



LEGEND

DRAINAGE AREA OF INTEREST



NOTES:

1. THE STORMWATER RUNOFF FROM THE HIGHLIGHTED AREA, DISCHARGES THROUGH ONE SIX FOOT DIAMETER STORMWATER OUTLET PIPE. THIS AREA HAS BEEN IDENTIFIED BY STAKEHOLDERS AS BEING PRONE TO FLOODING DURING RAIN EVENTS. THIS STORMWATER OUTLET AS SEEN IN FIGURE A, THE OUTFALL CONTAINS SEDIMENT THAT HAS RESULTED IN STANDING WATER, WHICH PROVIDES BREEDING GROUND FOR MOSQUITOS. ALSO, SINCE HALF OF THE OUTLET IS BLOCKED WITH SEDIMENT, THE OUTFALL CAN ONLY FLOW AT HALF OF ITS CAPACITY, THEREBY CREATING A BACKWATER EFFECT THAT CAUSES UPSTREAM FLOODING.
2. THE STORMWATER FROM THIS SIX FOOT PIPE IS DISCHARGED INTO A TRIBUTARY THAT FLOWS THROUGH WHITESELL'S FARM. OVER THE YEARS AT LEAST TWO ROAD CROSSING HAVE BEEN INSTALLED ACROSS THE TRIBUTARIES ON WHITESELL'S FARM. EACH CROSSING CONSISTS OF THREE PIPES EACH WITH A DIAMETER OF 30 INCHES (SEE FIGURE B). THESE PIPES ARE PARTIALLY CLOGGED WITH SEDIMENT, THEREBY RESTRICTING FLOW AND CREATING A BACKWATER EFFECT, WHICH CAUSES UPSTREAM FLOODING.
3. RCE CREATED A SIMPLIFIED MODEL OF THE WATERSHED FOR THIS OUTLET POINT TO DETERMINE IF THE SIZE OF THE VARIOUS PIPES IN THIS SYSTEM WERE ADEQUATE FOR THE PEAK FLOW FROM THE WATERSHED FOR VARIOUS STORM EVENTS. THE TIME OF CONCENTRATION IS ASSUMED TO BE 10 MINUTES FOR THIS ANALYSIS.
4. RCE USED MANNING'S EQUATION TO DETERMINE THE MAXIMUM ALLOWABLE FLOW THROUGH THE OUTLET PIPE AND THE PIPE UNDER THE ROAD ON THE FARM. FLOWS WERE DETERMINED WITH 0.5% SLOPE, AT FULL CAPACITY (EMPTY) AND AT HALF CAPACITY (HALF FULL OF WATER). SEE TABLE 2 FOR THIS ANALYSIS.
5. FROM THE ANALYSIS IN THE TABLES IT IS CLEAR THAT THAT EVEN IF THE OUTLET PIPE CAN BE CLEARED OF ALL THE STANDING WATER AND RESTORED TO CONVEY FLOWS AT FULL CAPACITY, FLOODING WILL STILL BE A CHRONIC PROBLEM BETWEEN THE OUTLET AND THE PIPES UNDERNEATH THE ROADS ON WHITESELL'S FARM.
6. ALTHOUGH CLEANING THE PIPES AND REMOVING THE ACCUMULATED SEDIMENT WILL HELP MINIMIZE SOME OF THE FLOODING PROBLEMS FOR THE SMALLER STORM EVENTS, A MORE SOLUTION TO THIS PROBLEM MAY BE NEEDED SUCH AS REPLACING EXISTING CULVERTS WITH LARGER CULVERTS, ESPECIALLY FOR THE ROAD CROSSINGS ON WHITESELL'S FARM OR SUBDIVIDING THE EXISTING WATERSHED INTO SMALLER WATERSHEDS WITH SEVERAL MORE DISCHARGE POINTS SO THAT ALL THE FLOW DOES NOT DISCHARGE THROUGH THE SIX FOOT DIAMETER PIPE INTO THE SINGLE TRIBUTARY.
7. IF THE TOWNSHIP WERE TO INSTALL ADDITIONAL CULVERTS UNDER THE ROAD TO ALLOW FOR A GREATER FLOW, THEY WOULD NEED TO ADD A PIPE APPROXIMATELY SIX FOOT DIAMETER FROM RCE CALCULATIONS.
8. RCE WAS NOT ABLE TO FULLY INVESTIGATE THE SITE BECAUSE ROADWAY IS ON PRIVATE PROPERTY. FROM REPORTS OF RESIDENTS, THERE IS EVIDENCE TO SUGGEST THAT THIS ROADWAY IS NOT THE ONLY OBSTRUCTION TO THE FLOW OF WATER. THAT IS WHY RCE URGES THAT A FULL INVESTIGATION OF THE STORMSEWERSHED AND WATERSHED OF THIS SYSTEM HAPPEN BEFORE ANY SOLUTIONS CAN BE PROPOSED.

TABLE 1

STORM SIZE	PEAK FLOW (CFS)
NJ WATER QUALITY (1.25" IN 2 HOURS)	28.77
2 YEAR STORM (3.4" IN 24 HOURS)	114.22
5 YEAR STORM (4.3" IN 24 HOURS)	169.34
10 YEAR STORM (5.2" IN 24 HOURS)	226.56
25 YEAR STORM (6.4" IN 24 HOURS)	304.45
50 YEAR STORM (7.6" IN 24 HOURS)	383.09
100 YEAR STORM (8.8" IN 24 HOURS)	461.90

TABLE 2

PIPE	CAPACITY	PEAK FLOW (CFS)
OUTLET PIPE	FULL	389.19
	HALF (PRESENT)	61.30
PIPES UNDER ROAD	FULL	37.31
	HALF (PRESENT)	5.77



FIGURE A



FIGURE B

SHED IN FIGURE 3

6" Ø OUTLET PIPE

TWO OF THE THREE CULVERTS UNDER THE ROAD. THE THIRD PIPE WAS COMPLETELY COVERED AT THE TIME WHEN THE PICTURE WAS TAKEN.

808 WATERFORD AVE. RESIDENTS COMPLAIN OF MOSQUITOS IN THE CATCH BASIN AND FROM THE OUTLET PIPE BEHIND THEIR HOUSE.

CATCH BASIN CONNECTED TO OUTLET PIPE, ALWAYS HAS STANDING WATER IN IT.



FIGURE C

6" Ø OUTLET PIPE IS BEHIND THIS SHED

CHRISTOPHER C. OBROPTA, Ph.D., P.E.
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DATE

APPROVED

DESIGNED
SPW
CCO

MILESTONE 4 OF REGIONAL STORMWATER MANAGEMENT PLAN FOR THE
POMPESTON CREEK
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLOODING ON WATERFORD AVE, DELRAN, NJ
CULVERT RETROFIT

RUTGERS
New Jersey Agricultural
Experiment Station
WATER RESOURCES PROGRAM
14 COLLEGE FARM ROAD
NEW BRUNSWICK, NJ 08901

JOB	CONCEPT SHEET #
POMP	5
BID	TOTAL
5	12

DRAFT