new jersey
department of transportation

REPORT TO
THE GOVERNOR AND LEGISLATURE

Study of Stormwater Basins in the Barnegat Bay Watershed

EXECUTIVE SUMMARY

AS MANDATED BY P.L. 2010, CHAPTER 114

June 2014

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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Purpose of Study

In January 2011, Governor Christie signed into law Bill A-3606, which requires the State Department of Transportation 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 Department of Transportation (NJDOT), to conduct a study of all stormwater basins owned by NJDOT, the New Jersey Transit Corporation (Transit), or the New Jersey Turnpike Authority (NJTA), which are 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, to include the estimated cost for each repair, and to consult with the Department of Treasury.

One of the stormwater basins evaluated
Source: McCormick Taylor, Inc.

Identification of Stormwater Basins

NJDOT owns approximately four hundred fifty (450) stormwater basins statewide. In addition, Transit and NJTA are responsible for approximately three hundred fifty (350) stormwater basins throughout the state.

Within the Barnegat Bay Watershed, one hundred twenty-five (125) stormwater basins have been inventoried and mapped. Of these, one is owned by Transit, thirty (30) are owned by 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	Owner
Bay Head Rail Yard	1	Transit
Garden State Parkway	30	NJTA
I-195	11	NJDOT
NJ Route 37	14	NJDOT
NJ Route 70	63	NJDOT
NJ Route 72	4	NJDOT
NJ Route 88	1	NJDOT
U.S. 9	1	NJDOT

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.
- **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.
- **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. At the time of field assessment, new infiltration trenches were being constructed along the Garden State Parkway.
- **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.

To assess malfunctioning basins, the study first identified issues affecting basin performance.

Overgrown vegetation interfering with basin outlet

Source: McCormick Taylor, Inc.

Assessment of Condition

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

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

Corrective and remedial maintenance needs were identified for each basin during field inspections. Based on field conditions, basins were placed into one of three categories of remediation:

- **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** –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.

Clogged inlet pipe in urgent need of maintenance

Source: McCormick Taylor

Findings

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. All basins will require annual inspection and routine maintenance as needed.

Table 3 – Basin Maintenance Needs

Maintenance Priority	Number	Estimated Cost	Ownership
Urgent Needs	14	$160,000 in repairs	NJDDOT (12) NJTA (2)
Elevated Needs	23	$241,000 in repairs	NJDDOT (15) NJTA (8)
Routine Needs	88	$8,000 annually per basin	NJDDOT (67) NJTA (20) Transit(1)

Table 4 contains the estimated repair costs for the basins within the Urgent Needs category:

Table 4 – Basins in Urgent Need of Maintenance

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

*Annual maintenance of $8,000 per basin, for a total of $112,000 annually thereafter.

Table 5 contains the estimated repair costs for basins in the Elevated Needs category:

Table 5 – Basins in Elevated Need of Maintenance

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

*Annual maintenance of $8,000 per basin, for a total of $184,000 annually thereafter.

Action Taken

The NJDOT conducted a study of state-owned stormwater basins within the Barnegat Bay Watershed to meet the requirements of Public Law 2010, Chapter 114 (P.L.2010, c.114), The study identified 125 stormwater basins under the ownership of the NJDOT, Transit and NJTA. The study determined that 37 of these basins were in either urgent or elevated need of maintenance repairs. This law required NJDOT to prioritize the list of malfunctioning basins for remediation and to incorporate projects for repair of these basins in the annual Transportation Capital Project and Investment Plan.

Remediation

The NJTA has completed the remediation of its 10 basins requiring urgent maintenance repairs. The NJDOT has repaired 22 of the 27 basins under NJDOT and Transit control requiring urgent or elevated maintenance. All NJDOT repairs not completed in FY 2014 are scheduled to be completed in FY 2015. Therefore, it is anticipated that the 37 basins will not need to be incorporated into future annual Transportation Capital Programs or Capital Project and Investment Plans.

Maintenance

The 125 stormwater basins may require routine yearly maintenance at a cost of approximately $8,000 each. Therefore, the 95 basins under the control of NJDOT and Transit within the Barnegat Bay Watershed will require an annual investment of approximately $760,000 for routine maintenance. The NJDOT plans to annually inspect each of its basins within the Barnegat Bay Watershed, and clean as appropriate. The routine maintenance of these basins will be placed as the first priority within the group of the 450 stormwater basins under NJDOT control.

The NJTA anticipates returning to normal routine maintenance of the basins south of Interchange 80 now that the construction activities associated with the Garden State Parkway (GSP) Widening Program have been completed in this area. Routine maintenance for the remaining basins will resume in 2015 upon completion of the construction activities associated with the GSP Roadway and Shoulder Reconstruction and Interchange Improvement Projects currently underway from Interchange 83 to Interchange 98.

All new stormwater basins constructed by NJDOT, Transit and NJTA will be incorporated into these maintenance programs.