.34	\$5,000
5	GSP – NB – 77.40 #2	\$5,000
6	GSP – SB – 90.18 #2	\$10,000
7	GSP – NB – 90.18 #4	\$10,000
8	I-195 – EB – 16.71 #3	\$15,000
9	I-195 – EB – 21.04 #1	\$6,000
10	37 – WB – 3.11	\$25,000
11	70 – WB – 45.44	\$10,000
12	70 – WB – 48.62	\$25,000
13	70 – EB – 49.30	\$5,000
14	70 – WB – 50.57	\$10,000
15	70 – EB – 52.62	\$5,000
16	70 – WB – 53.93	\$10,000
17	70 – EB – 57.18	\$10,000
18	70 – EB – 57.19	\$10,000
19	70 – WB – 57.72	\$10,000
20	70 – WB – 57.73 #1	\$10,000
21	70 – WB – 57.73 #2	\$5,000
22	88 – WB – 8.88	\$10,000
23	9 – SB – 91.05	\$10,000
		<b>\$236,000</b>

3. Incorporate all 125 stormwater basins into an annual maintenance program as appropriate.

## APPENDICES

Appendix 1 P.L. 2010, Chapter 114

Appendix 2 Location Map

Glossary

## APPENDIX 1 P.L. 2010, CHAPTER 114

AN ACT concerning the study and repair of certain stormwater basins in the Barnegat Bay watershed, and supplementing P.L.1984, c.73 (C.27:1B-1 et seq.) and P.L.1948, c.454 (C.27:23-1 et seq.).

*BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:*

1. The Department of Transportation, in consultation with the Department of the Treasury, shall conduct a study of all stormwater basins owned by the State, the New Jersey Transit Corporation, or the New Jersey Turnpike Authority in the Barnegat Bay watershed.

The study shall identify those stormwater basins owned by the State, the New Jersey Transit Corporation, or the New Jersey Turnpike Authority in the Barnegat Bay watershed that are malfunctioning and determine the order in which the stormwater basins should be repaired based on the need for maintenance or restoration. The study shall also estimate the cost to repair each stormwater basin individually.

2. Within one year of the effective date of this act, the Department of Transportation shall prepare and submit a final report of the study conducted pursuant to section 1 of this act, including the department's findings and any recommendations, to the Governor, to the Legislature pursuant to section 2 of P.L.1991, c.164 (C.52:14-19.1), and to the chairperson and members of the Assembly Environment and Solid Waste Committee and the Senate Environment and Energy Committee, or their successor committees. Copies of this report shall also be provided to the public upon request and free of charge, and the report shall be posted on the Internet website of the Department of Transportation.

C.27:1B-22.4 Inclusion of projects in "Annual Transportation Capital Program."

3. The Department of Transportation shall include, annually as part of its "Annual Transportation Capital Program" submitted pursuant to section 22 of P.L.1984, c.73 (C.27:1B-22), projects for the repair of malfunctioning stormwater basins owned by the State or the New Jersey Transit Corporation in the Barnegat Bay watershed based upon the priority order identified in the study prepared pursuant to section 1 of P.L.2010, c.114.

C.27:23-3.3 Inclusion of projects in Capital Project and Investment Plan.

4. The New Jersey Turnpike Authority shall include, annually as part of its Capital Project and Investment Plan submitted pursuant to subsection c. of section 1 of P.L.1970, c.184 (C.27:23-3.2), projects for the repair of malfunctioning authority-owned stormwater basins in the Barnegat Bay watershed based upon the priority order identified in the study prepared pursuant to section 1 of P.L.2010, c.114.

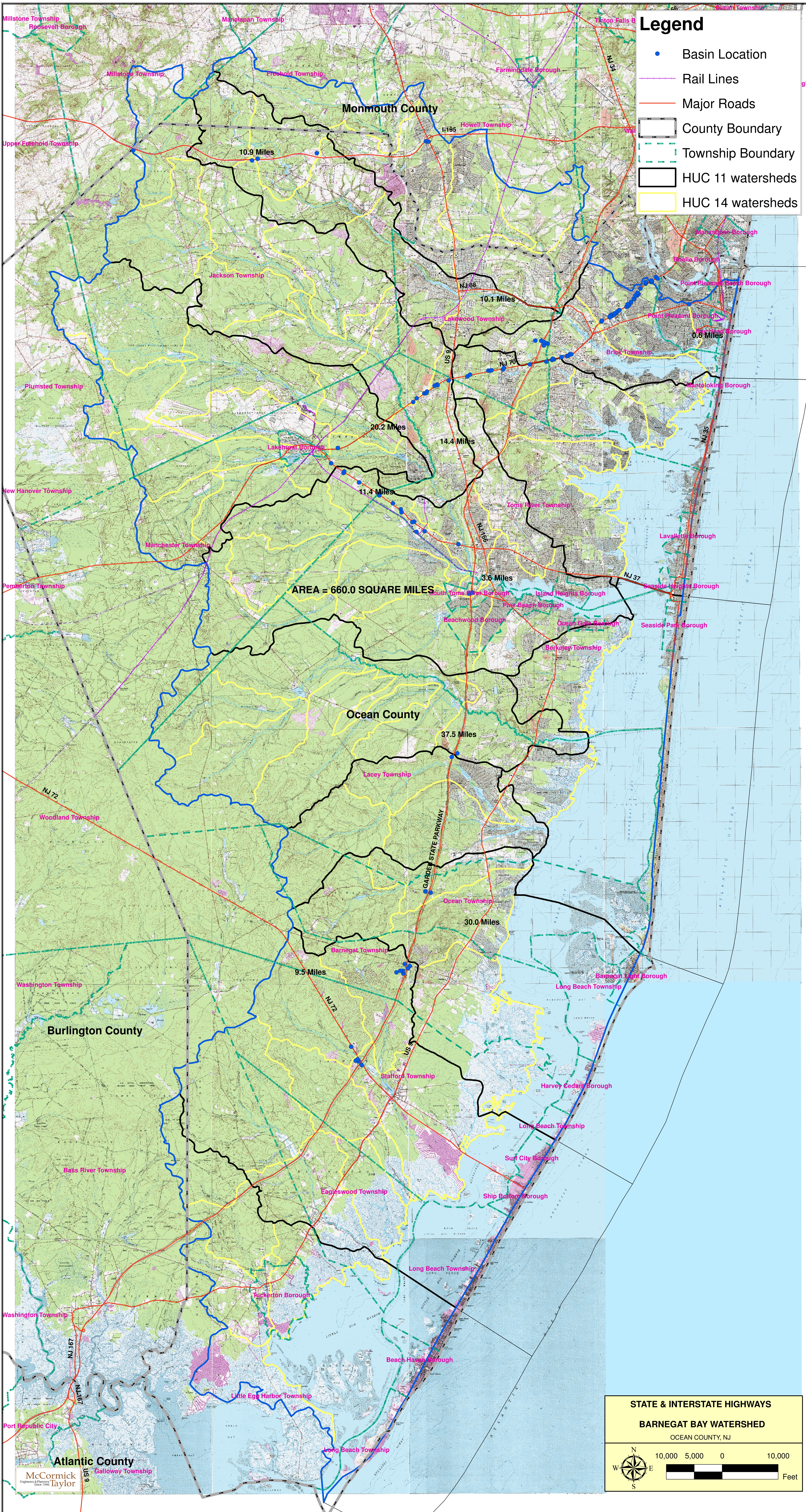
5. This act shall take effect immediately, and sections 1 and 2 shall expire on the 30th day after the Department of Transportation submits its report as prescribed in section 2 of this act.

Approved January 5, 2011.

## APPENDIX 2 LOCATION MAP

### Legend

- Basin Location
- Rail Lines
- Major Roads
- ▭ County Boundary
- ▭ Township Boundary
- ▭ HUC 11 watersheds
- ▭ HUC 14 watersheds

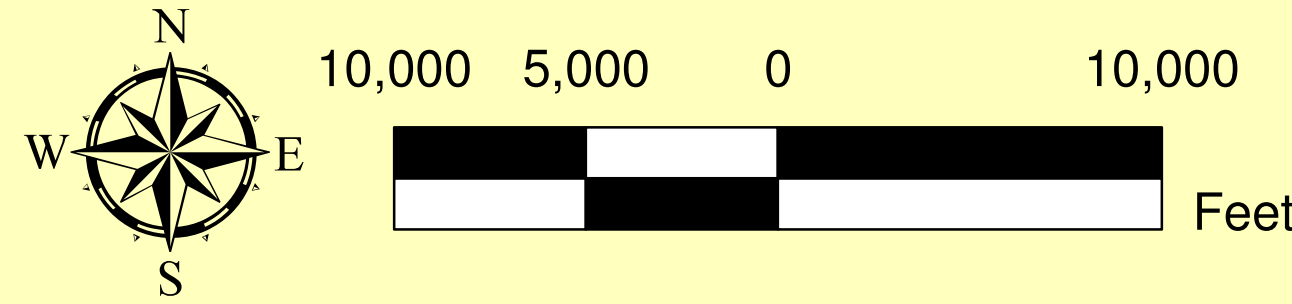


AREA = 660.0 SQUARE MILES

STATE & INTERSTATE HIGHWAYS

BARNEGAT BAY WATERSHED

OCEAN COUNTY, NJ



## GLOSSARY

**Detention** – The temporary storage of storm runoff in a stormwater practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

**Detention Basin** – A facility constructed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

**Drainage** – 1. The removal of excess surface water or ground water from land by means of surface or subsurface drains. 2. Soils characteristics that affect natural drainage.

**Drainage Area (Watershed)** – All land and water area from which runoff may run to a common (design) point.

**Extended Detention (ED)** – A stormwater design feature that provides for the gradual release of a volume of water over a 12 to 48 hour interval in order to increase settling of urban pollutants and protect downstream channels from frequent storm events.

**Infiltration Basin** – An infiltration practice that stores stormwater runoff in a shallow depression, and allows this runoff to percolate into the ground.

**Retention** – The amount of precipitation on a drainage area that does not escape as runoff. It is the difference between total precipitation and total runoff.

**Stormwater Wetland** – A shallow, constructed pool that captures stormwater and allows for the growth of characteristic wetland vegetation.

**Wet Pond** – A stormwater pond design that captures the entire water quality volume in a permanent pool.