12-2004

2003 Coastal Illicit Connection Identification and Elimination Grant Project

Jeffrey Marcoux
N.H. Department of Environmental Services

R-WD-03-36

2003 COASTAL ILLICIT CONNECTION IDENTIFICATION AND ELIMINATION GRANT PROJECT

A Final Report to

The New Hampshire Estuaries Project

Submitted by

Jeffrey Marcoux
N.H. Department of Environmental Services
29 Hazen Drive
Concord, New Hampshire 03301

December 2004

This report was funded in part by a grant from the Office of State Planning, New Hampshire Estuaries Project, as authorized by the U.S. Environmental Protection Agency pursuant to Section 320 of the Clean Water Act.

TABLE OF CONTENTS

List of Tables

EXECUTIVE SUMMARY

The New Hampshire Department of Environmental Services (DES) received funds in 2003 from the New Hampshire Estuaries Project (NHEP) to administer grants to coastal municipalities to eliminate illicit discharges into their storm drainage systems. This final report describes the three projects that were funded under this grant. Projects in Dover, Somersworth, and Hampton involved eliminating sewage discharges into storm drainage systems from houses, apartment buildings, and commercial buildings. All of these efforts helped improve water quality in the coastal area by reducing pollution.

NHEP chose to fund illicit discharge detection and elimination projects for a number of reasons. Primarily, this grant was established in order to fulfill several water quality action plans identified in the NHEP Management Plan. In addition, the Coastal/Piscataqua watershed has been identified by DES as a priority watershed in need of restoration. DES has worked in the coastal watershed since 1996 to reduce bacteria inputs that cause the closure of shellfish beds. Finally, the communities that were awarded grants are regulated as small municipal separate storm sewer systems (MS4s) under the Phase II federal stormwater regulation. The financial assistance these municipalities received has helped them comply with one of the requirements of these regulations.

INTRODUCTION

This final report describes a grant program funded by NHEP and administered by DES. A Memorandum of Agreement (MOA) between NHEP and DES created a grant program to provide assistance to coastal communities to identify and eliminate illicit discharges into the storm drain system. A total of $80,000 was made available for assisting municipalities with illicit discharge correction and storm sewer mapping projects. DES issued a request for proposals (RFP), chose grant recipients, and managed the grant agreements. This report provides details on the illicit discharge detection and elimination projects completed by Dover, Somersworth, and Hampton. The deadline for completion of all grant projects was December 31, 2004.

PROJECT GOALS AND OBJECTIVES

The goal of the project was to provide financial and technical assistance to coastal municipalities to identify and eliminate illicit discharges into the storm drainage system.

The project's objectives are derived from several Action Plans identified in the NHEP Management Plan relating to water quality and shellfish resources (see http://www.nh.gov/nhep/publications/pdf/ccmp-ch04-nhep-00.pdf.). One overall goal of the Management Plan is to ensure that New Hampshire's estuarine waters and tributaries will meet standards for pathogenic bacteria including fecal coliform, *E. coli*, and enterococci. Action WQ-4C aims to eliminate illicit connections in Seacoast communities, and Action WQ-7 aims to provide incentives to fix or eliminate illegal direct discharges such as grey water pipes, failing septic systems, and agricultural runoff. Lastly, Action SHL-2 is to identify sources of, and

reduce or eliminate, contaminants in the estuaries watersheds. The grant summarized in this report was established to help carry out these action plans.

METHODS

On March 19, 2003, the Governor and Executive Council approved an MOA between the New Hampshire Office of State Planning and DES to implement several NHEP actions to improve the environmental quality of the state's estuaries, including funding for illicit discharge remediation projects.

DES issued a request for proposals (RFP) to all communities within the coastal watershed, announcing the availability of funding for illicit connection remediation. The requirements for the use of the NHEP funds were as follows:

1. The proposed project will eliminate an illicit discharge to a storm drainage system. Remedial activities can include:
   - Removing an illicit connection from the storm drainage system,
   - Reinstalling plumbing to a residence or commercial establishment, and/or
   - Rerouting pollutant discharge to an adequate treatment facility.
2. The proposed project meets the eligibility criteria (see below).
3. Funding must be matched by an equal local (non-federal) share in cash or in-kind services.
4. All projects must be completed by December 31, 2004.

Proposals were received from Dover, Somersworth, and Hampton. DES reviewed the proposals and assessed their merit based on the following criteria:

- Locations of illicit connections are known.
- Illicit connections discharge into a storm drainage system that discharges into State surface waters within the coastal watershed.
- Elimination of the identified illicit connections is supported by town/city officials.
- Property owners are likely to cooperate.
- Practical solutions can be implemented.
- Results can be achieved.

The applications from Dover, Somersworth, and Hampton were accepted using these criteria.

RESULTS AND DISCUSSION

The activities performed as part of each grant are discussed in this section.

Dover

Over the past few years, Dover has been finding and fixing illicit discharges at a rapid pace. The City has attempted to fix all illicit discharges prior to resurfacing many downtown streets. The DES Watershed Assistance Section has collected numerous bacteria samples from the Dover storm drainage system, and DES staff has worked with the city to focus efforts in areas of suspected sewage discharges. The grant work scope was to eliminate three suspected sources of sewage into the storm drainage system, conduct dye and smoke testing at other possible sources,

and to complete additional fixes as time and budget allowed. Table 1 below shows buildings at which connections were made to the municipal sanitary sewer. The Maple Street and Hough Street locations were corrected by re-routing the building sewer service from the drainage system to the sanitary sewer distribution system. The Central Avenue location was corrected by plumbing alterations within the building.

Table 1. Summary of Activities in Dover, NH, 2003 Illicit Connection Identification and Elimination Grant

Illicit discharge eliminated	Cost
178 Central Avenue	$344.89
31 Hough Street	$2,993.04
22 Maple Street	$1,679.95
Total	$5,017.88

The original grant amount for this project was $5,000. The cost of completing the corrections was $5,017.88. With Dover providing 50% match, the total grant funding used was $2,508.94.

Somersworth

The purpose of the Somersworth grant was to detect and remove several illicit discharges into the City's storm drainage system. Before the grant project started, the DES Watershed Assistance Section had identified sewage discharges in the storm drainage system in Somersworth. Storm drainage for most of the central part of the city collects and discharges through one large outfall pipe on the Salmon Falls River. Bacteria (*E. coli*) levels from this pipe were consistently high and ranged between 1,900 and 18,000 cts/100 mL. DES investigated the storm drainage system and identified several "hot spots" by bacteria sampling and working with the city to smoke test in certain areas. Numerous samples were taken near suspected cross-connections on Freemont Street and South Street. Results as high as 24,000 cts/100mL for *E. coli* were encountered

The goal was to pinpoint and then eliminate the illicit discharges identified by DES and the City, and to continue the process of testing for additional cross-connections. Smoke testing was conducted by Somersworth DPW staff, and Rob Livingston of DES, in the areas of Highland, Washington, Myrtle, Brick, Bourque, Grand, and Union Streets. Smoke tests pinpointed potential cross-connections at 18 Bourque Street and 4 Grand Street.

Work still needs to be completed to eliminate the cross-connections found. The corrections were not completed by the end of the project cycle due to weather related delays. Somersworth was therefore not able to complete all of the tasks required under the contract agreement, and could not receive full payment. Somersworth intends to apply for a FY2005 grant in order to obtain the funding required to continue their illicit connection detection and repair activities.

The original grant amount for this project was $9,265.00. The grant amount requested for the work that the City was able to complete prior to December 31, 2004 was $1,726.30. Somersworth provided 50% non-federal match for the total project cost of $3,452.60.

Hampton

Outfall I.D. #OF02 was determined to have high concentrations of fecal coliforms from the May 2003 DES TMDL study and as such was the main focus of the project. Samples were

collected from catch basins and inlets within the catchment area during periods of no rain, mainly from direct flows and tested at either Hampton Public Works or ESI labs. By tracing back the high counts measured at various catch basins, a local area was determined to be the main vicinity of pollution to the specific outfall. However, collected samples varied in the extent of their contamination causing complications in actually pinpointing the source.

Bacterial indicator testing took place in the drainage system located along Park Avenue, starting at Tuck Field, up to Lafayette Road, then to the corner of Winnacunnet Road.

The southerly 24" culvert (#OF03) did not exhibit bacteria counts as substantial as the upper culvert. It is believed that the lower culvert serves a small area comprised of the Winnacunnet High School playing fields.

The results from the May 2003 TMDL study also recognized another area of potential illicit discharge located near the Hampton Police Station. These outfalls located near Ashworth Avenue were tested, one was found to have a high count of fecal coliform. Further investigation is yet to be performed at this location but planned for this spring.

In addition to the illicit discharge detection activities, the Hampton project had a mapping component which was used to augment with the investigations. Hampton examined existing data and old drainage maps for the area to create a directional drainage map. This map was used during the investigation to locate the sources of pollution. Dye testing the surrounding businesses near the contaminated sampling sites was performed in an attempt to pinpoint cross-connections. The Galley Hatch and the Hampton Cinema were thoroughly tested; however, no traces of dye were found in the adjacent drainage system. Further investigations will involve re-sampling tested areas that showed high bacteria counts and follow up with more local dye testing. A list of the follow up work areas was provided by the Town in a final report to DES.

Within the available time frame, Hampton was unable to pinpoint illicit connections to the stormwater system. However, they were able to further focus their testing locations, and create maps that will assist in illicit discharge elimination efforts in the future. They will continue to sample and schedule additional dye testing in the area to determine if a direct source of contamination exists.

A significant component of this project involved the analysis of multiple drainage areas and a tributary to Hampton Harbor. This work was conducted by Civil Design Engineering Consultants of Newfields, NH. The elements of the analysis included identification of key outfall locations, delineation of the watershed boundaries for each identified outfall, calculation of drainage area for each identified outfall, calculation of estimated flow for each outfall at 10, 25, and 50 year storm events, calculation of estimated future flows for buildout conditions, and preparation of data maps for use with the Town GIS.

The stormwater calculations were identified using existing and future stormwater characteristics of six drainage basins (in the downtown area of Hampton) and seven analysis points were completed through computer modeling. The report describes existing and estimated peak flow and a comparison with calculated outlet capacity. The report provided quantitative stormwater information that the Town can use in preparing for future development and managing water quality impacts from stormwater discharge at these outfalls.

The original grant amount for this project was $8,700.00. Hampton used $5,862.00 of the grant and provided $5,877.00 in non-federal match for the total project cost of $11,793.00. The

report prepared by Civil Design Engineering Consultants is on file with the Town of Hampton, 100 Winnacunnet Road, Hampton, NH 03842 and at the DES Watershed Assistance Section in Concord.

CONCLUSIONS AND RECOMMENDATIONS

Each of the grant recipients was able to utilize the NHEP grant funding to pinpoint illicit discharge sources, or make significant progress toward those goals during the project period. Additionally, Dover was able to remove three confirmed illicit discharges. Although DES has not measured the changes in receiving waters, we are encouraged by the progress these municipalities have made towards improving water quality. The grants described in this final report complemented DES's efforts and helped foster a partnership between DES and the communities in order to solve some of the water quality problems in the Coast. Table 2 summarizes the final project costs under this grant.

Table 2. 2003 Coastal Illicit Connection Identification and Elimination Grant Amounts

Grant recipient	Grant amount	Match amount	Total project cost
Dover	$2,508.94	$2,508.94	$5,017.88
Somersworth	$1,726.30	$1,726.30	$3,452.60
Hampton	$5,862.00	$5,877.00	$11,739.00
Total	**$10,097.24**	**$10,112.24**	**$20,209.48**

Based on the experience of the 2003 grant, the following changes are recommended for future grant opportunities with NHEP.

- Continued funding for illicit discharge remediation is recommended. Significant progress has been made toward eliminating illicit discharges with the help of this grant, however there is still a lot of work to be done. For example, there are several towns with suspected, or known, cross-connections that have not yet been repaired due to time or cost constraints.
- Beginning with the FY2005 grants DES will be requesting that final reports be submitted in November. This should allow DES sufficient time to prepare final reports for NHEP.

APPENDIX

Figure 1: Example Hampton Sewer map

Sample No.	Date Collected	Time	Rainfall - 48hrs	Location	Results (cfu/100mL)	Comments
1	20-Jul	9:38am	0.12	Upper culvert 101	431	Upper- closest to exit
2	20-Jul	9:41am	0.12	Lower culvert 101	342	Lower- school playing fields
3	20-Jul	9:50am	0.12	Behind High School	27	Standing Water - N/A
4	3-Aug	9:50am	0.00	Lower culvert 101	89	
5	3-Aug	9:55am	0.00	Upper culvert 101	227	
6	3-Aug	10:10am	0.00	Behind High School	0	Taken from direct outfall
7	3-Aug	10:20am	0.00	Culvert Behind School Road	298	Tracing back upper culvert
8	25-Aug	12:00pm	0.00	Tuck Field Park/ Park Ave	688	Taken directly from outfall
9	25-Aug	12:32pm	0.00	Eaton Park	50	
10	25-Aug	12:50pm	0.00	Behind Elementary School	50	
11	25-Aug	12:52pm	0.00	Behind Elementary School	50	
12	2-Sep	10:50am	0.00	Park Ave	378	Tracing back #8
13	2-Sep	10:58am	0.00	Park Ave	570	Tracing back #12
14	2-Sep	11:15am	0.00	Park Ave Complex Pkg Lot	2	
15	2-Sep	11:40am	0.00	Eaton Park	1	
16	14-Sep	9:24am	0.00	Stickney Terr	550	Sample Analysis - ESI
17	14-Sep	9:30am	0.00	Back of Sanborn Candies	1	Sample Analysis - ESI
18	14-Sep	9:50am	0.00	Front of Sanborn Candies	365	Sample Analysis - ESI
19	5-Oct	10:28am	0.00	Galley Hatch Pkg Lt- Lafayette Rd	128	Sample Analysis - ESI
20	5-Oct	10:35am	0.00	Wok Express- Lafayette Rd	45	Sample Analysis - ESI
21	5-Oct	10:40am	0.00	Prudential- Lafayette Rd	less than 1	Sample Analysis - ESI
22	5-Oct	10:50am	0.00	Lafayette Rd- near Y-median, adjacent to Park Ave.	55	Sample Analysis - ESI
23	26-Oct	10:58am	0.00	In front of Galley Hatch -Pkg Lt	25	no flow, dipped
24	26-Oct	11:05am	0.00	In front of Bean Insurance -Pking Lt	25	no flow, dipped
25	26-Oct	11:19am	0.00	Behind Galley Hatch -Pking Lt	10	Very Dirty -no flow, dipped
26	2-Nov	10:30am	0.00	Galley Hatch Pkg Lt- #19 retested	25	
27	2-Nov	10:50am	0.00	Tuck Field Park (1 C.B. back from #8)	25	High Flow -most likely sump pump
28	9-Nov	9:35am	0.03	Tuck Field Park #8 retested	less than 1	Directly from outfall
29	9-Nov	9:42am	0.03	Culvert Outlet - Park Ave	less than 1	Small Flow
30	9-Nov	9:56am	0.03	Lafayette- Executive Office	234	Standing Water - No flow on culvert inlet
31	23-Nov	10:30am	0.07	Front of Sanborn- manhole w/ sewer pipe	35	Small Flow
32	23-Nov	10:38am	0.07	Front of Cinema sign- tie in from Pruden. & Galley	262	
33	23-Nov	10:51am	0.07	Behind Park Ave. Business. Office, ties to culverts	24	No flow from upper culvert, only right side
34	2-Dec	12:10pm	1.08	Police HQ Culvert left	22	Low Flow
35	2-Dec	12:10pm	1.08	Police HQ Culvert right	169	Low Flow
36	2-Dec	12:20pm	1.08	Police HQ Culvert backside	2	Low Flow

Figure 2: Hampton Sampling Results