



12-2004

2003 Coastal Municipal Stormwater Infrastructure Mapping Project

Jeffrey Marcoux
N.H. Department of Environmental Services

Follow this and additional works at: <https://scholars.unh.edu/prep>



Part of the [Marine Biology Commons](#)

Recommended Citation

Marcoux, Jeffrey, "2003 Coastal Municipal Stormwater Infrastructure Mapping Project" (2004). *PREP Reports & Publications*. 283.
<https://scholars.unh.edu/prep/283>

This Report is brought to you for free and open access by the Institute for the Study of Earth, Oceans, and Space (EOS) at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in PREP Reports & Publications by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact Scholarly.Communication@unh.edu.

2003 COASTAL MUNICIPAL STORMWATER INFRASTRUCTURE MAPPING 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 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

TABLE OF CONTENTS	i
EXECUTIVE SUMMARY.....	1
INTRODUCTION	1
PROJECT GOALS AND OBJECTIVES.....	1
METHODS.....	1
RESULTS AND DISCUSSION	2
Seabrook.....	2
Farmington	3
Durham.....	3
Dover	4
Somersworth	4
North Hampton	5
CONCLUSIONS AND RECOMMENDATIONS	5

List of Tables

Table 1. 2003 Coastal Municipal Stormwater Infrastructure Mapping Grant Project Costs	5
---	---

EXECUTIVE SUMMARY

The New Hampshire Department of Environmental Services (DES) received funds in 2003 from the New Hampshire Estuaries Project (NHEP) to provide assistance to coastal communities to develop storm sewer infrastructure maps. This final report describes the grant projects that were completed in Farmington, Dover, Durham, Seabrook, Somersworth, and North Hampton.

NHEP chose to fund stormwater infrastructure mapping projects for a number of reasons. Primarily, this grant was established in order to fulfill one of the 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. Updated and comprehensive maps are a valuable tool for identifying pollution sources in the storm drainage system. Finally, five of 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 the Phase II regulations.

INTRODUCTION

This final report describes the 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 develop storm sewer infrastructure maps. DES issued a request for proposals (RFP), chose grant recipients, and managed the grant agreements. This report provides details on the grant projects completed by Farmington, Dover, Durham, Seabrook, Somersworth, and North 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 map their storm drainage systems. The project's objective is derived from one of the Action Plans identified in the NHEP Management Plan relating to water quality (see <http://www.nh.gov/nhep/publications/pdf/ccmp-ch04-nhep-00.pdf>.) Action WQ-4B aims to assist Seacoast communities in completing and maintaining maps of sewer and stormwater drainage infrastructure maps. The grant summarized in this report was established to help carry out this action plan.

METHODS

On March 19, 2003, the Governor and Executive Council approved a MOA between the New Hampshire Office of Energy and Planning and DES to implement several NHEP actions to improve the environmental quality of the state's estuaries, including funding for municipal stormwater infrastructure mapping.

On April 18, 2003 DES issued a request for proposals (RFP) to all communities within the coastal watershed, announcing the availability of \$80,000 for storm drainage system

mapping, and illicit discharge detection. The deadline for submissions was June 18, 2003. The requirements for the use of the NHEP funds were as follows:

1. Maps should show catch basins, underground and above ground storm drainage, direction of flow, and outfall locations.
2. Maps must have the ability to be stored electronically, using a system that is compatible with the computer mapping system the municipality uses. Ideally, the system would also be compatible with the NH GRANIT system, so that regional planning commissions and other interested parties can use the data.
3. The proposed project meets the program criteria, as specified in the Request for Proposal (RFP). Criteria listed below. The criteria include a 50% local (non-federal) match.
4. All projects must be completed by December 31, 2004.
5. All projects must be within the coastal watershed.

DES reviewed the proposals and assessed their merit based on the following criteria:

1. Proposals were submitted by eligible municipalities (NH coastal watershed).
2. Maps should be available in an electronic form consistent with the Town or City's GIS system. It is encouraged that the mapping format be compatible with regional planning commissions and the NH GRANIT system.
3. Maps should ideally show all of the following details:
 - catch basins
 - underground and above-ground (ditches, swales) storm drainage
 - direction of flow
 - outfall locations
4. If the town lies on the Coastal/Merrimack watershed boundary, NHEP funding will only apply to the part of town that drains into the Coastal watershed.

Six grant applications were deemed to be eligible and acceptable projects. Grant Agreements were developed for each project and approved by the town or city managers, the DES commissioner, and the NH Governor and Executive Council.

RESULTS AND DISCUSSION

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

Seabrook

The Town contracted with Earth Tech, Inc to complete the work described in the Grant Application. Field reconnaissance was completed to identify locations where structures were not identified by the Town's 2001 aerial mapping. The Cains Brook watershed was identified as a priority and work was concentrated in this area. Data gaps were identified and characterized and a meeting was then held with the Town to discuss survey needs. More than 370 structures were inspected. During review of the data, over 120 locations were identified where a certain structure, such as a catch basin or storm drain manhole, was witnessed in the field, but did not show on the Town's maps. These locations were identified and later surveyed to determine horizontal and vertical positioning. The acquired field data was used to further populate the

database and GIS layers for catch basins, drainage manholes and drain lines.

After the fieldwork was completed and the database updated, two final maps were created. The first map shows an overall view of the town and indicates the extent to which drainage features have been incorporated using the available paper records and field investigations. The second map highlights the Cains Brook watershed area where structure inspections were completed. The mapping was developed to suit 1"= 40' scale production. In addition, the data linked to the map was summarized in spreadsheet form.

The grant amount for this project was \$19,200. Seabrook provided \$19,200 in non-federal match, for a total project cost of \$38,400. Maps and data are available from the Town of Seabrook, 99 Lafayette Road, Seabrook, NH 03874. The maps and data are also on file at Department of Environmental Services, Watershed Assistance Section in Concord.

Farmington

Using funding from the NHEP 2003 grant, Farmington was able to field verify drainage feature types and locations using Trimble Pathfinder Pro GPS equipment, with real-time differential correction. The Town documented 233 drainage features and 211 link features, or pipes. Some of the structures' attributes were also documented at this time. All features were digitized into the Town's GIS map. Strafford Regional Planning Commission (SRPC) was enlisted to perform the GIS data processing and mapping. SRPC staff also assisted in some field verification of structures and preparation of the final report.

Any features that could not be verified at this time were entered into the GIS datasets as unknown nodes. SRPC created unknown node spreadsheet tables so that the Town can continue to gather information and update the data in the future.

Prior to the completion of this project Farmington had no maps or other documentation of the existing storm drainage structure. The maps created will be critical in helping the Town comply with Phase II regulations. The Town will use the data collected as a basis for an ongoing effort to map the entire Farmington drainage system.

The grant amount for this project was \$6,850. Farmington provided \$7,791.50 in non-federal match for a total project cost of \$14,641.50. Copies of the maps are on file with the Town of Farmington, 41 South Main Street, Farmington, NH 03835. The maps are also on file at Department of Environmental Services, Watershed Assistance Section in Concord.

Durham

Durham used their FY2003 NHEP grant funding to complete GIS mapping in the town. A road survey of all structures and outfalls within the designated MS4 area was completed, and then structures were located using GPS equipment. The only remaining data collection involves the determination and cataloging of all of the catch basin invert elevations. Durham intends to continue locating structures using GPS equipment including catch basin invert elevations, and the structures outside of the MS4 area until they are all catalogued and added into the GIS layer.

Geo Vantage was contracted to perform a digital imagery fly-over of the town. The University of New Hampshire (UNH) assisted in compiling the data and creating GIS data layers. The University was in the process of mapping their own drainage structure at the same

time. It was determined that there was significant overlap between the UNH and Durham systems to work cooperatively to finance and complete the storm system mapping process for both systems.

The grant amount for this project was \$11,285. Durham and UNH provided \$24,370 in non-federal match, for a total project cost of \$35,655. Copies of the maps are on file with the Town of Durham, Department of Public Works, 100 Stone Quarry Drive, Durham, NH 03824.

Dover

The entire city of Dover is considered an “urban area” by the U.S. Census Bureau and is therefore regulated as an MS4 under the federal Phase II stormwater program. Prior to receiving the 2003 NHEP grant, Dover had completed mapping of its underground drainage system, which covers mainly the downtown area. The City of Dover used the 2003 grant award to create maps of their above-ground drainage structures. This completed the mapping for Dover’s entire municipal storm drainage system. A total of 12.28 miles of ditches, 18 swales, 235 culverts, 6 retention ponds, and 12 detention ponds were cataloged.

Grant money was also used to create a set of comprehensive map books depicting all drainage structures. These map books will be used by field crews to help locate drainage features for standard maintenance and repair as well as incident response.

The total project costs were budgeted at \$11,400. This grant provided \$5,700 (50%) of the project costs and the City of Dover provided the remaining costs through cash and in-kind services. By the completion of this project, Dover had spent \$9,591.17 in matching funds, for a total project cost of \$15,291.17. The additional costs over the projected budget were incurred due to the amount of resources used in creating maps. Copies of the maps are on file with the City of Dover, 288 Central Avenue, Dover, NH 03820.

Somersworth

For the 2003 NHEP grant cycle the City of Somersworth was awarded grants for both Storm Drainage System Mapping and for Illicit Discharge and Detection projects. For the mapping project, the City hired an intern to collect and process data under supervision of the City Engineer.

Existing as-built plans were reviewed and then field verified. GPS data was collected using equipment loaned to the City by the University of New Hampshire Cooperative Extension Service. Structures that were missing or inaccurately located on the existing City GIS maps were updated. This project involved mapping Wards I, IV, and V of the City’s five voting wards. Somersworth estimates that this project completed mapping of 75% of the City’s drainage infrastructure. Somersworth has expressed interest in continuing their storm sewer mapping and illicit discharge connection projects, and plans on submitting an application for FY2005 grant money.

The grant amount for this project was \$5,000 with Somersworth providing an additional non-federal match of \$6,265 for a total project cost of \$11,265. Copies of the updated GIS maps are on file with the City of Somersworth, One Government Way, Somersworth, NH 03878.

North Hampton

The grant funds awarded to North Hampton were used to identify and map all drainage structures within the limits of the municipal MS4 area. During the summer of 2004, town personnel and contracted assistants collected GPS location and attribute data. The field collected data was processed and compiled to create a GIS model of the North Hampton storm sewer system. This map layer was then overlaid upon the existing GIS tax map data. The data was used to print hardcopy maps and drainage feature indices for use by the Town staff. A GIS data layer was created to allow continued updates to the map by James Verra and Associates, Inc. which maintains the GIS information files for the Town.

Data collected for each structure includes an identification number, type, size, and condition of the structure. During this project, the Town mapped the following features within the designated MS4 area: 86 catch-basins, 3 drain-manholes, 40 outfalls, and 81 culvert inlets and outlets. The Town plans to immediately be able to use the data generated to monitor the condition and maintenance history of the drainage structures. North Hampton plans to build upon the GIS layers created to continue mapping the entire town as resources become available.

The grant amount for this project was \$7,060 with the Town providing an additional \$7,060 in non-federal match for a total project cost of \$14,120. Copies of the maps and drainage feature index are on file at NHDES Watershed Assistance Section in Concord, or available from the Town of North Hampton, 237 Atlantic Avenue, North Hampton, NH 03862.

CONCLUSIONS AND RECOMMENDATIONS

This grant has assisted these communities in complying with federal Phase II stormwater requirements, and has alleviated some of the strain on municipal budgets. The grant has continued to foster positive relationships between municipalities and DES. Using the products of these grant projects, municipalities can increase pollution source reduction by removal of illicit discharges that are found through investigations using the improved tool of up-to-date and accurate storm drain infrastructure maps. DES and coastal municipal staff rely on these maps during illicit discharge detection surveys. Efficiency during the investigations is improved using the new maps that show the infrastructure components and flow patterns. Table 1 summarizes the final project costs under this grant.

Table 1. 2003 Coastal Municipal Stormwater Infrastructure Mapping Grant Project Costs

Grant recipient	Grant amount	Match amount	Total project cost
Seabrook	\$19,200.00	\$19,200.00	\$38,400.00
Farmington	\$6,850.00	\$7,791.50	\$14,641.50
Durham	\$11,285.00	\$24,370.00	\$35,655.00
Dover	\$5,700.00	\$9,591.17	\$15,291.17
Somersworth	\$5,000.00	\$6,265.00	\$11,265.00
North Hampton	\$7,060.00	\$7,060.00	\$14,120.00
Total	\$55,095.00	\$74,277.67	\$129,372.67

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

- A project completion date prior to the NHEP final reporting deadline is desirable. Given the time it takes the municipalities to submit final work products after the completion of the project, it frequently does not give DES staff enough time to review the documents and incorporate them into the final report to NHEP prior to the reporting deadline. Beginning with the FY2005 grant cycle DES will request that final reports from the municipalities be submitted in November.
- Additional funding for this grant is recommended until most communities in the coastal watershed have adequate maps. This grant program was viewed very positively by communities, and there is continued interest, particularly among regulated MS4s, for the grant to be offered again.