Appendix Contents

Consent Order

Memorandum of Understanding

Proposed Memorandum of Agreement

Town and the Center for Watershed Protection Correspondences

Department of Public Works Proposed Budget

Town Flyers and Brochures

Department of Environmental Protection and the Environmental Protection Agency Sample Flyers and Brochures

Storm Water Pollution and Management Program Report – December 1996

Integrated Pest Management Policy

"An Act Protecting Children and Families From Harmful Pesticides"

Consent Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

IN THE MATTER OF:	)	DOCKET NO. 96-08
	)	
TOWN OF NEEDHAM MASSACHUSETTS	)	FINDINGS OF VIOLATION
	)	AND
Proceedings under Section 309(a)(3) of the Clean Water Act, as amended, 33 U.S.C. §1319(a)(3)	)	ORDER FOR COMPLIANCE

STATUTORY AUTHORITY

The following findings are made and ORDER issued pursuant to Section 309(a)(3) of the Clean Water Act, as amended (the "Act"), 33 U.S.C. §1319(a)(3). Section 309(a)(3) grants to the Administrator of the U.S. Environmental Protection Agency ("EPA") the authority to issue orders requiring persons to comply with Sections 301, 302, 306, 307, 308, 318 and 405 of the Act and any permit condition or limitation implementing any of such sections in a National Pollutant Discharge Elimination System ("NPDES") permit issued under Section 402 of the Act, 33 U.S.C. §1342. This authority has been delegated to EPA's Regional Administrators.

The Order herein is based on findings of violations of Section 301 of the Act, 33 U.S.C. §1311. Pursuant to Section 309(a)(5)(A) of the Act, 33 U.S.C. § 1319(a)(5)(A), the Order provides a schedule for compliance which the Regional Administrator has determined to be reasonable.

FINDINGS

The Regional Administrator makes the following findings of fact:

1. The Town of Needham (the "Town") is a municipality, as defined in Section 502(4) of the Act, 33 U.S.C. §1362(4), established under the laws of the Commonwealth of Massachusetts, and, as such, is a person under Section 502(5) of the Act, 33 U.S.C §1362(5).
2. The Town is the owner and operator of separate stormwater drains, which collect, convey, and discharge stormwater to receiving waters. These drains discharge to the Charles River, a Class B waterway and navigable water under Section 502(7) of the Act, 33 U.S.C.§1362(7), and are point sources, as defined in Section 502(14) of the Act, 33 U.S.C. §1362(14).
3. On January 25, 1994, EPA issued an information request letter to the Town pursuant to Section 308(a) of the Clean Water Act, 33 U.S.C. §1318(a). The letter required that the Town submit information regarding dry weather discharges from its stormwater discharge pipes to EPA and the Massachusetts Department of Environmental Protection ("MADEP") by June 30, 1995. Dry weather was defined as a period of at least 72 hours in which there was no precipitation and no snow melt. The required information included;
   a. Maps showing the location and size of each of the Town's stormwater discharge pipes, and the runoff area tributary

to each pipe.

b. Visual observation of each of the Town's stormwater discharge pipes into the Charles River to determine whether the discharge is active during dry weather.

c. Sampling of each of the active dry weather discharges for fecal coliform bacteria, among other pollutants, to determine whether the discharge contains pollutants which would indicate illicit connections to the system.

d. A plan and schedule for eliminating the discharge of any pollutants during dry weather.

On May 18, 1995 EPA extended the submittal date to September 15, 1995.

4. On September 15, 1995, the Town of Needham submitted the required information. The information shows that:

a. The Town has 8 storm drains and two tributaries discharging to the Charles River during dry weather.

b. The dry-weather discharges from six of the storm drains and one tributary include fecal coliform bacteria in excess of Massachusetts Water Quality Standards. The discharges from storm drains which exceed water quality standards during dry weather are designated N1B, N1, N14B, N14, N19, and N22 (the "identified storm drains"). A description of these discharges and the fecal coliform bacteria measured in the discharges is shown on Attachment 1.

5. The dry-weather discharges of pollutants from storm drains

described in the preceding paragraph are not discharges of "storm water" as defined in 40 C.F.R. § 122.26 (b)(13).

6. Fecal coliform bacteria is a pollutant, as defined in Sections 502(6) and (12) of the Act, 33 U.S.C. §§ 1362(6) and (12).

7. Section 301(a) of the Act, 33 U.S.C. §1311(a), makes unlawful the discharge of pollutants to waters of the United States except in compliance with, among other things, the terms and conditions of an NPDES permit issued pursuant to Section 402 of the Act, 33 U.S.C. §1342. The Town of Needham is not authorized by an NPDES permit or any other provision of the Act to discharge pollutants from its storm drains. The dry-weather discharges described above are therefore a violation of Section 301(a) of the Act, 33 U.S.C. § 1311(a).

ORDER

Accordingly, pursuant to Section 309(a)(3) of the Clean Water Act, it is hereby ordered that the Town shall comply with the following schedule:

1. By April 30, 1996:

   a. submit a list of any illicit connections or potential illicit connection locations resulting from the preliminary investigations.

2. By May 31, 1996:

   a. obtain funding for conducting a comprehensive investigation ("the investigation") to determine the

sources of non-stormwater pollutants into the identified storm drains.

b. obtain partial funding for removal of illicit connections discovered during the investigation or make available the use of its own labor force for such removal work (an amount of at least twenty-five thousand dollars, or if carried out by its own labor force the equivalent value of labor and materials, shall be budgeted for this purpose).

3. By June 14, 1996 submit notification of the status of funding for items 2.a., and 2.b. above.

4. By July 1, 1996 execute a contract for completing the investigation.

TOWN

5. By November 30, 1996:

a. complete the investigation and submit a report documenting the findings. The report shall include a list of illicit connections, the estimated flow from the connections, and the estimated cost of removing the connections.

BETA

b. the report shall also state whether the City believes that third parties are responsible for the work necessary to remove any of the illicit connections. If so, the report shall identify any such connections and describe the actions to be taken by the City to ensure that these connections are removed by December 31, 1997. The City shall thereafter take all actions necessary to ensure the

removal of these connections by December 31, 1997.

c. if the City believes that it is impossible to remove or ensure the removal of all illicit connections to the identified storm drains by December 31, 1997 despite all reasonable efforts, the November 30, 1996 report shall document why the City considers this to be the case, and the EPA and the City shall then discuss whether changes to this Order are appropriate.

d. the City may in some cases be entitled to reimbursement from third parties for the work necessary to remove illicit connections. Nothing in this Order shall be construed to make the City responsible for costs which would ordinarily be borne by third parties.

6. By February 28, 1997 complete the design of projects necessary to remove illicit connections to the identified storm drains.

7. By May 31, 1997;

a. obtain funding for completing the removal of illicit connections to the identified storm drains.

b. submit a monitoring plan designed to demonstrate the removal of all illicit connections to the identified drains. The monitoring plan shall include an implementation schedule which will provide demonstrations, within 60 days of the date this order requires elimination of illicit connections (i.e. by March 2, 1998), as to whether all illicit connections have been removed. If EPA does not require modifications

to the plan, it shall be implemented as proposed. If EPA does require modifications to the plan, it shall be implemented as modified.

8. By June 14, 1997 submit notification of the status of funding for item 7(b) above.

9. By December 31, 1997 complete the removal of illicit connections to the identified storm drains.

10. By March 2, 1998 submit the results of the monitoring described in item 7.b. above for the identified drains.

NOTIFICATION PROCEDURES

1. Where this Order requires a specific action to be performed within a certain time frame, the Town shall submit a written notice of compliance or noncompliance with each deadline. Notification must be mailed within fourteen (14) days after each required deadline. The timely submission of a required report shall satisfy the requirement that a notice of compliance be submitted.

2. If noncompliance is reported, notification should include the following information:

   a. A description of the noncompliance;

   b. A description of any actions taken or proposed by the Town to comply with the elapsed schedule requirements;

c. A description of any factors which tend to explain or mitigate the noncompliance;

d. An approximate date by which the Town will perform the required action.

3. After a notification of noncompliance has been filed, compliance with the past requirement shall be reported by submitting any required documents or providing EPA with a written report indicating that the required action has been achieved.

Submissions required by this Order shall be in writing and should be mailed to the following addresses:

Harley Laing, Director
Office of Environmental Stewardship
U.S. Environmental Protection Agency
JFK Federal Building - SEW
Boston, MA 02203
Attn: Water Technical Unit

Massachusetts Department of Environmental Protection
One Winter Street
Boston, MA 02108
Attn: Marcia Sherman

Massachusetts Department of Environmental Protection
Northeast Region
10 Commerce Way
Woburn, MA 01103
Attn: David Ferris

GENERAL PROVISIONS

1. The Town may, if it desires, assert a business confidentiality claim covering part or all of the information requested, in the manner described by 40 C.F.R. § 2.203(b). Information covered by such a claim will be disclosed by EPA only to the extent, and by means of the procedures, set forth in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is received by EPA, the information may be made available to the public by EPA without further notice to the Town. The Town should read the above-cited regulations carefully before asserting a business confidentiality claim since certain categories of information are not properly the subject of such a claim. For example, the Clean Water Act provides that "effluent data" shall in all cases be made available to the public. See Section 308(b) of the Act, 33 U.S.C. § 1318(b).

2. This Order shall become effective upon receipt by the Town.

4/9/96

Date

John P. DeVillars
Regional Administrator
Environmental Protection Agency
Region I

Department of Public Works
Proposed Budget

DPW
Storm Drains
FY 2004
Budget Details

PURCHASE OF SERVICES Object Codes 2100 - 3801		Storm Drains 4403	NPDES Phase II 4404	Total
Repairs & Maintenance	*24X*			
Replace 0.1% of pipes per year (475 ft. ±)		$0	$28,500	$28,500
Rentals & Leases	*27X*			
Uniforms		$671	$0	$671
Other Property Related Services	*29X*			
Pipe cleaning		$0	$14,256	$14,256
Annual cleaning @ 4,750 ft./yr. - 1.0% of total system				
Jet flushing @ 19,000 ft./yr. - 4.0% of total system (40% of annual inspection)				
Professional & Technical Services	*30X*			
CCTV inspection of storm drains		$0	$47,250	$47,250
47,500 ft./yr. - 10% of total system annually				
Other - Street Cleaning	*38X*			
Street Cleaning		$20,000		
Catch Basin debris disposal		$13,850		
Street Sweeping debris disposal		$18,150		
		$52,000	$0	$52,000
Other - Brook/Culvert Light Cleaning	*38X*			
		$0	$50,000	$50,000
Purchase of Services Subtotal				$192,677

SUPPLIES & EXPENSES Object Codes 4200 - 6800		Storm Drains 4403	NPDES Phase II 4404	Total
Grounds Keeping Supplies	*46X*			
Grass Seed & Fertilizer		$100	$0	$100
Vehicular Supplies	*48X*			
Diesel & Gasoline		$3,000	$1,400	$4,400
Public Works Supplies	*53X*			
(i.e. precast manholes, frames, covers, grates, concrete block, and stone)		$5,000	$30,000	$35,000
Travel/ Conferences	*61X*			
		$0	$500	$500
Dues & Subscriptions	*63X*			
APWA/ NEWEA/ WEF		$250	$0	$250
Other Expenses	*68X*			
Other		$450	$0	$450
Supplies & Expenses - Subtotal				$40,700

#6

STORMWATER MANAGEMENT PROGRAM

LINE NO.	ITEM	APPROPRIATED FY02	APPROPRIATED FY03	PROPOSED FY04
Purchase of Service				
24X	Repairs & Maintenance: Defective pipe replacement @475 ft./yr.-0.1% of total system	$0	$9,500	$28,500
29X	Other property related: Annual cleaning @4750 ft./yr - 1.0% of total system, and jet flushing @19,000 ft./yr. - 4% of total system	0	3,800	14,256
30X	Professional & technical: CCTV inspect pipe@47,500 ft./yr - 10% of total system	0	15,840	47,250
38X	Other: Additional street cleaning increase from 1 to 2 times/yr.	0	0	20,000
38X	Other: Brook & culvert light cleaning 10% of system/yr.	0	0 (50,000 requested)	50,000
38X	Catch basin cleanings disposal	0	0	13,850
38X	Street sweepings disposal	0	0	18,150
		$0	29,140	192,006
Expenses				
53X	Public Works supplies: catch basin replacements 10/yr. (0.25% of total)	5,000	17,000 (35,000 requested)	35,000
61X	Conferences	0	500	500
		5,000	17,500	35,500

*Total length of drain pipe = 90 miles or 475200 ft.

Town Flyers and Brochures

Interior Stain, Paint Thinner, Paint Remover, Turpentine, Wood Preservative, etc...
Recycling and Disposal

In addition to contributing significantly to ground level ozone and air pollution problems, these items are highly flammable and pose a risk to the RTS staff if the materials are disposed of in yellow bags and placed in trash bins.

The following products should be
Recycled at the paint shed:

* Any labeled container with liquid still inside

The following products should be disposed of at home:

* Empty containers

How to dispose of products at home:

* Containers with *very little* liquid in them may be disposed of by leaving the lid off and allowing the product to evaporate, then dispose of empty container in a Needham Yellow Bag.

Unacceptable Materials

Hazardous materials should be brought to:

* Needham's Household Hazardous Waste Day
* Clean Harbors 1-800-444-4244
* www.Cleanharbors.com
* DEP info line 1-800-462-0444

Cost to the Town to dispose of unused paint and related products

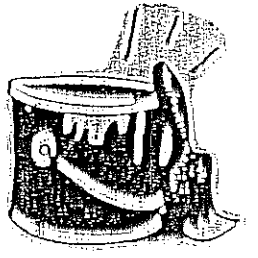
Disposing of unused paint is costly to the Town. The Town must pay the following costs to dispose of unwanted paint and related products. Products are shipped in boxes in their original container. There are approximately 100 gallon containers per box.

$195 per cubic yard box to dispose of latex paint suitable for recycling.

$340 per cubic yard box to dispose of oil bases paints, and special purpose products (such as stains, varnish, polyurethane, paint thinner, etc) for fuel blending.

NOV 2001

NEEDHAM SURPLUS PAINT PROGRAM



Paint reuse and recycling program
2002

Saturdays Only!

April 20
May 18
June 15
July 20
August 17
September 21
October 19

8AM-3:30PM

Sponsored by

Town Of Needham
455-7568

Oil and Alkyd-based Paint, Stain, Varnish, and Polyurethane- Recycling and disposal

Volatile elements in oil and alkyd-based paints, exterior stains, and polyurethane contribute significantly to ground-level ozone and air pollution problems. Whenever practical, residents should avoid using these products. Substantial quantities of leftover oil and alkyd based paint, stain, and polyurethane should be brought to the paint shed for reuse, recycling, or proper disposal. Small quantities may be disposed of at home (see below)

The following paint products should be recycled at the paint drop off:

* Cans of oil or alkyd-based paint, latex paint, stains, paint thinners, enamels, linseed oil, turpentine, or polyurethane that are more than 1/4 full of liquid and in their original container.

The following paint products should be disposed of at home:

* Empty cans
* cans with dried out paint, stain, or polyurethane

How to dispose of oil or alkyd-based paint, stain, or polyurethane at home:

Cans that are less than 1/4 full may be dried out and placed in a Yellow Needham Trash Bag and disposed of in the trash bin.

Latex Paint- Recycling and disposal

Latex paint is not a hazardous waste and may be safely disposed of at the paint drop off area.

The following latex paints may be recycled at the paint drop off:

* Paint can must be at least 1/2 full
* paint must be in it's original can with clear labels

The following latex paints should be disposed of at home:

* When paint can is empty & dried out, empty can may be placed on the ground at the metal recycling area.

How to dispose of latex paint at home:

* Cans with paint should be dried before disposal. To dry large quantities, mix with kitty litter, or pour into the bottom of a cardboard box (make sure the bottom edges are sealed) and allow to dry out, then dispose in a Needham Yellow Bag.

The Town will NOT accept the following at paint collection:

* Wood preservatives, creosote, wood bleach, pesticide, ISO, cyanides (2-part paint), non-paint related products, aerosols, oxidizers, corrosives, or other hazardous materials.
* These materials may be disposed of at the DPW Hazardous Waste Day Collection.

Paint Waste Collection- Types:

Oil/Latex/Stains/Varnishes/ thinners/Polyurethane

April - October

3RD Saturday of each month
8am-3:30pm

Who can Participate

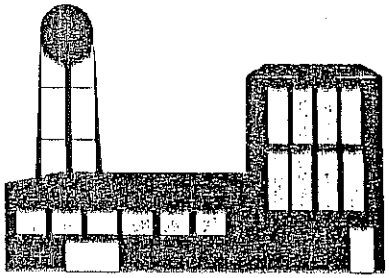
Drop-off is open to Needham residents only. Paint and related products are available free to residents, who hold a current RTS sticker.

Stickers can be purchase though the Treasurers Office Monday - Friday 8:30-5:00 or call 455-7504

Recycle Today-Save Tomorrow

responsible for inspecting and testing each backflow device to ensure it is providing maximum protection.

At your work place - It is the facility owner's responsibility to ensure that every cross connection situation is eliminated and protected by a backflow device. It is also the owner's responsibility to ensure that the device is in working order, and has been registered by the local public water supplier.



What can I do to make sure my water supply is protected from cross connections?

At home -

- Contact your local water supplier to find out what they are doing to prevent cross connection contamination incidents.
- Have all changes to your plumbing system performed by a licensed plumber.
- Do not attach any pesticide, chemical, or any other nonpotable liquid applicators to your water line without proper protection.
- Install hose bibb vacuum breakers on all outside faucets. The hose bibb vacuum breaker isolates garden hose applications, protecting your drinking water supply from contaminants that could be drawn into your home through the hose.

At work -

- Contact your manager or maintenance person to find out if all cross connections within your workplace are protected.
- Find out when/if all backflow preventers have been tested.
- Find out all you can about cross connection control from DEP, your local water department, or a plumbing inspector.

A publication of the MA Dept. of Environmental Protection, One Winter St., Boston, MA 02108

April 2000

Visit this Web site...

www.state.ma.us/dep

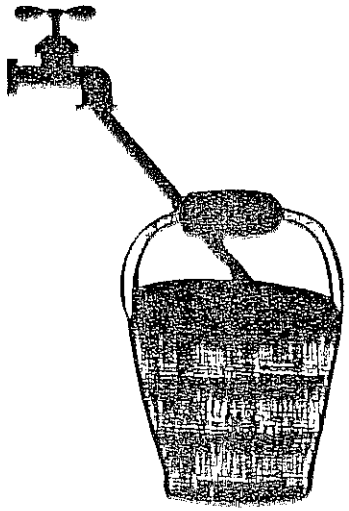
... to learn more about DEP programs, publications, and training

... to get a copy of the drinking water regulations

Printed on 100% recycled post consumer paper.

Protecting Drinking Water in Massachusetts

Cross Connection Control Guide for Consumers



Supported by the Safe Drinking Water Act Assessment.

What is a cross connection?

A cross connection is a interconnection between the potable drinking water line and any connection with non- potable water, gases, or chemicals.

Why should I be concerned about cross connections?

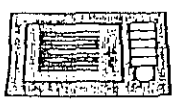
Plumbing cross connections, the actual connection between any pipe carrying potable water and any nonpotable water piping, are public health threats. Two examples of a cross connection are a fire sprinkler system tied in with the drinking water line or a hose left in a wash sink. If the system should lose pressure, the nonpotable liquids will be pulled into the potable lines and cause serious injuries or health related problems to people drinking the water.

Outbreaks of hepatitis A, gastroenteritis, and Legionnaire's disease have been traced to drinking water contaminated by unprotected cross connections.

Lack of proper protection can also cause damage to plumbing fixtures and homes.

How does a cross connection contamination event occur?

Nonpotable water, gases, or chemicals used in equipment or a plumbing system can end up in the drinking water line as a result of backpressure or backsiphonage. Backpressure occurs when the pressure in the system such as an air conditioning unit is greater than the pressure inside the drinking water line.



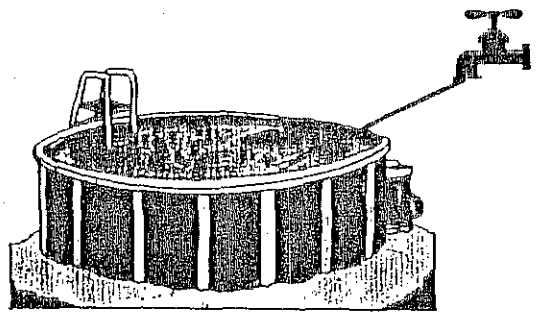
Backsiphonage occurs when the pressure in the drinking water line drops due to fairly routine occurrences such as main breaks, nearby fires and unusually heavy water demand. Contaminants are then sucked out from the equipment or system and into the drinking water line.

Have cross connections been a problem in Massachusetts?

There have been several incidents in which public drinking water contamination occurred due to cross connections. One of the most severe incidents occurred at a Massachusetts college. The entire football team was infected with hepatitis A due to cross connection contamination at a drinking water fountain that was hooked up to an unprotected water line. For more details, or a list of other incidents, contact the Drinking Water Program at 617.292.5770.

Where do we find cross connections in the home?

Garden hoses connected to an outside water tap are the most common sources of cross connections in the home. The garden hose creates a hazard when submerged in nonpotable water such as a swimming pool or when attached to a chemical sprayer for weed-killing. Your drinking water may be contaminated by fertilizer, cesspools, or garden chemicals when connected to a garden hose. Other common sources of cross connections in the home include connections of lawn irrigation systems, boilers, dishwashers, and appliances to the drinking water plumbing. Home businesses such as beauty parlors are locations where cross connections can be found.



Where do we find cross connections at the workplace?

Businesses that must be protected from cross connections include hospitals, laboratories, mortuaries, piers, docks, marinas, chemical plants and metal plating industries. Cross connections can be found in air conditioning or cooling systems, fire protection systems, lawn irrigation systems and high pressure boilers.

How is public drinking water protected from cross connections?

The best way to protect drinking water is to eliminate every cross connection. When this is not possible, drinking water lines are protected from contaminants resulting from cross connections by the installation of backflow devices.

Backflow preventers come in various sizes and types. The device required depends on the health risk associated with the cross connection condition.

Who protects public drinking water from cross connections?

In your neighborhood - Your local public water supplier is required to survey all industrial, commercial, and institutional facilities to make sure that all cross connections are identified and eliminated or protected by a backflow preventer. The water supplier is also

IN ADDITION TO HOUSEHOLD HAZARDOUS WASTE DAYS TWICE A YEAR AT DPW, THE

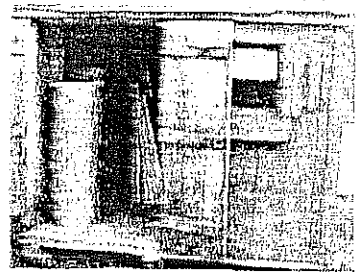
HAZARDOUS MATERIALS BELOW ARE COLLECTED ALL YEAR!

AT THE NEEDHAM RTS DURING NORMAL HOURS UNLESS OTHERWISE NOTED.

Thermometer Exchange Program

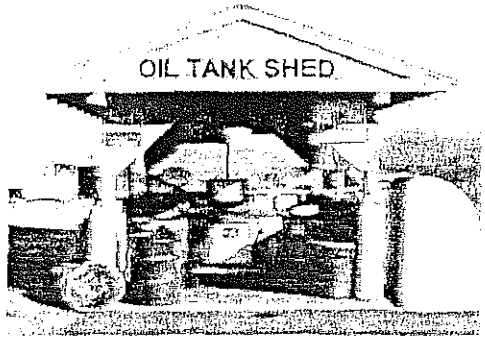
Exchange
Your Glass *Mercury* Fever Thermometer
For a New Digital Thermometer

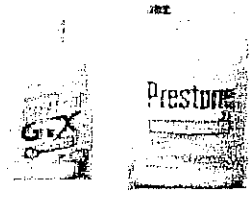
UNIVERSAL WASTE SHED



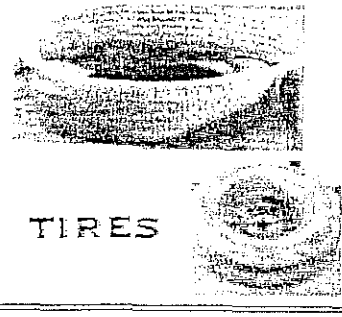
UNIVERSAL WASTES:
Fluorescent Lamps, Rechargeable Batteries, TVs, Computer Monitors, Computers, Electronic Equipment, VCRs, Mercury Thermostats, Mercury-Containing Thermometers

OIL FILTERS & OILY RAGS





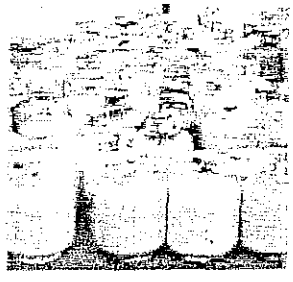
USED OIL & ANTIFREEZE



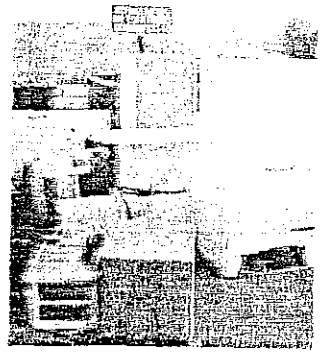
TIRES

INTACT LEAD-ACID BATTERIES (CAR BATTERY, ETC.)

NEW !!!



EMPTY PROPANE TANKS



REFRIGERATORS, AC-UNITS, DEHUMIDIFIERS (CFC EQUIPMENT)

MATERIALS ACCEPTED AT PAINT COLLECTION DAYS:
Oil Paint, Latex Paint, Thinner, Wood Stain, Wood Finish, Paint Remover, Varnish, Polyurethane
ONLY !!!!!!

2002 SCHEDULE

April 20th
May 18th
June 15th
July 20th
August 17th
September 21st
October 19th
SAVE THESE DATES !!!

WASTE PAINT COLLECTION AT RTS

3RD SATURDAY EVERY MONTH (APR-OCT)

NEEDHAM RECYCLING TRANSFER STATION
1421 CENTRAL AVE

ANY QUESTIONS PLEASE CALL DPW AT 781-455-7568

Recycling & Transfer Station (RTS) Fee Schedule — Effective Nov. 1, 2001

Hours of Operation: Tues.-Sat., 7:30 a.m. – 4:00 p.m.

TRASH / HOUSEHOLD AND COMMERCIAL SOLID WASTE

1. ***Pay-Per-Throw Bags:*** (Yellow trash bags are sold at the following Needham retailers: Harvey's Hardware, Birds Hill Pharmacy, CVS Pharmacy, Taylor's Stationery, Roche Brothers Supermarket, and Sudbury Farms Supermarket.
   30 gallon: $10.00 per package of 10 (or $1.00 each)
   15 gallon: $ 5.00 per package of 10 (or $0.50 each)

2. **Commercial Waste:** $100.00 per ton

3. ***Large Bulky Items:*** $5.00 each. Includes, but is not limited to, items such as: rug, couch, stuffed chair, cabinets, large plastic toys, end table, coffee table, kitchen table, dining table, dresser, bureau, stand-alone closet, mattress, box spring, wood bed frame, wood shelving unit, entertainment center, work bench, picnic table, wooden pallets and luggage carrier. *Residents will be invoiced at the Transfer Station.*

4. ***Clean-out of Garage, Attic, Cellar, Tool Shed, etc.:*** Material generated from clean-outs will be weighed and charged at the Commercial Waste rate of $100.00 per ton. This material must be processed over the scale at the Transfer Station. *Residents will be invoiced at the Transfer Station.*

5. ***Small Bulky Items:*** No additional charge with valid RTS sticker. Deposit into trash containers. This category includes items such as: small chairs, brooms, small amounts of wood, lamps, dishes, suitcases and games.

6. ***Appliances:*** $15.00 each. Includes items such as: refrigerator, freezer (doors must be off), stove, washer, dryer, air conditioner, dehumidifier, microwave, hot water heater and furnace. *Residents will be invoiced at the Transfer Station.*

7. ***Car Tires:*** $3.00 each ***Truck Tires:*** $6.00 each *Residents will be invoiced at the Transfer Station.*

8. ***TV's & Computer Monitors:*** $10.00 each *Residents will be invoiced at the Transfer Station.*

9. ***Screened Compost:*** Screened Compost is available for purchase by the cubic yard @ $12.00 or by the barrel @ $2.00 per barrel. Inquire at Transfer Station. *Residents will be invoiced at the Transfer Station.*

RECYCLABLE ITEMS - (No additional charge with valid RTS Sticker)

1. ***Paper:*** Includes items such as white paper, colored paper, newspapers, magazines, phone books, junk mail, packing paper, brown paperbags, catalogues, cereal and cracker boxes (remove wax liners and throw out in pay-per-throw trash bags), & shoe boxes.

2. ***Corrugated Cardboard:*** Heavy cardboard. Please flatten.

3. ***Commingle:*** Includes food and beverage containers such as glass, aluminum/tin containers/cans (tuna, pet food, soup, soda), plastics items marked with recycling #1, 2 and 3, and milk cartons and juice boxes. Please rinse out containers.

4. ***Miscellaneous Metals:*** Includes items such as metal shoe racks, small plumbing pipes/fixtures, metal bed frames, metal shelving, lawn mowers, bicycles, and pots & pans.

5. ***Motor Oil:*** Place in designated waste oil container at RTS Recycling Area.

6. ***Antifreeze:*** Place in designated antifreeze container at RTS Recycling Area.

7. ***Lead Acid (vehicle) Batteries:*** Place in designated area at RTS Recycling Area.

8. ***Paint (seasonal):*** Every 3rd Saturday of the month from April-October at the RTS. For further information, call the DPW at 455-7534 or RTS at 455-7568.

9. ***Yard Waste:*** Branches or limbs, 4 feet long or less and 10 inches (or less) in diameter; bushes, leaves and grass. Take directly to leaf compost/yard waste area and empty out of bags/containers.

10. ***Button and Ni-cad (rechargeable) Batteries:*** Collection containers at Library & Senior Center *(Button Batteries)* and Universal Waste Shed located near metal area at RTS. All regular household batteries should be thrown out in pay-per-throw trash bags.

11. ***Fluorescent bulbs, Mercury switches, Stereos, and VCR's:*** Deposit items in the Universal Waste Shed or the Designated Bin near the Universal Waste Shed.

NON-RECYCLABLE WASTE - Throw out in pay-per-throw yellow trash bags. *For example:* Styrofoam cups, plates and packaging peanuts, soiled paper plates, napkins, wax paper, wax box liners, wax cups and plastic items #4, 5, 6, and 7. Plastic bags from superma , dry-cleaners etc. may be recycled at your retailer or thrown out in pay-per-throw trash bags.

Compost Bins (2 sizes): $15.00 and $20.00 – Compost bins are available at the DPW, 470 Dedham Ave., (781) 455-7534
Additional Recycling Bins: $ 5.00. Recycling bins are available at the DPW, 470 Dedham Avenue, (781) 455-7534
NO oil tanks are accepted at the RTS RTS Telephone: (781) 455-7568 REV. Nov. 2001

TOWN OF NEEDHAM, MASSACHUSETTS
PUBLIC WORKS DEPARTMENT

TRIAL EXPANDED WEDNESDAY HOURS AND NEW DISPOSAL FEE AT THE RECYCLING & TRANSFER STATION

STARTING JUNE 7, 2000, THE RTS WILL BE EXPANDING ITS OPERATIONAL HOURS ON WEDNESDAYS ONLY, UNTIL 7:30 PM. THE EXTENDED HOURS ON WEDNESDAYS WILL CONTINUE ON A TRIAL BASIS THROUGH THE LAST WEEK OF SEPTEMBER.

HOURS OF OPERATION FROM JUNE 7 – SEPTEMBER 27:

TUESDAY	7:30 AM – 4:00 PM
WEDNESDAY	**7:30 AM – 7:30 PM**
THURSDAY	7:30 AM – 4:00 PM
FRIDAY	7:30 AM – 4:00 PM
SATURDAY	7:30 AM – 4:00 PM
SUNDAY	CLOSED
MONDAY	CLOSED

NEW Universal Waste Shed – Located near the metal area across from the transfer station.

What's accepted at the Universal Waste Shed?

Computer Monitors and TV's	*$10.00 each*	Effective Jan. 1, 2001
VCR's & Stereos / Computer Hardware	*No Fee*	
Fluorescent Light Bulbs	*No Fee*	
Nicad & Lithium Batteries	*No Fee*	
Mercury Thermostats	*No Fee*	

* NO CASH ACCEPTED AT THE RTS. RESIDENTS WILL BE INVOICED.

The Town of Needham and many other surrounding communities incinerate waste (trash) at the Wheelabrator Facility in Millbury, Massachusetts. The materials listed above have high concentrations of lead, mercury and other heavy metals. The Department of Environmental Protection's goal is to remove these heavy metals from the waste stream. By removing these heavy metals from the waste stream, we will be improving the emission quality of the incineration process.

If you have questions about what can be recycled at the Needham RTS, please call 455-7568 or ask any attendant at the RTS.

RECYCLE TODAY–SAVE TOMORROW

Conservation: Every Drop Counts!

The typical American uses between 70 and 100 gallons of water each day. That's over 100,000 gallons each year for a family of four. In the summer, rainfall decreases, evaporation increases, and flows in the rivers are a their lowest. At the same time, we increase our water consumption (by watering lawns and gardens and filling pools) and compete with streams and rivers for water. Water quality, wetlands, and fisheries of the Charles River depend on us to preserve river and stream flow. There are numerous ways for a household to inexpensively and easily implement tips aimed at water conservation in the household. By changing a few habits or making a modest purchase from a plumbing supply retailer, you will help to maintain river and stream flows, protect your water supply, and perhaps save on water and sewer charges!

In Your Home

- Take short showers instead of baths. (One less minute saves 3-7 gallons. A five-minute shower uses 25 gallons of water while a bath uses 35.) Shut off water while shampooing.
- Install low-flow showerheads and faucet aerators, and add water saving devices (which displace water) to toilet tanks. Consider replacing your toilet with a water savings model during renovation (saves 7,000 gallons/year/person).
- Flush less often and only when necessary. Don't use your toilet as a wastebasket (saves up to 6 gallons per flush).
- Repair leaks in faucets, toilets, hoses, and pipes. (A steady drip wastes up to 20 gallons of water per day while a leaking toilet can waste 50 gallons per day or more.)
- Minimize use of your garbage disposal.
- Run washing machines and dishwashers only when they are full and select cycles that use fewer rinses and washes. Favor using a dishwasher over washing by hand (saves 15 gallons per load).
- Minimize running water while brushing teeth, shaving, washing dishes, rinsing produce or getting cold water. (Saves 4-10 gallons per day.) Store drinking water in the refrigerator.

In Your Yard

- Water your lawn or garden only when necessary, preferably during the evening or early morning to avoid evaporation. Most lawns and gardens need an inch of water each week. If an inch of rain has fallen, don't water. Use trickle irrigation instead of sprinkling. Be careful to water only the lawn, not the driveway or sidewalk. A hose left on for one hour uses 375 gallons.
- Cut grass with mower blades at 2-to-3-inch grass length to promote water retention.
- Plant indigenous species requiring less water.
- Cover your swimming pool when it's not in use to prevent evaporation. Avoid overfilling the pool to prevent splashing.
- Wash your car with a bucket instead of a hose. Rinse using a hose with a spray nozzle or turn off water between rinses.
- Use a broom to sweep driveways, walks, and garages rather than washing with water.
- Check outside hoses, faucets, and sprinklers for leaks.
- Use wood chips, mulch or compost to retain moisture garden soil.

How to Check for Leaks: Check your water meter when the water is not being used. If the dial or register moves, there is a leak. To test your toilet, add food coloring or dye tablets to toilet tank and do not flush. If after 15 to 30 minutes the color appears in the bowl, it has a leak. The flush valve or the valve seat may need cleaning or repair. Parts are inexpensive and easily installed. To check for leaky pipes, look under sinks, behind the washing machine, and around basement plumbing for wet areas.

*Reprinted courtesy of the Charles River Watershed Association
*Needham Department of Public Works – Water Division (781) 455-7534 6/00

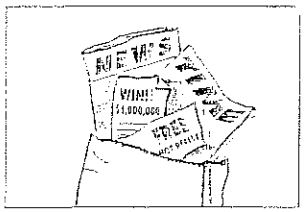
2002-2003 Needham Recycling Information

For all residents and businesses with valid RTS sticker

Needham RTS, 1421 Central Avenue

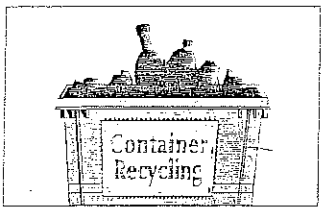
Hours: Tuesday - Saturday 7:30 am - 4 pm Wednesday 7:30 am-7:30 pm (April-Sept)

Paper



- Newspapers/inserts
- Magazines, catalogs, phone books and other paperback books
- Junk mail, office paper, brown paper bags
- Paperboard (cracker and cereal boxes)
- Corrugated cardboard, flatten (place in separate container)
- No food-soiled paper or plastic bags

Containers



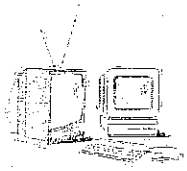
Glass, metal and plastic containers are collected as "commingle" containers at the RTS. Rinse all containers.

- Clear, brown and green glass bottles/jars
- No other glass items such as window glass, dishes, glasses, Pyrex, ceramics, regular light bulbs

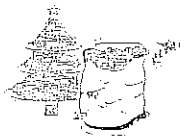
- Aluminum/tin/steel cans and lids
- Aluminum foil and trays
- Deposit cans and bottles (place at grey building) (proceeds benefit non-profit organizations in Needham)
- No aerosol cans or cans containing oil-based paint (unless dry)

- Plastic food and beverage containers labeled 1 2 3
- Milk and juice cartons and drink boxes
- No plastic bags or unmarked containers or motor oil containers

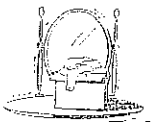
Other Recyclables



Electronics
Computer monitors, TVs, (fee) other electronics (free)



Yard Waste
Christmas trees
Leaves, grass (all free)



Household
Clean clothes, books (all free)

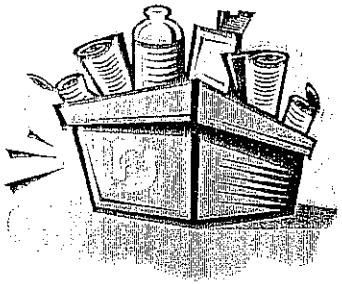
Auto
Tires (fee)
Motor oil (free)

Paint

Bulky Items (Fee)

Mercury

2002-2003 Needham Recycling Information



Recycling – it's easier than you think!

Think recycling is hard or confusing? Well, good news! Recycling requirements have changed over the years making it even simpler for you to take part. You no longer have to remove labels or separate bottles and cans. Most items can just be dropped in the designated bin! **Check inside for details and find out just how easy recycling is.**

Did you know...?

Massachusetts prohibits the disposal of the following items:

- Paper and cardboard
- Bottles and cans
- Leaves and yard waste
- Car batteries
- TVs and computer monitors
- Large home appliances

Be sure to recycle these items. **Check inside for details on how to recycle them or call (781) 455-7568. Trash must be disposed in Pay-As-You-Throw bags. Bags may be purchased at Roche Bros., Sudbury Farms, Harvey's Hardware, Taylor's Stationery, Bird's Hill Pharmacy and CVS Pharmacy.**

Recycle.
a little effort
a Big difference

Your efforts are making a difference!

Last year, Needham collected more than 4,310 tons of recyclables. That included enough paper to save 60,799 trees and enough plastic soda bottles to make 18,073 fleece jackets. Enough energy was saved by recycling aluminum cans to run a refrigerator for 4,145 days. You have helped make [illegible] recycling program a success. With your continued commit[illegible]t, we will achieve our recycling goals. Keep up the good w[illegible]!

Needham DPW
470 Dedham Avenue
Needham, MA 02492

ECRWSS

POSTAL CUSTOMER
NEEDHAM, MA

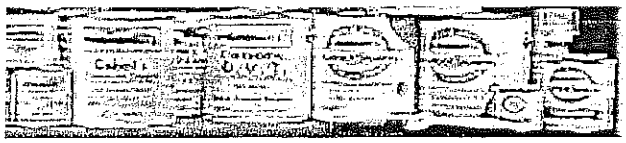
PRSRT STD
US POSTAGE PAID
Mass. Department of Environmental Protection

Please save

WASTE & SURPLUS PAINT COLLECTION DAYS

3RD SATURDAY EACH MONTH (APR-OCT) AT RTS

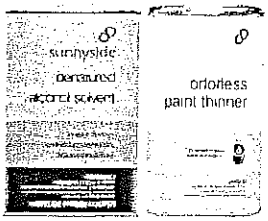
8:00 AM UNTIL 3:30 PM



MATERIALS ACCEPTED AT PAINT COLLECTION DAYS:

Oil Paint, Latex Paint, Thinner, Wood Stain, Wood Finish, Paint Remover, Varnish, Polyurethane

ONLY !!!!!!

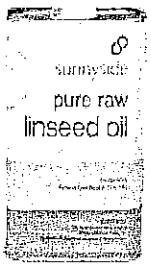


2003 SCHEDULE

April 19th May 17th June 21st

July 19th August 16th

September 20th October 18th

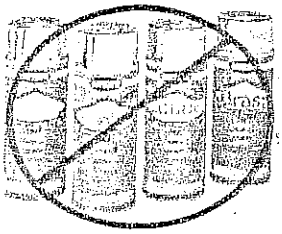


FREQUENTLY ASKED QUESTIONS

#1) EMPTY OR DRIED-UP CONTAINERS SHOULD GO IN THE YELLOW BAGS AS TRASH !

#2) BOTH WASTE & SURPLUS PAINT IS COLLECTED. GOOD SURPLUS PAINT IS SET ASIDE IN THE SHED NEXT TO THE COLLECTION AREA FOR OTHERS TO REUSE. THE WASTE MATERIAL IS SENT OFF-SITE FOR RECYCLING & DISPOSAL.

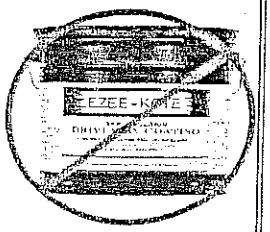
#3) WOOD STAINS/VARNISHES/LACQUERS AND THINNING SOLVENTS ARE ALSO ACCEPTED ON PAINT DAYS



MATERIALS NOT ACCEPTED AT PAINT COLLECTION DAYS:

Spray Paint/Cans, Wood Preservatives (Creosote), Isocyanate Paint, Epoxy Paints, Other Hazardous Mtrls (Corrosives, Pesticides, Driveway Sealers, Etc.)

Bring to HOUSEHOLD HAZARDOUS WASTE Days



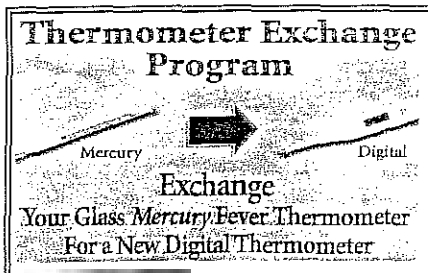
ANY QUESTIONS PLEASE CALL RTS AT 781-455-7568

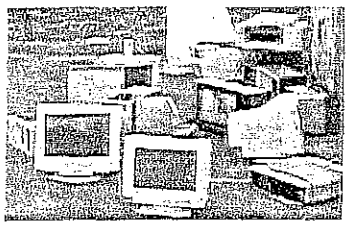
11/16/02

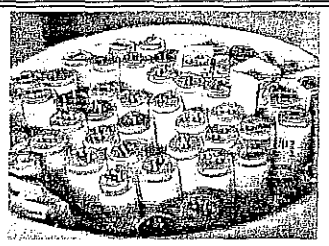
IN ADDITION TO HOUSEHOLD HAZARDOUS WASTE DAYS TWICE A YEAR AT DPW, THE

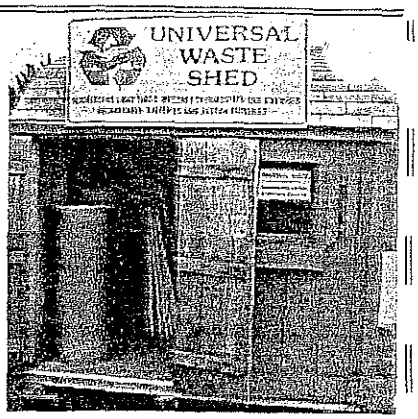
HAZARDOUS MATERIALS BELOW ARE COLLECTED ALL YEAR!

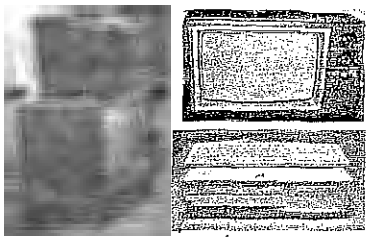
AT THE NEEDHAM RTS DURING NORMAL HOURS UNLESS OTHERWISE NOTED.





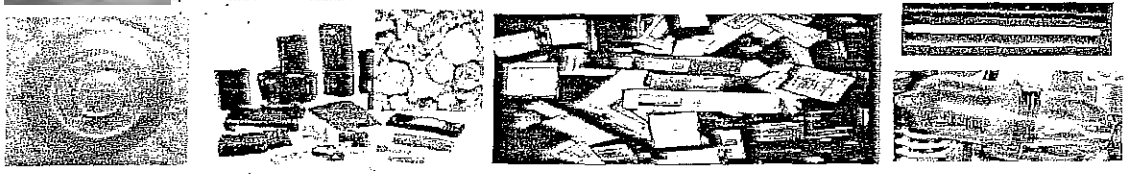


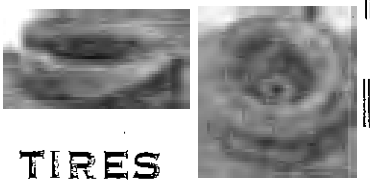




UNIVERSAL WASTES:

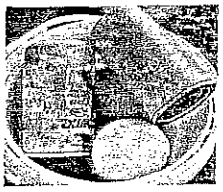
Fluorescent Lamps, Rechargeable Batteries,
TVs & Computer Monitors ($10 Fee),
Computer Hardware, Electronic Equipment, VCRs,
Mercury Thermostats, Mercury Thermometers



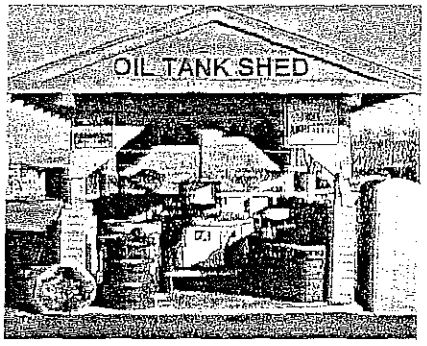


TIRES

($3 AUTO /$6 TRUCK FEE)



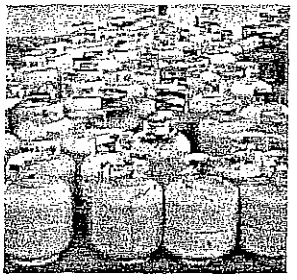
OIL FILTERS & RAGS



USED OIL & ANTIFREEZE

REFRIGERATORS, AIR CONDITIONERS, DEHUMIDIFIERS ($15 FEE)

INTACT LEAD-ACID BATTERIES (CAR BATTERY, TOYS, ETC.)



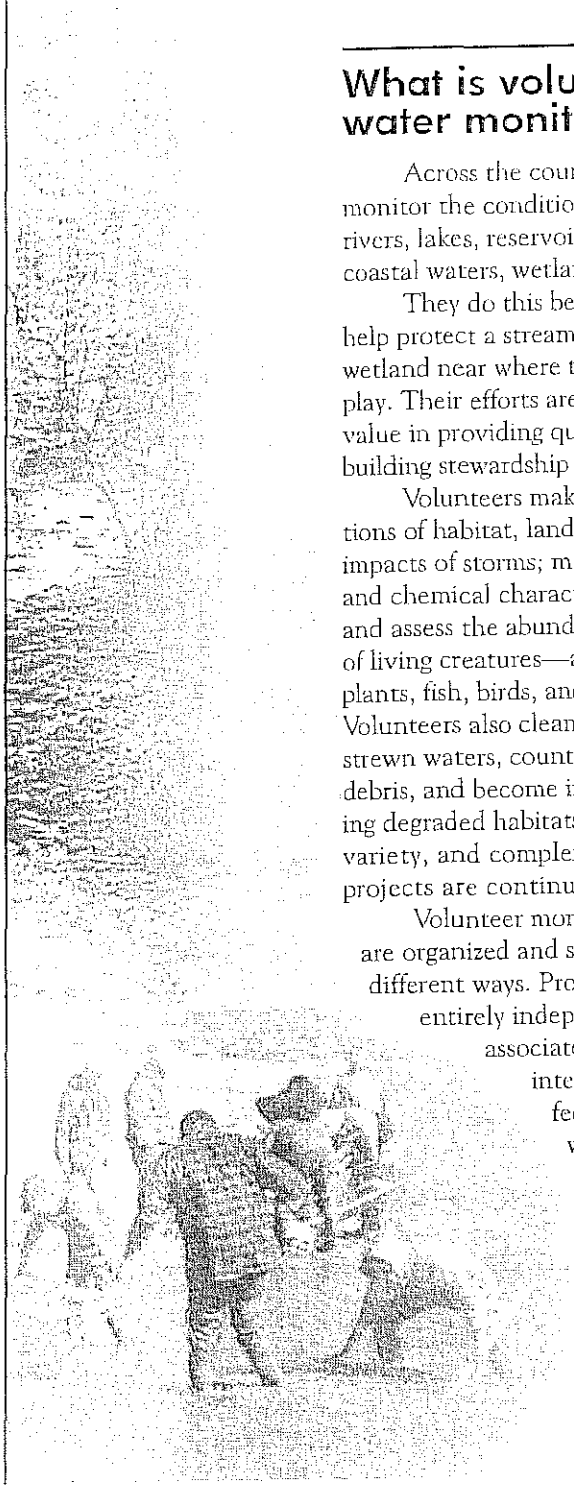
EMPTY PROPANE TANKS

PAINT COLLECTION AT RTS
3RD SATURDAY (APR-OCT)
(SEE REVERSE SIDE FOR DETAILS !!)

NEEDHAM RECYCLING TRANSFER STATION
1421 CENTRAL AV

Department of Environmental Protection and the Environmental Protection Agency Sample Flyers and Brochures

Starting Out in Volunteer Water Monitoring



What is volunteer water monitoring?

Across the country, volunteers monitor the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells.

They do this because they want to help protect a stream, lake, bay or wetland near where they live, work, or play. Their efforts are of particular value in providing quality data and building stewardship of local waters.

Volunteers make visual observations of habitat, land uses, and the impacts of storms; measure the physical and chemical characteristics of waters; and assess the abundance and diversity of living creatures—aquatic insects, plants, fish, birds, and other wildlife. Volunteers also clean up garbage-strewn waters, count and catalog beach debris, and become involved in restoring degraded habitats. The number, variety, and complexity of these projects are continually on the rise.

Volunteer monitoring programs are organized and supported in many different ways. Projects may be entirely independent or may be associated with state, interstate, local, or federal agencies; with environmental organizations; or with schools and universities. Financial support may come from government grants, partnerships with business, endowments, independent fundraising efforts, corporate donations, membership dues, or a combination of these sources.

Volunteers Provide Quality Data

Many volunteer groups collect data that supplements the information collected by state and local resource management or planning agencies. These agencies might use the data to:

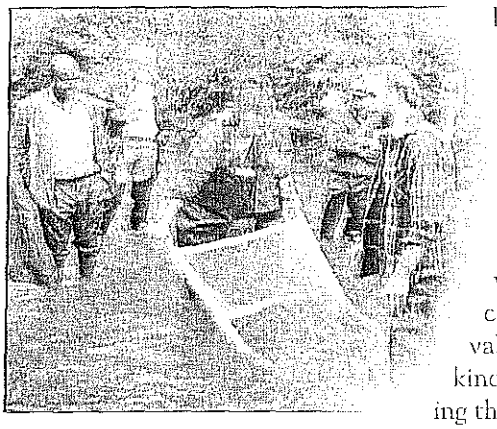
- screen water for potential problems, for further study or for restoration efforts
- establish baseline conditions or trends for waters that would otherwise go unmonitored
- evaluate the success of best management practices (BMPs) designed to mitigate problems

In general, the volunteer monitoring program should work cooperatively with state and local agencies in developing and coordinating its technical components. To ensure that its data are used, the monitoring program should also develop a strong *quality assurance project plan* (QAPP) that governs how volunteers are trained, how samples are collected and analyzed, and

Volunteers Most Commonly Monitor:

Water temperature	Flow/water level
Dissolved Oxygen	Turbidity
pH	Habitat
Macroinvertebrates	Secchi transparency
Phosphorus	Bacteria
Nitrogen	Land use

Source: *Directory of Volunteer Environmental Monitoring Programs*, 5th Edition



Participating in a volunteer program that provides data to be used by government agencies will usually require that you take part in formal training sessions and commit to a regular schedule of sampling.

how information is stored and disseminated.

Volunteers Build Stewardship of Local Waters

By educating volunteers and the community about the value of local waters, the kinds of pollution threatening them, and how individual and collective actions can help solve specific problems, volunteer monitoring programs can:

- make the connection between watershed health and our individual and collective behaviors
- build bridges among various agencies, businesses, and organizations
- create a constituency for local waters that promotes personal and community stewardship and cooperation

Volunteer groups whose primary purpose is education and constituency-building generally adopt simple, easy-to-use assessment methods and may not need to develop a stringent quality assurance project plan.

How do you get started as a volunteer monitor?

If you are interested in learning about your local waterway and educating others, your time commitment may be less and any training will probably be less formal.

Determine your personal goals.

Ask yourself why you want to become a volunteer monitor. Do you want to provide high-quality data to be shared with state and local government agencies, or are you more interested in helping local students learn about the environment? Do you want to monitor a specific stream in your neighborhood or are you willing to be assigned a site by your county resource management agency?

Participating in a volunteer program that provides data to be used by government agencies will usually require that you take part in formal training sessions and commit to a regular schedule of sampling (usually weekly, monthly, or seasonally, depending on the project). If you are more interested in learning about your local waterway and educating others, your time commitment may be less and any training will probably be less formal.

Learn about any existing volunteer monitoring programs in your area and around the country.

The National Directory of Volunteer Environmental Monitoring Programs, published by the U.S. Environmental Protection Agency (USEPA), can help you locate existing groups nearby and around the country and help you learn about the kinds of monitoring taking place. In addition, USEPA's *Adopt Your Watershed* site on the World Wide Web can help you link up with volunteer groups in your watershed (see back page).

Another good place to start is with your local or state environmental protection, natural resource, parks, or fish and game agency. Even if it does not sponsor a volunteer program, the agency may be aware of other programs or groups you can join. Other potential sponsors or sources of information include:

- local community-based groups such as civic or watershed associations, garden clubs, universities, and activist organizations
- national environmental organizations with chapters in your area
- regional offices of federal agencies such as USEPA, the US Department of Agriculture's Extension Service, the U.S. Park Service, and the U.S. Fish and Wildlife Service

Once you locate volunteer monitoring groups, you will probably find that they offer a variety of opportunities. You might become involved in collecting samples, analyzing the results in a laboratory, developing ways to present data, writing reports, speaking to local groups about water resource issues and the volunteer project, producing a newsletter, fundraising, or recruiting and training new volunteers. You might also become involved in organizing stream cleanups, planting trees, and other habitat restoration activities. Chances are you will find opportunities that suit your interests and skills.

If you can't locate a local group, consider starting one yourself.

If you decide to start your own program, you'll need to do some basic research to determine how to proceed. To help your research, develop a list of questions that you can discuss with other volunteer program coordinators. For example:

- what relationships does the program have with state and local agencies, local businesses, schools and colleges, other groups?
- what kind of monitoring does the program conduct?
- what are the program's monitoring costs? How is the program funded?
- how are volunteers recruited, trained, and retained?
- how is the quality of the data ensured? Does the program have an approved quality assurance plan?
- what reference materials, training aids, and methods manuals do they recommend?

Starting a volunteer monitoring program is not a simple task. You will need money for equipment and possibly for staff; appropriate meeting, training, and lab facilities; a network of knowledgeable people (such as educators, extension agents, local government representatives, etc.) who are interested in your project and willing to advise and help out; connection to (or sponsorship by) potential data users who can help you plan your project so that it meets *their* needs as well as your own; and organizational skills to manage and maintain the project. Most of all, you will need time to make contacts in the community, design your monitoring plan, develop training sessions, recruit volunteers, revise the program as it matures, raise funds, analyze the data, and report back to the volunteers and the community.

As you start out, connect with potential users of your data to ensure that your project meets their needs as well as yours.

Here are some of the lessons learned by other volunteer programs:

Start small. A pilot project that serves to test out methods, training sessions, and organizational skills can keep you from being overwhelmed and allows you to evaluate and refine your project before moving on to more ambitious efforts.

Keep your goals—and those of your volunteers—realistic. Chances are slim that your data will ever be used in court to stop a polluter. Data collected for such regulatory purposes requires a very high degree of quality assurance. Most volunteer data is used to educate the community and to screen for potential problems.

Planning pays off. Beware of collecting a year's worth of data and then finding that you have no idea how to analyze it, that the methods you used are not considered valid, or that you sampled sites in the wrong locations.

Make connections. The more people you talk to in your community and within local and state agencies, the more friends and supporters your program will have. Include potential data users in all phases of your project's development.

Develop volunteer leadership. Volunteer leaders within a project provide the vision for setting goals and the commitment to achieve them. They also enable a

Some USEPA resources on theWorld Wide Web...

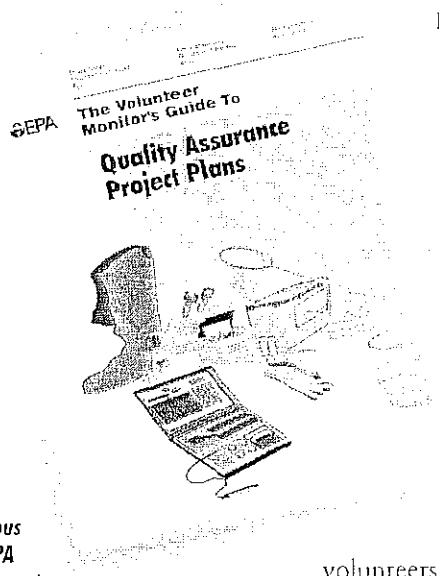
Office of Water Homepage:
www.epa.gov/ow

Wetlands, Oceans, and Watersheds Homepage:
www.epa.gov/owow

Monitoring Water Quality Homepage:
www.epa.gov/owow/monitoring

Volunteer Monitoring Homepage:
www.epa.gov/owow/monitoring/vol.html

Adopt Your Watershed:
www.epa.gov/surf/adopt/



Various USEPA documents, such as this quality assurance guide, can help programs that are starting out in volunteer monitoring.

project to develop and grow without stagnating. Build into your monitoring project plenty of opportunities for volunteers to develop as leaders.

Pamper your volunteers. Volunteers give up their free time to come to meetings, attend training sessions, and trudge out to monitoring sites. Provide social opportunities and reward volunteers for a job well done.

Use your data. Report findings to volunteers and to the community. Help volunteers present monitoring results at fairs and town meetings. Send your findings to your contacts in state and local government. Create a newsletter or data report and let the world see what you've accomplished.

Volunteer Monitoring Resources

USEPA supports volunteer monitoring by sponsoring national conferences, publishing methods manuals, producing a nationwide directory of volunteer programs, and funding a national newsletter, *The Volunteer Monitor* (see resource box for information on subscribing to this publication). Volunteer coordinators in the 10 EPA Regional offices provide some technical assistance for local programs and help coordinate regionwide conferences. The Regions are also responsible for grants to the states that can be used, in part, to support volunteer monitoring programs that help assess nonpoint sources of pollution or that serve to educate the public about nonpoint source issues.

For more information on USEPA's volunteer monitoring program, or to obtain any of the documents listed in the resource box, contact Volunteer Monitoring Coordinator, USEPA (4503T), 1200 Pennsylvania Avenue NW, Washington, DC 20460.

Volunteer monitoring resources available from USEPA

National Directory of Citizen Volunteer Environmental Monitoring Programs, Fifth Edition. EPA 841-B-98-009.

Proceedings of the Sixth National Citizen's Volunteer Water Monitoring Conference. EPA 841-R-01-001, June 2001.

Volunteer Estuary Monitoring: A Methods Manual. Available only on the Web at www.epa.gov/owow/estuaries/monitor.

Volunteer Lake Monitoring: A Methods Manual. EPA 440/4-91-002, December 1991. Available only on the Web at www.epa.gov/owow/monitoring/lakevm.html.

Volunteer Monitor's Guide to Quality Assurance Project Plans. EPA 841-B-96-003, September 1996.

Volunteer Stream Monitoring: A Methods Manual. EPA 841-B-97-003, November 1997.

Volunteer Wetland Monitoring: An Introduction and Resource Guide. EPA 843-B-00-001, December 2001.

***The Volunteer Monitor*, newsletter, partially funded under cooperative agreement by the USEPA, is published twice yearly. This newsletter facilitates the exchange of ideas, monitoring methods, and practical advice among volunteer monitoring groups ocross the country. Subscriptions are free. Available on the Web at www.epa.gov/owow/monitoring/volunteer/vm_index.html or contact the editor at ellieely@earthlink.net.**

United States
Environmental Protection
Agency

Office of Water
(4503T)
Washington, DC 20460

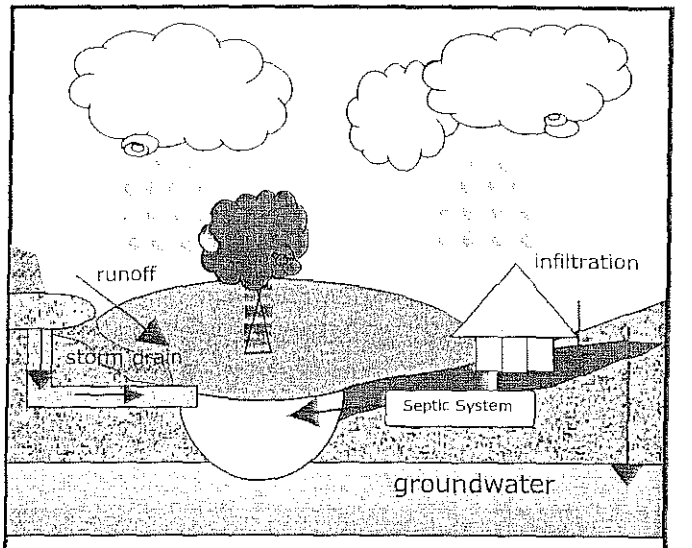
EPA 841-F-02-004
August 2002

GIVE YOUR LAKE THE BLUES!

Protecting Your Lake from Nonpoint Source Pollution

Lake Water Quality, Watersheds, and Nonpoint Source Pollution

A lake's water quality reflects what is happening in its surrounding watershed. A watershed includes all the land, or drainage area, that drains into a stream, lake or other waterbody. Nonpoint source (NPS) pollution occurs when water (i.e. stormwater, snowmelt, water from a garden hose) flows throughout the watershed, picking up pollutants and depositing them into water resources. Common types of NPS pollutants include phosphorus and nitrogen in lawn and garden fertilizers, pet waste, phosphorus and bacteria from septic systems, oil and grease from parking lots, and sediment from construction activities and soil erosion.



NPS pollution does not observe property lines. It flows wherever water takes it throughout the watershed – typically to stormdrains and then, without any treatment, into nearby streams and lakes.

How Does NPS Pollution Affect Lake Water Quality?

The combined effect of NPS pollutants such as phosphorus, sediment and bacteria result in degraded water quality and loss of recreational use and wildlife habitat. This accelerated degradation as a result of human activity in the watershed is called "cultural eutrophication".

- Excessive nutrients such as phosphorus stimulate algal and plant growth, limiting the recreational use of the lake (fishing, swimming and boating) and degrading wildlife habitat.
- Sediment can cause serious damage to the lake by causing turbidity and filling-in sensitive habitat that is needed for aquatic life. It also transports phosphorus.
- Bacteria from failing or substandard septic systems, pet waste, and waterfowl often cause swimming beach closures.

This information is available in alternative format by calling our ADA Coordinator at (617) 574-6872.

Produced by the Massachusetts Department of Environmental Protection, Division of Watershed Management, Nonpoint Source Program.
July 2001

Is There a Solution to NPS Pollution?

Cumulatively, watershed residents can have the greatest impact on the health of a lake. Steps to prevent or reduce NPS pollution can be simple and inexpensive. Preventing and reducing NPS pollution is the key to improving lake water quality. Every little bit helps!

Best Management Practices (BMPs) are activities that prevent nonpoint source pollution or mitigate the effects of NPS. It is easier and more cost effective to prevent pollution than to restore a degraded resource. BMPs can be structural, such as planting a buffer strip, or non-structural, such as analyzing lawn soils prior to applying fertilizer. Some simple and cost effective BMPs for residents include:

Encourage Infiltration and Control Sedimentation

- Minimize impervious surfaces such as driveways and parking lots to encourage infiltration.
- Slow or divert stormwater runoff toward vegetated areas where water can seep into the ground.
- Mulch and seed exposed soils to eliminate erosion.
- Wash cars over pervious surfaces, such as lawns, not over driveways, and wash undercarriages at a commercial car wash facility.

Reduce and Eliminate Nutrients and Bacteria

- Plant vegetation around driveways, shorelines and on slopes. The vegetation will absorb nutrients, filter out pollutants and trap sediment.
- Keep yard waste such as grass clippings and leaves out of the lake, storm drains, and off streets. Although yard waste is natural, when it decomposes it becomes high in nutrients.
- Reduce or eliminate fertilizer application, use organic, no-phosphate or slow-release fertilizer. To determine the phosphorus content in a fertilizer, look at the middle number in the formula on the package (i.e. Formula 16-4-8). Also, have your soil tested (Call the UMASS Extension Soil Testing Lab at (413) 545-2311 or download a soil test order form at http://www.umass.edu/plsoils/soiltest). You may not need to add fertilizer.
- Use phosphate free or low phosphate (less than 1%) automatic dishwashing detergents. Phosphate content in various dishwashing detergents sold in Massachusetts ranges from 0% up to 8.7% by weight. Gel detergents tend to have less phosphorus than powder detergents.
- Maintain septic tanks with regular pumping and inspection at least every 3-5 years.
- Pick up pet waste and dispose of it in the trash.
- Establish a vegetated buffer strip along shorelines to discourage waterfowl, such as geese, and avoid feeding them. The average goose will produce one pound of droppings a day!

For more information contact DEP's Regional Nonpoint Source Coordinators:

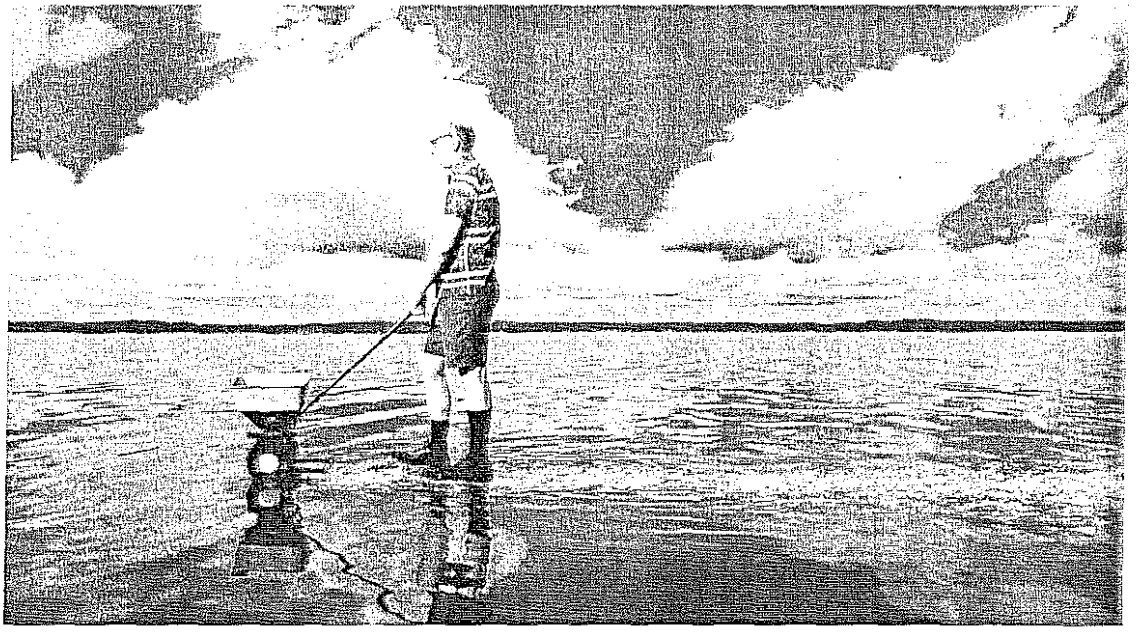
Northeast: Rosalia Barber
(978) 661-7816
rosalia.wollenhaupt@state.ma.us

Southeast: Jeff Brownell
(508) 946-2702
jeffrey.brownell@state.ma.us

Central: Brian Duval
(508) 849-4027
brian.duval@state.ma.us

Western: Tracey Miller
(413) 755-2162
tracey.miller@state.ma.us

When you fertilize the lawn, *Remember* you're not *just* fertilizing the lawn.



It's hard to imagine that a green, flourishing lawn could pose a threat to the environment, but the fertilizers you apply to your lawn are potential pollutants! If applied improperly or in excess, fertilizer can be washed off your property and end up in lakes and streams. This causes algae to grow, which uses up oxygen that fish need to survive. So if you fertilize, please follow directions and use sparingly.

The Massachusetts Department of Environmental Protection, One Winter Street, Boston, MA 02108

Clean water is important to all of us.

It's up to all of us to make it happen. In recent years, sources of water pollution like industrial wastes from factories have been greatly reduced. Now, more than 60 percent of water pollution comes from things like cars leaking oil, fertilizers from farms and gardens, and failing septic tanks. All these sources add up to a big pollution problem. But each of us can do small things to help clean up our water too—and that adds up to a pollution solution!

Why do we need clean water?

Having clean water is of primary importance for our health and economy. Clean water provides recreation, commercial opportunities, fish habitat, drinking water, and adds beauty to our landscape. All of us benefit from clean water—and all of us have a role in getting and keeping our lakes, rivers, streams, marine, and ground waters clean.

What's the problem with fertilizers?

Fertilizer is a "growing" problem for lakes, rivers, and streams, especially if it's not used carefully. If you use too much fertilizer or apply it at the wrong time, it can easily wash off your lawn or garden into storm drains and then flow into lakes or streams. Just like in your garden, fertilizer in lakes and streams makes plants grow. In water bodies, extra fertilizer can mean extra algae and aquatic plant growth. Too much algae causes water quality problems and makes boating, fishing, and swimming unpleasant. As algae decay, it uses up oxygen in the water that fish and other wildlife need.

Clean Water Tips:

How can you fertilize and help keep our waters clean?

Use fertilizer sparingly. Many plants don't need as much fertilizer or need it as often as you might think.

Don't fertilize before a rain storm.

Consider using organic fertilizers. They release nutrients more slowly.

Have your soil tested before applying fertilizers to your lawn and gardens. A standard soil test costs $8.00. You may not need to add any fertilizer. (Call the UMass Extension Soil Testing Lab at 413/545-2311 or download a soil test order form at www.umass.edu/plsoils/soiltest.)

To find out more about the impacts of nonpoint source pollution and what you can do to prevent it, call the numbers listed below.

MDC
617/727-5114

617/626-1540

EPA New England
617/918-1111

617/292-5500

CZM
617/626-1250

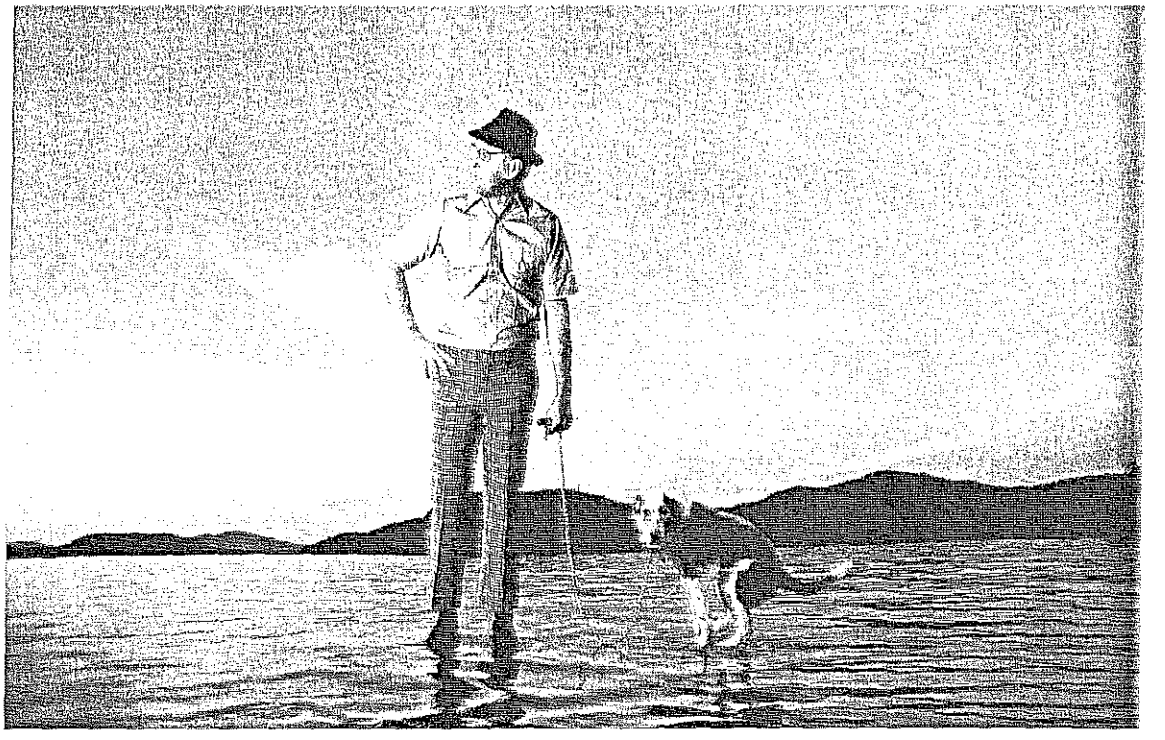
MDFA
617/626-1700

617/626-1395

Watershed
617/626-1000

This information on nonpoint source pollution is brought to you by the Department of Environmental Protection, the Executive Office of Environmental Affairs' Massachusetts Watershed Initiative, Coastal Zone Management, the Department of Environmental Management, the Department of Fisheries, Wildlife, and Law Enforcement, the Department of Food and Agriculture, and the Metropolitan District Commission working to reduce nonpoint source pollution through public education. This project was funded by the U.S. Environmental Protection Agency with a federal 104(b)(3) grant.

When your pet goes on the lawn
Remember
it doesn't *just* go on the lawn.



When our pets leave those little surprises, rain can wash pet waste and bacteria into our storm drains that can pollute our waterways. So what to do? Simple! Dispose of it properly. Then that little surprise gets treated like it should.

The Massachusetts Department of Environmental Protection, One Winter Street, Boston, MA 02108

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What's the problem with pet waste?

It's a health risk to pets and people, especially children. It's a nuisance in our neighborhoods. Pet waste is full of bacteria that can make people sick. If it's washed into the storm drain and ends up in a lake, stream, or marine water, the bacteria ends up in shellfish. People who eat those shellfish can get very sick. The waste produced by cats and dogs in the Charles River Watershed adds up to nearly 3 tons per day! Unless people take care of it, the waste enters our water with no treatment.

Clean Water Tips:

How can you get rid of pet waste and help keep our waters clean?

Never dump pet waste into a storm drain or catch basin, since the average dog dropping produces ***3 billion*** fecal coliform bacteria.

If your community doesn't regulate pet waste, (e.g. "scooper" law), try to make it a priority of your local governing body. Encourage your community to adopt a "pooper-scooper" ordinance.

Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

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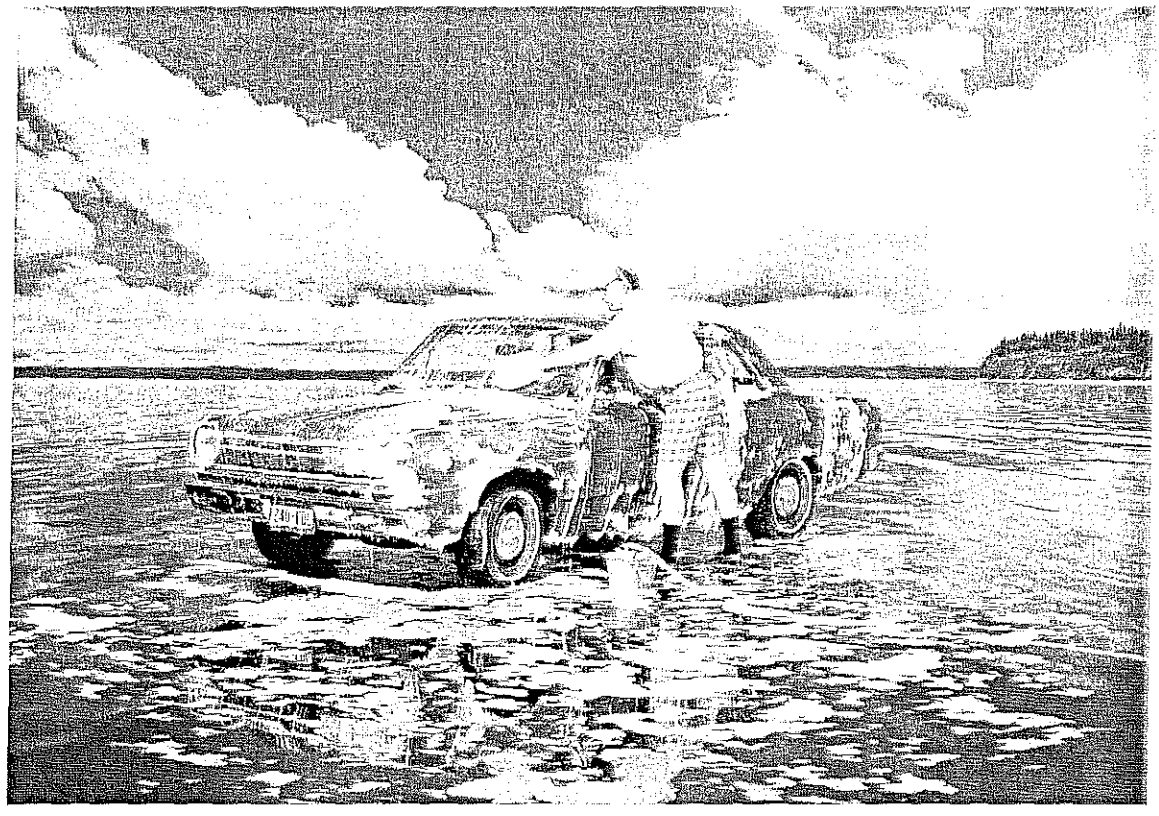
When you wash your car in the driveway,

Remember

you're not *just* washing your car in the driveway.



All the soap, scum, and oily grit runs along the curb. Then into a storm drain and directly into our lakes, rivers, and streams. And that causes pollution which is unhealthy for everyone. So how do you avoid this whole mess? Easy! Wash your car on the grass or gravel instead of the street. Or better yet, take it to a car wash where the water gets treated or recycled.

The Massachusetts Department of Environmental Protection One Winter Street Boston, MA 02108

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What's the problem with car washing?

There's no problem with washing your car. It's just how and where you do it. The average driveway car wash uses a total of 116 gallons of water! Most commercial car washes use 60 percent less water in the entire washing process than a simple home wash uses just to rinse off a car. Most soap contains phosphates and other chemicals that harm fish and water quality. The soap, together with the dirt and oil washed from your car, flows into nearby storm drains which run directly into lakes, rivers, or marine waters. The phosphates from the soap can cause excess algae to grow. Algae look bad, smell bad, and harm water quality. As algae decays, it uses up oxygen in the water that fish and other wildlife need.

Clean Water Tips:

How can you wash your car and help keep our waters clean?

Use soap sparingly. Use a hose nozzle with a trigger to save water.

Pour your bucket of soapy water down the sink when you're done, not in the street. Or wash your car on a grassy area so the ground can filter the water naturally.

Best of all, take your car to a commercial car wash, especially if you plan to clean the engine or the bottom of your car. Most car washes reuse wash water several times before sending it to the sewer system for treatment.

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When your car leaks oil on the street, *Remember* it's not *just* leaking oil on the street.

Leaking oil goes from car to street. Then it gets washed from the street into the storm drain and into our lakes, rivers, and streams. Now imagine the number of cars in the area and you can imagine the amount of oil that finds its way from leaky gaskets into our water. So please, fix oil leaks.

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What's the problem with motor oil?

Oil doesn't dissolve in water. It lasts a long time and sticks to everything from beach sand to bird feathers. Oil and petroleum products are toxic to people, wildlife, and plants. One quart of motor oil can pollute 250,000 gallons of water, and one gallon of gasoline can pollute 750,000 gallons of water! Oil that leaks from our cars onto roads and driveways is washed into storm drains, and then usually flows directly into a lake or stream. Used motor oil is the largest single source of oil pollution in lakes, streams, and rivers. Americans spill 180 million gallons of used oil each year into the nation's waters. This is 16 times the amount spilled by the Exxon Valdez in Alaska!

Clean Water Tips:

How can you fertilize and help keep our waters clean?

Check for oil leaks from your vehicle regularly and fix them promptly!

Never dispose of oil or other engine fluids down the storm drain, on the ground, or into a ditch. Recycle used motor oil. For more information on recycling, contact the closest DEP regional office.

Buy recycled oil to use in your car.

Use ground cloths or drip pans beneath your vehicle if you have leaks or are doing engine work. Clean up spills!

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Memorandum of Understanding

ATTACHMENT 3

MEMORANDUM OF UNDERSTANDING

1. EPA has set a goal of restoring fishable and swimmable conditions in the Lower Charles River by Earth Day 2005. Controlling polluted storm water runoff is a critical element to achieving this goal.

2. Needham has developed a storm water management plan which was submitted to EPA in June 1998 (the Existing Plan). The goals of the Existing Plan are to effectively prohibit unauthorized discharges to the separate storm sewer system; and to reduce pollutant loadings from wet weather discharges to the maximum extent practicable.

3. EPA and its consultant, Center for Watershed Protection (CWP) have reviewed the Existing Plan and met with officials of Needham to discuss the Plan.

4. In July of 1999, CWP provided written comments on the Existing Plan. These comments were based on a review according to eight criteria essential to effective storm water management: source identification; land reclamation and restoration; riparian management; site design for redevelopment; erosion and sediment control; storm water Best Management Practices; municipal pollution prevention; and public education and outreach. Based on this review, CWP provided written comments including General Comments, Programmatic Strengths, and Areas for Improvement.

5. Needham agrees to immediately implement the Existing Plan and further agrees to amend and Implement its Final Storm Water Management Plan in accordance with the following schedule:

a. By May 30, 2000, Needham will provide EPA with a written summary of how it intends to address each of the recommendations contained in the Areas for Improvement portion of CWP's comments. This summary should provide sufficient detail to identify what Needham intends to do as well as how and when.

b. Needham agrees to meet with representatives of EPA to discuss the Areas of Improvement provided in the CWP comments. The goal of this meeting will be to discuss the Areas of Improvement and to propose dates and mechanisms by which these Areas for Improvement will be implemented.

c. By June 28, 2000 Needham will provide EPA with an amendment to the Existing Plan which incorporates changes agreed to as a result of discussions. With respect to those items in the Areas for Improvement that EPA and Needham agree cannot be implemented immediately, Needham will propose a schedule by which such items can be implemented.

d. The Existing Plan and the Amendment together shall become the Final Plan. Needham agrees to implement the Final Plan according to the schedule contained therein.

7. By December 31 of each year, Needham agrees to submit to EPA a report describing its accomplishments in complying with the MOA. The report should provide information for each of the activities described in the MOA and should provide quantitative data on activities undertaken, and progress on implementing activities identified in the Amendment, to the extent possible.

8. EPA intends to minimize any administrative burden associated with implementation of Phase II of the NPDES storm water program.

9. This memorandum reflects the intent of the parties. It does not create any legal rights which did not previously exist.

For EPA:

Mindy Lubber
Regional Administrator

Date: 5/8/00

For: Needham

Municipal Official

Date:

Integrated Pest Management Policy

RECEIVED
JUN 14 2002
PUBLIC WORKS DEPT.
NEEDHAM, MA

Town of Needham IPM Policy
MAY 22, 2002

Preface

The Town of Needham recognizes that public agencies should be a model of environmentally responsible practices. Employing an integrated pest management (IPM) policy allows the Town to accrue the financial benefits of planning, prevention and responsible management, while reducing the use of pesticides that pose a health risk to people directly through breathing, drinking, ingesting or skin absorption of toxic products or via delayed exposures from contaminated soil, food, air, water utensils, and toys.

The Town of Needham has already introduced IPM principles into its parks, landscaping and building maintenance programs. The purpose of developing an IPM policy is to formalize and institutionalize the current practices dating back many years and to provide general guidance in the creation of integrated pest management policies and site-specific plans in compliance with the requirements of the *Act to Protect Children and Families from Exposure to Harmful Pesticides*, Chapter 85 of the Acts of 2000.

Needham IPM Policy

The Town of Needham will commit to IPM principles and practices and incorporate them into all landscape maintenance and building maintenance and construction work. This policy will apply to work by contractors hired by the Town as well as to work done by town employees.

IPM Defined

IPM is a problem-solving approach to landscape and building management designed to prevent and control undesirable weeds, insects, fungi and rodents. IPM relies on the use of site-specific information about environmental conditions and the dynamics of human characteristics and activities, and pest biology and behavior to prevent, resist and control pests that interfere with the purpose and use of a particular site. When a pest has exceeded a predetermined threshold at a particular site, all appropriate pest control strategies are employed including modifying the habitat, modifying maintenance practices, modifying user behavior, and, if all else fails, using pesticides as a last resort, and only within specific guideline for least toxic selection and use.

Pests Defined

Pests are undesirable plants, insects, fungi and rodents. Common examples in the landscape are grubs, chinch bug, crabgrass, knotweed, and a variety of plant diseases. Insects, weeds, and fungi can become a significant problem on our athletic fields and other public grounds. They can destroy or overtake large

areas of turf resulting in lack of playability, large renovation costs, and unsafe conditions for players. Common pests in buildings are ants, lice, cockroaches, termites, mice and other rodents that thrive when food and other conditions are available. They can create hygiene and safety problems, cause damage to building structures and, if nothing else, cause a nuisance.

IPM Policy Goals

The goal of Needham's IPM Policy is to promote the health, safety, quality and sustainability of public buildings and landscapes and maximize the enjoyment and use of public buildings and grounds for functional, recreational (both active and passive) and ornamental purposes. The goals of this policy are to:

1. Require all pesticide applicators to be certified and licensed.
2. Ensure that all support and supervisory personnel receive training and continuing education on the use of pesticides.
3. Reduce the use of pesticides through common sense principles of IPM, to the point of no pesticide use whenever possible and practical.
4. Provide healthy, high quality and sustainable buildings, parks and public open spaces.
5. Prevent the contamination of buildings, soil, air, and water and protect people (especially children and other vulnerable populations), animals and beneficial plants and insects from toxic exposures.
6. Assure cooperation and communication between town departments by setting standard operating procedures for the control of pests.
7. Recognize and support the programmatic and economic impact of changes in procedures and processes that may be required to meet these goals
8. Establish a formal IPM Committee with representation from the boards and committees that approved the policy. This committee will meet annually or as needed. This committee is not meant to supersede the individual committees at each school required under the Child Protection Act.

IPM Practices

The Town of Needham will develop site-specific building and landscape maintenance plans for all sites, which will incorporate pest prevention and control measures. These plans will specify site-assessment protocols, testing methods, and the timing and/or type of maintenance practices, require the monitoring of site conditions and pest populations, and establish pest thresholds; recommend how to educate users or modify user behavior (including modifying public access, traffic or use patterns), define record keeping requirements, with school building reports that are consistent with Section IV of School Committee policy EBAB and evaluation criteria, establish conditions for building re-occupancy after pesticide or herbicide application; enable the use of expert assistance and resources to solve problems; and, if determined to be necessary, identify the conditions for use of pesticides.

IPM Selection Guidelines:
The Town will develop guidelines for considering all appropriate intervention options, including changes in cultural, mechanical, physical, biological and chemical measures, or no action. Criteria for selecting pest control interventions commensurate with these guidelines shall, in order of priority, be or provide:

1. Least toxic to people, beneficial insects and plants and the aquatic environment.
2. Most species-specific.
3. Highest level of anticipated effectiveness.
4. Greatest need for ongoing use and maintenance of field or facility.
5. Timely coordination and scheduling with the Park & Recreation Department and the schools to ensure safest use of all fields or facilities.

Use of Pesticides for Aesthetic Purposes:
The Town of Needham supports limiting pesticide use for aesthetic purposes. The Town recognizes that the safe use of playing fields to prevent injuries from recreational and organized team activities may require the use of chemicals. Any chemicals used will follow the IPM application and notification guidelines as outlined in this Policy and in the Children's Safety and Protection Act.

Restrictions on the use of Pesticides and Herbicides:
As referenced under the principals of The Children's and Families' Protection Act and as part of each schools plan the application of any pesticide or herbicide may be performed only by certified applicators. If a pest situation is deemed an emergency an emergency waiver form should be submitted to the Needham Health Department to determine if the single use waiver is warranted.

IPM Implementation:
For IPM to be successful in the schools and other town buildings and fields, it must be supported by administration, building and field maintenance staff, custodial staff, teachers, students and parents. Through training and education, and with strong administrative support, town employees, teachers, staff and students must understand and be required to comply with site-specific rules and regulations designed to deny pests access to food and shelter. Failure to comply could result in unnecessary infestations and potentially require the use of pesticides to mitigate the problem. Maintenance, custodial and cafeteria staff must understand and support the principles of IPM and adhere to site-specific guidelines relating to pesticide approval, use and notification guidelines. All must understand that pests may be present while the source of a problem is identified and eliminated.

The Municipal Building Maintenance Board, the Department of Public Works and the School Department principals will keep copies of their site-specific plans

available for public review. Copies of plans will also be filed with the Needham Health Department and the MA Department of Food and Agriculture. The Needham Health Department will serve as the liaison for questions from the community.

Approved by: _____ Date approved: _____

_____

_____

_____

_____

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"An Act Protecting Children and Families from Harmful Pesticides"

Legal - Statutes

Chapter 85 of the Acts of 2000
AN ACT PROTECTING CHILDREN AND FAMILIES FROM HARMFUL PESTICIDES.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. (a) The general court finds that:

(1) the people of the commonwealth have a fundamental right to know about the use of pesticides;

(2) pesticides contain toxic substances, many of which may have a detrimental effect on human health and the environment and, in particular, have developmental effects on children;

(3) citizens of the commonwealth are being denied their right to know and their ability to make informed decisions about the level of pesticide exposure to them and their children; and

(4) information compiled regarding pesticide use in the commonwealth is not maintained in a manner which is useful to the public, thereby making it difficult to assess and address the potential health and environmental impact of pesticide use in the commonwealth;

(b) The policy goals of this act are to:

(1) prevent unnecessary exposure of children to chemical pesticides;

(2) promote safer alternatives to pesticides;

(3) ensure that clear and accurate notification concerning the use of pesticides in schools, day care centers and school age child care programs be made available so that measures may be taken to prevent and address pest problems effectively without endangering children or adults;

(4) promote the use of integrated pest management techniques to reduce the need for reliance on chemical pesticides; and

(5) develop a comprehensive, reliable and cost-effective system for collecting and organizing information on all categories of pesticide use in the commonwealth for review by government agencies, researchers, policy makers and the public to ensure the public health and safety and to protect the environment of the commonwealth.

SECTION 2. Chapter 28A of the General Laws is hereby amended by inserting after section 10B the following section:-

Section 10C. Any person who operates a school age child care program or a day care center as defined in section 2 of chapter 132B, shall comply with the requirements regarding pesticide applications as set forth in sections 6C to 6I, inclusive, of said chapter 132B.

SECTION 3. Section 68 of chapter 71 of the General Laws, as appearing in the 1998 Official Edition, is hereby amended by inserting after the sixth sentence the following sentence:- Each school shall comply with the requirements regarding pesticide applications as set forth in sections 6C to 6I, inclusive, of chapter 132B.

SECTION 4. Section 2 of chapter 132B of the General Laws, as so appearing, is hereby amended by inserting after the definition of "Advisory council" the following definition:-

"Agency", any executive office, department, division, agency, board, branch, bureau or commission of the commonwealth.

SECTION 5. Said section 2 of said chapter 132B, as so appearing, is hereby further amended by inserting after the definition of "Animal" the following definition:-

"Anti-microbial pesticide", a pesticide that is used for the control of microbial pests, including, but not limited to, viruses, bacteria, algae and protozoa, and is intended to disinfect, sanitize, reduce or mitigate growth or development of microbiological organisms. Anti-microbial pesticide shall not include any fungicide or pesticide used on plants, turf or other vegetation or for ornamental uses.

SECTION 6. Said section 2 of said chapter 132B, as so appearing, is hereby further amended by inserting after the definition of "Commissioner" the following definition:-

"Day care center", any public or private facility operated on a regular basis whether known as a day nursery, nursery school, kindergarten, child play school, progressive school, child development center or preschool, or known under any other name, which receives children not of common parentage who are not more than six years of age, or who are not more than 21 years of age if such children have special needs, for nonresidential custody and care during part or all of the day separate from their parents. Day care center shall not include: any part of a public school system; any part of a private, organized educational system, unless the services of such system are primarily limited to kindergarten, nursery or related preschool services; periodic religious instruction classes conducted by a religious institution; a facility operated by a religious organization where children are cared for during short periods of time while persons responsible for such children are attending religious services; a family day care home; an informal cooperative arrangement among neighbors or relatives; or the occasional care of children with or without compensation.

SECTION 7. Said section 2 of said chapter 132B, as so appearing, is hereby further amended by inserting after the definition of "Insect" the following definition:-

"Integrated pest management", a comprehensive strategy of pest control whose major objective is to achieve desired levels of pest control in an environmentally responsible manner by combining multiple pest control measures to reduce the need for reliance on chemical pesticides; more specifically, a combination of pest controls which addresses conditions that support pests and may include, but is not limited to, the use of monitoring techniques to determine immediate and ongoing need for pest control, increased sanitation, physical barrier methods, the use of natural pest enemies and a judicious use of lowest risk pesticides when necessary.

SECTION 8. Said section 2 of said chapter 132B, as so appearing, is hereby further amended by inserting after the definition of "Registrant" the following four definitions:-

"School", any public or private school for preschool, elementary, middle or high school students.

"School administration", a school committee, private school board of directors, or other body of school supervisory officers.

"School age child care program", any public or private program or facility operated on a regular basis which provides supervised group care for children not of common parentage who are enrolled in kindergarten and are of sufficient age to enter first grade the following year, or an older child who is not more than 14 years of age, or not more than 21 years of age if such child has special needs. Such a program may operate before and after school and may also operate during school vacation and holidays. A school age child care program shall not include: any part of a public school system; any part of a private, organized educational system, unless the services of such system are primarily limited to a school age day care program; periodic religious instruction classes conducted by a religious institution; a facility operated by a religious organization where children are cared for during short periods of time while persons responsible for such children are attending religious services; a family day care home; an informal cooperative arrangement among neighbors or relatives; or the occasional care of children with or without compensation.

"Standard written notification", includes the following information: the approximate dates on which the spraying, release, deposit or application of a pesticide shall commence and conclude; the specific location of the anticipated application; the product name and type of each pesticide to be used; a department-approved fact sheet and United States Environmental Protection Agency registration number for each pesticide; a description of the purpose of the pesticide application; and a department-approved statement describing ways to minimize exposure, and precautions to be taken, especially for sensitive individuals such as children, the elderly, pregnant women and those with health problems.

SECTION 9. Said chapter 132B is hereby further amended by inserting after section 5 the following section:-

Section 5A. The department shall promote the use of biologic

controls, integrated pest management, sustainable agriculture and other alternate pest control methods through education, technical assistance and research in order to reduce or eliminate, whenever possible, human or environmental exposures to chemical pesticides. Said department shall submit an annual report to the clerks of the senate and the house of representatives and the joint committee on natural resources and agriculture describing the efforts taken and the progress made toward reducing pesticide use, furthering the use of integrated pest management and other alternate pest control methods in the commonwealth.

SECTION 10. Said chapter 132B is hereby further amended by striking out section 6B, as appearing in the 1998 Official Edition, and inserting in place thereof the following section:-

Section 6B. (a) No gas, electric, telephone or other utility company licensed to do business in the commonwealth, nor any agency of the commonwealth or any of its political subdivisions, nor any authority, as defined in section 39 of chapter 3, nor any private entity or their agent, shall spray, release, deposit or apply any pesticide to any land which it owns, or as to which it holds an easement or similar right and over which it maintains power, high tension or other lines, or to any roadway, railway, or other transportation layout, without first notifying the department and, by registered mail, the mayor, city manager or chair of the board of selectmen and the conservation commission in the city or town where such application is to occur 21 days before such spraying, release, deposit or application, and without first publishing conspicuous notice in at least one newspaper of general circulation in each city or town where such land lies at least 48 hours prior to such spraying, release, deposit or application. Such notice shall appear in the local section of the newspaper and measure at least four by five inches in size. The published notice shall include: the method and locations of pesticide spraying, release, deposit or application; the approximate dates on which spraying, release, deposit or application shall commence and conclude, but such spraying, release, deposit or application shall not commence more than ten days before nor conclude more than ten days after such approximate dates; a list of potential pesticides to be used; a description of the purpose of the spraying, release, deposit or application; and the name, title, business address and phone number of a designated contact person from whom any citizen may request further information.

(b) The notice to the city or town where the affected land lies shall contain the following information: the method and locations of pesticide spraying, release, deposit or application; the approximate dates on which such spraying, release, deposit or application shall commence and conclude, but such spraying, release, deposit or application shall not commence more than ten days before nor conclude more than ten days after such approximate dates; the type of pesticide to be used and a copy of all information supplied by the manufacturers thereof relative to the pesticide; a department-approved fact sheet and United States Environmental Protection Agency registration number for each pesticide; the name, title, business address and phone number of the certified commercial applicator, certified

private applicator or licensed applicator, or the contractor, employers or employees responsible for carrying out the pesticide spraying, release, deposit or application.

(c) Notwithstanding any other provision of law, all agencies of the commonwealth and all authorities, as defined in section 39 of chapter 3, shall develop policies to eliminate or, if necessary, reduce the use of pesticides for any vegetation management purpose along any roadway.

(d) Any employee of any state agency, or authority, as defined in section 39 of chapter 3, when spraying, releasing, depositing or applying pesticides, supervising the use of pesticides, or when present during the spraying, release, deposit or application of pesticides, shall be provided with personal protection equipment and clothing in conformance with all federal and state laws and regulations pertaining to pesticide applications. This shall include, but not necessarily be limited to, protections according to Material Safety Data Sheets (MSDS), the product label, and any other supportive technical data provided by the manufacturer.

SECTION 11. Said chapter 132B is hereby further amended by inserting after section 6B the following nine sections:-

Section 6C. (a) Pesticides shall not be sprayed, released, deposited or applied indoors while children are on the property of a school, day care center or school age child care program, except for those pesticides listed in section 6F.

(b) Pesticides shall not be sprayed, released, deposited or applied on the outdoor property of a school, day care center or school age child care program while children are located in, on, or adjacent to the area of the pesticide application.

(c) (1) Whenever pesticides are to be sprayed, released, deposited or applied outdoors at a school, day care center or school age child care program, the school administration, day care center operator or school age child care program operator shall ensure that employees, pupils or supervised children and their parents or guardians receive standard written notification, as defined in section 2, at least two working days before pesticides are sprayed, released, deposited or applied, provided that such spraying, release, deposit or application of pesticides shall not commence prior to the approximate dates set forth on the standard written notification, and shall not conclude more than 72 hours after such approximate dates.

(2) Such notification policy shall apply at all times except during periods when classes are not scheduled for at least five consecutive days after the spraying, release, deposit or application or when day care or school age child care facilities are not scheduled to be open for at least five consecutive days after the spraying, release, deposit or application.

(3) Information to be included in the standard written notification shall be provided to the school administration, day care center operator, or school age child care program operator by the certified commercial applicator, certified private applicator, or licensed applicator, or the contractor,

employers or employees responsible for carrying out the pesticide spraying, release, deposit or application. Larval mosquito control applications using pesticides classified as category four pesticides by the United States Environmental Protection Agency, as applied by mosquito control projects under chapter 252, are exempt from the notification requirements of this section. This section shall not apply to any use of an anti-microbial pesticide as defined in section 2.

Section 6D. Each school administration, day care center operator, or school age child care program operator shall ensure that standard written notification is posted in a common area of its facility at least two working days before the outdoor spraying, release, deposit or application of a pesticide and for at least 72 hours following the spraying, release, deposit or application. Treated areas will be posted with clear and conspicuous warning signs along the perimeter in accordance with regulations to be promulgated by the department governing indoor and outdoor spraying, release, deposit or application of pesticides at schools, day care centers and school age child care programs. Larval mosquito control applications using pesticides classified as category four pesticides by the United States Environmental Protection Agency, as applied by mosquito control projects under chapter 252, are exempt from the notification requirements of this section. This section shall not apply to any use of an anti-microbial pesticide as defined in section 2.

Section 6E. (a) On or before November 1, 2001, each school, day care center and school age child care program in the commonwealth shall adopt and implement, in accordance with any regulations promulgated by the department pursuant to this chapter, an integrated pest management plan. The plan shall cover both indoor and outdoor areas. The department shall produce a generic integrated pest management plan that may be adopted by any school, day care center or school age child care program. One copy of the plan adopted by the school, day care center or school age child care program shall be filed with the department, and at least one additional copy shall be kept on site and made available to the public upon request pursuant to section 10 of chapter 66. Every agency of the commonwealth shall develop and implement integrated pest management plans and procedures for all buildings and grounds owned or managed by the commonwealth.

(b) No person shall spray, release, deposit or apply or supervise the spraying, release, deposit or application of any pesticide in, on, or around structures or grounds of a school, day care center or school age child care program unless that person is a certified commercial applicator, certified private applicator, licensed applicator, or is under the supervision of a certified commercial applicator, certified private applicator or licensed applicator.

Section 6F. Beginning November 1, 2001, pesticide products eligible for use indoors on the facility grounds of any school, day care center or school age child care program shall be limited to the following:

(a) Anti-microbial pesticides;

(b) Rodenticides placed in tamper resistant bait stations or placed in areas inaccessible to children and the general public;

(c) Ready-to-use dust, powder or gel formulations of insecticide applied in areas inaccessible to children and the general public;

(d) Insecticidal baits placed in tamper resistant bait stations or in areas inaccessible to children and the general public;

(e) Termiticides used only in the presence of an active termite infestation and when non-chemical pesticide alternatives have been determined to be ineffective; and

(f) Pesticides classified by the United States Environmental Protection Agency as exempt materials under 40 CFR 152.25.

Section 6G. Beginning November 1, 2001, pesticide products eligible for use on the outdoor grounds of any school, day care center or school age child care program shall be limited to the following:

(a) pesticides used in accordance with the facility's integrated pest management plan filed with the department and maintained on site;

(b) pesticides other than those classified as known, likely or probable human carcinogens by the United States Environmental Protection Agency, or equivalently categorized by the department, except as provided for in section 6H;

(c) pesticide products that do not contain inert ingredients categorized as "List 1: Inerts of Toxicological Concern" or any equivalent categorization by the United States Environmental Protection Agency; and

(d) pesticides that are applied for reasons other than purely aesthetic purposes, except that any municipality, city or town may allow the use of pesticide products for purely aesthetic purposes on the outdoor grounds of any school, day care center or school age child care program.

Section 6H. (a) If a school official or an operator of a day care center or school age child care program determines that a human health emergency warrants the use of a pesticide not otherwise allowed under this chapter, or warrants its use sooner than two days after providing the required standard written notification, such official or operator may apply for a single-use waiver from the appropriate municipal board of health or agent or director of public health or the department.

(b) The department or appropriate municipal board of health or agent or director of public health shall determine if such a waiver is warranted based on the following criteria:

(1) whether the pest situation poses an immediate threat to human health; and

(2) whether no viable alternatives to the use of chemical pesticides exist.

As a condition of approval, the appropriate municipal board of health or agent or director of public health or the department shall require a commitment from the school official or operator of a day care center or school age child care program that the underlying causes of the pest outbreak will be identified and addressed in order to prevent future outbreaks.

(c) In such an emergency situation, the school official or operator of a day care center or school age child care program shall ensure that conspicuous warning signs are posted near the site of the spraying, release, deposit or application prior to, and for at least 72 hours after the spraying, release, deposit or application. Treated areas will be posted with clear and conspicuous warning signs along the perimeter in accordance with regulations to be promulgated by the department governing indoor and outdoor spraying, release, deposit or application of pesticides at schools, day care centers and school age child care programs. In such an emergency situation, the school official or operator of a day care center or school age child care program shall also ensure that standard written notification is provided to employees, pupils or supervised children and their parents or guardians immediately prior to or, if necessary, immediately following the emergency spraying, release, deposit or application. A record of the emergency event, including the identification of the cause and the actions taken to address it, shall be maintained as a part of the records required under section 6I.

Section 6I. A written or electronic record of any and all chemical pesticide spraying, release, deposit or application made at a school, day care center or school age child care program in the commonwealth shall be maintained on site for a period of not less than five years, and shall be made available to the public upon request pursuant to section 10 of chapter 66.

Section 6J. Notwithstanding any other provisions of this chapter, sections 6C to 6I, inclusive, shall not apply to the spraying, release, deposit or application of any pesticide made as a part of a supervised training program at any of the state-aided and approved vocational-technical or agricultural schools in the commonwealth.

Section 6K. The department shall conduct a review of anti-microbial pesticides, as defined in section 2, to determine whether and to what extent they should be subject to the provisions of this chapter.

SECTION 12. Said chapter 132B is hereby further amended by inserting after section 7 the following section:-

Section 7A. (a) Subject to appropriation, the department shall establish and implement a pesticide use reporting system for use by government agencies, researchers, policy makers and the public to ensure the public health and safety and to protect the environment of the commonwealth. In establishing and implementing the system, said department shall design,

develop and implement the system in order to collect, evaluate, summarize, retain and report information on the use of pesticides in each major category of use in the commonwealth, including agriculture, forestry, industrial, commercial and homeowner uses. Said department shall, at least one time each year, collect the best data practicable from each major category of pesticide use in a manner that will allow such data to be used for public health purposes, including, but not limited to, epidemiological studies, and for environmental protection purposes. Such data shall be collected in a manner which minimizes reporting costs. Said department shall begin operation of the required statewide data reporting program on or before January 31, 2002.

(b) The secretary of environmental affairs shall appoint a pesticide stakeholder work group to advise the department in developing the pesticide use reporting system required by this section. Said secretary shall appoint the following members of the work group: one pesticide applicator, one pesticide dealer, one public health expert or researcher familiar with pesticides and their impact on public health, one representative from the department of public health, one representative from the department of environmental protection, one representative from the department's pesticide board established by section 3, and one representative from each of the following organizations: one environmental organization, one labor organization, one public health organization, one public water supplier and one agricultural organization. In carrying out its responsibilities under this section, the department shall consult with the work group appointed under this section and convene meetings of the work group as necessary. All meetings of the work group shall be open to the public and shall include an opportunity to receive recommendations and comments from members of the public. The work group shall make specific recommendations on stable and sufficient funding mechanisms to support the pesticide reporting program.

(c) Said department shall conduct an analytical review of any issues that must be resolved in order to establish a valid, cost-effective pesticide use reporting system in the commonwealth. The review shall be conducted in consultation with the work group appointed under this section, and its conclusions shall be published not later than January 31, 2001. As part of the analytical review required by this section, the department shall consider whether and to what extent use of anti-microbial pesticides, as defined in section 2, shall be part of the pesticide use reporting system. In implementing the pesticide use reporting system, the department shall, beginning January 31, 2003, and annually thereafter, make available data on pesticide use in the commonwealth.

(d) Said department shall develop protocols for the exchange of information with the department of public health or other state agencies for the purpose of conducting research related to the public health and the environment. Said department shall also establish policy and adopt rules relating to the public release of pesticide use information. The policy and rules may not reveal the identity of the owner or lessee of a specific property or the address of the property itself where a pesticide has been applied, and shall maintain the confidentiality of that information. Nothing in the policy or

rules adopted by said department shall limit access to data for the following purposes: (1) information obtained as part of any investigation under any other provision of law; (2) the release of information obtained exclusively under this chapter to any other local, state or federal agency, if the local, state or federal agency has agreed to maintain the confidentiality of any information that is required to be treated as confidential under this subsection, unless the public interest by clear and convincing evidence requires disclosure in the particular instance; and (3) the release of information obtained exclusively under this chapter to a health or environmental researcher acting in an official capacity from an accredited university or accepted research institute who agrees to maintain the confidentiality of any information that is required to be treated as confidential under this section.

(e) Nothing in this section shall be construed to create a new private right of action against any pesticide user or retail pesticide dealer.

SECTION 13. The eighth paragraph of section 10 of said chapter 132B, as appearing in the 1998 Official Edition, is hereby amended by adding the following sentence:- Each examination shall include an evaluation of the applicant's competence with respect to the use of integrated pest management.

SECTION 14. Section 14 of said chapter 132B, as so appearing, is hereby amended by striking out, in line 9, the words "six A or six B" and inserting in place thereof the following:- 6A to 6I, inclusive, or section 7A.

SECTION 15. Said chapter 132B is hereby further amended by inserting after section 14 the following section:-

Section 14A. (a) The department may adopt and promulgate such regulations as may be necessary for the enforcement of sections 6C to 6I, inclusive, and the licensing requirements of section 10. Said department may assess a civil administrative penalty of up to $1,000 against any person or school administration who violates the requirements of sections 6C to 6I, inclusive, or any regulation promulgated under such sections.

(b) Said department may assess a civil administrative penalty of up to $1,000 against any person who violates the licensing requirement of section 10.

(c) Prior to assessment of the penalty, said department shall provide written notice and an opportunity to correct the violation within 90 days of the issuance of the notice of violation. This penalty shall be assessed in addition to any other civil penalty otherwise provided for by law. Notice of assessment of a penalty pursuant to this section shall be made by service in hand, or by certified mail, return receipt requested, and shall state the amount of the administrative penalty, the date the penalty shall be due, a statement of the violator's right to an adjudicatory hearing pursuant to chapter 30A regarding the assessment, a statement of the actions the person may take in order to avoid the assessment of the penalty or to avoid waiving the right to a hearing relative to the penalty, and the manner of acceptable payment if an

election to waive a hearing is made.

A person shall be deemed to have waived all right to an adjudicatory hearing unless, within 21 days of the date of the department's notice, the person files a written notice, by hand or by certified mail, return receipt requested, requesting such adjudicatory hearing. In the event that such request is not received in accordance with this section, the proposed administrative penalty shall become final and payment shall be due in accordance with the notice.

SECTION 16. Said chapter 132B is hereby further amended by adding the following section:-

Section 16. There shall be established and set up on the books of the commonwealth a separate fund to be known as the Children and Families Protection Fund. There shall be credited to the fund any penalties collected for violations of sections 6C to 6I, inclusive, and any income derived from the investment of amounts credited to the fund. Amounts credited to the fund shall be used, subject to appropriation, for the implementation and enforcement of said sections 6C to 6I.

| Privacy | Disclaimer |

Proposed Memorandum of Agreement

TOWN OF NEEDHAM, MASSACHUSETTS
PUBLIC WORKS DEPARTMENT
470 Dedham Ave., Needham, MA 02492
Telephone: (781) 455-7534 Fax: (781) 449-9023

Richard P. Merson
Director

Anthony L. Del Gaizo, P.E.
Town Engineer

Robert A. Lewis
Water & Sewer Supt.

John F. Cusick
Parks & Forestry Supt.

Mark A. Flynn, P.E.
Highway Supt.

Steven J. Hawes
Garage & Equip. Supv.

Beta inv
#1504

COPY

July 19, 2000

Mindy Lubber, Regional Administrator
United States Environmental Protection Agency
Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

RE: PROPOSED MEMORANDUM OF AGREEMENT
Development of Needham's Stormwater Management Program

Dear Ms. Lubber:

I am responding on behalf of the Town of Needham to your correspondence of May 9, 2000 regarding a proposed Memorandum of Agreement (MOA) to be implemented between the Town of Needham and the EPA relating to the development of a Stormwater Management Program. This letter followed an earlier letter dated October 21, 1999 regarding the same subject. Upon receipt of the earlier correspondence, the Department of Public Works contacted Mr. Jay Brolin of your office. We had been in periodic contact with him regarding this matter since that time. We have just been informed that he is no longer employed by EPA.

At the time we received the earlier correspondence we were in the process of reviewing the Center for Watershed Protection's (CWP) final review of the Town of Needham's Stormwater Management Program. During our review of the CWP document, we noted numerous and significant omissions or incomplete representations of our conversations and communications with CWP. As a result, this required a somewhat lengthy and involved detailing of these items in order to provide a more complete and thorough picture of Needham's present status. Whereas the proposed MOA and the supporting attachments produced by CWP serve as the base upon which the Town of Needham will proceed, the Town felt it important that this document be as correct a representation as possible.

On December 29, 1999, the Town of Needham and its consultant Beta Engineering, Inc. met with Jay Brolin to discuss among other things the status of the MOA. At that time, we detailed the magnitude of our comments to CWP. This was followed up with a letter to Mr. Brolin dated December 30, 1999 with a draft of a letter to Mr. Ted Brown of CWP detailing our comments. This included other attachments demonstrating these points. The letter to CWP was finalized and sent on February 18, 2000. The receipt of this letter was acknowledged by Mr. Brown on March 2, 2000. Mr. Brolin was copied on this letter. Since that time, we have been awaiting a revised set of

comments from CWP of the Stormwater Management Plan for review. We believe this will result in a significantly different Stormwater Management Recommendation Summary (Attachment 1) and Example Narrative and Table Response to CWP Comments (Attachment 2) as provided in each of the 2 earlier letters. Upon resolution of the content of these attachments based upon revised comments from CWP, a revised MOA can be developed.

Please advise this office how you wish to proceed in this matter. I can be reached by telephone at (781) 455-7537.

Sincerely,

Richard P. Merson

Richard P. Merson
Director of Public Works

enclosures(2)

cc. C.F. Valente, Town Administrator
A.L. Del Gaizo, Town Engineer
R.A. Lewis, Supt. Water & Sewer Div.
C. Alwin, Asst. Supt., Water & Sewer Div.
M. Vignale, Beta Group, Inc.
L. Newman, Needham Planning Director
R. Cramer, Chairman, Needham Conservation Comm.

epa.dg

TOWN OF NEEDHAM, MASSACHUSETTS
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Robert A. Lewis
Water & Sewer Supt.

Steven J. Hawes
Garage & Equip. Supv.

December 30, 1999

COPY

Mr. Jay Brolin
United States Environmental
Protection Agency - Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

RE: IMPLEMENTATION OF STORM WATER MANAGEMENT PLANS AND MEMORANDUM OF UNDERSTANDING; FOLLOW-UP SAMPLING RESULTS

Dear Mr. Brolin:

Thank you for agreeing to meet with our consultant Beta Engineering, Inc., my staff and me regarding these issues. In regard to the Memorandum of Understanding (MOU), I would like to clarify the reason for not submitting the MOU in a timely fashion. Please be advised that the DPW fully intends to recommend that the Board of Selectmen sign the MOU. The issue that has caused the delay pertains to items 5a through 5c contained in the MOU. These relate to the Areas of Improvement outlined in the comments provided by the EPA and its consultant, Center for Watershed Protection (CWP).

Upon receipt of the draft of the comments from CWP in late July 1999, the DPW recognized that the Areas of Improvement sections of the comments failed to reflect significant components which are presently being done and have been for quite some time. Apparently the site visit by CWP staff and subsequent follow-up discussions failed to capture these significant components. The DPW regrets that it did not present our comments in a more timely fashion. However, given that the current version of the comments which will be attached to the MOU will serve as a "snapshot" of our current practices, the DPW felt strongly that these comments and Areas of Improvement be corrected and a true representation attached to the MOU. Because of the extensive nature of the omissions, it has taken a considerable amount of time to complete and prepare our response. What we believe to be our final draft of the response to CWP is attached for your files. We anticipate the final version to be completed and forwarded to CWP by January 15, 2000. Please contact me to establish a revised MOU and schedule of milestones based upon an updated set of comments from CWP.

In regard to the follow-up dry weather sampling results conducted throughout the summer of 1999 for sections N10A-7, N10A-9, N10A-9A and N10A-9B, I appreciate your input during this meeting. Given our discussions, analysis and further investigation of our records, it appears that the problem in N10A-7 is not significant and is related to animal vs human origin. One of the remaining three areas, N10A-9B, will be investigated in greater detail. This investigation will include field

investigation, CCTV inspection and additional sampling. The DPW will seek the assistance of the Board of Health Director to pursue the status of two houses in the vicinity which we now believe are not connected to the sewer. One house, No. 1012 Webster Street, located adjacent to the sewer and drain easement which parallels the railroad right-of-way, now appears to be a strong candidate for a source of the contamination. The DPW will also follow up on the disconnection of the direct connection from the cesspool at No. 15 Norfolk Street to the storm drain ordered previously. Whereas circumstances have delayed the connection of this house to the sewer system, it may be possible that effluent from the cesspool may still be leaching into this drain.

Upon completion of these investigations and any subsequent actions that may be required, these outlets will be re-sampled and submitted to the EPA for review and comment. The DPW believes this work can be completed by April 30, 1999.

Sincerely,

Richard P. Merson

Richard P. Merson
Director of Public Works

enclosure - Response to Draft CWP Comments

cc: Carl F. Valente, Town Administrator
A.L. Del Gaizo, Town Engineer
R.A. Lewis, Supt., Water & Sewer Div.
C. Alwin, Asst. Supt. Water & Sewer Div.
M. Vignale, Beta Engineering, Inc.
L. Newman, Needham Planning Director
R. Cramer, Chairman, Needham Conservation Commission

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Town and the Center for Watershed Protection Correspondences

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PROTECTION

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April 20, 1999

Mr. Richard P. Merson
Director
Public Works Department
470 Dedham Avenue
Needham, MA 02492

Mr. Robert A. Lewis
Superintendent Water and Sewer
Division
Public Works Department
470 Dedham Avenue
Needham, MA 02492

Mr. Anthony Del Gaizo, P.E.
Needham Town Engineer
Public Works Department
470 Dedham Avenue
Needham, MA 02492

Dear Gentlemen:

Enclosed you will find the Center for Watershed Protection's draft review of the Town of Needham's stormwater management program and specifically the Town's 1996 document entitled: *Stormwater Pollution and Management Program.*

Please take the time to review the draft and provide us with your comments by May 4, 1999. We hope to finalize the review by May 11 for submittal to EPA. As we noted in the draft, our review was limited to the information contained within the 1996 document and information provided directly by you. It is quite possible that we have overlooked information or are unaware of existing programs in Needham that may be important to protecting the Charles River and its tributaries. Your review of the document will assist in identifying areas that we may need to address.

Thank you for your participation in this process. We hope that you find our review to be accurate and helpful.

Very Truly Yours,
Center for Watershed Protection

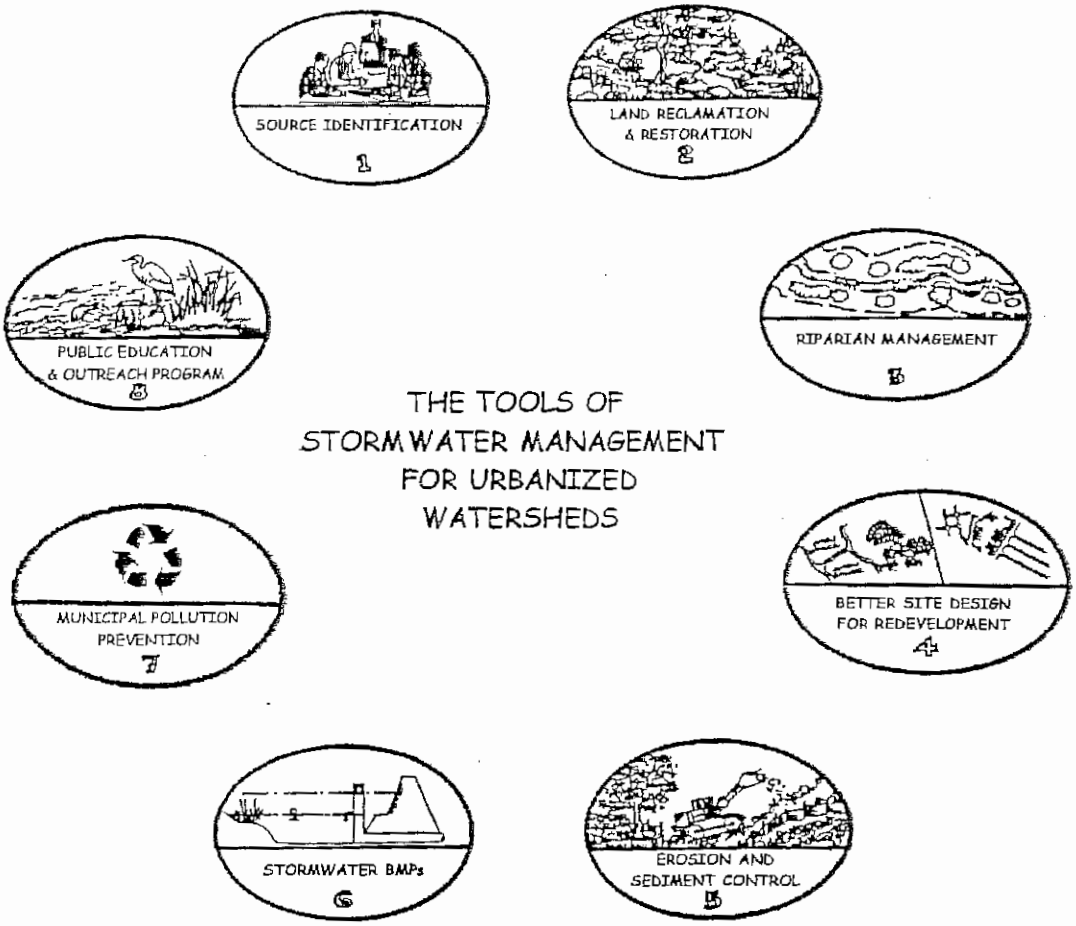
Ted Brown

Ted Brown
Water Resources Engineer

Enclosure

cc: Mr. Sean Scully, Beta Engineering

Town of Needham Stormwater Program Review - DRAFT



for: Town of Needham, Massachusetts
US EPA Region 1

by: The Center for Watershed Protection
8391 Main Street
Ellicott City, Maryland 21043

Introduction

Under a grant from the United States Environmental Protection Agency (EPA), Region 1, and as part of the Charles River 2005 Initiative, the Center for Watershed Protection is providing technical support in the following two task areas to support the Lower Charles River Restoration Plan:

Task 1: Review Community Stormwater Plans and Provide Technical Support
Task 2: Conduct Stormwater Retrofit Inventories for Priority Subwatersheds

This stormwater plan review represents one of four major deliverables for Task 1 of the project (the other deliverables include: conducting a stormwater management workshop for municipal representatives, developing a stormwater management tools reference notebook, and providing specific local technical support for each community).

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The goal of this review is to provide the necessary technical assistance and training support to enable Needham to make its stormwater program more effective. This review is not a formal audit of the stormwater program, nor a critique of past stormwater management efforts in Needham. Instead, this review is intended to provide a basis for future efforts in controlling pollutants delivered to the Charles River. We view our role as assisting Needham in its development of a moderate cost, state-of-the-practice approach to meeting the stormwater control objectives set forth by EPA.

The following review is based on the Town of Needham's 1996 document, *Stormwater Pollution and Management Program* and information gathered in our meeting with Town officials in early February, 1999. The Town is in the process of preparing an updated stormwater management plan. This work was scheduled to begin in the spring of 1999. Our review does not consist of a critical evaluation of the Town's subdivision, zoning, roads, utilities or other codes. We relied only on the information contained within the above document and information provided directly by the Town officials.

The Center for Watershed Protection has developed and adapted a holistic approach to watershed protection that involves the realization that the impacts of stormwater runoff on receiving water quality are wide and varied. Research conducted by a wide range of scientists has conclusively demonstrated the link between urbanization and receiving water body health. These impacts of urbanization come from many sources, including alterations to natural hydrology, influxes of pollutants during both wet and dry weather, and modifications to natural vegetation. Based on these causes and sources of impacts, watershed practitioners have recognized the need to apply a wide array of techniques to help maintain or restore water body health. The Center refers to these techniques as the "Tools of Watershed Protection."

To facilitate our review of the Lower Charles River Basin, we have integrated our watershed approach with EPA's *Elements of a Stormwater Management Program*, resulting in 8 tools of urban watershed and stormwater management (see Table 1). The concept is that there are several areas of activities where watershed protection occurs, from basic land planning and zoning to daily behavior of citizens within the watershed. The premise behind a watershed approach is that it takes a concerted, fully integrated

approach to effectively maintain or enhance water resource quality.

Table 1. Description of the tools of urban watershed and stormwater management.

Watershed Protection Tools	Description
1. Source identification	Stormwater program uses a mapping system coupled with a range of pollutant identification techniques to locate, catalog and quantify wet and dry weather pollutant sources in the watershed.
2. Land reclamation and restoration	Local government program encourages and fosters the restoration of forests, wetlands, soils, and creation of natural areas in the urban environment.
3. Riparian management	Local government program fosters the protection, restoration, creation, or reforestation of stream, wetland, and urban lake buffers.
4. Better site design for redevelopment	Local ordinances and codes incorporate techniques to reduce impervious cover and/or redirect runoff onto pervious surfaces in the design of new development and redevelopment projects.
5. Erosion and sediment control	Local government program encourages or requires the use of erosion control, sediment control, and dewatering practices at all new development and redevelopment sites.
6. Stormwater best management practices (BMPs)	Local government program requires the use of structural BMPs for new development and redevelopment, and promotes retrofitting for existing development to help mitigate the impacts of urbanization and stormwater runoff on receiving water quality.
7. Municipal pollution prevention	Local government employs operation and maintenance practices that prevent or reduce pollutants from entering the municipal or natural drainage system.
8. Public education and outreach programs	Local government operates or supports stormwater and watershed education or outreach programs targeted towards fostering human behavior that prevents or reduces pollution over a range of urban land uses and activities.

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Our review of Needham's stormwater management plan has been organized around these eight tools. This review is a draft document and as such, should be viewed as a work in progress. It is quite possible that we have overlooked information or are unaware of existing programs in Needham that may be important to protecting the Charles River and its tributaries. We will complete a final review document once Needham officials have had a chance to review this draft document.

Tool 1. Source Identification

Stormwater program uses a mapping system coupled with a range of pollutant identification techniques to locate, catalog and quantify wet and dry weather pollutant sources in the watershed.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget in 1996 was approximately $11.4 million (only $7.9 million was issued, while the remainder was authorized debt which was not issued). It is unclear what the 1999 budget is; although, the Town indicated that they are pursuing no interest funds from the state specifically for the stormwater management program.

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Review Evaluation Criteria:

- Mapping
- Use and identification of environmental and programmatic indicators
- Sanitary sewer overflow (SSO) detection
- Illicit connection detection
- Detection of infiltration from sanitary sewers and septic systems
- Hotspot[1] land use identification

General Comments on Town's Source Identification Practices and Program:
Existing mapping could be improved, particularly by the addition of topography. Some catchment-level delineation is done but without topography. A new GIS system is being proposed as part of the 1999 work being performed by Beta Engineering.

Selected outfalls are shown on the provided mapping as part of the dry weather inventory that occurred in 1996. Inventory will also be performed for the new GIS system. Location of structural controls owned and operated by the municipality (catch basins, oil water separators, stormwater ponds, etc.) are not shown on the provided mapping, and it is unclear on the number and location of these facilities. The number of catch basins and other BMPs within the Town jurisdiction needs to be clarified and maintenance responsibilities need to be identified and specified.

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[1] A stormwater hotspot is defined as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff (e.g., commercial parking lots, vehicle service and fueling stations, public works yards, and fleet storage areas). See the Tools Notebook for a more detailed discussion on hotspots and their water quality implications.

Important features that should be kept up-to-date on the new Town mapping include:

- Location of hazardous material sites. These sites are identified in the 1996 report in a table. General spill response is assigned to the fire department based on complaint or notification.
- Location of NPDES holders. No details are provided in the 1996 report with regard to these industry permits and accompanying responsibilities.
- Location of landfills and/or solid waste transfer stations. The 1996 report provides a general discussion on the landfill site. Closure of this site just occurred in December 1998.
- Existing and future land use maps are important for planning purposes. The 1996 report does not contain any of this information. This mapping should be generated, verified and updated routinely.
- Location of public parks, recreation areas, and open lands. This information is provided only descriptively through the dry weather field study that was performed.
- Soils information, which is readily available from the local NRCS branch office or cooperative extension.

Due to the absence of an up-to-date mapping system and database, the Town can not take advantage of tracking pollutant indicators such as location of NPDES permit holders, building permits, septic systems, catch basins and associated outfalls. In addition, due to funding constraints, public education programs targeting pollution prevention are limited.

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Discussion on sanitary sewer overflow and surcharge problems in wet and dry weather conditions for specific areas is provided in the 1996 report, and many of these areas have been targeted for repair.

The Town has performed video surveillance of primarily the sanitary sewer system; however, it is also considering video surveillance of the drainage system as well. Typically, illicit connections are detected on a report/complaint basis. It is believed that there are existing illicit connections in the Town, but it is unsure as to the number. The Town also relies on video surveillance and visual observations and reports to detect infiltration and inflow problems with the sanitary sewers.

A detailed inventory of hotspot areas does not currently exist; however, hazardous material storage sites are known.

Programmatic Strengths:

The biggest strength is that the Town is aware of its limitations and is taking necessary steps to address the program shortcomings. Past video surveillance and field reconnaissance studies have helped with the identification of problem areas. The new GIS system and accompanying inventory will go a long way in making the source identification process more efficient and proactive. The DPW staff has a good understanding of the areas that historically cause problems, which enables them to address these sites reasonably efficiently.

Areas for Improvement:

As previously mentioned, an up-to-date mapping and database system is needed to streamline the Town's

operations and improve source identification efficiency and effectiveness. Important features that should be kept up-to-date on Town mapping include:

- Location of hazardous material sites.
- Location of NPDES holders.
- Location of landfills.
- Existing and future land use maps are important for planning purposes.
- Storm drains, sewers, utilities, etc.
- Location of public parks, recreation areas, and open lands.
- Soils information.

Another area of improvement is the need to develop a good working relationship with the Conservation Commission so that efforts are not duplicated and communication paths are left open to increase the efficiency of both entity's operations.

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Tool 2. Land Reclamation and Restoration

Local government program encourages and fosters the restoration of forests, wetlands, soils, and creation of natural areas in the urban environment.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

- Revegetation/forestry projects or programs
- Wetland restoration projects or programs
- Land purchase and reclamation programs
- Soil restoration programs in urban areas

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General Comments on Town's Land Reclamation and Restoration Program:

There are no provisions for revegetation or reforestation programs or projects in the 1996 report. Nor are there any programs for wetland restoration in place in the Town. The Conservation Commission, however, does have authority to regulate development within water resource zones (i.e., 100 ft buffer from wetlands and 200 foot buffer from rivers and streams).

Programmatic Strengths:

With no specific programs identified in the 1996 report, it is difficult to identify program strengths.

Areas for Improvement:

Being largely built out, there are limited opportunities for improvement. The Town should be aware of opportunities where reforestation might be accomplished in redevelopment areas (through the use of conservation development strategies) and clearing limits required in new development areas. Redevelopment projects should be encouraged to create/restore as much natural area as possible. Land restoration is also an area where efforts can be tied into public education initiatives where the local community (i.e., individual citizens, schools, scout programs) can participate in tree planting and other programs. Similarly, the Conservation Commission should be active in requiring adequate wetland and riparian corridor protection measures within the resource areas.

Tool 3. Riparian Management

Local government program fosters the protection, restoration, creation, or reforestation of stream, wetland, and urban lake buffers.

Authority: Department of w and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

- Stream and wetland buffer requirements
- Reforestation, restoration, or riparian cover requirements or programs for buffers
- Stream and wetland buffer exemptions
- Daylighting programs for streams in culverts

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General Comments on Town's Riparian Management Program:

Buffers are required along streams and wetlands per the MA Wetlands Protection Act, however existing development is not subject to this requirement. This includes redevelopment. The Act strives to maintain a 100 ft vegetated buffer for wetlands and rivers. However, if the development already exists or if redevelopment is planned, it can occur under a 25 ft setback requirement. There are no riparian buffer revegetation or reforestation programs in place currently.

Exemptions for disturbance within the buffer and 200 foot riverfront area are allowed by the Conservation Commission so long as appropriate notice of intent filings have been submitted and approved. The Conservation Commission has the authority and flexibility to treat issues on a case by case basis.

Programmatic Strengths:

Program strength lies in the authority that the Conservation Commission has. The active nature of the Commission is not well established in the 1996 report, so it is difficult to evaluate the efficacy of the Conservation Commission's involvement.

Areas for Improvement:

The DPW and the Conservation Commission should strive to work in a cooperative manner, as open lines of communication will improve the efficiency of the stormwater management operations. DPW indicated in the February meeting with the Center that urban wildlife was a major source of bacteria. Urban waterfowl can be managed to some degree with a focused effort on reforestation or at least maintaining native

vegetation along wetlands and waterways (see additional information in Tools Notebook). Finally, when sites within the resource area are redeveloped, DPW, working cooperatively with the Conservation Commission, should encourage (or require) reductions in the amount of impervious cover and strive to increase existing buffer widths to approach the 100- or 200-foot limit. Reforestation efforts should also be made within the buffer.

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Tool 5. Erosion and Sediment Control

Local government program encourages or requires the use of erosion control, sediment control, and dewatering practices at all new development and redevelopment sites.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

- Areas where required
- Different methods allowed
- Dewatering controls
- Sediment stockpiling controls
- Inspection and enforcement

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General Comments on Town's Erosion and Sediment Control Program:

No formal erosion and sediment control requirements exist within the Town. The new plan should identify basic requirements.

Programmatic Strengths:

The DPW does require some form of erosion and sediment control at all construction sites; however, there does not appear to be a set of minimum requirements nor guidance.

Areas for Improvement:

The Town should require, through the development of an ordinance, that a minimum set of erosion and sediment control criteria be set for all development and redevelopment. As a component of this effort, guidance and design criteria should be provided. This guidance can usually be readily adopted from available sources (see Tools notebook for effective measures). It should be noted that there are some measures recommended in the NRCS handbook that have been shown to be ineffective when used as the sole control measure. These include: 1) straw bales; 2) inlet protection devices 3) catch basin inserts. Where possible, DPW should provide incentives to reduce clearing and grading on a site, and grading techniques that minimize the amount of soil disturbed should be emphasized. Finally, an inspection and enforcement component to an erosion and sediment control program needs to be provided, and it should include preconstruction meetings and inspection at specified points during construction. By providing rigorous erosion and sediment control measures, other areas of DPW operations are improved such as frequency of catch basin cleanings.

Tool 6. Stormwater BMPs

Local government program requires the use of structural BMPs for new development and redevelopment, and promotes retrofitting for existing development to help mitigate the impacts of urbanization and stormwater runoff on receiving water quality.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

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Stormwater management requirements or exemptions
- Quantity and quality control
- Special requirements for brownfield redevelopment, hotspots, small residential in-fill development, or basic redevelopment
- Exemptions from stormwater management requirements

Structural controls
- When on-site structural controls are required
- BMP selection criteria
- Availability of fee-in-lieu option

Proprietary products
- Guidelines for the selection of proprietary stormwater BMPs

Retrofitting
- Program to identify and prioritize retrofit projects

Maintenance, Inspection, Enforcement
- Required of the developer or owner
- Use of maintenance agreements
- BMP inspection for maintenance upkeep and structural integrity
- Enforcement measures to ensure maintenance upkeep

General Comments on Town's Stormwater BMP Program:

No specific provisions for stormwater quantity or quality control at new development and redevelopment sites are provided in the 1996 report. The 1996 report suggests that structural BMPs be discouraged due to space limitations and cost constraints and that nonstructural practices instead be emphasized.

The Town has expressed an interest in installing proprietary hydrodynamic devices; however, a constraint facing the Town is that they do not own the vacuum equipment required for clean out of these devices. Catch basin clam shell cleaners are not capable of cleaning most proprietary devices.

No program exists for stormwater retrofits, nor is there an inspection and maintenance program for existing structural BMPs that is described.

Programmatic Strengths:

The 1996 report did not provide sufficient detail with respect to stormwater BMP requirements. There are apparently, however, subdivision and floodplain regulations which provide various levels of stormwater controls. These documents were not reviewed.

Areas for Improvement:

There is a critical need to extend the practices and regulations required by the Conservation Commission in resource areas to the areas beyond these boundaries. The Town needs to adopt comprehensive drainage and stormwater management requirements with minimum performance goals. The MA DEP manual is an excellent reference that can be adopted in whole or in part. Specifically, the Town should strive to require all redevelopment and new development sites where a building permit is issued to comply with a minimum set of stormwater quantity and quality requirements. In some redevelopment cases, exemption from quantity control may be considered. The Town should provide specific BMP recommendations along with design criteria. Finally, an effective and enforceable maintenance policy/requirement should be implemented where a clearly established responsibility is identified. In addition, because the Town is largely built out, it should always be looking for retrofit opportunities. Problem areas should be identified and prioritized and, if feasible, capital improvement funds should be earmarked for water quality retrofits.

Tool 7. Municipal Pollution Prevention Programs

Local government employs operation and maintenance practices that prevent or reduce pollutants from entering the municipal or natural drainage system.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

Spill Response, Prevention and Cleanup
- Requirements

Street Sweeping
- Type of machine used
- Frequency of sweeping, including seasonality

Snow Management
- Type of deicing compounds and storage
- Snow storage and disposal

Catch Basin Cleaning
- Frequency
- Disposal
- Retrofitting
- Standard design

Trash and recycling
- Availability and frequency of curbside leaf and debris pickup
- Used oil recycling

Stormwater System Inspection
- Storm sewer inspection and maintenance schedule and practices
- Structural BMP inspection and maintenance schedule and practices

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General Comments on Town's Municipal Pollution Prevention Program:

The Town fire department is generally responsible for spill response. There is no formal program for educating the public, and the program is typically reactionary.

Needham's street cleaning program consists of owning 2 street sweeping machines (Elgin Pelicans) which are used on a fairly regular basis throughout the year, except during the winter months.

Salt/sand mixture is the primary compound applied on streets. No detail about snow storage practices is provided in the 1996 report. Calcium chloride is also used on streets. There are no areas identified as

sensitive, where sanding/salting is minimized or alternative de-icers are used.

The Town owns a single "Stetco" cleaner for cleaning its catch basins, however, no records are kept on the frequency of cleanings. It is estimated that basins are cleaned at least once a year, with 30 % receiving maintenance a second time. Removed debris is stored in DPW compound and ultimate disposal used to be at the Town landfill. Now that the landfill has closed, there is concern about where catch basin as well as street sweeping debris can be stored. The Town has requested guidance on this issue from the State and EPA. No catch basin retrofitting was described in the 1996 report.

There is no discussion on Town trash collection provided in the 1996 report. Similarly, no discussion on large debris/leaf pickup programs is provided in the 1996 report. Recycling of used oil occurs under the household hazardous wasted collection program (see Tool 8).

Storm drain inspection usually occurs in response to complaints and/or reports. Line flushing and catch basin cleaning occur on a fairly regular basis to ensure proper functioning of the system and as a general maintenance practice.

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Programmatic Strengths:

The Town has fairly strong pollution prevention programs in place and realizes the economic benefit of preventing pollution from occurring as opposed to cleaning it up once it has occurred.

Areas for Improvement:

With a GIS system, it will be relatively easy to maintain a database that tracks the amount of sediment collected in specific catch basins and identifies structural BMPs that routinely have maintenance problems. These types of features will increase the efficiency of the Town's operations and save time for other needed tasks. Other areas for improvement include:

- Combining pollution prevention practices with public education initiatives to get the public more involved in the process of minimizing pollutant sources.
- Consider purchasing, or sharing with another town, a vacuum sweeper to be used in tandem with the standard drive sweeper for commercial streets. This will greatly improve the efficiency of removal of fine-grained materials that carry the majority of the pollutant load.
- Ensure that the melt water from the snow storage area receives adequate treatment prior to discharge to the storm drain system or surface waters.
- Consider use of a alternative deicers such as "Ice Ban," or an equivalent. Ice Ban is an organic material derived from the beer brewing process that improves the effectiveness of salt, reducing the need for application. The BOD loadings are increased, but some use may be effective.

Tool 8. Public Education and Outreach Programs

Local government operates or supports stormwater and watershed education or outreach programs targeted towards fostering human behavior that prevents or reduces pollution over a range of urban land uses and activities.

Authority: Department of Public Works and Conservation Commission

Funding source: The Public Works budget

Review Evaluation Criteria:

Existence of education or outreach programs targeted towards:

- Range of land uses and activities including residential, commercial, industrial, municipal, or hotspot land uses
- Automotive and other motorized equipment maintenance
- Lawn care and landscaping
- Car washing
- Septic system maintenance
- Selection, storage, collection, and disposal of household hazardous waste products
- Pet waste management

DRAFT

General Comments on Town's Public Education and Outreach Program:

There are periodic TV segments on local cable television where selectmen can be asked questions about stormwater management and other Public Works-related questions. The effectiveness of this program as an education tool and community outreach tool is not known.

There is a household hazardous waste collection program; however, the frequency of this program has dropped off due to funding constraints in recent years.

Programmatic Strengths:

The Town has demonstrated in the past that it has the ability to implement a public education effort. This effort should be maintained and previously existing programs like household hazardous waste recycling and television question and answer spots should be renewed.

Areas for Improvement:

As stated in the Town's plan, given the fact that the Town of Needham is largely built out, there are limited opportunities to site and construct structural stormwater treatment facilities that will yield a substantial

water quality benefit. It is more likely that the most significant pollutant load reductions would occur as a result of changes in public behavior patterns. Through a targeted and consistent public education initiative on practices such as pet waste management, lawn care practices, and individual home drainage and septic maintenance practices, the Town should be able to realize substantial pollutant load reductions as well as a reduced burden on the operational tasks that DPW routinely needs to perform.

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Stormwater Program Review Summary

The Town of Needham may not have a full suite of regulatory tools to ensure that appropriate stormwater management controls are in place and can be enforced for new development and redevelopment areas. However, the Town does have the government framework in place to develop specific by-laws that can require stormwater management controls. The Conservation Commission likely has sufficient authority and by-laws; however, their jurisdiction is limited to resource areas.

Specific allocation of budget dollars for stormwater management is not apparent from the 1996 report. As such, it is hard to determine what the Town's future commitment to stormwater protection is. Short-term funding is being pursued in the form of federal and state grants. These dollars are being used, for example, to update (or really establish for the first time) a stormwater management plan and Town-wide GIS mapping inventory and database. This should go a long way in increasing the efficiency of the Town's program and allow some of the program's strengths to become stronger. For example, what appears to be a good system of catch basin cleaning and street sweeping might be improved with a database that locates all existing catch basins and provides an up-to-date logbook of maintenance activities.

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Table 2 below provides a summary of the areas of improvement recommended throughout this review. The recommendations have been divided into three priority (highest, medium, and lowest) categories based on relative cost of implementation and associated benefit realized in terms of reducing total pollutant loads to the Charles.

Table 2. Summary of Recommendations and Associated Cost Implications

Tool	Recommendation	Associated Costs
Highest Priority - Relatively inexpensive measures to implement with high potential for pollutant load reduction		
1	Update and improve existing mapping system. The following should be identified on Needham's stormwater system mapping: • Location of hazardous material sites. • Location of NPDES holders. • Location of landfills. • Existing and future land use maps are important for planning purposes. • Storm drains, sewers, utilities, etc. • Location of public parks, recreation areas, and open lands. • Soils information.	b - start-up costs have already been accounted for in the current contract for GIS development
4	Encourage / require disconnection of impervious surfaces such as roof leaders from storm drains, where appropriate.	a, b, e
4, 6	Review effectiveness of various stormwater BMPs and provide guidance on acceptable stormwater BMPs (e.g. use of bioretention in parking lots).	b
5	Adopt and enforce erosion and sediment control standards for all development and redevelopment sites.	b
5	Erosion control plan should be required on the site plan used in the plan review process. The plan designer should then be required to inspect and certify installation of the erosion and sediment control.	a, b
6	Require development and redevelopment projects throughout the whole Town, not just in resource areas, to meet the Stormwater Management Standards set forth in the MA DEP Stormwater Management Policy, or some comparable set of guidelines.	a
8	Consider outreach programs that target behavioral attitudes towards pet waste management, lawn care, and septic maintenance.	b, e
Medium Priority - Generally more costly yet critical to total pollutant load reduction		
3, 6	Look for retrofit and stream restoration opportunities. Include a retrofit line item in capital improvement programs.	b, d
4	Work with Needham Planning Board to review site design requirements to reduce impervious cover in new and redevelopment. Consider capping building footprint as a percent of total site area, minimizing road widths in low to medium density residential areas, minimizing the amount and size of parking spaces.	a, e
6	Regularly inspect BMPs and develop enforcement mechanisms for maintenance failure.	a, b

DRAFT

Tool	Recommendation	Associated Costs
Lowest Priority - Most costly measures and less critical to the goal of reducing total pollutant load to the Charles		
2	Examine potential restoration opportunities for wetlands and stream channels throughout Town.	f
7	Purchase of vacuum assisted sweeper (possibly in conjunction with other Towns) so that sweeping can be performed in tandem with traditional sweepers, especially on highly traveled, commercial, and industrial area roads. Also pursue purchase of vacuum cleaner for proprietary devices if the Town decides to install a significant number of these devices.	c, f

Associated Costs:

a. regulatory / legislative
b. personnel
c. equipment purchase
d. large start-up
e. inter-departmental coordination
f. inter-jurisdictional coordination

DRAFT

FILE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

OFFICE OF THE
REGIONAL ADMINISTRATOR

AUG 22 2000

August 14, 2000

Mr. Richard P. Merson
Director of Public Works
Town of Needham
470 Dedham Avenue
Needham, MA 02492

Dear Mr. Merson:

EPA is in receipt of your July 19, 2000, letter regarding Needham's response to the Center for Watershed Protection's comments on Needham's stormwater management plan. We have been in contact with the Center on your letter and hope to arrange a call with the appropriate town staff in early September to discuss Needham's concerns.

Bill Walsh-Rogalski of my office will be in contact with you to arrange a convenient time to discuss your issues with EPA and the Center for Watershed Protection.

Thank you for your continued commitment to the Clean Charles 2005 initiative.

Sincerely,

Mindy S. Lubber
Regional Administrator

cc: Carl Valente, Town Administrator

Help us serve you better. If you need to call us regarding this correspondence in the future, please reference 01-0000471.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

00 MAY 10 PM 1:06

RECEIVED MAY 12 2000 PUBLIC WORKS DEPT. NEEDHAM

Finance
Fire
Police
Consent Agenda

Pack
Pls advise
Carl

May 9, 2000

Mr. Carl Valente, Town Administrator
Town of Needham
1471 Highland Avenue
Needham, MA 02192

Re: Implementation of Storm Water Management Plans

Dear Mr. Valente:

We are sorry you were unable to attend the most recent meeting of the Clean Charles 2005 Task Force in March. As your representatives to the Task Force will tell you, during the meeting I affirmed EPA's continued commitment to our mutual goal of a fishable and swimmable Charles River by Earth Day 2005. The meeting included updates on illicit connection identification and removal, storm water management plans, a presentation of water quality sampling of the Charles River by EPA's Office of Environmental Measurement and Evaluation, and a presentation on the Watershed Study being conducted by USGS. The water quality sampling results indicate significant improvements in water quality since 1995 which we attribute to increased control of combined sewer overflows, and your efforts in storm water management and illicit connection removal. However, the sampling indicates more work is necessary to achieve our goal.

You have demonstrated your commitment by developing a storm water management plan, which was submitted to the Agency in November of 1996 and updated in June of 1998. As you know, over the past year, our consultant, Center for Watershed Protection, has met with your officials, reviewed your plan and provided comments on program strengths and recommendations for improvement. Attachment 1 provides a summary of those comments.

In the original MOU, you agreed to develop a storm water management program. It also stated that once that program was developed, "the parties intend to negotiate a further memorandum of agreement regarding its implementation."

In a letter dated October 21, 1999, EPA sent you a draft MOU for implementation of your storm water program. At that time, we asked that you agree to implement the storm water management plan as submitted to the Agency and to discuss with EPA which Center for Watershed Protection recommendations could be incorporated before the document was signed. Unfortunately, the process did not result in a signed MOU with your community, and we have decided to try again to work with you toward developing a mutually acceptable agreement.

The purpose of this letter is to develop a framework for those discussions. We have included several documents that we request you respond to.

1. Storm Water Management Recommendation Summary: This document (Attachment 1) summarizes recommendations made by the Center for Watershed Protection(CWP), which reviewed your initial program and spoke to officials in your municipality. CWP made recommendations regarding your program and ranked them by priority. The summary lists the priority of each item (High, Medium, or Low), identifies the task, and specifies what specific deliverable is associated with the task.

2. Example Narrative and Table Response to CWP Comments: This document provides an example for responding to CWP recommendations (Attachment 2). Please fill out the table in a way that addresses all of the recommendations. For all high and medium priority recommendations, please identify how you will implement them and the critical milestones and associated dates. For any low priorities that you do not intend to implement, please identify the reasons. For any activity that is presently being implemented please identify by which department and how, e.g. through planning and site plan review or through conservation and the wetlands protection program. In the chart, for each recommendation, please specify the output or deliverable and the end date you expect it to happen. Please use the narrative to further explain your implementation plan, and schedule to include all key milestones. We hope to receive this no later than May 30, 2000.

3. Implementation MOU: We hope to have a signed MOU (see Attachment 3 for draft MOU) agreeing to implement current activities and the negotiated recommendations implementation schedule no later than June 28, 2000.

If you have any questions or if you wish to meet, please contact Bill Walsh-Rogalski at (617)918-1035 or Jay Brolin, at (617)918-1699.

Sincerely,

Mindy Lubber
Regional Administrator

enclosures

Stormwater Program Review Summary

The Town of Needham does not have a full suite of regulatory tools to ensure that appropriate stormwater management controls are in place and can be enforced for new development and redevelopment areas. However, the Town does have the government framework in place to develop specific by-laws that can require stormwater management controls. The Conservation Commission likely has sufficient authority and by-laws; however, their jurisdiction is limited to resource areas.

Specific allocation of budget dollars for stormwater management is not apparent from the 1996 report. As such, it is hard to determine what the Town's future commitment to stormwater protection is. Short-term funding is being pursued in the form of federal and state grants. These dollars are being used, for example, to update (or really establish for the first time) a stormwater management plan and Town-wide GIS mapping inventory and database. This should go a long way in increasing the efficiency of the Town's program and allow some of the program's strengths to become stronger. For example, what the Town's system of catch basin cleaning and street sweeping would be improved with a database that locates all existing catch basins and provides an up-to-date logbook of maintenance activities.

Table 2 below provides a summary of the areas of improvement recommended throughout this review. The recommendations have been divided into three priority (highest, medium, and lowest) categories based on relative cost of implementation and associated benefit realized in terms of reducing total pollutant loads to the Charles.

SEP-05-2000 12:34 NEEDHAM DPW

Table 2. Summary of Recommendations and Associated Cost Implications

Tool	Recommendation	Associated Costs
Highest Priority - Relatively inexpensive measures to implement with high potential for pollutant load reduction		
1	Update and improve existing mapping system. The following should be identified on Needham's stormwater system mapping: ☐ Location of hazardous material sites. ☐ Location of NPDES holders. ☐ Location of landfills. ☐ Existing and future land use maps are important for planning purposes. ☑ Storm drains, sewers, utilities, etc. ☐ Location of public parks, recreation areas, and open lands. ☑ Soils information.	b - start-up costs have already been accounted for in the current contract for GIS development
3	Manage urban waterfowl with a focused effort on reforestation or at least maintaining native vegetation along wetlands and waterways (see additional information in Tools Notebook).	b, c
4	Encourage / require disconnection of impervious surfaces such as roof leaders from storm drains, where appropriate.	a, b, e
4, 6	Review effectiveness of various stormwater BMPs and provide guidance on acceptable stormwater BMPs (e.g. use of bioretention in parking lots).	b
5	Adopt and enforce erosion and sediment control standards for development and redevelopment sites. The ordinance should include guidance on when measures are required, necessary components of an erosion control plan submittal, acceptable control practices, and inspection and maintenance schedules.	a, b
5	An erosion control plan should be required on the site plan used in the plan review process. The plan should include among other things, location and type of controls being used, supporting design calculations, limits of disturbance, required buffers and setbacks, and construction schedule. The plan designer should then be required to inspect and certify installation of the erosion and sediment controls.	a, b
6	Require development and redevelopment projects throughout the whole Town, not just in resource areas, to meet the Stormwater Management Standards set forth in the MA DEP Stormwater Management Policy, or some comparable set of guidelines.	a
7, 8	Consider outreach programs that target behavioral attitudes towards pet waste management, lawn care, and septic maintenance. Combine municipal pollution prevention practices with public education initiatives.	b, e
Medium Priority - Generally more costly yet critical to total pollutant load reduction		
1	Develop better communication with the Conservation Commission so that efforts are not duplicated and communication paths are left open to increase the efficiency of both entity's operations.	a, e

ATTACHMENT 2
Example Narrative and Table Response to CWP Comments

City of Lower Charles
Implementation of Recommended Improvements to the Storm Water Management Program

Highest Priority:

Tool 1. Existing Storm Drainage Map.
City has existing digital base map for sewer and water infrastructure, zoning, and assessments. Existing drain maps will be digitized and added to the base map by July 2000. Known outfalls will be GPSed by November 2000. Field verification of remaining components of the storm drain system will be conducted in conjunction with ongoing infrastructure and roadway improvement projects and illicit connection program. A decision to link this with an Management Information System such as Hansen to track complaints, work orders, and illicit connections has not been made. This decision will be primarily based on the FY2001 budget which will not be available until June 2000. We expect to have a GIS map of the system with the location of all known drains, drainage areas, and outfalls by January 2001.

Tool 5. Sediment and Erosion Control Policy/Regulations
The City will strengthen it's existing sediment and erosion control program by November 2000 as follows:

A. Conservation Commission Sediment and Erosion Control standards were adopted as a city-wide policy for all development and redevelopment in November 1998. The Town's Storm Water Management Committee (DPW, BOH, Building Inspector, Conservation, Planning) will draft city wide regulations for City Solicitor review by June 2000. The City Council Environmental Subcommittee review and approval should be complete by August 2000. The Public Works Committee review and approval should be complete by September 2000. The City Council should vote on the regulations by October 2000.

B. A guidance package on the Sediment and Erosion Control Policy has been available for any proponent of development or redevelopment from all departments since January 1999.

C. The first training courses will be conducted by the City and MA DEP by June 2000 for all City staff that would review or inspect sediment and erosion controls. We intend to conduct training for all new staff and annual refresher training for appropriate staff.

D. The Department of Public Works in association with the Conservation Agent will apply for a MA DEP 319 grant to establish a pilot "Third Party Inspection Program" by April 2000.

ATTA MENT 2

Example Narrative and Table Response to CWP Comments

CITY OF LOWER CHARLES
STORM WATER MANAGEMENT RECOMMENDATION IMPLEMENTATION SUMMARY

PRIORITY	TOOL	TASK	DELIVERABLE	DATE
H	1	MAPPING	DIGITIZE EXISTING MAPS	JUNE 2000
H	5	SEDIMENT AND EROSION CONTROL POLICY/REGULATION	MODIFY EXISTING REGULATIONS	NOVEMBER 2000
H	6	CITY SPECIFIC GUIDANCE ON ACCEPTABLE BMPS FOR DEVELOPMENT AND REDEVELOPMENT	GUIDANCE DOCUMENT/REPORT	JUNE 2000
H	8	TARGETED EDUCATION AND OUTREACH	WORKSHOPS	ONGOING NOVEMBER 2000
M	3	25' BUFFER/REPLANTING FOR ALL REDEVELOPMENT	REGULATIONS	EXISTING CONCOM
M	4	COMPREHENSIVE SITE PLAN REVIEW	REGULATIONS	EXISTING ZONING
M	6	STORM WATER PERFORMANCE STANDARDS FOR DEVELOPMENT AND REDEVELOPMENT	REVIEW EXISTING STANDARDS MODIFY REGULATIONS	NOVEMBER 2000
M	6	POST-CONSTRUCTION BMP INSPECTION MAINTENANCE ENFORCEMENT PROGRAM	REGULATIONS	JUNE 2000

SEP-05-2000 12:35 NEEDHAM DPW

TOW_ OF NEEDHAM, MASSACHUS TTS
PUBLIC WORKS DEPARTMENT
470 Dedham Ave., Needham, MA 02492
Telephone: (781) 455-7537 Fax: (781) 449-9023

RICHARD P. MERSON
Director

COPY
RPM

February 18, 2000

Mr. Ted Brown
Center for Watershed Protection
8391 Main Street
Ellicott City, MD 21043

Re: Needham's Stormwater Management Program

Dear Mr. Brown:

Your organization completed a review of our Stormwater Pollution and Management Program dated December 1996 and your comments were summarized in a letter to the Town dated July 21, 1999. Since the report was prepared, the Town has taken many steps towards improving stormwater management in our community. We felt that it would be appropriate to respond to your comments so you will be fully aware of the Town's commitment to improving stormwater quality. Included below is a discussion of what the Town is doing or intends to do regarding the eight watershed protection tools listed in your letter.

Tool 1 – Source Identification

It was recommended that existing mapping and facility inventories be improved to create a tool that would help locate, catalog and quantify wet and dry weather pollutant sources in the watershed.

The Town is currently in the process of completing a Stormwater Master Plan/Non-Point Source Pollution Study (the Study) funded thorough the SRF program. Included in this project is the preparation of photogrammetric mapping of the entire town at a scale of 1"=40' for use in a GIS system. The mapping will include all prominent surface features and contours at two foot intervals. The drainage system will be added to the base mapping based on our record drawings, supplemented by field information, and a GIS coverage created. This will provide the Town with a complete and comprehensive inventory of our drainage system. The sewer system has previously been digitally compiled and will be added to the new base mapping in the future.

It was also recommended that other features be added to the mapping and databases:

Location of hazardous material sites – Although not included in the Study, adding the location of hazardous material sites to the base mapping would be beneficial. The Town will add this information as identified on CERCLA and Superfund site lists in the future.

Tool 3 – Riparian Management

It was recommended that the Department of Public Works (DPW) and Conservation Commission work in a cooperative manner with open lines of communication to improve the efficiency of stormwater management operations. In addition, it was recommended that when sites within the resource area are redeveloped, the Town should encourage (or require) reductions in the amount of impervious cover, increases of the existing buffer widths, and reforestation efforts.

The DPW currently works in the common interest of the Town's Conservation Commission through the Planning Board process. This occurs on all development throughout the Town including those areas within the jurisdiction of the Conservation Commission. All references to the jurisdiction of the Conservation Commission are typically incorporated into the Planning Board's approvals for all subdivisions and site developments or redevelopments. Regardless of this, specific measures are routinely required of the developers by the DPW to be incorporated into the design plans as they relate to either the Massachusetts Department of Environmental Protection's (DEP) Stormwater Regulations, the Environmental Protection Agency's (EPA) Memorandum of Understanding (MOU) signed by the Board of Selectmen or to impacts upon the Town's systems.

Tool 4 – Better Site Design for Redevelopment

It was recommended that the Town require all building permits receive approval from the DPW to ensure proper handling of stormwater and that the Town adopt stormwater regulations, similar to DEP Stormwater Regulations, to improve water quality throughout the Town. It was also recommended that the Town work with the Needham Planning Board to review site design requirements to reduce impervious cover in redevelopment and new development.

The DPW, working with the Planning Board, enforces DEP Stormwater regulations in all areas of Town that are within watersheds that discharge directly to the Charles River in accordance with the MOU signed by the Town.
The DPW also enforces the provisions in the MOU through the Town's Subdivision Regulations for development and redevelopment projects and Stormwater connection permits for projects that may not require approval of the Planning Board. In addition to the DPW and the Planning Board, the Conservation Commission enforces the DEP Stormwater regulations in all areas within their jurisdiction.

Tool 5 – Erosion and Sediment Control

It was recommended that the Town adopt an ordinance that requires all development and redevelopment projects to comply with erosion and sediment control standards that are clearly defined, documented and enforced.

All projects under the jurisdiction of the Planning Board are reviewed by the DPW, through the Town Engineer, for adequacy of erosion and sediment control. Projects under the jurisdiction of the Conservation Commission are reviewed by the Town

Engineer at the request of the Commission. The Town Engineer ensures that proper controls are in place based on the Town's Standard Construction Specifications (March 1995).

Tool 6 – Stormwater BMPs

It was recommended that the practices and regulations required by the Conservation Commission in resource areas be extended to all areas of the Town and that the Town investigate any opportunities for retrofitting existing stormwater facilities to enhance water quality.

As stated previously, the Town is currently in the process of completing a Stormwater Master Plan/Non-Point Pollution Study (the Study) funded thorough the SRF program. Included in this project is dry weather sampling of all the Town's stormwater discharges, wet weather sampling of selected outfalls, investigation of opportunities for stormwater quality structural BMPs, and development of a Stormwater Master Plan/Capital Improvement Plan. Through this effort, opportunities for retrofit of existing stormwater facilities and implementation of new stormwater BMPs will be investigated and potential solutions recommended to a conceptual level of detail.

Tool 7 - Municipal Pollution Prevention Programs

It was recommended that the Town develop a GIS system to maintain a database that tracks the amount of sediment collected in specific catch basins and identifies structural BMPs that routinely have maintenance problems. It was also recommended that additional public education be conducted, that a vacuum sweeper be used in tandem with a standard sweeper, that melt from snow storage be properly treated, and that the Town consider alternative deicers.

The Town's Stormwater Management Program Report, dated December 1996, recommended a development of a municipal database that tracks cleaning dates, amount of debris removed, repairs required and other related data. The town, through the Study currently underway, will inventory all of the municipal drainage systems and create a database that can be easily expanded to include record data on catch basin and BMP cleaning operations. The Town desires to implement this system in the future and will do so when appropriate funding is available.

Public education programs are addressed in the Tool 8 discussion that follows.

A vacuum sweeper would be a welcome addition to the Town's equipment inventory. The units, however, are quite expensive and funding is not currently available to purchase this equipment. Should funding become available, the Town will consider purchasing a vacuum sweeper and using it in tandem with our standard sweeper currently in use.

At a recent Special Town Meeting, funding was provided to undertake a vehicle and equipment study for the entire DPW fleet. Due to the high cost of equipment replacement and the financial impact upon the Town, it was recommended that this study be conducted. Contained within this study will be an investigation of potential or future

requirements that will affect the number and type of equipment required. Recommendations such as this will be incorporated into this investigation.

Melt from snow storage areas is currently handled by an extended detention basin located at the Town's landfill.

The Town has evaluated alternative deicers. We have found that magnesium chloride is an effective deicer and is presently being used in a 50% mix with rock salt. This has allowed the Town to reduce salt application to the roadway from 800 lbs./lane mile to as little as 400 lbs./lane mile.

Tool 8 – Public Education and Outreach Programs

It was recommended that the Town conduct a targeted and consistent public education initiative on practices such as pet waste management, lawn care practices, and individual home drainage and septic maintenance practices.

The Town intends to continue its outreach programs through Hazardous Waste Days and cable TV spots.

We hope the information contained in this response to your comments clarifies the Town's position on current and future activities related to stormwater quality enhancements. If you have any questions or need any additional information please feel free to call.

Sincerely,

Richard P. Merson

Richard P. Merson
Director

cc: C. Valente, Town Administrator
A. Del Gaizo, Town Engineer
R. Lewis, Superintendent
C. Alwin, Asst. Superintendent
L. Newman, Planning Director
R. Cramer, Chair, Needham Conservation Commission
J. Brolin, U.S. Environmental Protection Agency
M. Vignale, BETA Engineering, Inc.

Memo

CENTER FOR WATERSHED PROTECTION

8391 Main Street
Ellicott City, MD 21043
(410) 461-8323

Date: January 15, 2001

To: U.S. EPA, Region 1
Mr. William Walsh-Rogalski
Mr. David Gray

From: The Center for Watershed Protection

Re: Town of Needham - Implementation of Stormwater Management Plan Recommended Action in Response to Town's Submission Dated February 18, 2000

The Center for Watershed Protection has reviewed the Town's response to our initial recommendations (from July 1999) for implementing stormwater program elements in association with the Clean Charles River Initiative (and indirectly, the NPDES, Phase II permit rules). We are providing herein recommended actions that EPA may elect to pursue in negotiating with Town officials. While we believe that our original recommendations were structured in a way to allow flexibility and cooperation between EPA and the Town in meeting a cleaner Charles River, we feel that some of the Town's responses may not go far enough in meeting the goals and objectives of controlling stormwater runoff, particularly in light of the recently promulgated rules for Phase II NPDES. In general, we believe the highest priority recommendations should receive the greatest level of detail by the Town and the greatest scrutiny by EPA, and the Town can provide somewhat less detail and be allowed more flexibility for lower priority recommendations.

We have prepared this memorandum as follows:

Our original comment is listed first, followed by the Town's response (dated February 18, 2000), and then followed by our recommended action on the part of EPA with the justification or logic behind the recommendation.

Highest Priority

1. Original Comment: *Update and improve existing mapping system. The following should be identified on Needham's stormwater system mapping:*
   - *Location of hazardous material sites*
   - *Location of NPDES holders*
   - *Location of landfills*
   - *Existing and future land use maps are important for planning purposes*
   - *Storm drains, sewers, utilities, etc.*
   - *Location of public parks, recreation areas, and open lands*

Soils information

Needham's Response: The Town is currently in the process of completing a Stormwater Master Plan/Non-Point Source Pollution Study (the Study) funded through the SRF program. Included in this project is the preparation of photogrammetric mapping of the entire Town at a scale of 1" = 40' for use in a GIS system. The mapping will include all prominent surface features and contours at two foot intervals. The drainage system will be added to the base mapping based on our record drawings, supplemented by field information, and a GIS coverage created. This will provide the Town with a complete and comprehensive inventory of our drainage system. The sewer system has previously been digitally compiled and will be added to the new base mapping in the future.

It was also recommended that other feature be added to the mapping and databases:

Location of hazardous material sites - Although not included in the Study, adding the location of hazardous material sites to the base mapping would be beneficial. The Town will add this information as identified on CERCLA and Superfund sites lists in the future.

Location of NPDES holders - The Town has no specific jurisdiction over NPDES permit holders nor are we informed when a new permit is granted. However, providing the locations of these permit holders to our mapping may be beneficial in understanding the pollutants at our discharges and this information will be added to the mapping at a later date based on the availability of obtaining a NPDES permit list from the EPA.

Location of Landfills - Landfill locations will be added the base mapping and database.

- Land Use Maps - Land use mapping will be added to the base mapping as part of the Study in all areas where critical pipes are located (about 15% of the Town) to allow for hydrology to be completed. Land use mapping will be added in the future as additional hydrologic studies are completed or when funding for additional GIS implementation is available.

Storm Drains, Sewers, Utilities, etc. - Storm drains are being added to the base mapping and databases as part of the Study. Sewer and water systems were compiled digitally in the past and will be added to the base mapping in the future. The Town has no plan to add other utilities to our base mapping at this time.

Parks, Recreation Areas, and Open Lands - Parks and recreation areas will be identified on the base mapping as part of the Study within the areas where land uses are to be defined. Other areas will be added to the mapping in the future.

Soils Information - Soils information that includes hydrologic soil groups will be added to the base mapping for the entire Town.

Recommended Action:

The Town is responsive to our original comment. EPA should agree on a schedule for completion of the GIS system, review the relevant data "themes", or layers to ensure that they are being adequately depicted and documented, and agree on a cycle for updating the map in the future. We note that the Town is planning on doing several items in the future (hazardous material sites, NPDES permit holders, some land use mapping, and parks). The Town should provide a time frame for completing this information. The Town has no plans to add other utilities at this time. While not urgent, nor absolutely critical, it is very beneficial to have most utilities located on a single mapping resource so that future retrofit inventories, or redevelopment projects have a true picture of what constraints are present at a given location.

2. Original Comment: *Manage urban waterfowl with a focused effort on reforestation or at least maintaining native vegetation along wetlands and waterways.*

Needham's Response: None evident.

Recommended Action:

Since this was one of our highest priority recommendations, the Town should provide a detailed plan to manage urban waterfowl within the Town's limits. The plan should be specific with respect to plan actions, provide budget and time frame for implementation.

3. Original Comment: *Encourage/require disconnection of impervious surfaces such as roof leaders from storm drains, where appropriate.*

Needham's Response: None evident.

Recommended Action:

Since this was one of our highest priority recommendations, the Town should provide a specific plan to make it a policy to achieve wide-spread disconnection of rooftops and other directly connected impervious surfaces in the Town. While the original recommendation is simple

enough, the implementation of such a recommendation requires a comprehensive program, if voluntary, or an ordinance modification, if a mandate. The Town should decide based on available resources, existing zoning and land use density how to approach this issue.

The Town might consider responding to our original comment by submitting a plan of action that would include a program for a voluntary disconnection approach, and/or a mandatory approach; a schedule; and methods for measuring success. For example, in a voluntary approach, the Town would need to have a public education campaign most likely coupled with an incentive to encourage rooftop or non-rooftop disconnections (such as a free rain barrel, - refer to the Toronto, Canada example, or a publication citing the benefits of disconnection, and techniques/methods for doing it). The Town might appoint a staff person to answer questions from homeowners or businesses on how to do a disconnection. The Town might proffer a goal of 50 disconnected rooftops per year, and this would be part of a stormwater management report to EPA on a periodic basis. In a mandatory disconnection program, the Town will need to pass an ordinance to make directly connected roof leaders illegal and give property owners a time limit to complete disconnections. We're not suggesting that the Town be required to do this to address our recommendation, but we are suggesting that a mandatory program would need to entail these provisions. We suggest the Town work with its consultant to develop the most appropriate approach and provide EPA with a detailed plan of action.

4. Original Comment: *Review effectiveness of various stormwater BMPs and provide guidance on acceptable stormwater BMPs (e.g., use bioretention in parking lots).*

Needham's Response: None evident.

Recommended Action:

Since this was one of our highest priority recommendations, the Town should submit a plan of action to limit the use of less effective practices for stormwater control. The traditional oil/water separator, for example, has limited capability to remove nutrients or bacteria, two of the target pollutants for a cleaner Charles River. The Town should submit a list of acceptable stormwater treatment practices to EPA that it intends to allow in new development and redevelopment projects. This can follow the MA DEP stormwater Policy Manual, with perhaps a few practices excluded. CWP can assist in developing such a list either on behalf of EPA or the Town.

5. Original Comment: *Adopt and enforce erosion and sediment control standards for development and redevelopment sites. The ordinance should include guidance on when measures are required, necessary components of an erosion control plan submittal, acceptable control practices, and inspection and maintenance schedules.*

Needham's Response: All projects under the jurisdiction of the Planning Board are reviewed by the DPW, through the Town Engineer, for adequacy of erosion and sediment control. Projects under the jurisdiction of the Conservation Commission are reviewed by the Town Engineer at the request of the Commission. The Town Engineer ensures that proper controls are in place based on the Town's Standard Construction Specifications (March 1995).

Recommended Action:

The Town seems to not understand that the recommendation is to develop and pass a separate erosion and sediment control ordinance or modify an existing code. We acknowledge that the Town's March 1995 Standard Construction Specifications may contain specific standards for erosion and sediment control practices, but we have not reviewed those documents as they were not made available to us during our interviews with Town staff in early 1999. We recommend that the Town provide EPA with documentation that the March 1995 Standards contain specific performance criteria for E&SC devices, and include maintenance measures, inspection provisions and enforcement actions. Alternatively the Town can provide EPA with an outline for a proposed E&SC ordinance and a schedule for adopting such an ordinance. A draft model ordinance can be downloaded from www.stormwatercenter.net. This site has been developed by CWP on behalf of EPA, Office of Water, for use by communities who are implementing stormwater programs in accordance with the NPDES, Phase II rules.

6. Original Comment: *An erosion control plan should be required on the site plan used in the plan review process. The plan should include among other things, location and type of controls being used, supporting design calculations, limits of disturbance, required buffers and setbacks, and construction schedule. The plan designer should then be required to inspect and certify installation of the erosion and sediment controls.*

Needham's Response: No specific response provided.

Recommended Action:

Since this was one of our highest priority recommendations, the Town should provide specifics on what standards and procedures will be required for E&SC plans. We recommend that the Town provide EPA with an outline for proposed E&SC plan review requirements and a schedule for adopting such requirements. We suggest the Town work with its consultant to develop the most appropriate approach (which can certainly rely on existing standards and procedures from other jurisdictions) and provide EPA with a detailed plan of action. CWP can help provide assistance on where to find existing E&SC manuals and how to modify this for local application.

7. Original Comment: *Require development and redevelopment projects throughout the whole Town, not just in resource areas, to meet the Stormwater Management Standards set forth in the MA DEP Stormwater Management Policy, or some comparable set of guidelines.*

Needham's Response: As stated previously, the Town is currently in the process of completing a Stormwater Master Plan/Non-point Pollution Study (the Study) funded through the SRF program. Included in this project is dry weather sampling of all the Town's stormwater discharges, wet weather sampling of selected outfalls, investigation of opportunities for stormwater quality structural BMPs, and development of a Stormwater Master Plan/Capital Improvement Plan. Through this effort, opportunities for retrofit of existing stormwater facilities and implementation of new stormwater BMPs will be investigated and potential solutions recommended to a conceptual level of detail.

The DPW, working with the Planning Board, enforces DEP Stormwater regulations in all areas of Town that are within watersheds that discharge directly to the Charles River in accordance with the MOU signed by the Town. The DPW also enforces the provisions of the MOU through the Town's Subdivision Regulations for development and redevelopment projects and stormwater connection permits for projects that may not require approval of the Planning Board. In addition to the DPW and the Planning Board, the Conservation Commission enforces the DEP Stormwater regulations in all areas within their jurisdiction.

Recommended Action:

We acknowledge that the Town is developing a Master Plan for stormwater management and according to the second paragraph, they acknowledge that they enforce DEP stormwater regulations "in all areas of the Town that are within watersheds that discharge directly to the Charles River." However, the intent of the comment is to regulate stormwater for all areas, not just direct discharges to the Charles River. We recommend that the Town provide EPA with an outline for proposed stormwater plan review requirements and a schedule for adopting such requirements. We suggest the Town work with its consultant to develop the most appropriate approach (which can rely on the existing MA DEP Stormwater Management Policy) and provide EPA with a detailed plan of action for implementation.

8. Original Comment: *Consider outreach programs that target behavioral attitudes*

towards pet waste management, lawn care, and septic maintenance. Combine municipal pollution prevention practices with public education initiatives.

Needham's Response: The Town intends to continue its outreach programs through Hazardous Waste Days and cable TV spots.

Recommended Action:

We acknowledge the Town's current public outreach programs, but suggest that these do not address the intent of our original recommendation to address pollutant sources from pet waste, lawns and septic systems.

A public outreach program requires specific attention to detail to be effective, and requires, at a minimum, an identification of target behaviors and educational topics, a budget for implementation of a program (including any staff assignments or new hires), methods for implementation (such as flyers, public service announcements, training, videos, etc), methods for measuring success in changing targeted behaviors (such as public attitude surveys), and a schedule. We recommend that the Town provide EPA with an outline of the proposed program, an approximate budget, and a schedule for implementation.

Medium Priority

9. Original Comment: *Develop better communication with the Conservation Commission so that efforts are not duplicated and communication paths are left open to increase the efficiency of both entity's operations.*

Needham's Response: The DPW currently works in the common interest of the Town's Conservation Commission though the Planning Board process. This occurs on all development throughout the Town including those areas within the jurisdiction of the Conservation Commission. All references to the jurisdiction or the Conservation Commission are typically incorporated into the Planning Board's approvals for all subdivisions and site developments and redevelopments. Regardless of this, specific measures are routinely required of the developers by the DPW to be incorporated into the design plans as they relate to either the Massachusetts Department of Environmental Protection's (DEP) Stormwater Regulations, the Environmental Protection Agency's (EPA) Memorandum of Understanding (MOU) signed by the Board of Selectmen or to impacts upon the Town's systems.

Recommended Action:

We acknowledge that the Town is being responsive to our original recommendation. This is a medium priority recommendation, and as such, probably does not warrant as specific a response at this time. However, the Town should be prepared to provide more specifics to address this comment in the near future. The Town should submit to EPA a copy of the current site plan (or development approval) review process with a narrative of how the process works and whether any modifications are warranted to address the recommendation of better communication.

10. Original Comment: *Look for retrofit and stream restoration opportunities. Include a retrofit line item in capital improvement programs. Encourage/require reductions in impervious cover along riparian corridors and strive to increase existing buffer widths.*

Needham's Response: As stated previously, the Town is currently in the process of completing a Stormwater Master Plan/Non-point Pollution Study (the Study) funded through the SRF program. Included in this project is dry weather sampling of all the Town's stormwater discharges, wet weather sampling of selected outfalls, investigation of opportunities for stormwater quality structural BMPs, and development of a Stormwater Master Plan/Capital Improvement Plan. Through this effort, opportunities for retrofit of existing stormwater facilities and implementation of new stormwater BMPs will be investigated and potential solutions recommended to a conceptual level of detail.

Recommended Action

The Town is attempting to be responsive to our original recommendation. This is a medium priority recommendation, and as such, probably does not warrant as specific a response at this time. However, the Town should be prepared to address this comment in the near future. Our recommendation is that EPA accept the Town's commitment to investigate retrofit opportunities as part of the development of their Stormwater Master Plan, but request a specific schedule for identifying retrofit sites, with a specific budget and schedule for implementation (meaning construction) of feasible sites. In addition, the Town should provide EPA with a specific action plan to address the recommendation of reducing impervious cover along riparian corridors and increasing buffer widths for new and re-development projects.

11. Original Comment: *Work with Needham Planning Board to review site design requirements to reduce impervious cover in new and redevelopment. Consider capping building footprint as a percent*

of total site area, minimizing road widths in low to medium density residential areas, and minimizing the amount and size of parking spaces.

Needham's Response: The Town's Zoning By-Laws and Subdivision Regulations require development standards be met for redevelopment and new development. Zoning dictates open space requirements and Subdivision Regulations define the construction requirements of the developments. Considering that the Town is currently nearly built out, the Town believes that current regulations are adequate to require appropriate land reclamation and reforestation.

Recommended Action

The Town feels that its current Subdivision Regulations and Zoning ordinance is adequate to address our original recommendation. This is a medium priority recommendation, and as such, probably does not warrant as specific a response at this time. However, the Town should be prepared to address this comment in the near future. Our recommendation is for the Town to provide EPA with specifics on how codes, ordinances, or design standards meet our recommendations, or how they could be amended to reduce impervious cover for new- and re-development projects (e.g., modifying street standards to allow narrow streets for residential projects). Our recommendation is for the Town to submit an analysis of its current codes, ordinances and design standards to EPA with specific items identified for modification (if necessary) in conjunction with a schedule for implementation. A tool the Town may find useful in conducting this analysis is the Code and Ordinance Worksheet (COW), available for downloading at www.cwp.org.

12. Original Comment: *Regularly inspect BMPs and develop enforcement mechanisms for maintenance failure.*

Needham's Response: None evident.

Recommended Action

This is a medium priority recommendation, and as such, probably does not warrant as specific a response at this time, and none was provided. The Town should be prepared to address this comment in the near future. Our recommendation is for the Town to provide EPA with an action plan for implementation of a BMP inspection and enforcement program. We recommend that the Town estimate the number of BMPs that need inspection and/or enforcement action, set up a budget based on this need, document the Conservation Commission's current enforcement authority, develop a plan for enhanced enforcement (if needed), and provide EPA with a schedule for implementation.

13. Original Comment: *Implement stringent stormwater runoff controls at the Town's snow storage areas.*

Needham's Response: Melt from snow storage areas is currently handled by an extended detention basin located at the Town's landfill.

Recommended Action

The Town is attempting to be responsive to our original recommendation. This is a medium priority recommendation, and as such, probably does not warrant as specific a response at this time. However, the Town should be prepared to address this comment in the near future. We acknowledge that the Town has an extended detention basin to accommodate snow melt from the Town's landfill, we question whether or not this is a "stringent stormwater runoff control" and whether there are other snow storage areas that warrant controls. A specific response would include a complete listing of snow storage areas, a budget for implementing the recommendation (for both design, and construction) and a time frame for completing construction (if necessary).

Lowest Priority

14. Original Comment: *The Town should be aware of opportunities where reforestation might be accomplished in redevelopment areas and clearing limits required in new development areas. Redevelopment projects should be encouraged to create/restore as much natural area as possible. This will also require coordinating with the Conservation Commission in resource areas.*

Needham's Response: The Town's Zoning By-Laws and Subdivision Regulations require development standards be met for redevelopment and new development. Zoning dictates open space requirements and Subdivision Regulations define the construction requirements of the developments. Considering that the Town is currently nearly built out, the Town believes that current regulations are adequate to require appropriate land reclamation and reforestation.

The Conservation Commission has the authority to regulate development within wetland resource zones and is quite active in enforcing their authority.

Recommended Action

The Town feels that its current Subdivision Regulations and Zoning ordinance is adequate to address our original recommendation. This is a lowest priority recommendation, and as such, probably does not warrant as specific a response at this time. However, the Town should be

prepared to address this comment in the future. Our recommendation is for the Town to provide EPA with specifics on how codes, ordinances, or design standards meet our recommendations, or how they could be amended to foster more reforestation. Our recommendation is for the Town to submit an analysis of its current codes, ordinances and design standards to EPA with specific items identified for modification (if necessary) in conjunction with a schedule for implementation.

15. Original Comment: *Purchase of vacuum assisted sweeper (possibly in conjunction with other Towns) so that sweeping can be performed in tandem with traditional sweepers, especially on highly traveled, commercial, and industrial area roads. Also pursue purchase of vacuum cleaner for proprietary devices if the Town decides to install a significant number of these devices.*

Needham's Response: A vacuum sweeper would be a welcome addition to the Town's equipment inventory. The units, however, are quite expensive and funding is not currently available to purchase this equipment. Should funding become available, the Town will consider purchasing a vacuum sweeper and using it in tandem with our standard sweeper currently in use.

Recommended Action

We acknowledge the Town's response to our original comment and their concern of the cost with purchasing a new vacuum sweeper. This is a lowest priority recommendation, and as such, does not warrant a specific plan for implementation as this time. However, the Town should develop and submit an alternative plan for controlling fine particulate matter from commercial and residential streets. It is our recommendation that EPA revisit this issue with the Town within a reasonable time period, say a year after adoption of the MOU.

This concludes our point by point listing of recommended actions in response to Needham's proposed implementation of our original recommendations. We acknowledge that several of these items may require additional resources in terms of staff and dollars on the Town's part. We therefore suggest a phased in approach, concentrating on the highest priorities and working over time to the lowest priorities. We also acknowledge the Town's concerns regarding our original comments and their view that their current program was not adequately represented. However, in our review of Needham's letter of February 18, 2000 our greatest observation is that the Town has not accepted that many of their stormwater program elements do not go far enough towards the goal of minimizing stormwater runoff and pollutant load delivery to the Charles River.

Table of Contents

		Page
	Acronyms	**iii**
Section 1	**Introduction**	**1-1**
1.1	Overview	1-1
1.2	Community Profile	1-4
1.3	Needham's Storm Water Management Program	1-6
1.4	Contacts	1-8
Section 2	**Resource Protection**	**2-1**
2.1	Charles River Watershed	2-1
2.2	Impaired Water Bodies and TMDL Progress	2-2
2.3	Endangered and Threatened Species	2-5
2.4	Historic Property	2-6
2.5	Outstanding Resource Waters	2-7
Section 3	**Drainage System Description**	**3-1**
3.1	General	3-1
3.2	Sub-Watershed Descriptions	3-1
3.3	Drainage System Mapping	3-4
Section 4	**Minimum Control Measures**	**4-1**
4.1	Public Education and Outreach	4-1
4.2	Public Involvement/Participation	4-10
4.3	Illicit Discharge Detection and Elimination	4-15
4.4	Construction Site Storm Water Runoff Control	4-22

4.5 Post Construction Site Storm Water Runoff Control in New Development/Redevelopment 4-26
4.6 Pollution Prevention/Good Housekeeping for Municipal Operations 4-30
4.7 Control of Pollutants of Concern to Impaired Waters 4-38

Acronyms

AAS	Adopt-A-Stream
PCB	Polychlorinated Biphenyl
BMP	Best Management Practice
CPCA	Cutler Park to Commonwealth Avenue
CRWA	Charles River Watershed Association
CSO	Combined Sewage Overflow
CWP	Center for Watershed Protection
DEP	Department of Environmental Protection
DPW	Department of Public Works
EPA	Environmental Protection Agency
ESRI	Environmental Research Systems Institute
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GPS	Global Positioning System
IPM	Integrated Pest Management
LWCF	Land and Water Conservation Fund
MassGIS	Massachusetts Geographic Information System
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NHESP	Natural Heritage and Endangered Species Program
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
ORW	Outstanding Resource Water
SRF	State Revolving Fund
SWMP	Storm Water Management Plan
SWQS	Surface Water Quality Standards
TDS	Total Dissolved Solids

TMDL	Total Maximum Daily Load
UA	Urbanized Area

Storm Water Pollution and Management Program

Report – December 1996

Stormwater Pollution and Management Program Needham, MA

December 1996

Prepared for:

Needham Department of Public Works
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Needham, MA 02192

Submitted by:

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Table of Contents

Part I - Stormwater Pollution Study

Section I
Background and Project Description

Background 1
Project Description 1

Section II
Mapping of Identified Drainage Areas 3

Section III
Dry Weather Sampling Procedures and Results, and Drainage Area Descriptions

Dry Weather Sampling Procedure 5
Drainage Area Descriptions and Sampling Results 7
Drainage Area - N1B 7
Drainage Area - N1 13
Drainage Area - N6C 27
Drainage Area - N8 32
Drainage Area - N10A 45
Drainage Area - N11 96
Drainage Area - N14B 100
Drainage Area - N14 105
Drainage Area - N19 110
Drainage Area - N22 120
Dry Weather Summary and Conclusions. 125
Summary 125
Drainage Area - N1B 125
Drainage Area - N1 126
Drainage Area - N8 126
Drainage Area - N10A 126
Subarea 10A-7 ..... *127*
Subarea 10A-9A *127*
Subarea 10A-9B *128*
Other Area N10A Issues *128*
Drainage Area - N14 128
Drainage Area - N14B 128
Conclusions 134
Illicit Connections and Fecal Coliform Bacteria 134
Costs of Removal of Illicit Connections 135

Part I
List of Figures

Figure 2.1 - Stormwater Drainage Areas
Figure 3.1 - Area Layout Drainage Area - N1B
Figure 3.2 - Sampling Results Drainage Area - N1B
Figure 3.3 - Stormwater Drain Outfall Inspection Report - N1B-1
Figure 3.4 - Stormwater Drain Outfall Inspection Report - N1B-2
Figure 3.5 - Area Layout Drainage Area - N1
Figure 3.6 - Sampling Results Drainage Area - N1
Figure 3.7 - Stormwater Drain Ontfall Inspection Report - N1
Figure 3.8 - Stormwater Drain Outfall Inspection Report - N1-1
Figure 3.9 - Stormwater Drain Outfall Inspection Report - N1-2
Figure 3.10 - Stormwater Drain Outfall Inspection Report - N1-3
Figure 3.11 - Stormwater Drain Outfall Inspection Report - N1-3A
Figure 3.12 - Stormwater Drain Outfall Inspection Report - N1-4
Figure 3.13 - Stormwater Drain Outfall Inspection Report - N1-5
Figure 3.14 - Stormwater Drain Outfall Inspection Report - N1-6
Figure 3.15 - Area Layout Drainage Area - N6C
Figure 3.16 - Sampling Results Drainage Area - N6C
Figure 3.17 - Stormwater Drain Outfall Inspection Report - N6C-1
Figure 3.18 - Area Layout Drainage Area - N8
Figure 3.19 - Sampling Results Drainage Area - N8
Figure 3.20 - Stormwater Drain Outfall Inspection Report - N8
Figure 3.21 - Stormwater Drain Ontfall Inspection Report - N8-1
Figure 3.22 - Stormwater Drain Outfall Inspection Report - N8-2
Fignre 3.23 - Stormwater Drain Outfall Inspection Report - N8-3
Figure 3.24 - Stormwater Drain Outfall Inspection Report - N8-4
Figure 3.25 - Stormwater Drain Outfall Inspection Report - N8-4A
Fignre 3.26 - Stormwater Drain Outfall Inspection Report - N8-5
Figure 3.27 - Area Layout Drainage Area - N10A
Figure 3.28 - Sampling Results Drainage Area - N10A
Figure 3.29 - Stormwater Drain Outfall Inspection Report - N10A-1
Figure 3.30 - Stormwater Drain Outfall Inspection Report - N10A-1A
Fignre 3.31 - Stormwater Drain Outfall Inspection Report - N10A-1B
Figure 3.32 - Stormwater Drain Outfall Inspection Report - N10A-3
Fignre 3.34 - Stormwater Drain Outfall Inspection Report - N10A-5
Figure 3.35 - Stormwater Drain Outfall Inspection Report - N10A-5A
Figure 3.36 - Stormwater Drain Outfall Inspection Report - N10A-6
Figure 3.37 - Sampliug Results Sub-Area - N10A-7
Figure 3.38 - Stormwater Drain Outfall Inspection Report - N10A-7

Part I
List of Figures (cont.)

Figure 3.39 - Photograph Log of Sub-Area - N10A-7
Figure 3.40 - Stormwater Drain Outfall Inspection Report - N10A-8
Figure 3.41 - Sampling Results Sub-Area - N10A-9
Figure 3.42 - Stormwater Drain Outfall Inspection Report - N10A-9
Figure 3.43 - Stormwater Drain Outfall Inspection Report - N10A-9A
Figure 3.44 - Stormwater Drain Outfall Inspection Report - N10A-9B
Figure 3.45 - Stormwater Drain Outfall Inspection Report - N10A-10
Figure 3.46 - Stormwater Drain Outfall Inspection Report - N10A-11
Figure 3.47 - Stormwater Drain Outfall Inspection Report - N10A-11A
Figure 3.48 - Stormwater Drain Outfall Inspection Report - N10A-12
Figure 3.49 - Stormwater Drain Outfall Inspection Report - N10A-13
Figure 3.50 - Stormwater Drain Outfall Inspection Report - N10A-14
Figure 3.51 - Stormwater Drain Outfall Inspection Report - N10A-15
Figure 3.52 - Stormwater Drain Outfall Inspection Report - N10A-16
Figure 3.53 - Stormwater Drain Outfall Inspection Report - N10A-16A
Figure 3.54 - Stormwater Drain Outfall Inspection Report - N10A-17
Figure 3.55 - Stormwater Drain Outfall Inspection Report - N10A-18
Figure 3.56 - Stormwater Drain Outfall Inspection Report - N10A-19
Figure 3.57 - Stormwater Drain Outfall Inspection Report - N10A-22
Figure 3.58 - Stormwater Drain Outfall Inspection Report - N10A-23
Figure 3.59 - Area Layout Drainage Area - N11
Figure 3.60 - Sampling Results Drainage Area - N11
Figure 3.61 - Stormwater Drain Outfall Inspection Report - N11
Figure 3.62 - Area Layout Drainage Area - N14B
Figure 3.63 - Sampling Results Drainage Area - N14B
Figure 3.64 - Stormwater Drain Outfall Inspection Report - N14B-1
Figure 3.65 - Area Layout Drainage Area - N14
Figure 3.66 - Sampling Results Drainage Area - N14
Figure 3.67 - Stormwater Drain Outfall Inspection Report - N14-1
Figure 3.68 - Area Layout Drainage Area - N19
Figure 3.69 - Sampling Results Drainage Area - N19
Figure 3.70 - Stormwater Drain Outfall Inspection Report - N19-1
Figure 3.71 - Stormwater Drain Outfall Inspection Report - N19-3
Figure 3.72 - Stormwater Drain Outfall Inspection Report - N19-3A
Figure 3.73 - Stormwater Drain Outfall Inspection Report - N19-4
Figure 3.74 - Area Layout Drainage Area - N22
Figure 3.75 - Sampling Results Drainage Area - N22
Figure 3.76 - Stormwater Drain Outfall Inspection Report - N22-1
Figure 3.77 - Suspected Areas of Fecal Coliform Bacteria Pollution

Part I
List of Tables

Table 3.1 - Summary of Dry Weather Sampling for N1B
Table 3.2 - Summary of Dry Weather Sampling for N1
Table 3.3 - Summary of Dry Weather Sampling for N6C
Table 3.4 - Summary of Dry Weather Sampling for N8
Table 3.5 - Summary of Dry Weather Sampling for N10A
Table 3.6 - Summary of Dry Weather Sampling for N11
Table 3.7 - Summary of Dry Weather Sampling for N14B
Table 3.8 - Summary of Dry Weather Sampling for N14
Table 3.9 - Summary of Dry Weather Sampling for N19
Table 3.10 - Summary of Dry Weather Sampling for N22
Table 3.11 - Companies with NPDES General Permits
Table 3.12 - Summary of Dry Weather Sampling

Part II Stormwater Management Program

Section I
Wet Weather Sampling Procedures and Results

General 137
Municipal and Regulatory Authority 137
Stormwater Impacts to Receiving Waters 138
Wet Weather Sampling, Analysis and Evalnation 140
Results of Wet Weather Sampling 142
Total Results for Metals 142
Copper 142
Iron 142
Lead 143
Zinc 143
Chloride, Nitrate and Phosphorus Results 143
Total Solids and Total Suspended Solids 143
Total Petroleum Hydrocarbons 144
Watershed Hydrology 144
Conclusions 156

Section II
Evaluation of Stormwater Management Practices

Hazardous Materials (HAZMAT) Response Plan 158
General 158
HAZMAT Response 158
Minor Releases 158
Major Releases 158
HAZMAT Corridors/Storage Facilities ... 159
Local Land Use Issues and Regulations .. 160
Wetlands Protection Act 160
Rivers Protection Act 160
Charles River Corridor Plan 161
Stormdrain Cleaning and Maintenance Program 161
Street Sweeping and Cleaning Program 162
De-icing of Municipal Streets 162
Illicit Connection Identification and Removal Plan 162
Septic System Inspection 163
Infiltration from Sanitary Sewers and Septic Systems 164
Public Education and Outreach Program .. 164
Capital Improvements Program 165
Existing Capital Improvements Program .. 165
Additional Costs from Stormwater Management Improvements 165

Section III
Proposed Stormwater Management Improvements

Proposed Stormwater Managment Program Improvements 166

Part II
List of Figures

Figure 2.1.1 - Total Copper
Figure 2.1.2 - Total Iron
Figure 2.1.3 - Total Lead
Figure 2.1.4 - Total Zinc
Figure 2.1.5 - Chlorine
Figure 2.1.6 - Nitrate Nitrogen
Figure 2.1.7 - Total Phosphorus
Figure 2.1.8 - Total Solids
Figure 2.1.9 - Total Suspended Solids (TSS)
Figure 2.1.10 - Total Petroleum Hydrocarbons (TPH)
Figure 2.3.1 - Drain Structure Inspection Report
Figure 2.3.2 - Sewer Manhole Inspection Report

Part II - List of Tables

Table 2.1.1 - Comparison of Road Runoff Contaminants from Urban and Rural Areas
Table 2.1.2 - Effects of Highway Runoff on Receiving Waters
Table 2.1.3 - Regulatory and Guidance Levels of Copper, Iron, Lead, and Zinc
Table 2.1.4 - List of Type/Size and Preparation of Bottles Used for Sampling
Table 2.1.5 - Land Use of Wet Weather Sampling Areas
Table 2.1.6 - Summary of Wet Weather Sampling Results
Table 2.1.7 - Watershed Analysis Summary

List of Appendices

Appendix A - Results of Wet Weather Sampling of Stormwater

Appendix B - Watershed Hydrology Data

Appendix C - Needham Municipal Budget (FY'96)

Section I. Background and Project Description

Background

The United States Environmental Protection Agency (EPA) has set a goal of restoring "fishable and swimmable conditions" in the lower Charles River by the year 2005. Towards that goal, the EPA and the Town of Needham have entered into a "Consent Order" and "Memorandum of Understanding", resulting in requirements which the Town of Needham must complete.

The Consent Order required that the following information be submitted to the EPA by November 30, 1996:

- mapping each of the municipal stormwater discharge pipes and drainage areas flowing into the Charles River
- visual examination and sampling of each discharge during dry weather conditions. Samples must be analyzed for fecal coliform bacteria
- investigation and inventory of potential illicit connections to the stormwater drainage system
- cost estimates to remove the illicit connections

On November 29, 1996, BETA Engineering, Inc., on behalf of the Town, submitted a Report to the EPA entitled "Stormwater Pollution Study of the Charles River Watershed".

The Memorandum of Understanding requires that the following information be submitted to the EPA by December 31, 1996:

- development of a stormwater management program in accordance with the Memorandum
- evaluation of management practices and programs to improve stormwater quality, including source controls
- provide proof of adequate local funding mechanisms
- preparation of an annual report summarizing the results of the program in December of each year

The focus of this report is to complete the work mandated in the Memorandum of Understanding. However, issues of the Consent Order are also included.

Project Description

This project is being conducted in accordance with the Town of Needham's "Memorandum of Understanding" and "Consent Order, Docket No. 96-08", with the Environmental Protection Agency (EPA), Region 1, dated May 28 and April 11, 1996 respectively. The purpose of this report is to develop a stormwater management program for stormwater collection systems which discharge to the Charles River, and to complete the requirements listed above.

The Consent Order specifies that ten (10) drainage areas are to be investigated. The ten areas are identified as follows: Areas N1, N1B, N6C, N8, N10A, N11, N14, N14B, N19 and N22. This investigation is the first step of a comprehensive stormwater management program being undertaken by the Town of Needham. Work tasks included data research, mapping, visual examination and dry weather sampling of drainage systems, and television inspection of drain pipes.

Preliminary investigations involved sampling each of the ten areas which discharged flow during dry weather conditions. Samples were analyzed for several parameters, including fecal coliform bacteria, chloride and fluoride. For this study, dry weather conditions reflect any period following a minimum of 72 hours of antecedent dry period. Additionally, television inspection of storm drains was conducted in areas where potential illicit connections were suspected, based upon the results of the sampling program. The final phase of the project included estimating costs to remove illicit connections and other significant sources of pollution.

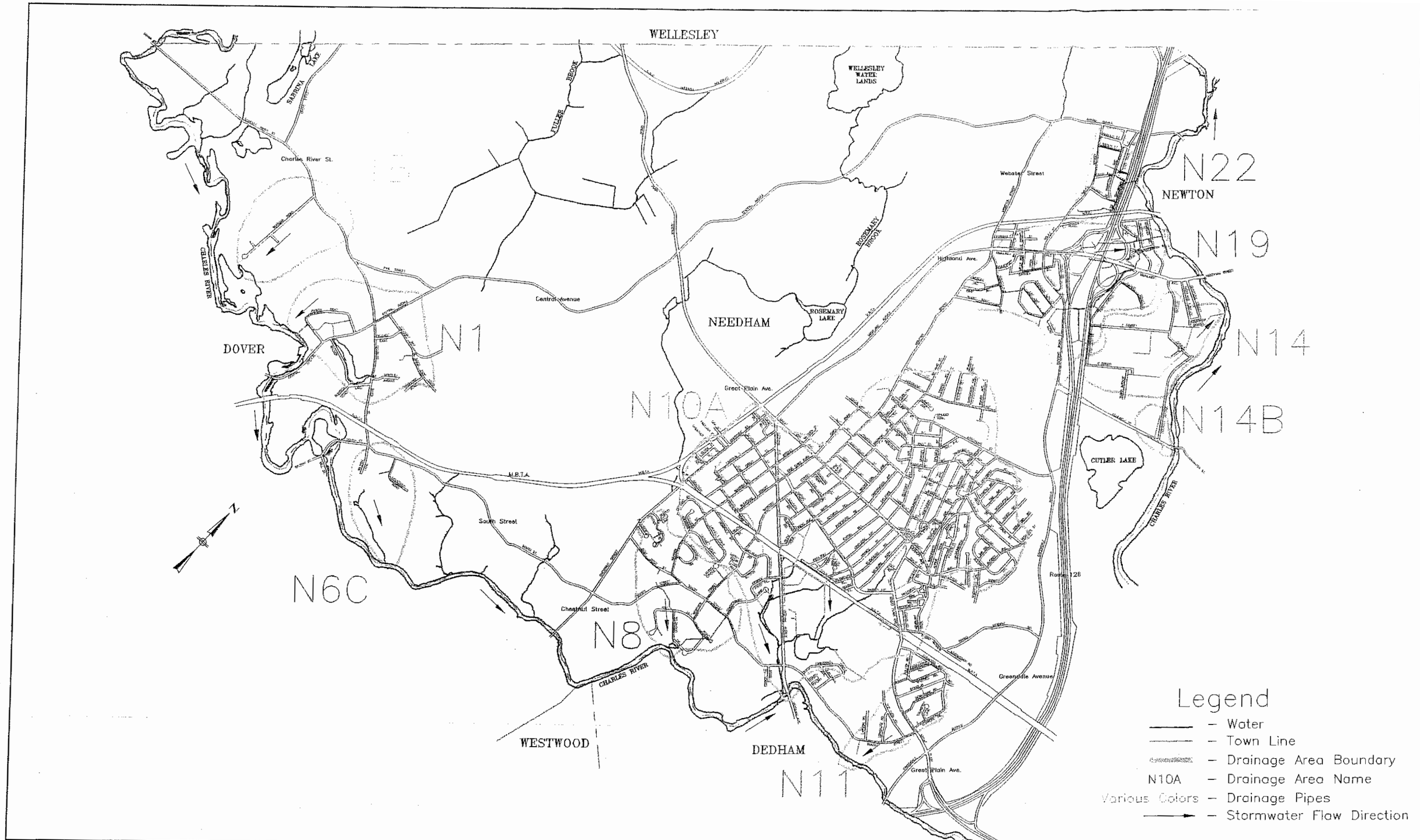
Investigations also included: sampling the outfalls during storm events and hydrologic analysis of each of the ten areas to estimate pollutant loadings to the Charles River. Existing municipal stormwater management programs were evaluated, and proposed improvements to these programs which could improve stormwater quality discharged to the Charles River were also developed. A comprehensive stormwater management program was developed in cooperation with the Town of Needham Department of Public Works.

Section II. Mapping of Identified Drainage Areas

An overall map was developed which reflects each of the ten drainage areas which were studied. The map was prepared utilizing the existing Municipal Drainage Map of Needham, prepared by David Greenwood, Needham Town Engineer, in 1988. The maps provide the following information:

- area and sub-area boundaries
- municipal boundaries
- Charles River/wetlands and water bodies
- land use/zoning
- flow directious
- dry weather sampling locations
- discharge locations and sizes

Existing drainage configurations for each of the ten areas were verified in the field. Where discrepancies existed between plan and field data, the mapping was revised to reflect field conditions. Figure 2.1 provides an overall map of the drainage areas.



BETA ENGINEERING, INC.
Engineers/Planners

Figure 2.1 – Stormwater Drainage Areas
Needham Stormwater Managment

SCALE: Not to Scale

JOB 917

FILE NO. NEEDHAM.DWG

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1-2

Date: 10/2/96 Time: 3:15 p.m.

Weather: Dry

Location: Manhole on Oxbow Rd. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS umhos

Chloride: 35 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 11 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 24 in

Pipe Material/Condition: RCP/Good

Flow Estimate: 20 gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was observed flowing from this pipe.

BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N1-2.pm6

Figure 3.9

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1-3

Date: 10/16/96 Time: 2:35 p.m.

Location: On Charles River St. Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: 6.30

Conductivity: 270 mohms

Chloride: 39 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 22 MPN/100ml

Temperature: 11.6 °c

SAMPLING DATA

Pipe Size: 36 in

Pipe Material/Condition: RCP/good

Flow Estimate: 20 gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was discharging from the pipe.

BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N1-3.pm6

Figure 3.10

Section III. Dry Weather Sampling Procedure and Results, and Drainage Area Descriptions

Dry Weather Sampling Procedure

As previously mentioned, ten (10) drainage areas were identified for this study in the Consent Order and Memorandum of Understanding. All ten drainage areas discharge to the Charles River through either a pipe, stream, or pond. These areas vary significantly in size, land use and number of sub-areas within them.

A sub-area consists of a defined segment of the drainage area that was sampled. The drainage from these sub-areas eventually flows into the Charles River. The sub-areas were sampled to identify specific areas of potential dry weather pollution within the drainage areas.

The main focus of the Consent Order and Memorandum was to identify "illicit connections" to the stormwater drainage system. This was the primary goal of the field investigations. This involved a physical inspection of each of the ten (10) drainage areas and their associated sub-areas.

The first task involved an inventory of each drainage area, including an inspection and photographing of each discharge to the Charles River. Three (3) areas (N1B, N6C, and N14B) were considered to have no sub-areas. The remaining seven (7) areas (N1B, N8, N10A, N11, N14, N19, and N22) were divided into sub-areas to isolate the source of flow and/or contamination.

Each of the ten (10) areas were physically inspected for flow during dry weather conditions. Samples were taken at each discharge to the Charles River, or, in larger areas, at sub-area boundaries. Dry weather samples were analyzed for fecal coliform bacteria, chloride, fluoride, pH and conductivity (in situ). Additionally, visual observations were made with respect to flow quantity, turbidity, organic matter, pipe material, pipe condition and pipe size.

In large areas, or where elevated fecal coliform bacteria or organic matter were detected, further investigations were conducted. Further investigations included physical inspections of sub-area pipes and manholes upstream of the discharges, to identify the source(s) of contamination. Additionally, an attempt was made to correlate fluoride and chloride levels with fecal coliform bacteria, as these can be an indication of potable water and/or sanitary sewage.

Sampling of residential sub-areas was conducted during periods of anticipated sewer use, such as morning and daytime hours. In large sub-areas, samples were taken at a time which reflected time of travel through the sub-area drainage system. Testing times of commercial and industrial sub-areas were conducted similarly, and reflected those periods when businesses were observed operating with a full staff, such as mid-day.

If no flow existed during all dry weather inspections, the area was determined to have no illicit connections. This was true for areas N-11 and N-22, where the discharge pipes were dry, and there was no indication of flow during dry weather conditions.

During the inspections, numerous outfalls were noted to have an organic brown flocculent present. Analytical testing revealed the flocculent was iron bacteria, which chemically oxidize reduced iron. These bacteria pose no threat to water quality, and actually reduce levels of dissolved iron in stormwater. They do form a residual flocculent, however, which ranges in color from orange to brown. These bacteria are discussed further in Section 4.0.

The following sections provide a discussion of each drainage area, including land use issues, acreage and lengths of drainage pipes. Also included for each drainage area is a map reflecting dry weather sampling results. A summary of the dry weather sampling results with the corresponding sampling times are provided at the end of this section.

Drainage Area Descriptions and Sampling Results

Drainage Area - N1B

This drainage area consists of approximately 150 acres. The area is characterized entirely by residential land use. There are two sub-area discharge points located in this drainage area. The discharge point into the Charles River is south of Whitman Road, as shown in Figure 3.1 and 3.2)

Some of the characteristics which could effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 2,280 linear feet
- all of the area is sewered
- few birds or animals were observed in the area, except geese in a field near the cul-de-sac of Whitman Road
- the water discharges into a wetland approximately 100 feet from the Charles River

Sub-area - N1B-1

This 36 inch reinforced concrete pipe discharges directly into a wetland sonth of Whitman Road (see Figure 3.3). The length of pipe in this snb-area is approximately 1,680 linear feet.

Dry Weather Sampling #1

The first dry weather sampling was conducted on September 24, 1996 at 1:40 p.m., following a three day dry period. BETA observed that there was stagnant water in the pipe, but no actual flow. A quarter of the pipe was filled with water and BETA sampled the water in the stagnant pipe to determine if the organic material may be from sewage. The laboratory results revealed the following:

- chloride - 230 mg/l
- fluoride - None Detected (ND)
- fecal coliform - 900 MPN/100 ml.

Dry Weather Sampling #2

The second dry weather sampling was conducted on October 16, 1996 at 3:30 p.m. BETA observed that there was a slow flow in the pipe of approximately 0.1 gpm. The water was slightly turbid. The laboratory resnlts revealed the following:

- chloride - 200 mg/l
- fluoride - ND
- pH - 6.92
- conductivity - 1020 umhos
- fecal coliform - ND

Dry Weather Sampling #3
The third dry weather sampling was conducted on November 14, 1996 at 6:55 a.m. The water in the pipe was stagnant. The laboratory results revealed the following:

- fecal coliform - ND

Sub-area - N1B-2
This twelve (12) inch reinforced concrete pipe discharges into a manhole on Charles River Street. The length of pipe in this sub-area is approximately 600 linear feet (see Figure 3.4).

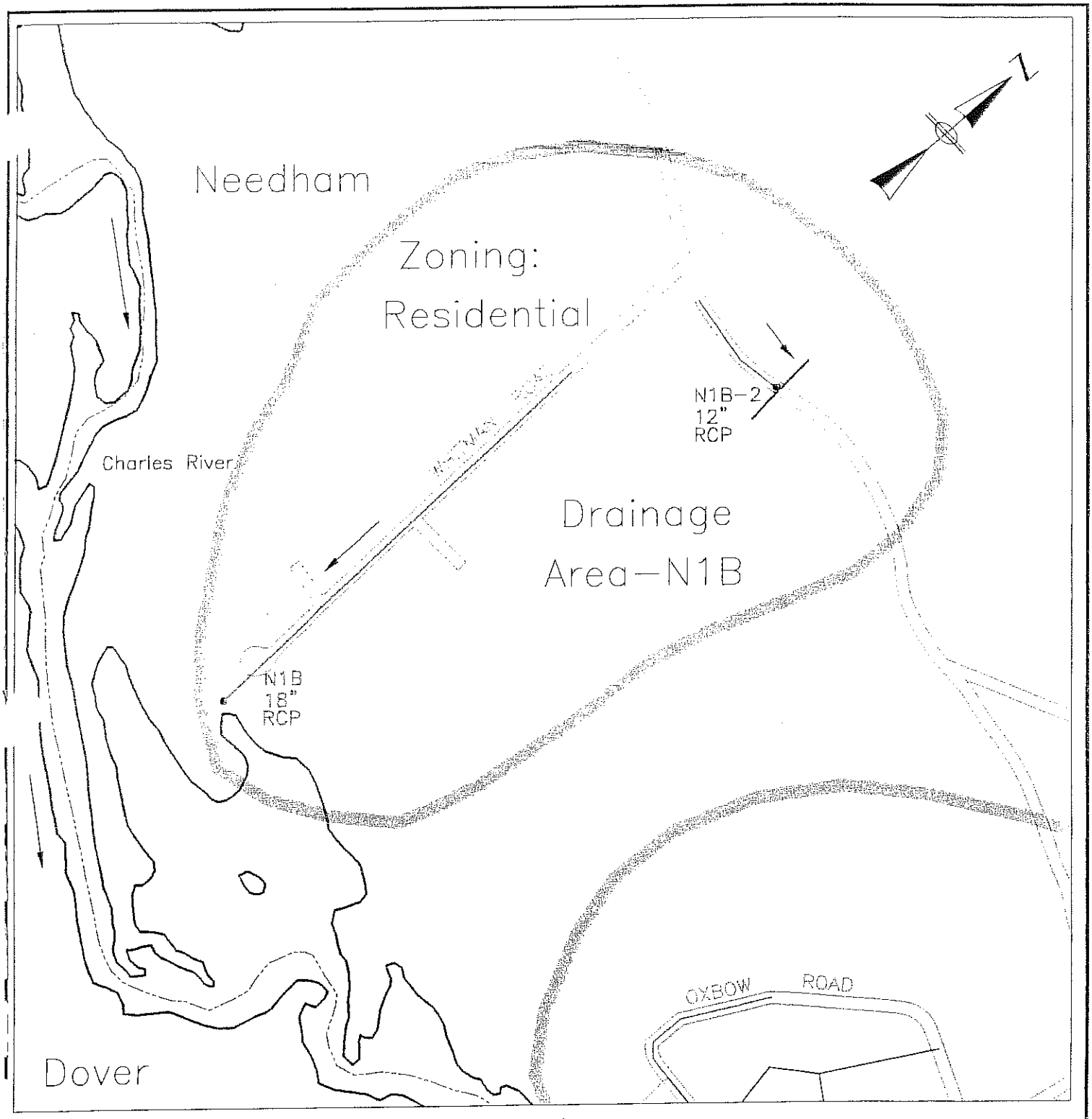
Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 11:45 a.m. No evidence of recent flow was observed.

Table 3.1 summarizes the dry weather sampling locations and results.

Table 3.1 Summary of Dry Weather Sampling for N1B

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N1B					
N1B-1	South of Whitman Road	18-RCP	Stagnant	9/24/96	13:40	230	ND	**900**
N1B-1	South of Whitman Road	18-RCP	0.1	10/16/96	15:30	200	ND	**4**
N1B-1	South of Whitman Road	18-RCP	Stagnant	11/14/96	6:55	NS	NS	**ND**
N1B-2	Culvert at Charles River St.	12-RCP	Dry	11/5/96	11:45	NA	NA	**NA**

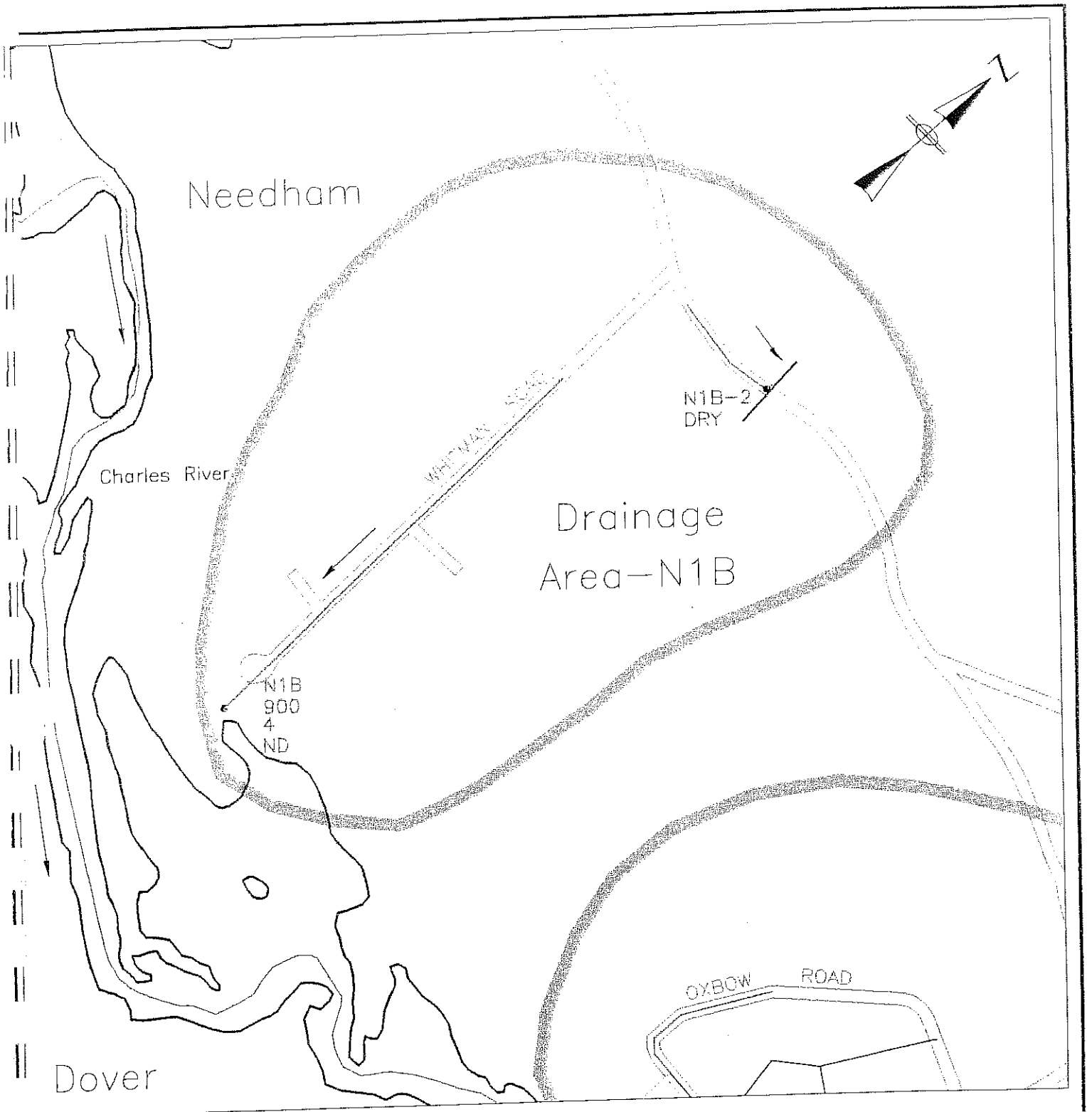
Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



Legend

- N1B-1 – Sub-area Discharge/Sampling Location
- N1B – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material
- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale	Figure 3.1 – Area Layout Drainage Area – N1B Needham Stormwater Management	BETA ENGINEERING, INC. Engineers/Planners



Legend

N1B-1	– Sub-area Discharge
N1B	– Discharge Point
300	– Fecal Coliform Bacteria
•	– Sampling Location
———	– Water
———	– Town Line
▒▒▒	– Drainage Area Boundary
←———	– Stormwater Flow Direction

Not to Scale

Figure 3.2 – Sampling Results
Drainage Area – N1B
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1B

Discharge Point: N1B-1

Date: 10/16/96 Time: 3:30 p.m.

Weather: Dry

Location: South of Whitman Rd. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS uohms

Chloride: 200 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 4 MPN/100ml

Temperature: 14.0 °c

SAMPLING DATA

Pipe Size: 18 in.

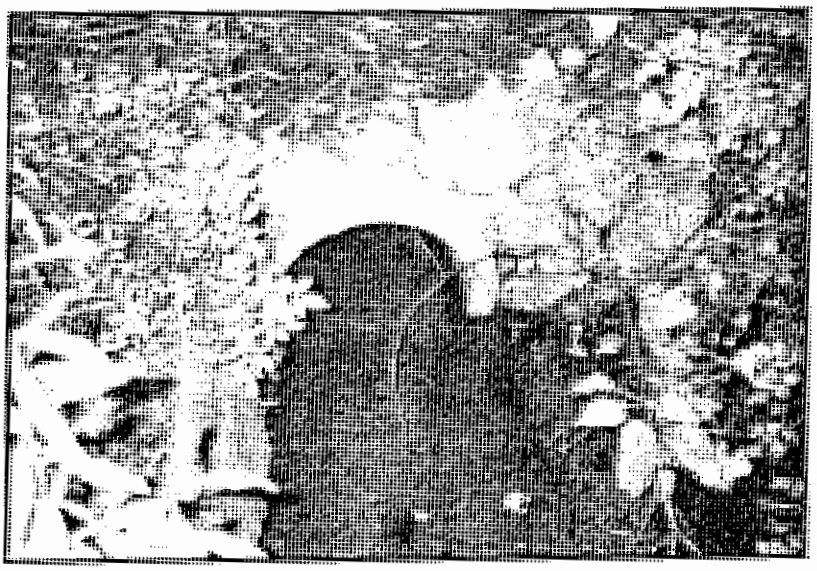
Pipe Material/Condition: RCP/Good

Flow Estimate: 0.1 gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Iron bacteria noted.



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Scientists/Engineers/Planners

File name: N1B-1.pm6

Figure 3.3

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1B

Discharge Point: N1B-2

Date: 11/5/96 Time: 11:45 a.m.

Weather: Dry

Location: Culvert at Charles River St. Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA uohms

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in.

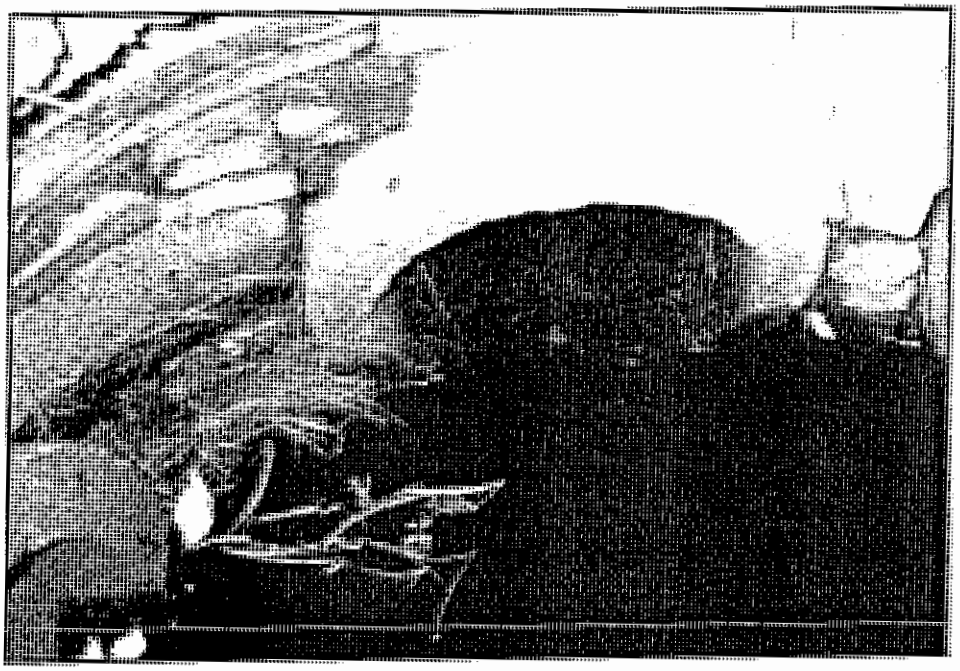
Pipe Material/Condition: RCP/Good

Flow Estimate: Dry gpm

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: NA

Comments: The pipe was partially submerged.



BETA Engineering, Inc.

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File name: N1B-2.pm6

Figure 3.4

Drainage Area - N1

This drainage area consists of approximately 200 acres. The area is characterized by residential land use. There are six sub-area discharge points within the area. All of the cumulative flow enters the Charles River through a 42-inch RCP located south of Oxbow Road, as shown in Figure 3.5.

Some of the characteristics which could effect the water quality of this area include the following:

- total length of drainage pipe in this area is approximately 7,550 linear feet
- drainage systems within area N1 include 37 catch basins
- most of the area is sewered with a few remaining septic systems
- Country Way is now sewered, but was a problem due to the soils and shallow bedrock in the 1980's
- various breeds of wild life, specifically Canada Geese, migrate in the area. Many geese were noted in Walker Gordon Pond (numerous geese feces also observed) and adjacent athletic fields
- septic systems are located along Walker Gordon Pond
- the Walker Gordon Pond acts as a detention/retention pond half of the discharge area
- Walker Gordon Pond discharges directly to drainage pipes that flow to the Charles River.
- stormwater discharges from a 42 inch reinforced concrete pipe directly to Charles River

Discharge Point - N1

This discharge point is located off of Oxbow Road behind a private residence. The pipe discharges directly into the Charles River. Instead of sampling at this discharge point, BETA sampled from the manhole at Oxbow Road (see Figure 3.6 and 3.7). This manhole is where two separate drainage systems combine and flow to the river. To help distinguish between the two flows, BETA sampled from the manhole instead of the submerged outfall. The length of pipe in this sub-area is approximately 300 linear feet.

Dry Weather Sampling

The sampling was conducted on November 14, 1996 at 7:05 p.m. A flow of approximately 25 gpm was observed discharging from tbe pipe. Some suds were located at the outfall. The laboratory results revealed the following:

- chloride - 42 mg/l
- fluoride - ND
- fecal coliform - 20 MPN/100 ml.

Sub-area - N1-1

This sampling point was from a manhole located on Oxbow Road (see Figure 3.8). The pipe collects the drainage area north of the manhole. The length of pipe in this sub-area is approximately 1,110 linear feet.

Dry Weather Sampling
The first dry weather sampling of this discharge point was conducted on October 2, 1996 at 3:15 p.m., following a three day dry period. BETA sampled from a manhole on Oxbow Road and observed visually clean water flowing at approximately one (1) gpm. The laboratory results revealed the following:

- chloride - 29 mg/l
- fluoride - ND
- fecal coliform - 130 MPN/100 ml.

Sub-area - N1-2
This sampling point was from the same manhole as N1-1. The pipe collects the drainage area south of the manhole (see Figure 3.9). This discharge point is fed by water from the Walker Pond. The length of pipe in this sub-area is approximately 1,620 linear feet.

Dry Weather Sampling
The dry weather sampling of this discharge point was conducted on October 2, 1996 at 3:15 p.m. BETA sampled from the same manhole referenced above, and observed visually clean water flowing at approximately twenty (20) gpm. The laboratory results revealed the following:

- chloride - 35 mg/l
- fluoride - ND
- fecal coliform - 11 MPN/100 ml.

Sub-area - N1-3
This sampling point is located on Charles River Street and west of Moseley Avenue. The pipe discharges through a culvert below Charles River Street (see Figure 3.10). BETA sampled from the 36 inch culvert. The length of pipe in this sub-area is approximately 2,400 linear feet.

Dry Weather Sampling
The sampling was conducted on October 16, 1996 at 2:35 p.m. A flow of approximately twenty (20) gpm was observed discharging from the pipe. No discoloration of the water was noticed in the flow discharging from the culvert. The laboratory results revealed the following:

- chloride - 39 mg/l
- fluoride - ND
- pH - 6.30
- conductivity - 270 umhos
- fecal coliform - 22 MPN/100 ml.

Sub-area - N1-3A
This sample was taken from Walker Gordon Pond, behind the Walker Pond Ballfield, and west of Charles River Street. BETA sampled from the edge of the pond (see Figure 3.11).

Sub-area - N1-6A

This sampling point is located adjacent to sampling point N1-6. This six (6) inch asbestos concrete pipe is possibly an old floor drain.

Dry Weather Sampling

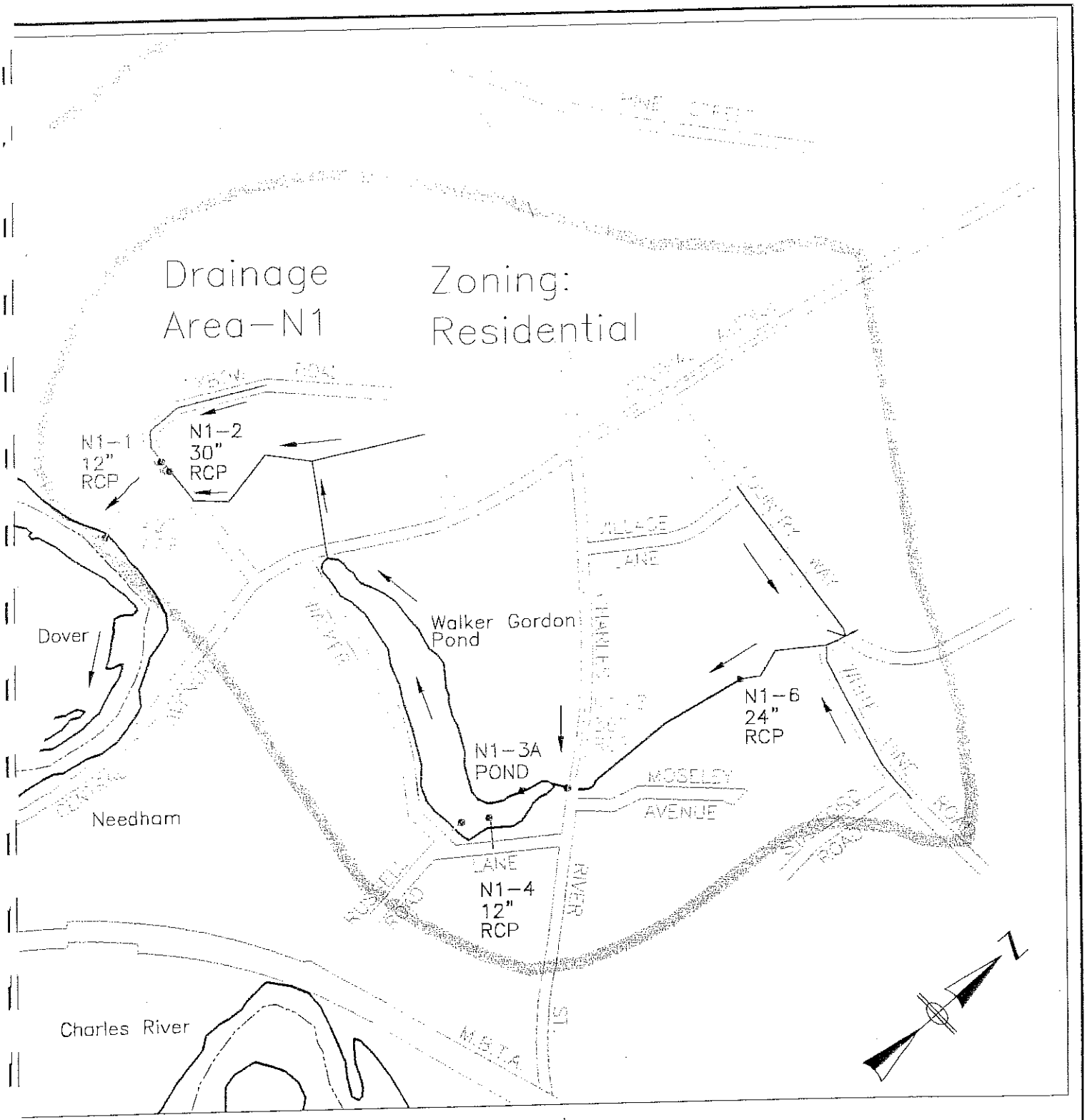
The discharge point was dry on October 16, 1996 at 2:55 p.m. No evidence of recent flow from the pipe was observed.

Table 3.2 summarizes the dry weather sampling locations and results.

Table 3.2 Summary of Dry Weather Sampling for N1

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N1					
N1	South of Oxbow Road	42-RCP	25	11/14/96	7:05	42	ND	**20**
N1-1	Oxbow Road	12-RCP	1	10/2/96	15:15	29	ND	**130**
N1-2	Oxbow Road	30-RCP	20	10/2/96	15:15	35	ND	**11**
N1-3	Culvert at Charles River St.	36-RCP	20	10/16/96	14:35	39	ND	**22**
N1-3A	Walker Gordon Pond	Pond	NA	10/16/96	14:40	32	ND	**16,000**
N1-4	Northwest of Walker Lane	12-RCP	Dry	10/16/96	15:05	NA	NA	**NA**
N1-5	North of Walker Lane	12-RCP	Dry	10/16/96	15:10	NA	NA	**NA**
N1-6	Southwest of Country Way	24-RCP	7	10/16/96	14:55	33	ND	**8**
N1-6A	Southwest of Country Way	6-AC	Dry	10/16/96	14:55	NA	NA	**NA**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled

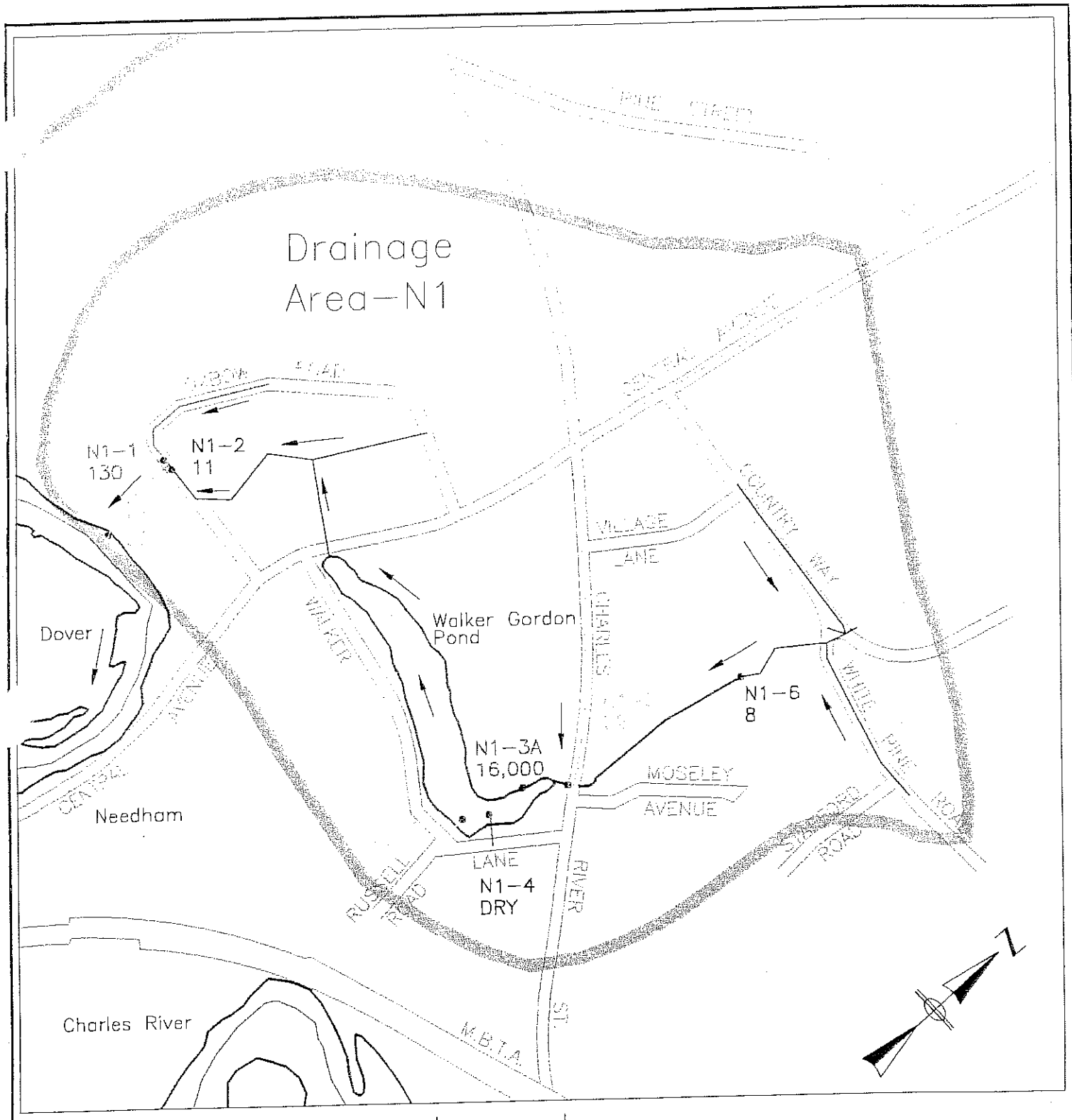


Legend

- N1—6 — Sub—area Discharge/Sampling Location
- N1 — Discharge Point
- 12" — Pipe Size in Inches
- RCP — Pipe Material

- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale	Figure 3.5 — Area Layout Drainage Area — N1 Needham Stormwater Management	BETA ENGINEERING, INC. Engineers/Planners



Legend

N1—6	— Sub-area Discharge		— Water
N1	— Discharge Point		— Town Line
300	— Fecal Coliform Bacteria		— Drainage Area Boundary
•	— Sampling Location		— Stormwater Flow Direction

Not to Scale

Figure 3.6 — Sampling Results
Drainage Area — N1
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1

Date: 11/14/96 Time 7:05 a.m.

Weather: Dry

Location South of Oxbow St. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity NS mohms

Chloride: 42 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 20 MPN/100ml

Temperature: 10.2 °c

SAMPLING DATA

Pipe Size: 42 in.

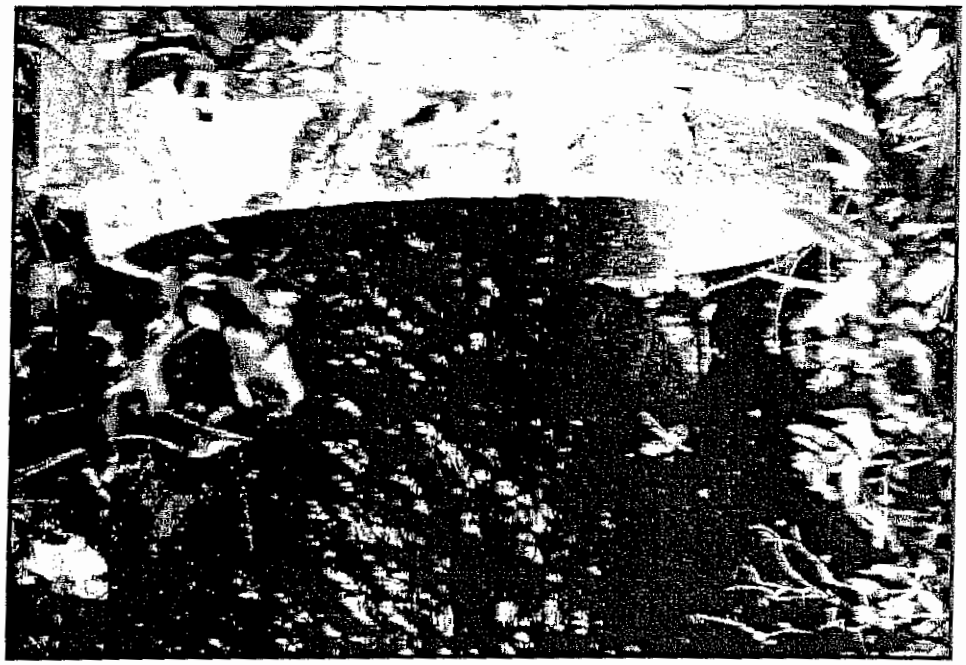
Pipe Material/Condition: RCP/Good

Flow Estimate: 25 gpm

Last Precipitation: 11/9/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was discharging from the pipe.



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File name: N1.pm6

Figure 3.7

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1-1

Date: 10/2/96 Time: 3:15 p.m.

Weather: Dry

Location: Manhole in Oxbow Rd. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS uohms

Chloride: 29 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 130 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 12 in.

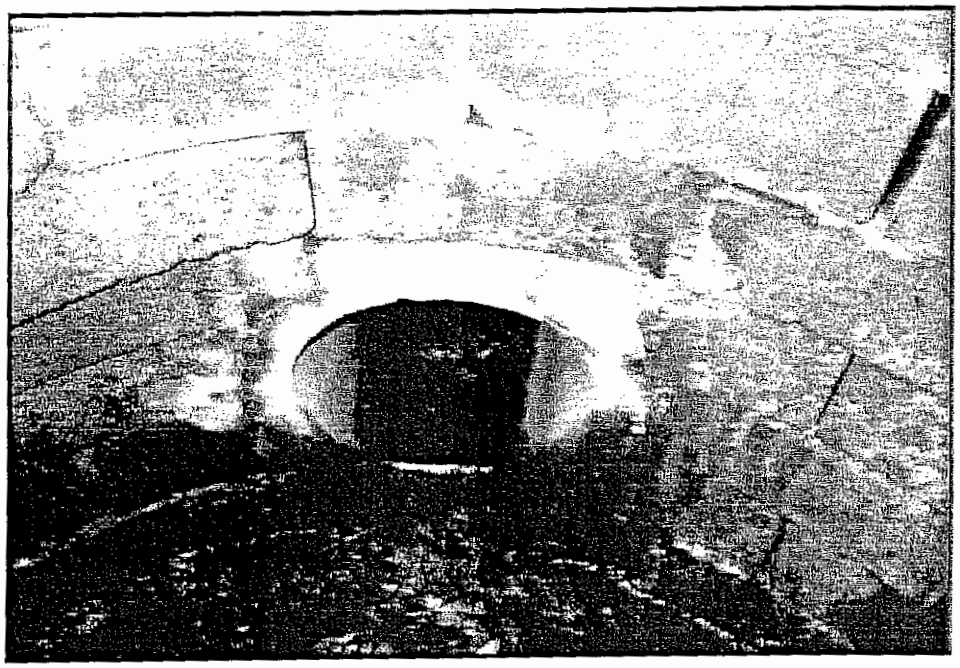
Pipe Material/Condition: RCP/Good

Flow Estimate: 1 gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was flowing from this pipe.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N1-1.pm6

Figure 3.8

Photograph Log

Job. No. : 917
Date : October 2, 1996
By : SMS

Job Name : Stormwater Management Sudy
Charles River Watershed

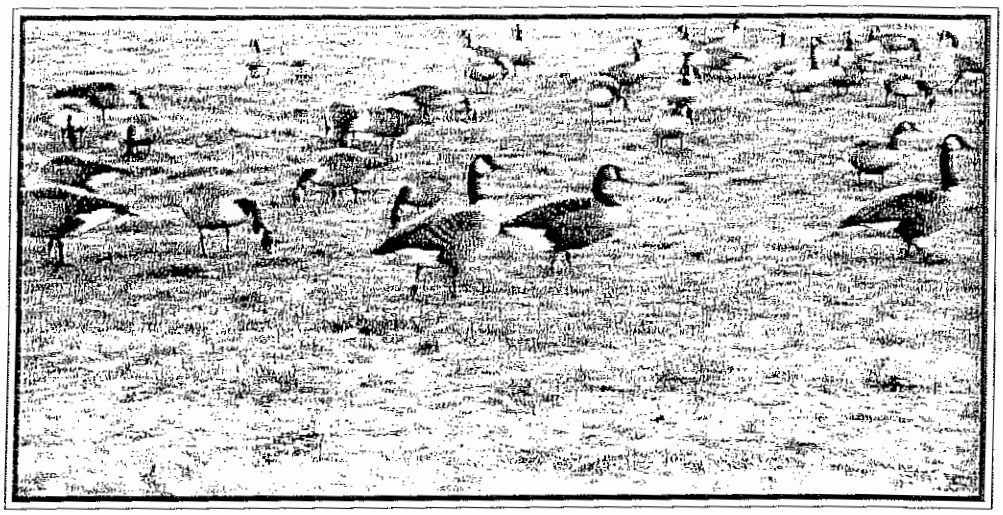


Photo 1: Geese population within sub-area N1 at Walker Gordon Pond, Charles River Street.

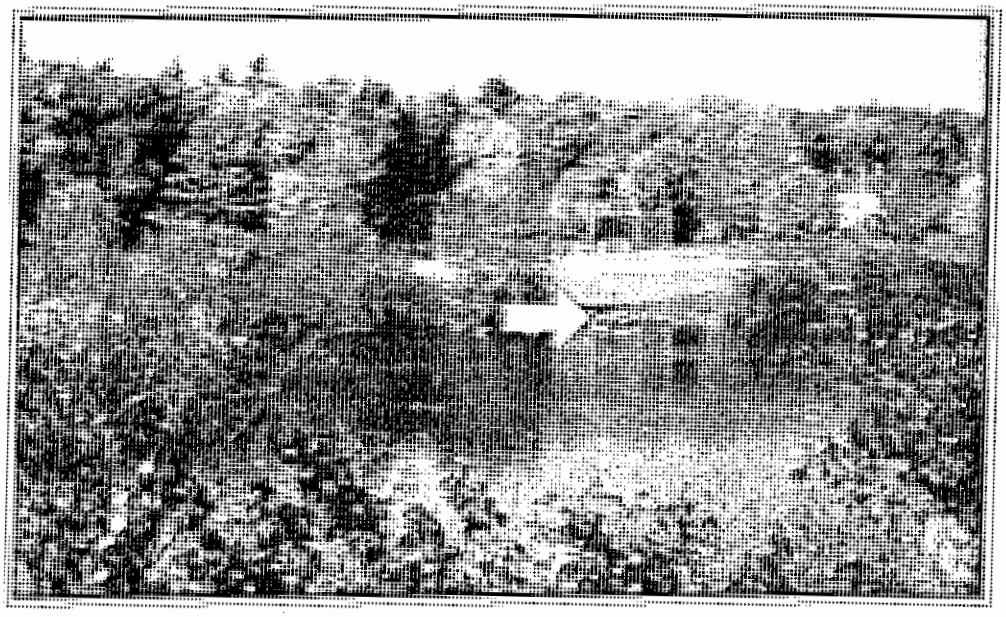


Photo 2: Sampling location N1-3A (refer to the arrow above), Walker Gordon Pond, Charles River Street.

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Consulting Engineers & Planners

FILE NO. Needham.PM6

FIGURE 3.11

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1-4

Date: 10/16/96 Time: 3:05 p.m.

Weather: Dry

Location: Northwest of Walker Lane, Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA mohm

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in

Pipe Material/Condition: RCP/Good

Flow Estimate: Dry gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: NA

Comments: Discharges directly into Walker Pond. Animal feces were observed at the outfall (refer to the arrow below).

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File name: N1-4.pm6

Figure 3.12

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1 Discharge Point: N1-5

Date: 10/16/96 Time: 3:10 p.m. Location: North of Walker Lane

Weather: Dry Needham, MA

ANALYTICAL DATA

pH: NA Fluoride: NA mg/l

Conductivity: NA uohms Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l Temperature: NA °c

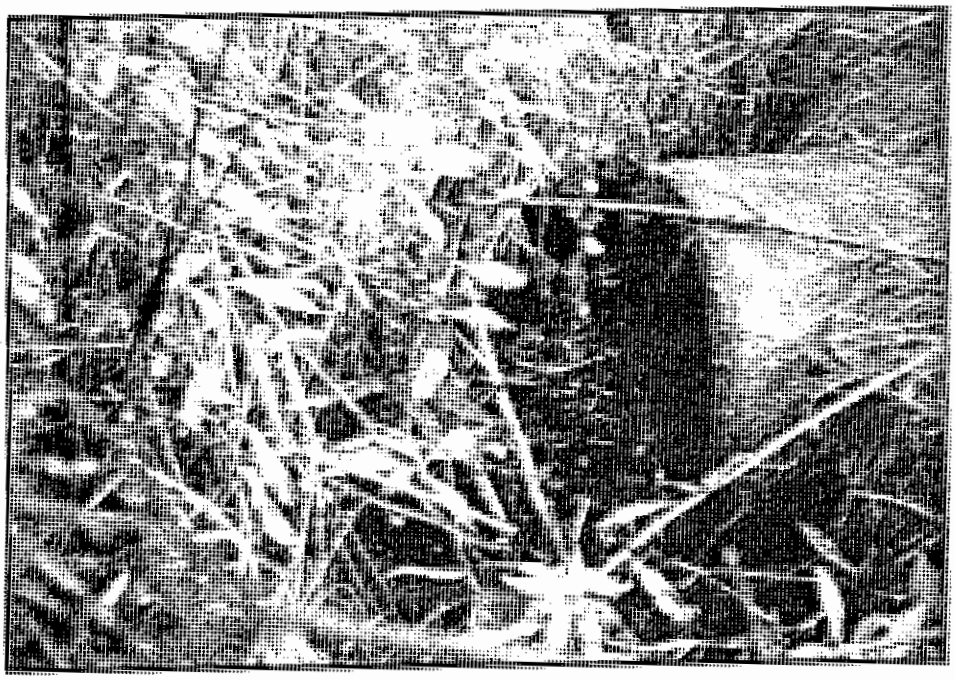
SAMPLING DATA

Pipe Size: 12 in Flow Estimate: Dry gpm

Pipe Material/Condition: RCP/Good Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: NA

Comments: No debris was located at the outfall.



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Scientists/Engineers/Planners

File name: N1-5.pm6

Figure 3.13

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N1

Discharge Point: N1-6

Date: 10/16/96 Time: 2:55 p.m.

Location: Southwest of Conntry Way Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: 6.2

Fluoride: ND mg/l

Conductivity: 260 uohm

Fecal Coliform Bacteria: 8 MPN/100ml

Chloride: 33 mg/l

Temperature: NS °c

SAMPLING DATA

Pipe Size: 24 in

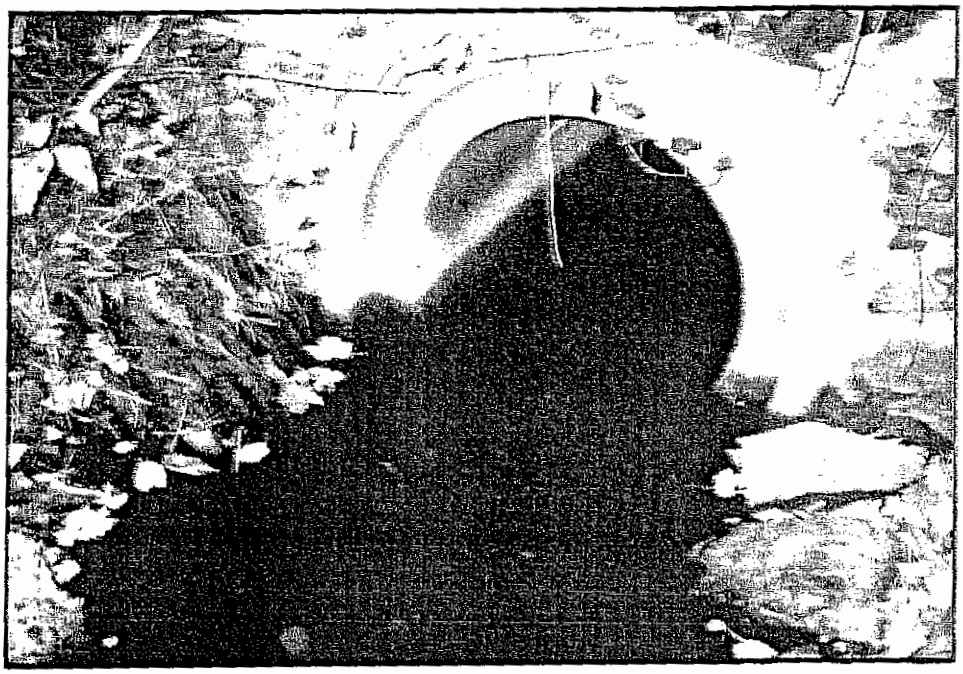
Flow Estimate: 7 gpm

Pipe Material/Condition: RCP/good

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Minor dark brown organic material was observed in the discharge pipe. Flow appears to be constant.



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Scientists/Engineers/Planners

File name: N1-6.pm6

Figure 3.14

Drainage Area - N6C

This drainage area consists of approximately 100 acres. The area is dominated by residential land use. There is one discharge point located in the drainage area. The 12 inch RCP discharge flows into a wetland west of Crestview Road (see Figure 3.15).

Some of the characteristics of this area include the following:

- total length of drain pipe in this area is approximately 1,080 linear feet
- drainage systems within area N6C include six (6) catch basins
- none of the area is sewered
- nine (9) septic systems are located in the drainage area
- the outfall is located 1,000 feet from the Charles River
- historic problems of MWRA sewer overflows have occurred in December of 1994, several MWRA sewer manholes surcharged and overflowed, releasing approximately two (2) million gallons of wastewater
- no wildlife impacts to surface water were noted
- dry weather flows and small storm flows infiltrate into the muck and organic soils of the wetland and Charles River flood plain. This allows for volatile organic compounds (VOC) volatilization, a reduction in oil, grease, total solids and total suspended solids prior to discharge into the Charles River.

Sub-area - N6C-1

This pipe discharges into a wetlands located behind a home southwest of Crestview Road (see Figure 3.16 and 3.17). The outfall to the Charles River is located 1,000 feet from this sampling point.

Dry Weather Sampling #1

BETA sampled the discharge pipe on September 24, 1996 at 1:50 p.m. There was no observed flow in the pipe. A sample was taken from the stagnant pool at the end of pipe to determine if the water may be from sewage. The laboratory results are as follows:

- chloride - 54 mg/l
- fluoride - ND
- pH - 6.60
- conductivity - 330 umhos
- fecal coliform - 240 MPN/100 ml.

Dry Weather Sampling #2

BETA sampled the discharge pipe on November 15, 1996 at 7:10 a.m. There was no observed flow in the pipe. A sample was taken from the stagnant pool at the end of pipe. The laboratory results are as follows:

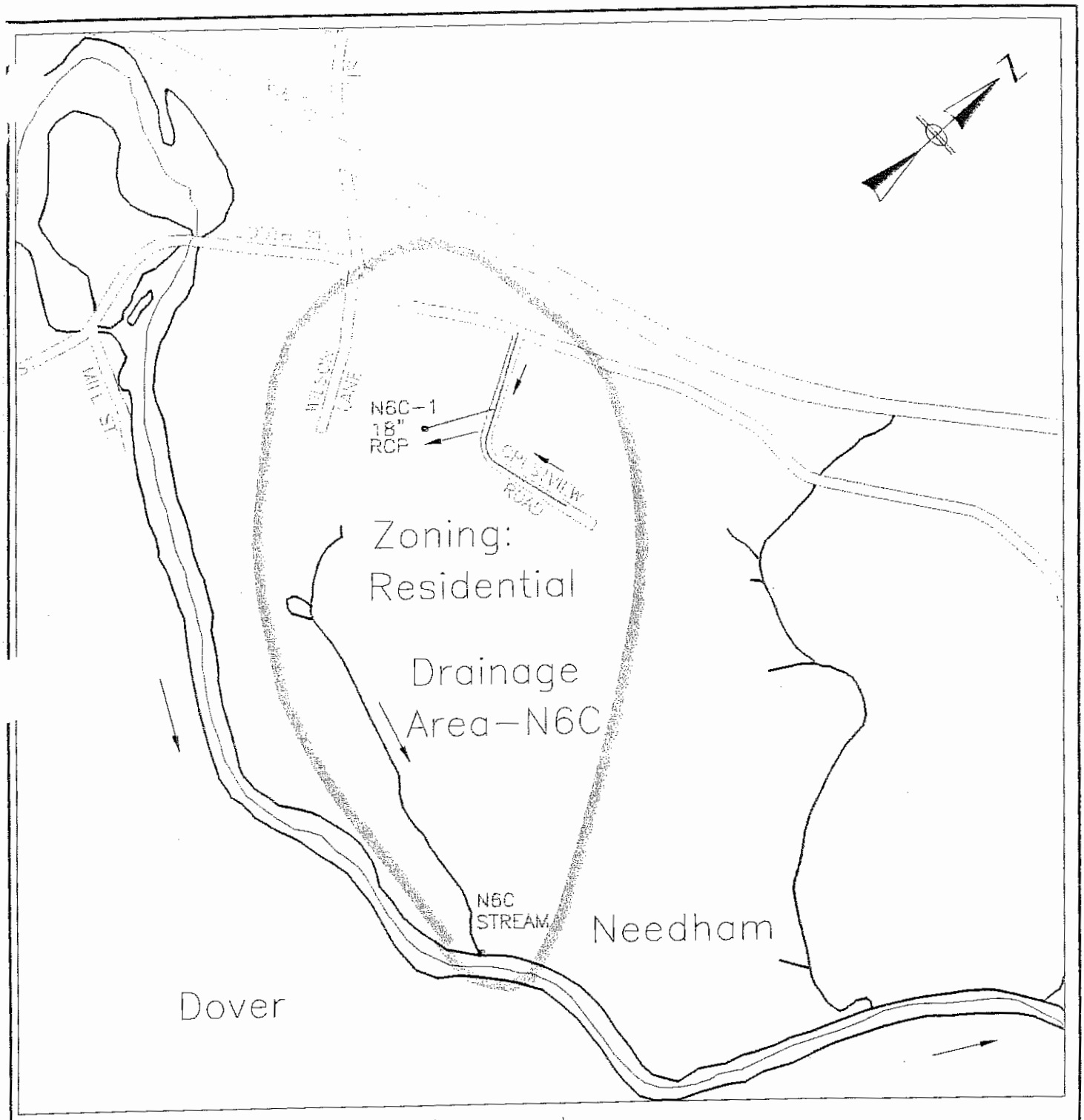
- fecal coliform - ND

Table 3.3 summarizes the dry weather sampling locations and results.

Table 3.3 Summary of Dry Weather Sampling for N6C

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N6C								
N6C	Southwest of Crestview Road	18-RCP	Stagnant	9/24/96	13:50	54	ND	**240**
N6C	Southwest of Crestview Road	18-RCP	Stagnant	11/15/96	7:10	NS	NS	**ND**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



Legend

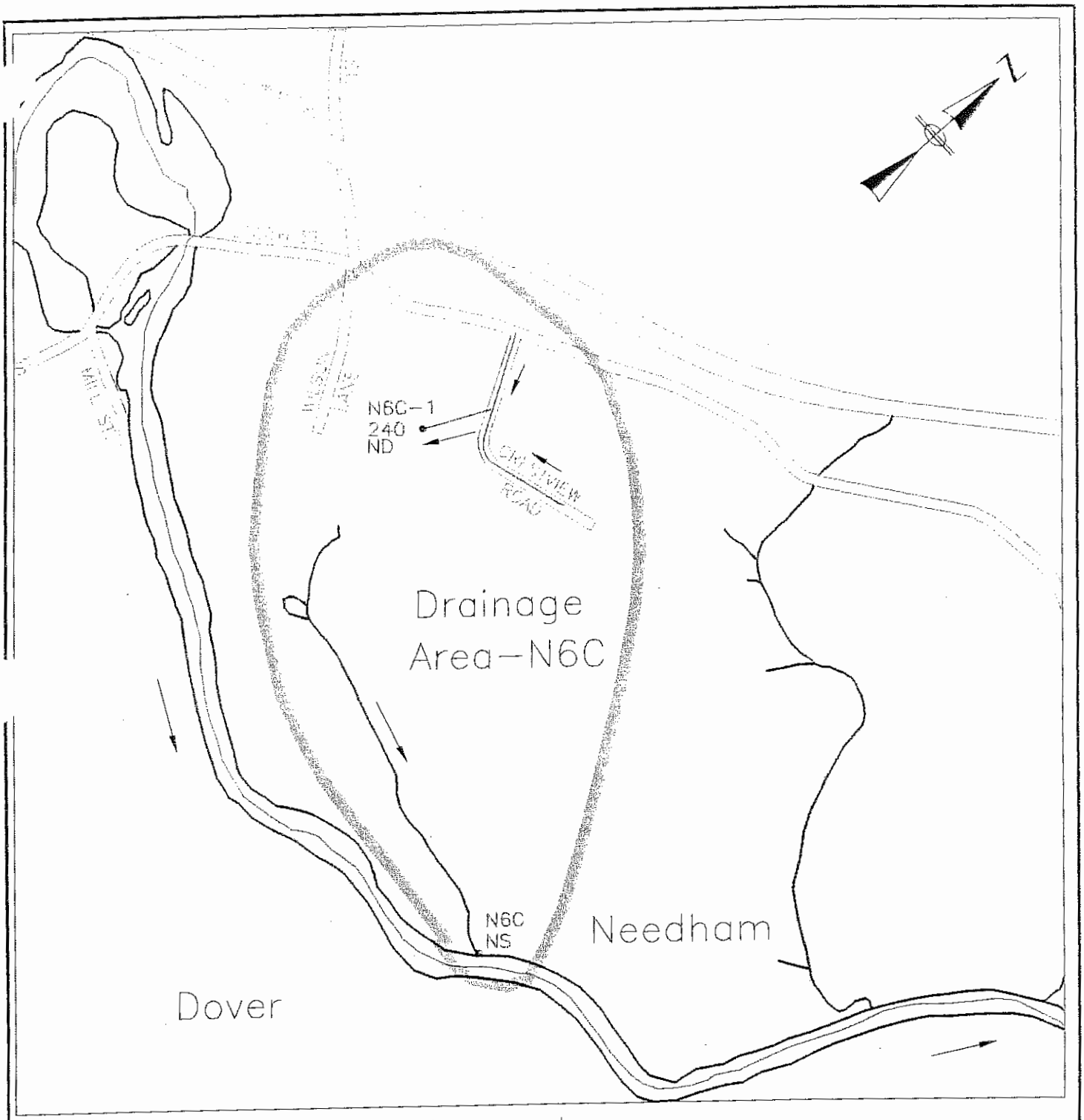
- • N6C-1 – Sub-area Discharge/Sampling Location
- N6C – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material

- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale

Figure 3.15 – Area Layout
Drainage Area – N6C
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners



Legend

N6C-1 – Sub-area Discharge
N6C – Discharge Point
300 – Fecal Coliform Bacteria
• – Sampling Location

– Water
– Town Line
– Drainage Area Boundary
– Stormwater Flow Direction

Not to Scale

Figure 3.16 – Sampling Results
Drainage Area – N6C
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N6C

Discharge Point: N6C-1

Date: 9/24/96 Time: 1:50 p.m.

Weather: Dry

Location: Southwest of Crestview Rd.
Needham, MA

ANALYTICAL DATA

pH: 6.60

Conductivity: 330 uohms

Chloride: 54 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 240 MPN/100ml

Temperature: 10.9 °c

SAMPLING DATA

Pipe Size: 18 in.

Pipe Material/Condition: RCP/Good

Flow Estimate: Stagnant gpm

Last Precipitation: 9/18/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was observed at the outfall.

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File name: N6C-1.pm6

Figure 3.17

Drainage Area - N8

This drainage area is approximately 175 acres in size. The area is characterized by residential land use. There are five (5) sub-area discharge points located in the area (see Figure 3.18).

Some of the characteristics which could effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 11,670 linear feet
- drainage systems within area N8 include 90 catch basins
- all except one (1) street in the sub-area have sanitary sewers
- septic systems are located along South Street
- four (4) of the five (5) discharges flow through a small pond
- various breeds of wildlife, specifically Canada Geese, migrate in the pond adjacent to the Charles River. Many geese and geese feces were observed.
- the pond retains dry weather and stormwater flows of area N-8. This accomplishes the following:
    - allows sediments to settle out (sediment/suspended solids)
    - provides retention/detention of stormwater effluent and extended (>3 day detention) for effluent during dry periods
    - the pond likely results in a reduction of solids, suspended solids, and metals discharged to the Charles River. The fecal coliform bacteria, which would normally tend to die-off during detention in the pond, are increased by the geese population.

Discharge Point - N8

This sampling point is from a culvert that discharges directly into the Charles River. The culvert is fed by a pond which is supplied by discharge pipes N8-1 and N8-2 (see Figures 3.19 and 3.20). Numerous geese were found to be living around the pond.

Dry Weather Sampling

A dry weather sample was taken from the inlet of this ten (10) feet arch culvert on September 24, 1996 at 1:15 p.m. An approximate flow of five (5) gallons per minute (gpm) of visually clean water was observed discharging from this point. Laboratory results revealed the following:

- chloride - 54 mg/l
- fluoride - ND
- fecal coliform - 300 MPN/100 ml.

The fecal coliform bacteria exceeded swimmable water criteria. Geese and water fowl are problematic in this vicinity, and undoubtedly impact fecal coliform. Geese numbers have exceeded fifty (50) during several site inspections of this study.

Sub-area - N8-1

This sampling point is located south of Wildwood Drive. Stormwater discharges into the pond before discharging to the Charles River (see Figure 3.21). This pond acts as a detention pond for some pollutant removal. The total length of pipe in this sub-area is approximately 3,540 linear feet.

Dry Weather Sampling #1

A sample was taken on September 24, 1996 at 1:20 p.m. An approximate flow of five (5) gpm was observed. The water was visually clean water with no evidence of suspended solids. The laboratory results revealed the following:

- chloride - 79 mg/l
- fluoride - ND
- fecal coliform - 140 MPN/100 ml.

Dry Weather Sampling #2

A sample was taken on November 14, 1996 at 6:45 a.m. An approximate flow of twelve (12) gpm was observed. The water was visually clean water with no evidence of suspended solids. The laboratory results revealed the following:

- chloride - 74 mg/l
- fluoride - ND
- fecal coliform - 40 MPN/100 ml.

Sub-area - N8-2

This sampling point is located south of Wildwood Drive. Stormwater discharges into the pond before discharging to the Charles River (see Figure 3.22). This pond acts as a detention pond for some pollutant removal. The length of pipe in this sub-area is approximately 4,980 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on September 24, 1996 at 1:25 p.m. and October 16, 1996 at 1:40 p.m. The pipe is partially submerged.

Sub-area - N8-3

This 15 inch corrugated metal pipe discharges in back of a house southeast of Fox Hill Road. The water is carried to the Charles River through a small stream (see Figure 3.23). The length of pipe in this sub-area is approximately 390 linear feet.

Dry Weather Sampling
The sampling was conducted on October 16, 1996 at 1:25 p.m. A flow of approximately one (1) gpm was observed discharging from the pipe. The flow was likely increased by the recently watered lawn adjacent to the discharge. No discoloration of the water was noticed in the flow. The laboratory results revealed the following:

- chloride - 56 mg/l
- fluoride - ND
- pH - 6.10
- conductivity - 280 umhos
- fecal coliform - 500 MPN/100 ml.

Sub-area - N8-4
Sampling location N8-4 is located south of High Rock Street. The discharge pipe is a 20 inch reinforced concrete pipe (see Figure 3.24) The length of pipe in this sub-area is approximately 900 linear feet. A 4 inch PVC pipe was noted, which was tied into roof drains of the adjacent residence (see Figure 3.25)

Dry Weather Sampling
The sampling was conducted on October 16, 1996 at 1:15 p.m. A flow of approximately 0.1 gpm was observed discharging from the pipe. No discoloration of the water was noticed in the flow. The laboratory results revealed the following:

- chloride - 66 mg/l
- fluoride - ND
- pH - 6.30
- conductivity - 630 umhos
- fecal coliform - 80 MPN/100 ml.

Sub-area - N8-5
This sampling point located south of Lantern Lane. The discharge pipe is a 12 inch metal pipe (see Figure 3.26). The length of pipe in this area is approximately 1,860 linear feet.

Dry Weather Sampling
A sample was taken on October 16, 1996 at 1:30 p.m. An abundance of iron bacteria flocculent was noticed in the pipe and in the discharging stream. A flow of approximately three (3) gpm was noted. Also, a thin shiny film was observed on the surface of the water in the outfall area. The laboratory results revealed the following:

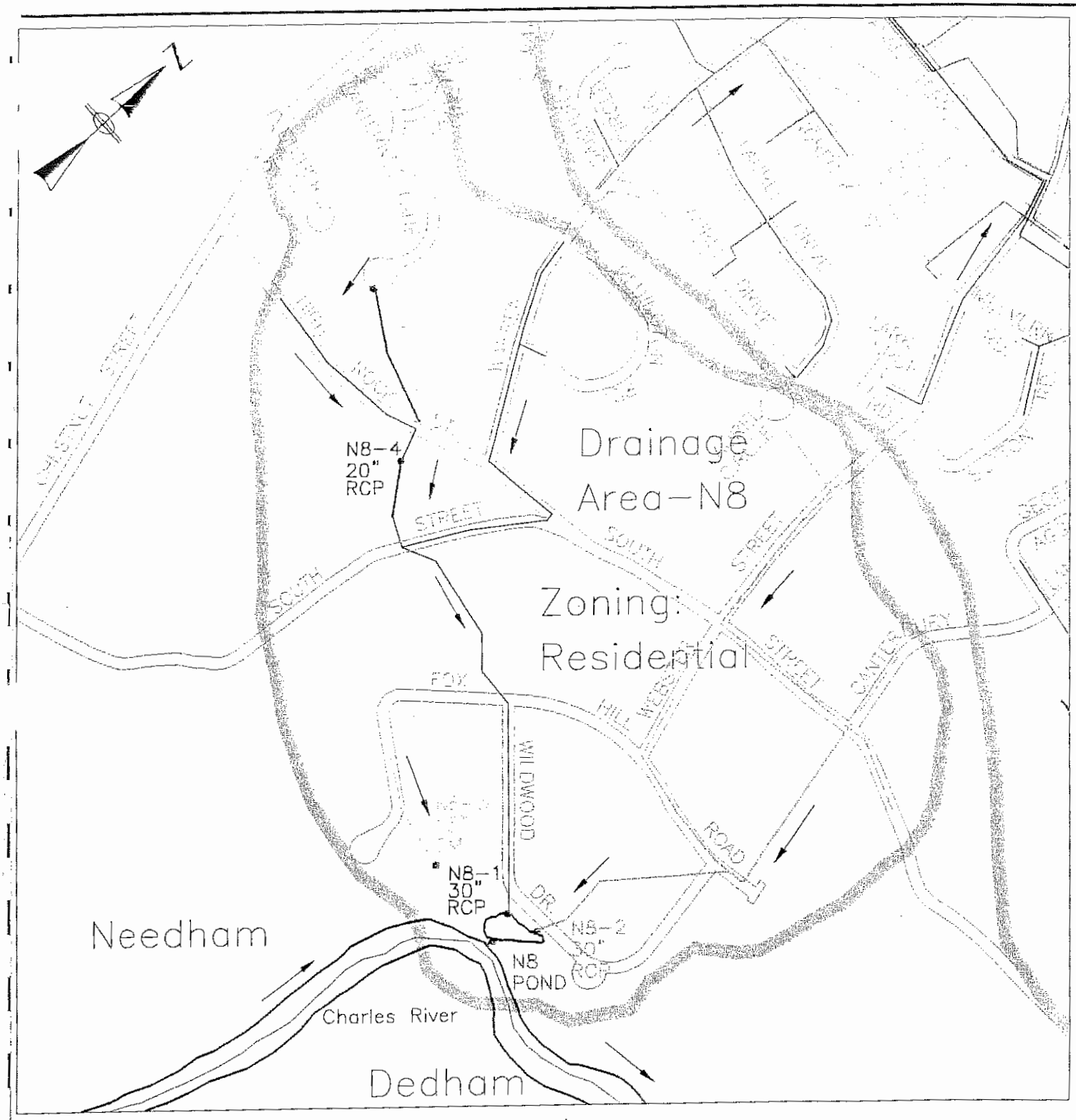
- chloride - 61 mg/l
- fluoride - 0.42 mg/l
- pH - 6.10
- conductivity - 310 umhos
- fecal coliform - 2 MPN/100 ml.

Table 3.4 summarizes the dry weather sampling locations and results.

Table 3.4 Summary of Dry Weather Sampling for N8

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N8					
N8	South of Wildwood Drive	10'-Archway	5	9/24/96	13:15	54	ND	**300**
N8-1	South of Wildwood Drive	30-RCP	5	9/24/96	13:20	79	ND	**140**
N8-1	South of Wildwood Drive	30-RCP	12	11/14/96	6:45	74	ND	**40**
N8-2	South of Wildwood Drive	30-RCP	Dry	9/24/96	13:25	NA	NA	**NA**
N8-2	South of Wildwood Drive	30-RCP	Dry	10/16/96	13:40	NA	NA	**NA**
N8-3	Southeast of Fox Hill Road	15-CM	1	10/16/96	13:25	56	ND	**500**
N8-4	South of High Rock Street	20-RCP	0.1	10/16/96	13:15	66	ND	**80**
N8-5	South of Lantern Lane	12-AC	3	10/16/96	13:30	61	0.42	**2**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



Legend

- N8-3 – Sub-area Discharge/Sampling Location
- N8 – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material

- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale

Figure 3.18 – Area Layout
Drainage Area – N8
Needham Stormwater Management

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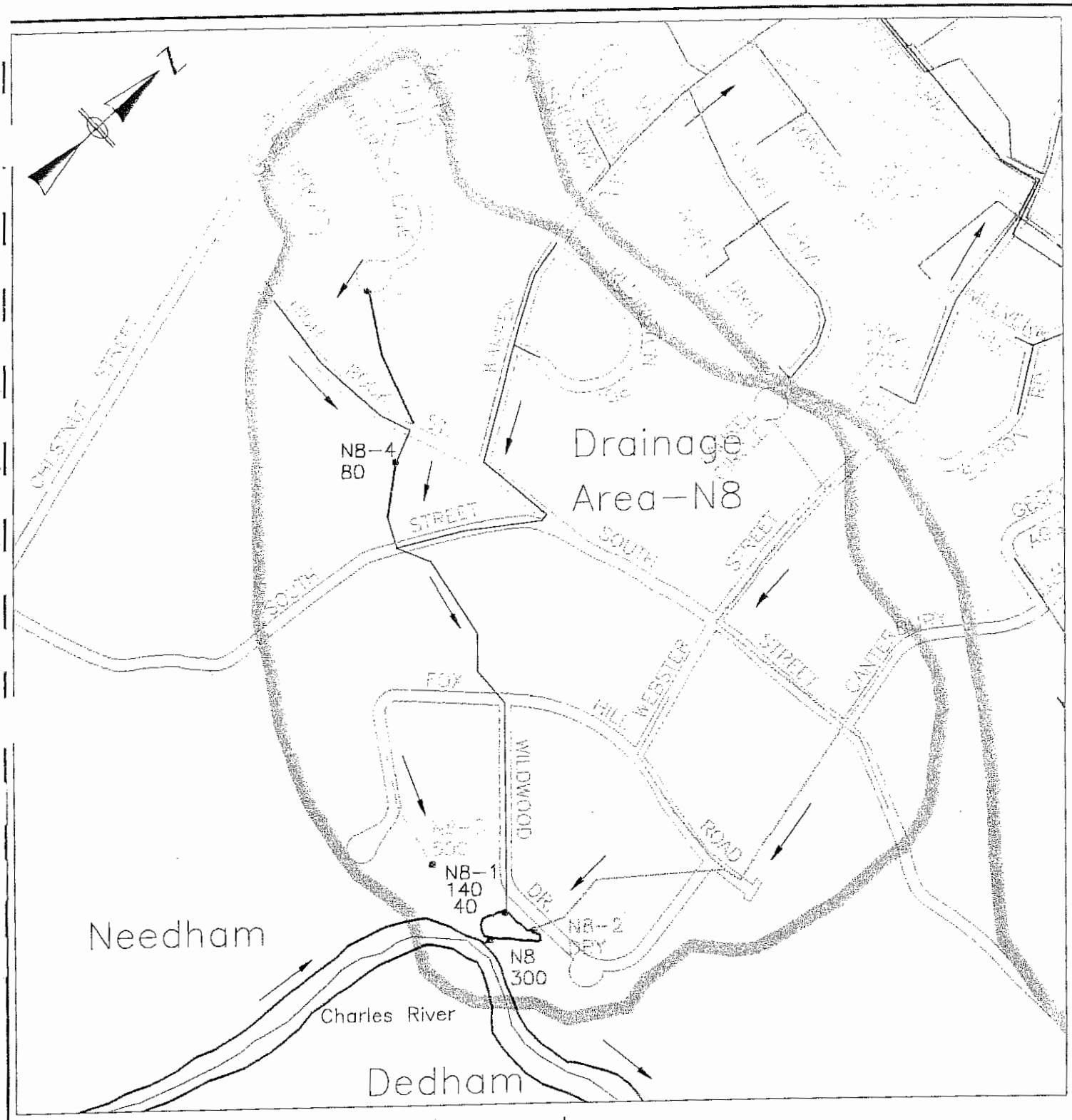

Legend

N8—3	— Sub—area Discharge		— Water
N8	— Discharge Point		— Town Line
300	— Fecal Coliform Bacteria		— Drainage Area Boundary
•	— Sampling Location		— Stormwater Flow Direction

Not to Scale

Figure 3.19 — Sampling Results
Drainage Area — N8
Needham Stormwater Management

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Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N8

Discharge Point: N8

Date: 9/24/96 Time: 1:35 p.m.

Weather: Dry

Location: South of Wildwood Drive
Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS uohms

Chloride: 54 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 300 MPN/100ml

Temperature: 12.6 °c

SAMPLING DATA

Pipe Size: 10 feet in.

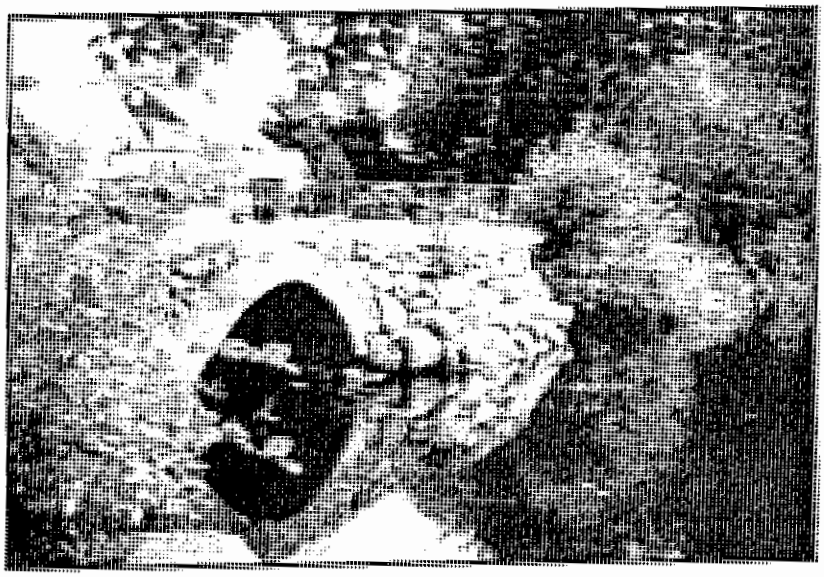
Pipe Material/Condition: Concrete Archway

Flow Estimate: 5 gpm

Last Precipitation: 9/18/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clear water was discharging through the archway.



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File name: N8.pm6

Figure 3.20

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N8

Discharge Point: N8-1

Date: 11/14/96 Time: 6:45 a.m.

Weather: Dry

Location: South of Wildwood Drive
Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS umhos

Chloride: 74 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 40 MPN/100ml

Temperature: 13.6 °c

SAMPLING DATA

Pipe Size: 30 in

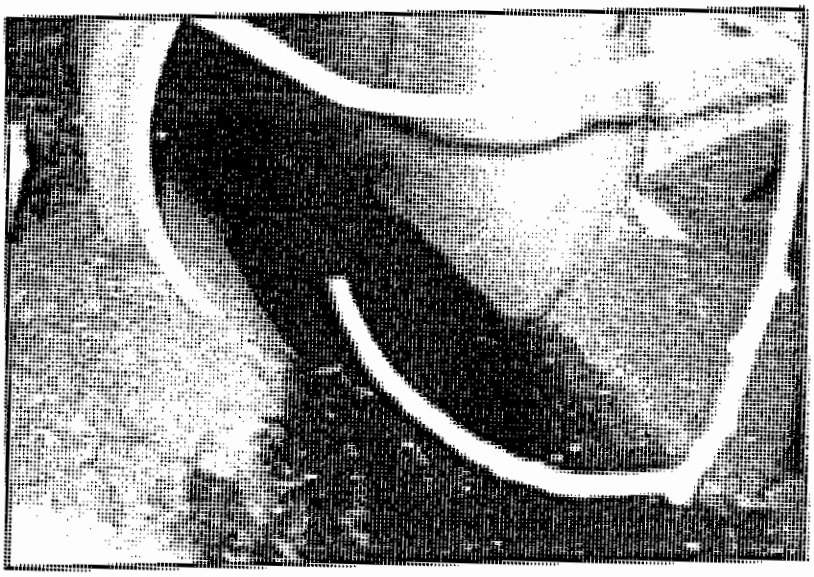
Pipe Material/Condition: RCP/Good

Flow Estimate: 12 gpm

Last Precipitation: 11/9/96

Clarity of Flow/Turbidity: Clear

Comments: Visually clean water was discharging with no evidence of suspended solids.



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File name: N8-1.pm6

Figure 3.21

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N8

Discharge Point: N8-3

Date: 10/16/96 Time: 1:25 p.m.

Location: End of Fox Hill Road
Needham, Massachusetss

Weather: Dry

ANALYTICAL DATA

pH: 6.1

Fluoride: ND mg/l

Conductivity: 280 uohms

Fecal Coliform Bacteria: 500 MPN/100ml

Chloride: 56 mg/l

Temperature: 13.2 °c

SAMPLING DATA

Pipe Size: 15 in.

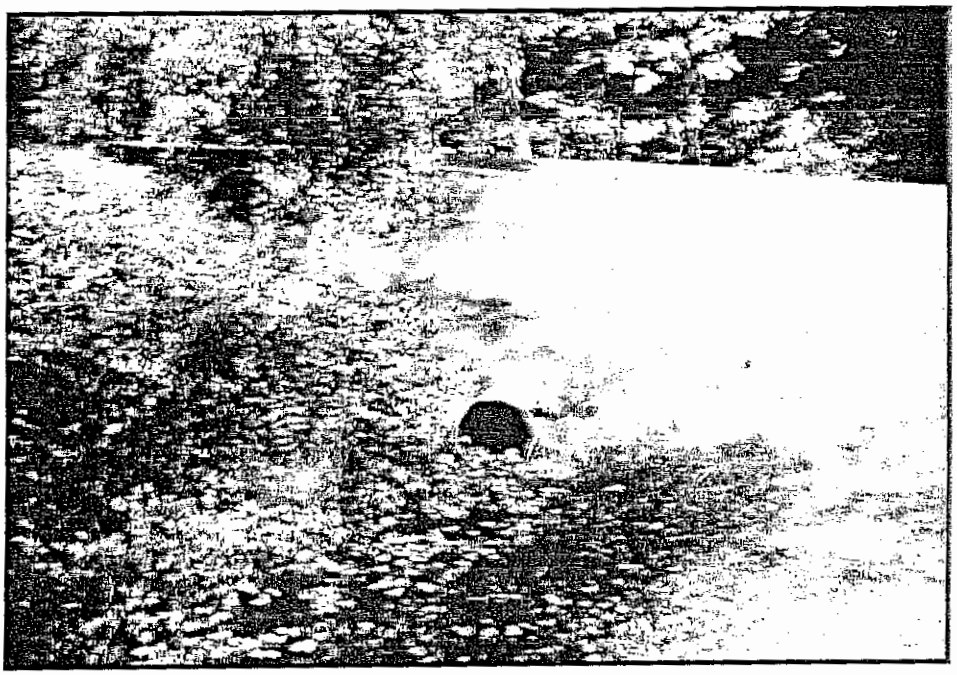
Flow Estimate: 1 gpm

Pipe Material/Condition: Corrugated metal pipe/Fair

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Flow could be attributed to the sprinklers next to the discharge. Geese populations in the area.



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File name: N8-3.prn6

Figure 3.23

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N8

Discharge Point: N8-4

Date: 10/16/96 Time: 1:15 p.m.

Weather: Dry

Location: South of High Rock St. Needham, MA

ANALYTICAL DATA

pH: 6.30

Conductivity: 630 uohms

Chloride: 66 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 80 MPN/100ml

Temperature: 13.2 °c

SAMPLING DATA

Pipe Size: 20 in.

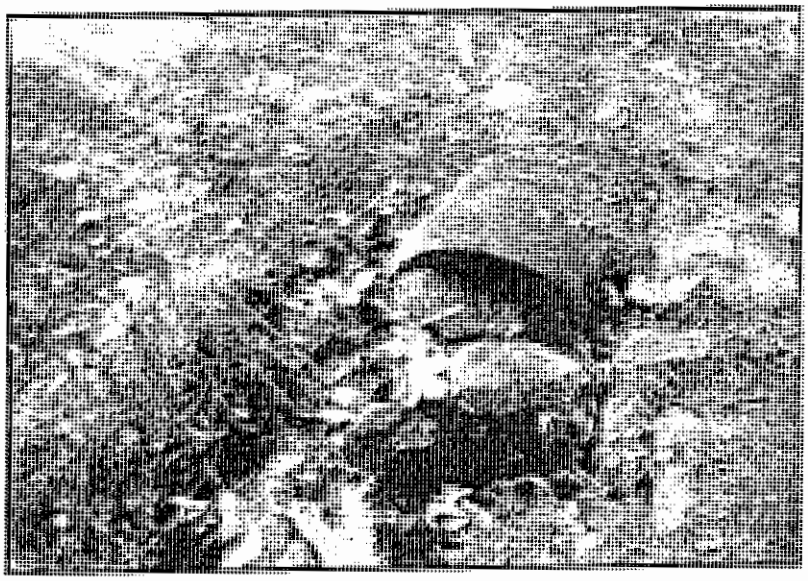
Pipe Material/Condition: RCP/Good

Flow Estimate: 0.1 gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Clear water was observed in the stream.



BETA Engineering, Inc.

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File name: N8-4.pm6

Figure 3.24

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N8

Discharge Point: N8-4A

Date: 10/16/96 Time: 1:15 p.m.

Weather: Dry

Location: South of High Rock St. Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA uohms

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 4 in.

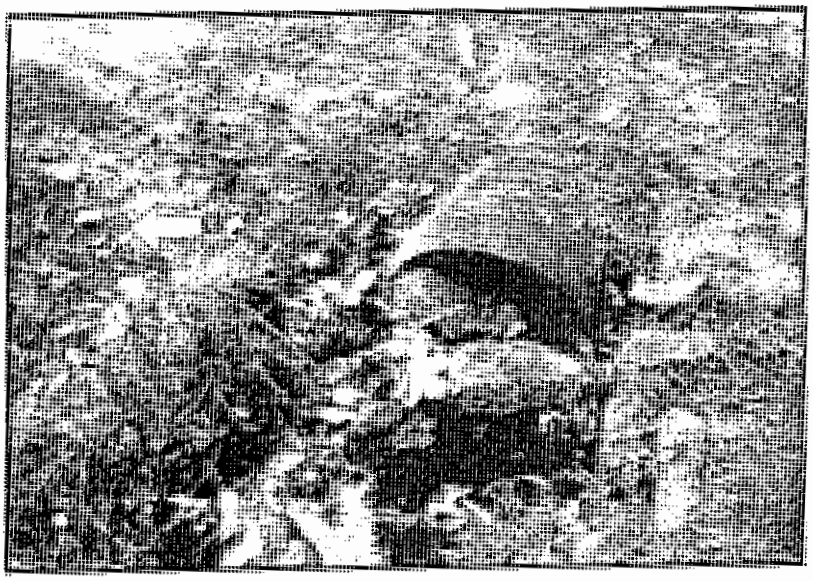
Pipe Material/Condition: PVC/Good

Flow Estimate: Dry gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: NA

Comments: One pipe appeared to be running from the backyard of the abutting house. It could possibly be tied into the roof drains.



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File name: N8-4A.pm6

Figure 3.25

Drainage Area - N10A

This drainage area is approximately 1,000 acres in size, and is the largest area of our study. The area is characterized by residential housing, commercial businesses, a pond (Needham Reservoir), the Needham Golf Course, the Town of Needham DPW, the MBTA Railroad, several schools and athletic fields. There are twenty-three (23) discharge points located throughout the area. All of the cumulative flow enters the Charles River through Alder Brook, located west of Dedham Avenue (see Figure 3.27 and Figure 3.28).

Some of the characteristics which could effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 96,750 linear feet
- drainage systems within area N10A include 885 catch basins
- all of the area is sewered. A small percentage of homes have septic systems.
- fertilizers and pesticides are used at the Needham Golf Course and Town of Needham athletic fields
- the Needham Reservoir collects a portion of the drainage area before discharging to the Alder Brook. This reservoir serves as a retention/detention pond for flows from several sub-areas prior to discharge to the Charles River.
- the Alder Brook also allows settling time for stormwater before discharging into the Charles River. This allows for some VOC volatilization, and settlement of oil; grease; total solids; total suspended solids, including associated metals; and increased fecal coliform die-off.

Sub-area - N10A-1

The first sampling point located in this sub-area is located 1,000 feet west of Green Street. This 24 inch reinforced concrete pipe discharges into a tributary stream which flows into the Needham Reservoir (see Figure 3.29). The length of pipe in this sub-area is approximately 1,020 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on October 8, 1996 at 1:20 p.m. No evidence of recent flow was noted.

Sub-area - N10A-1A

The sampling point is located west of Green Street, adjacent to N10A-1 (see Figure 3.30). This 12 inch reinforced concrete pipe, which appears to collect runoff from the golf course, discharges into a tributary stream which flows into the Needham Reservoir.

Dry Weather Sampling

BETA observed no flow from this discharge point on October 8, 1996 at 1:20 p.m. No evidence of recent flow was noted.

Sub-area - N10A-1B

The sampling point is located west of Green Street, adjacent to N10A-1. This twelve (12) inch reinforced concrete pipe, which appears to collect runoff from the golf course, discharges into a tributary stream which flows into the Needham Reservoir (see Figure 3.31).

Dry Weather Sampling

The sampling was conducted on October 8, 1996 at 1:20 p.m. There was a flow of approximately two (2) gpm discharging from the pipe. No discoloration of the water was noticed in the flow from the outfall. The laboratory results revealed the following:

- chloride - 130 mg/l
- fluoride - ND
- pH - 6.92
- conductivity - 600 umhos
- fecal coliform - 3,000 MPN/100 ml.

Sub-area - N10A-2

This discharge pipe is located south of Great Plain Avenue. The length of pipe in this sub-area is approximately 120 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on November 5, 1996 at 1:28 p.m.

Sub-area - N10A-3

This 12 inch reinforced concrete pipe located in the DPW parking lot discharges into a down gradient stream of the Needham Reservoir (see Figure 3.32). This piping collects runoff from the DPW parking lot and roads. The length of pipe in this sub-area is approximately 780 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on October 8, 1996 at 1:30 p.m. Some iron bacteria flocculent was observed at the discharge area.

Sub-area - N10A-4

This 12 inch reinforced concrete pipe discharges to a culvert underneath Dedham Avenue. This pipe collects runoff from Dedham Avenue. The length of pipe in this sub-area is approximately 900 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on November 5, 1996 at 1:35 p.m.

Sub-area - N10A-5

Sampling point N10A-5 is located west of the Needham Athletic Fields (west of first base). This 48 inch reinforced concrete pipe discharges into a stream which flows into the Needham Reservoir (see Figure 3.34). The length of pipe in this sub-area is approximately 4,500 linear feet.

Dry Weather Sampling #1

The sampling was conducted on October 8, 1996 at 12:48 p.m. There was a flow of approximately ten (10) gpm discharging from the pipe. A slime layer was noticed on the inside of the pipe. No discoloration of the water was noticed in the flow from the outfall. The laboratory results revealed the following:

- chloride - 78 mg/l
- fluoride - ND
- pH - 6.70
- conductivity - 380 umhos
- fecal coliform - 80 MPN/100 ml.

Dry Weather Sampling #2

The sampling was conducted on November 14, 1996 at 7:25 a.m. There was a flow of approximately fifteen (15) gpm discharging from the pipe. No discoloration of the water was noticed in the flow from the outfall. The laboratory results revealed the following:

- chloride - 86 mg/l
- fluoride - ND
- fecal coliform - 60 MPN/100 ml.

Sub-area - N10A-5A

This sampling point is located on the Needham Golf Course. This 36 inch reinforced concrete pipe discharges into a stream which flows into the Needham Reservoir (see Figure 3.35).

Dry Weather Sampling

The sampling was conducted on October 8, 1996 at 12:40 p.m. There was a flow of approximately three (3) gpm discharging from the pipe. Clear water was noticed in the discharge flow from the outfall. The laboratory results revealed the following:

- chloride - 120 mg/l
- fluoride - ND
- pH - 6.88
- conductivity - 510 umhos
- fecal coliform - 170 MPN/100 ml.

Sub-area - N10A-6

This 24 inch reinforced concrete pipe is located northwest of Harris Avenue (see Figure 3.36). The length of pipe in this sub-area is approximately 1,800 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on October 8, 1996 at 12:55 p.m.

Sub-area - N10A-7
Sampling point N10-7 is a 48 inch pipe located south of Ivy Road. This pipe discharges to a stream that feeds the Needham Reservoir. The length of pipe in this sub-area is approximately 29,040 linear feet. Figure 3.37 provides a detailed map of this sub-area. A photograph of this sampling point is given in Figure 3.38.

Dry Weather Sampling #1
The sampling was conducted on October 8, 1996 at 1:40 p.m. There was a flow of approximately 1.5 gpm discharging from the pipe. Clear water was observed discharging from the pipe. The laboratory results revealed the following:

- chloride - 130 mg/l
- fluoride - ND
- pH - 6.80
- conductivity - 600 umhos
- fecal coliform - 900 MPN/100 ml.

Dry Weather Sampling #2
The pipe was re-sampled on October 8, 1996 at 2:40 p.m. BETA revisited the discharge point later in the day and observed a cloudy pool of water at the discharge location. The laboratory results revealed the following:

- chloride - 120 mg/l
- fluoride - ND
- pH - 7.30
- conductivity - 580 umhos
- fecal coliform - 90,000 MPN/100 ml.

Dry Weather Sampling #3
The pipe was again re-sampled on October 17, 1996 at 2:10 p.m. BETA observed suds at the outfall consistent with detergent. The sample was taken from the suds area of the outfall basin. The laboratory results revealed the following:

- chloride - 99 mg/l
- fluoride - ND
- fecal coliform - 5,000 MPN/100 ml.

Dry Weather Sampling #4
The pipe was re-sampled on October 18, 1996 at 2:20 p.m. BETA observed some foam located at the outfall. A flow of approximately twenty (20) gpm was discharging from the pipe. The laboratory results revealed the following:

- chloride - 110 mg/l
- fluoride - ND
- fecal coliform - 1,100 MPN/100 ml.

Dry Weather Sampling #5
The pipe was re-sampled on November 7, 1996 at 9:30 a.m. The laboratory results revealed the following:
- fecal coliform - 1,700 MPN/100 ml.

Manhole Sampling
To help determine if there was a possible illicit connection in the system, BETA began to sample manholes that feed the discharge point N10A-7. A map is provided to show the locations of the sampling in relation to the discharge point. To help define the locations of flow, BETA opened different manholes to determine if a flow was present. The samples taken from the manholes are discussed below while the dry manholes are only indicated on the map.

Manhole N10A-7-Ivy Court
This manhole is located at the end of Ivy Road. The sampling location was from a twelve (12) inch RCP.

Dry Weather Sampling
The manhole was sampled on October 18, 1996 at 2:35 p.m. Iron bacteria flocculent was noticed on the wall of the manhole in the area the pipe discharges. A flow of approximately 0.5 gpm of turbid water was noticed discharging from the pipe. A large amount of animal feces and groundwater were found to be the cause of constant elevated fecal coliform bacteria (see Figure 3.39). No illicit connections were found during the television inspection. The laboratory results revealed the following:
- fecal coliform - 9,000 MPN/100 ml.

Dry Weather Sampling
The manhole was re-sampled on November 5, 1996 at 12:00 p.m. A brown flocculent was noticed at the invert of the discharge pipe. A flow of approximately 0.5 gpm of clear water was noticed discharging from the pipe. The laboratory results revealed the following:
- fecal coliform - 1,900 MPN/100 ml.

Manhole N10A-7-C1
This manhole is located in a residential home's backyard south of Wilshire Park. The manhole had one 42 inch RCP entering and exiting the structure.

Dry Weather Sampling
The manhole was sampled on October 18, 1996 at 12:15 p.m. The laboratory results revealed the following:
- chloride - 69 mg/l
- fluoride - ND
- fecal coliform - 1,700 MPN/100 ml.

Manhole N10A-7-C2
This manhole is located northwest of the intersection of Wilshire Park and Great Plain Avenue. Please refer to the attached drawing for the approximate location. The manhole had one 36 inch RCP entering and exiting the structure.

Dry Weather Sampling
The manhole was sampled from the 36 inch RCP on October 18, 1996 at 12:20 p.m. The laboratory results revealed the following:
fecal coliform - 700 MPN/100 ml.

Manhole N10A-7-C3
This manhole is located northwest of the intersection of Wilshire Park and Great Plain Avenue. Please refer to the attached drawing for the approximate location. The manhole had one 24 inch RCP (N10A-7-C3), one 42 inch RCP (N10A-7-C4), and one 36 inch RCP (N10A-7-C5) entering the manhole and one 42 inch RCP exiting the manhole. This 24 inch RCP collects runoff from Beaufort Street.

Dry Weather Sampling
The manhole was sampled from the 24 inch RCP on November 6, 1996 at 11:30 a.m. The laboratory results revealed the following:
- chloride - 57 mg/l
- fluoride - ND
- pH - 7.14
- conductivity - 390 umhos
- fecal coliform - 300 MPN/100 ml.

Manhole N10A-7-C4
This manhole is located northwest of the intersection of Wilshire Park and Great Plain Avenue. Please refer to the attached drawing for the approximate location. There was one 24-inch RCP (N10A-7-C3), one 42 inch RCP (N10A-7-C4), and one 36 inch RCP (N10A-7-C5) entering the manhole and one 42 inch RCP exiting the manhole. This 42 inch RCP collects runoff from Holmes Street.

Dry Weather Sampling
The manhole was sampled from the 42 inch RCP on November 6, 1996 at 11:30 a.m. The laboratory results revealed the following:
- chloride - 86 mg/l
- fluoride - ND
- pH - 7.19
- conductivity - 360 umhos
- fecal coliform - 170 MPN/100 ml.

Manhole N10A-7-C5

This manhole is located northwest of the intersection of Wilshire Park and Great Plain Avenue. Please refer to the attached drawing for the approximate location. There was one 24 inch RCP (N10A-7-C3), one 42 inch RCP (N10A-7-C4), and one 36 inch RCP (N10A-7-C5) entering the manhole and one 42 inch RCP exiting the manhole. This 36 inch RCP collects runoff from Washington Street.

Dry Weather Sampling

The manhole was sampled from the 36 inch RCP on November 6, 1996 at 11:30 a.m. The laboratory results revealed the following:

- chloride - 73 mg/l
- fluoride - ND
- pH - 7.25
- conductivity - 200 umhos
- fecal coliform - 2,200 MPN/100 ml.

Manhole (N10A-7) - Sergeant Street

This manhole is located on Sergeant Street, west of Washington Avenue. The approximate location is shown on the attached map. There was one 24-inch RCP entering and exiting the manhole.

Dry Weather Sampling #1

The manhole was sampled on October 18, 1996 at 3:15 p.m. The laboratory results revealed the following:

- chloride - 77 mg/l
- fluoride - ND
- fecal coliform - 40 MPN/100 ml.

Manhole (N10A-7) - Washington Avenue

This manhole is located at the intersection of Washington Avenue and Sergeant Street. The approximate location is shown on the attached map. There was one 24 inch RCP and one twelve (12) inch RCP entering the manhole and one 24 inch RCP exiting the manhole.

Dry Weather Sampling #1

The manhole was sampled on November 6, 1996 at 10:20 a.m. The laboratory results revealed the following:

- chloride - 53 mg/l
- fluoride - ND
- pH - 7.12
- conductivity - 200 umhos
- fecal coliform - 2,400 MPN/100 ml.

Manhole (N10A-7) - Wash./GT Plain Street
This manhole is located at the intersection of Washington Avenue and Great Plain Street. The approximate location is shown on the attached map. There was one 24-inch RCP and one 18 inch RCP entering the manhole and one 36 inch RCP exiting the manhole.

Dry Weather Sampling #1
The manhole was sampled on November 6, 1996 at 11:15 a.m. The laboratory results revealed the following:

- pH - 7.27
- conductivity - 200 umhos
- fecal coliform - 1,400 MPN/100 ml.

Manhole (N10A-7) - Ellicot Street
This manhole is located at the intersection of Ellicot Street and Powers Street. The approximate location is shown on the attached map. The manhole had one 18 inch RCP and one twelve (12) inch RCP entering the manhole and one 18 inch RCP exiting the manhole.

Dry Weather Sampling #1
The manhole was sampled on November 6, 1996 at 10:20 a.m. The laboratory results revealed the following:

- chloride - 28 mg/l
- fluoride - 0.21
- pH - 7.3
- conductivity - 200 umhos
- fecal coliform - 1,700 MPN/100 ml.

Sub-area - N10A-8
This sampling point is located southwest of Canterbury Lane. The twelve (12) inch RCP discharges into Adler Brook approximately 2,200 feet from the Charles River (see Figure 3.40). The length of pipe in this sub-area is approximately 510 linear feet.

Dry Weather Sampling
The sampling was conducted on October 8, 1996 at 2:45 p.m. There was a flow of approximately one (1) gpm discharging from the pipe. Iron bacteria flocculent was abundant in the pipe and at the outfall. The laboratory results revealed the following:

- chloride - 75 mg/l
- fluoride - ND
- pH - 7.18
- conductivity - 410 umhos
- fecal coliform - 80 MPN/100 ml.

Sub-area - N10A-9

This sampling point is located east of Webster Street. The 36 inch RCP discharges to Alder Brook approximately 3,600 feet from the Charles River. The length of pipe in this sub-area is approximately 9,960 linear feet. Figure 3.41 provides a detailed map of sub-area 10A-9. A photograph of the outfall is provided in Figure 3.42.

Dry Weather Sampling #1

The dry weather sampling was conducted on October 2, 1996 at 3:00 p.m. BETA observed a flow of three (3) gpm of visually clean water. The bottom of the discharge pipe was also noted to be relatively clean, with no organic material evident. The laboratory results revealed the following:

- chloride - 50 mg/l
- fluoride - ND
- fecal coliform - 110 MPN/100 ml.

Dry Weather Sampling #2

BETA re-sampled the discharge on October 17, 1996 at 1:50 p.m. The laboratory results revealed the following:

- fecal coliform - 1,600 MPN/100 ml.

Dry Weather Sampling #3

BETA re-sampled the discharge on November 7, 1996 at 9:40 a.m. The laboratory results revealed the following:

- fecal coliform - 3,000 MPN/100 ml.

Sub-area - N10A-9A

This sampling point is located east of Webster Street. The 24 inch RCP discharges to Alder Brook approximately 3,600 feet from the Charles River adjacent to the N10A-9 discharge (see Figures 3.41 and 3.43). The length of pipe in this sub-area is approximately 15,600 linear feet.

Dry Weather Sampling #1

The dry weather sampling was conducted on October 2, 1996 at 3:00 p.m. BETA observed a flow of ten (10) gpm of visually clean water. A slime layer was noticed on the bottom of the discharge pipe. The laboratory results revealed the following:

- chloride - 120 mg/l
- fluoride - ND
- fecal coliform - 160,000 MPN/100 ml.

This elevated level of fecal coliform indicated a possible illicit connection to the storm drain system.

Dry Weather Sampling #2
Due to the elevated levels, BETA re-sampled the discharge on October 11, 1996 at 2:20 p.m. The laboratory resnlts revealed the following:

- fecal coliform - 3,000 MPN/100 ml.

Dry Weather Sampling #3
A duplicate sample was taken from the discharge on October 11, 1996 at 2:30 p.m. The laboratory results revealed the following:

- fecal coliform - 3,000 MPN/100 ml.

Dry Weather Sampling #4
BETA re-sampled the discharge on October 16, 1996 at 1:00 p.m. A flow of approximately five (5) gpm was discharging from the pipe. The laboratory results revealed the following:

- pH - 6.50
- conductivity - 390 umhos
- fecal coliform - 16,000 MPN/100 ml.

Dry Weather Sampling #5
BETA re-sampled the discharge on October 17, 1996 at 1:50 p.m. The laboratory results revealed the following:

- fecal coliform - 9,000 MPN/100 ml.

Dry Weather Sampling #6
BETA re-sampled the discharge point on October 18, 1996 at 12:00 p.m. The laboratory results revealed the following:

- chloride - 130 mg/l
- fluoride - ND
- fecal coliform - 3,000 MPN/100 ml.

Dry Weather Sampling #7
BETA re-sampled the discharge on November 5, 1996 at 2:30 p.m. The laboratory results revealed the following:

- fecal coliform - 9,000 MPN/100 ml.

Dry Weather Sampling #8
BETA re-sampled the discharge on November 7, 1996 at 9:40 a.m. The laboratory results revealed the following:

- fecal coliform - 3,000 MPN/100 ml.

Manhole Sampling
To help determine if there was an illicit connection is in the system, BETA began to sample manholes that feed the discharge point N10A-9A. A map is provided to show the locations of the sampling in relation to the discharge point. To help define the locations of flow, BETA inspected different manholes to determine if a flow was present. The samples taken from the manholes are discussed below. Dry manholes are indicated on the map.

Manhole N10A-9A - C1
This manhole is located on Webster Street after the railroad easement. One 24 inch RCP enters and exit the manhole. For the approximate location, refer to the attached map.

Dry Weather Sampling
The manhole flow was sampled on October 18, 1996 at 12:15 p.m. The laboratory results revealed the following:
- chloride - 130 mg/l
- fluoride - ND
- fecal coliform - 5,000 MPN/100 ml.

Manhole N10A-9A - C2
This manhole is located on Webster Street after the MTBA railroad easement. One 24 inch RCP and one 15 inch clay pipe enters the manhole and one 24 inch RCP exits the manhole. For the approximate location, refer to the attached map.

Dry Weather Sampling #1
The manhole flow was sampled on October 18, 1996 at 12:20 p.m. The laboratory results revealed the following:
- fecal coliform - 3,000 MPN/100 ml.

Dry Weather Sampling #2
The manhole flow was sampled on November 7, 1996 at 11:00 a.m. The laboratory results revealed the following:
- chloride - 57 mg/l
- fluoride - ND
- fecal coliform - 230 MPN/100 ml.

Manhole N10A-9A - C3
This manhole is located on Webster Street before the MTBA railroad easement. One 24 inch RCP enters and exit the manhole. For the approximate location, refer to Fig. 3.41.

Dry Weather Sampling
The manhole flow was sampled on October 18, 1996 at 12:30 p.m. The laboratory results revealed the following:
- fecal coliform - 16,000 MPN/100 ml.

Manhole (N10A-9A) - Corner of Howland and Pleasant
This manhole is located at the corner of Howland Street and Pleasant Street. Please refer to the attached map for the approximate location.

Dry Weather Sampling #1
The manhole flow was sampled on October 17, 1996 at 3:00 p.m. The laboratory results revealed the following:

- chloride - 210 mg/l
- fluoride - ND
- fecal coliform - 110 MPN/100 ml.

Manhole (N10A-9A) - 90 Norfolk Street
This manhole is located on Norfolk Street in front of #90 Norfolk. Two (2) pipes enter the manhole. BETA sampled from the twelve (12) inch clay pipe entering Norfolk Street from an easement. For the approximate location, refer to the attached map.

Dry Weather Sampling
The manhole flow was sampled on October 18, 1996 at 1:50 p.m. A flow of approximately two (2) gpm was discharging through this pipe. BETA visually observed the flow to increase while sampling (a possible indication of flushing). The laboratory results revealed the following:

- chloride - 160 mg/l
- fluoride - ND
- fecal coliform - 300 MPN/100 ml.

Manhole (N10A-9A) - 302 Warren Street
This manhole is located on Warren Street in front #302 Warren. One 24 inch clay pipe, one 12 inch clay pipe, and one 12 inch RCP enters the manhole and one 24 inch RCP exits the manhole. BETA sampled from the 12 inch clay pipe. For the approximate location, refer to the attached map.

Dry Weather Sampling
The manhole was sampled on October 18, 1996 at 1:00 p.m. A flow of approximately four (4) gpm was discharging through this pipe. Clear water was observed flowing through the pipes. The laboratory results revealed the following:

- chloride - 120 mg/l
- fluoride - ND
- fecal coliform - 40 MPN/100 ml.

Sub-area - N10A-9B

This sampling point is located east of Webster Street. The eight (8) inch asbestos concrete pipe is a former sub-drain for the sewer line (see Fig. 3.44).

Dry Weather Sampling #1

The sampling was conducted on November 7, 1996 at 10:30 a.m. There was a flow of five (5) gpm discharging from the pipe. Brown organic flocculent was noticed at the outfall which was not visually consistent with iron bacteria. The laboratory results revealed the following:

- chloride - 93 mg/l
- fluoride - ND
- pH - 5.98
- conductivity - 420 umhos
- fecal coliform - 24,000 MPN/100 ml.

Dry Weather Sampling #2

A duplicate sample was taken at the outfall on November 7, 1996 at 10:30 a.m. The laboratory results revealed the following:

- fecal coliform - 160,000 MPN/100 ml.

Sub-area - N10A-10

This sampling point is located northwest of Sutton Road behind a residence. The twelve (12) inch RCP discharges to the Alder Brook approximately 2100 feet from the Charles River (see Figure 3.45). The length of pipe in this sub-area is approximately 780 linear feet.

Dry Weather Sampling

The sampling was conducted on October 8, 1996 at 2:22 p.m. There was stagnant water in the pipe. The pipe was partially submerged. The laboratory results revealed the following:

- pH - 6.97
- conductivity - 440 umhos
- fecal coliform - 3,000 MPN/100 ml.

NOTE: Elevated coliform was likely due to upstream discharge of 10A-9A and 10A-9B.

Sub-area - N10A-11

This sampling point is located east of Dedham Avenue. The 42 inch RCP flows into Alder Brook approximately 2,600 feet from the Charles River (see Figure 3.46). The length of pipe in this sub-area is approximately 24,960 linear feet.

Dry Weather Sampling #1
The sampling was conducted on October 2, 1996 at 3:20 p.m. There was a flow of approximately ten (10) gpm discharging from the pipe. No floatables or discoloration was noticed in the outfall or discharging pipe. The laboratory results revealed the following:

- chloride - 75 mg/l
- fluoride - ND
- fecal coliform - 80 MPN/100 ml.

Dry Weather Sampling #2
The sampling was conducted on November 14, 1996 at 7:30 a.m. There was a flow of approximately twenty (20) gpm discharging from the pipe. No floatables or discoloration was noticed in the outfall or discharging pipe. The laboratory results revealed the following:

- chloride - 71 mg/l
- fluoride - 0.24 mg/l
- fecal coliform - ND

Sub-area - N10A-11A
This sampling point is located east of Dedham Avenue. The twelve (12) inch RCP discharges to Alder Brook approximately 2,500 feet from the Charles River (see Figure 3.47).

Dry Weather Sampling #1
The sampling was conducted on October 8, 1996 at 12:30 p.m. There was a flow of approximately three (3) gpm discharging from the pipe. Iron bacteria flocculent was abundant at the outfall. No discoloration of the water was noticed in the flow from the outfall. The laboratory results revealed the following:

- chloride - 38 mg/l
- fluoride - ND
- pH - 6.50
- conductivity - 390 umhos
- fecal coliform - 500 MPN/100 ml.

Dry Weather Sampling #2
The sampling was conducted on November 15, 1996 at 7:30 a.m. There was a flow of approximately two (2) gpm discharging from the pipe. Abundant iron bacteria was noticed at the outfall and in the pipe. The laboratory results revealed the following:

- fecal coliform - ND

BETA sampled the orange flocculent (iron bacteria) to determine if the material was possibly a petroleum by-product or actually an iron compound. The sample was taken on October 17, 1996 at 1:30 p.m.. The laboratory results revealed the following:

- total hydrocarbons - ND (detection limit of 1.0 mg/l)
- total iron - 130 mg/l
- iron bacteria test: Positive

Sub-area - N10A-12

This sampling point is located east of Canterbury Lane at the end of the cul-de-sac. The twelve (12) inch RCP discharges into the Alder Brook approximately 2,300 feet from the Charles River (see Figure 3.48). The length of pipe in this sub-area is approximately 210 linear feet.

Dry Weather Sampling

The sampling was conducted on October 8, 1996 at 2:50 p.m. There was a flow of less than 0.5 gpm discharging from the pipe. An orange flocculent was observed in the pipe and at the outfall. The laboratory results revealed the following:

- chloride - 74 mg/l
- fluoride - ND
- pH - 7.15
- conductivity - 390 umhos
- fecal coliform - 23 MPN/100 ml.

Sub-area - N10A-13

This sampling point is located in the middle of a culvert below the street. BETA observed the discharge point by pulling a manhole cover within George Aggot Road (see Figure 3.49).

Dry Weather Sampling

BETA observed no flow from this discharge point on October 8, 1996 at 2:15 p.m. However, when BETA pulled the manhole cover during the dry weather sampling, an abundance of animal feces were within the invert of the pipe.

Sub-area - N10A-14

This sampling point is located west of Great Plain Avenue. The 24 inch RCP discharges to a stream that fed the Needham Reservoir (see Figure 3.50). The length of pipe in this sub-area is approximately 180 linear feet.

Dry Weather Sampling

BETA observed no flow from this discharge point on October 8, 1996 at 2:55 p.m.

Sub-area - N10A-15

This sampling point is located west of Great Plain Avenue. The sampling point was an old brick structure that had water flowing out of the ground (see Figure 3.51). Please refer to the attached photograph log.

Dry Weather Sampling
The sampling was conducted on October 8, 1996 at 2:10 p.m. There was a flow of approximately 0.2 gpm discharging from the structure. The water appeared to be groundwater seeping form the ground. The laboratory results revealed the following:

- chloride - 120 mg/l
- fluoride - ND
- pH - 6.70
- conductivity - 550 umhos
- fecal coliform - 300 MPN/100 ml.

Sub-area - N10A-16
This sampling point is located southwest of Great Plain Avenue. The 21 inch pipe flows into a pond on the Needham Golf Course (see Figure 3.52). The length of pipe in this sub-area is approximately 3,300 linear feet.

Dry Weather Sampling
The sampling was conducted on November 5, 1996 at 11:30 a.m. There was a flow of approximately fifteen (15) gpm discharging from the pipe. No floatables or discoloration was noted in the outfall or discharging pipe. Laboratory analysis revealed the following:

- chloride - 94 mg/l
- fluoride - ND
- pH - 6.23
- conductivity - 450 umhos
- fecal coliform - 500 MPN/100 ml.

Sub-area - N10A-16A
This sampling point is located southwest of Great Plain Avenue, adjacent to N10A-16 (see Figure 3.53). The 15 inch pipe flows into a pond on the Needham Golf Course.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 11:30 a.m.

Sub-area - N10A-17
This sampling point is located northwest of Livingston Circle. The twelve (12) inch RCP pipe discharges into a backyard which eventual flows into the Needham Reservoir (see Figure 3.54). The length of pipe in this sub-area is approximately 180 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 1:10 p.m.

Sub-area - N10A-18
This sampling point is located southwest of South Street. The twelve (12) inch PVC pipe discharges into an adjacent woodlands which eventually discharges to the Charles River (see Figure 3.55). The length of pipe in this sub-area is approximately 210 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 1:20 p.m.

Sub-area - N10A-19
This sampling point is located southwest of Great Plain Avenue. The fifteen (15) inch PVC pipe discharges into a woodlands which eventual flows into the Needham Reservoir (see Figure 3.56). The length of pipe in this sub-area is approximately 120 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 1:25 p.m.

Sub-area - N10A-20
This sampling point is located south Washington Avenue. The length of pipe in this sub-area is approximately 300 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 1:45 p.m.

Sub-area - N10A-21
This sampling point is located at the intersection of South Street and Dedham Avenue. The length of pipe in this sub-area is approximately 2,400 linear feet.

Dry Weather Sampling
BETA observed no flow from this discharge point on November 5, 1996 at 1:23 p.m.

Sub-area - N10A-22
This sampling point is located in the Department of Public Works parking lot. The twelve (12) inch PVC pipe discharges into a stream that discharges to the Charles River (see Figure 3.57).

Dry Weather Sampling
The sampling was conducted on November 6, 1996 at 10:00 a.m. There was a flow of approximately 0.5 gpm discharging from the pipe. No floatables or discoloration was noticed in the outfall or discharging pipe. Iron bacteria flocculent was observed on the bottom of the pipe. The laboratory results revealed the following:

- chloride - 410 mg/l
- fluoride - 0.23 mg/l
- pH - 6.55
- conductivity - 410 umhos
- fecal coliform - ND MPN/100 ml.

Sub-area - N10A-23
This sampling point is located south of Dedham Avenue. The twelve (12) inch RCP pipe discharges into the Charles River (see Figure 3.58).

Dry Weather Sampling

The sampling was conducted from the submerged pipe on November 6, 1996 at 2:00 p.m. There was a stagnant water inside the pipe. The laboratory results revealed the following:

- fecal coliform - 130 MPN/100 ml.

Stream Sampling

The streams surrounding the Needham Reservoir (refer to Figure 3.28) were sampled to determine if the reservoir was providing a sufficient holding time for the fecal coliform to die off. The laboratory results included the following:

- Stream #2 (downstream of Needham Reservoir and N10A-9A) had fecal coliform of 130 MPN/100 ml.
- Stream #3 (downstream of Needham Reservoir) had fecal coliform of 80 MPN/100 ml.
- Stream #4 (downstream of N10A-9A) had fecal coliform of 500 MPN/100 ml.
- Stream #5 (downstream of N10A-5) had fecal coliform of 220 MPN/100 ml.
- Stream #6 (downstream of N10A-7) had fecal coliform of 1,300 MPN/100 ml.

Table 3.5 summarizes the dry weather sampling locations and results.

Table 3.5 Summary of Dry Weather Sampling for N10A

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N10A					
N10A-1	West of Green Street	24-RCP	Dry	10/8/96	13:20	NA	NA	**NA**
N10A-1A	West of Green Street	12-RCP	Dry	10/8/96	13:20	NA	NA	**NA**
N10A-1B	West of Green Street	12-RCP	2	10/8/96	13:20	130	ND	**3,000**
N10A-2	South of Great Plain Avenue	NS	Dry	11/5/96	13:28	NA	NA	**NA**
N10A-3	DPW Parking Lot	12-RCP	Dry	10/8/96	13:30	NA	NA	**NA**
N10A-4	Dedham Avenue	12-RCP	Dry	11/5/96	13:35	NA	NA	**NA**
N10A-5	West of Needham Athletic Fields	48-RCP	10	10/8/96	12:48	78	ND	**80**
N10A-5	West of Needham Athletic Fields	48-RCP	15	11/14/96	7:25	86	ND	**60**
N10A-5A	Dedham Golf Course	36-RCP	3	10/8/96	12:40	120	ND	**170**
N10A-6	Northwest of Harris Avenue	24-RCP	Dry	10/8/96	12:55	NA	NA	**NA**
N10A-7	South of Ivy Road	48-RCP	15	10/8/96	13:40	130	ND	**900**
N10A-7	South of Ivy Road	48-RCP	15	10/8/96	14:40	120	ND	**90,000**
N10A-7	South of Ivy Road	48-RCP	NS	10/17/96	14:10	99	ND	**5,000**
N10A-7	South of Ivy Road	48-RCP	20	10/18/96	14:20	110	ND	**1,100**
N10A-7	South of Ivy Road	48-RCP	NS	11/7/96	9:30	NS	NS	**1,700**
N10A-7-Ivy Road	Ivy Road	12-RCP	0.5	10/18/96	14:35	NS	NS	**9,000**
N10A-7-Ivy Road	Ivy Road	12-RCP	0.5	11/5/96	12:00	NS	NS	**1,900**
N10A-7-C1	South of Wilshire Park	42-RCP	NS	10/18/96	12:15	69	ND	**1,700**
N10A-7-C2	Great Plain Avenue	36-RCP	NS	10/18/96	12:20	NS	NS	**700**
N10A-7-C3	Great Plain Avenue	24-RCP	5	11/6/96	11:30	57	ND	**300**

N10A-7-C4	Great Plain Avenue	42-RCP	25	11/6/96	11:30	86	ND	170
N10A-7-C5	Great Plain Avenue	36-RCP	5	11/6/96	11:30	73	ND	2,200
N10A-7-Beaufort	Beaufort Street	NS	DRY	11/18/96	15:00	NA	NA	NA
N10A-7-Ellicot	Ellicot Street	18-RCP	20	11/6/96	10:20	28	0.21	1,700
N10A-7-Greenwood	Greenwood Avenue	NS	DRY	11/6/96	9:40	NA	NA	NA
N10A-7-Wash/GT. Plain	Corner of Washington and Great Plain Avenue	36-RCP	NS	11/6/96	11:15	NS	NS	1,400
N10A-7-Washington	Washington Avenue	24-RCP	5	11/6/96	10:20	53	ND	2,400
N10A-7-Washington #2	Washington Avenue	NS	DRY	11/6/96	10:30	NA	NA	NA
N10A-7-Seargent St.	Sergeant Street	24-RCP	NS	10/18/96	15:15	77	ND	40
N10A-7-Woodlawn	Woodlawn Avenue	NS	DRY	11/6/96	9:30	NA	NA	NA
N10A-8	Southwest of Canterbury Lane	12-RCP	1	10/8/96	14:45	75	ND	80
N10A-9	East of Webster Street	36-RCP	3	10/2/96	15:00	50	ND	110
N10A-9	East of Webster Street	36-RCP	NS	10/17/96	13:50	NS	NS	1,600
N10A-9	East of Webster Street	36-RCP	NS	11/7/96	9:40	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	10	10/2/96	15:00	120	ND	160,000
N10A-9A	East of Webster Street	24-RCP	NS	10/11/96	14:20	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	NS	10/11/96	14:30	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	5	10/16/96	13:00	NS	NS	16,000
N10A-9A	East of Webster Street	24-RCP	NS	10/17/96	13:50	NS	NS	9,000
N10A-9A	East of Webster Street	24-RCP	NS	10/18/96	12:00	130	ND	3,000
N10A-9A	East of Webster Street	24-RCP	NS	11/5/96	14:30	NS	NS	9,000
N10A-9A	East of Webster Street	24-RCP	NS	11/7/96	9:40	NS	NS	3,000
N10A-9A-C1	Webster Street	24-RCP	NS	10/18/96	12:15	130	ND	5,000
N10A-9A-C2	Webster Street	15-CLAY	NS	10/18/96	12:20	NS	NS	3,000
N10A-9A-C2	Webster Street	15-CLAY	NS	11/7/96	11:00	57	ND	230
N10A-9A-C3	Webster Street	14-RCP	NS	10/18/96	12:30	NS	NS	16,000
N10A-9A-C4	Webster Street	NS	DRY	10/18/96	11:30	NA	NA	NA
N10A-9A-Corner of Howland and Pleasant	Corner of Howland and Pleasant	NS	NS	10/17/96	15:00	210	ND	110
N10A-9A-90 Norfolk St.	90 Norfolk Street	12-CLAY	2	10/18/96	13:50	160	ND	300
N10A-9A-302 Warren St.	302 Warren Street	12-CLAY	4	10/18/96	13:00	120	ND	40
N10A-9B	Northeast of Webster Street	8-AC	5	11/7/96	10:30	93	ND	24,000
N10A-9B	Northeast of Webster Street	8-AC	5	11/7/96	10:30	NS	NS	160,000
N10A-10	Northwest of Sutton Road	12-RCP	NS	10/8/96	14:22	NS	NS	3,000
N10A-11	East of Dedham Avenue	42-RCP	10	10/2/96	15:20	75	ND	80
N10A-11	East of Dedham Avenue	42-RCP	20	11/14/96	7:30	71	0.24	ND
N10A-11A	East of Dedham Avenue	12-RCP	3	10/8/96	12:30	38	ND	500
N10A-11A	East of Dedham Avenue	12-RCP	2	11/15/96	7:30	NS	NS	ND

N10A-12	East of Canterbury Lane	12-RCP	0.5	10/8/96	14:50	74	ND	**23**
N10A-13	George Abbot Lane	NS	Dry	10/8/96	14:15	NA	NA	**NA**
N10A-14	West of Great Plain Avenue	24-RCP	Dry	10/8/96	14:55	NA	NA	**NA**
N10A-15	West of Great Plain Avenue	Brick	0.5	10/8/96	14:10	120	ND	**300**
N10A-16	Needham Golf Course	21	15	11/5/96	11:30	94	ND	**500**
N10A-16A	Needham Golf Course	15	Dry	11/5/96	11:30	NA	NA	**NA**
N10A-17	Northwest of Livingston Circle	12-RCP	Dry	11/5/96	13:10	NA	NA	**NA**
N10A-18	Southwest of South Street	12-PVC	Dry	11/5/96	13:20	NA	NA	**NA**
N10A-19	Southwest of Great Plain Avenue	15-PVC	Dry	11/5/96	13:25	NA	NA	**NA**
N10A-20	South of Washington Avenue	12-RCP	Dry	11/5/96	13:45	NA	NA	**NA**
N10A-21	South St. and Dedham Avenue	NS	Dry	11/5/96	13:23	NA	NA	**NA**
N10A-22	DPW Parking Lot	12-PVC	0.5	11/5/96	10:00	410	0.23	**ND**
N10A-23	South of Dedham Avenue	12-RCP	NS	11/6/96	14:00	NS	NS	**130**
N10A-Stream #1	Southwest of Dedham Avenue	STREAM	NS	11/5/96	13:50	NS	NS	**20**
N10A-Stream #2	Southwest of Dedham Avenue	STREAM	NS	11/5/96	14:10	NS	NS	**130**
N10A-Stream #3	West of Needham Reservoir	STREAM	NS	11/5/96	14:10	NS	NS	**80**
N10A-Stream #4	Southwest of Dedham Avenue	STREAM	NS	11/5/96	14:15	NS	NS	**500**
N10A-Stream #5	Northwest of Needham Reservoir	STREAM	NS	11/5/96	14:30	NS	NS	**220**
N10A-Stream #6	North of Needham Reservoir	STREAM	NS	11/5/96	14:35	NS	NS	**1,300**

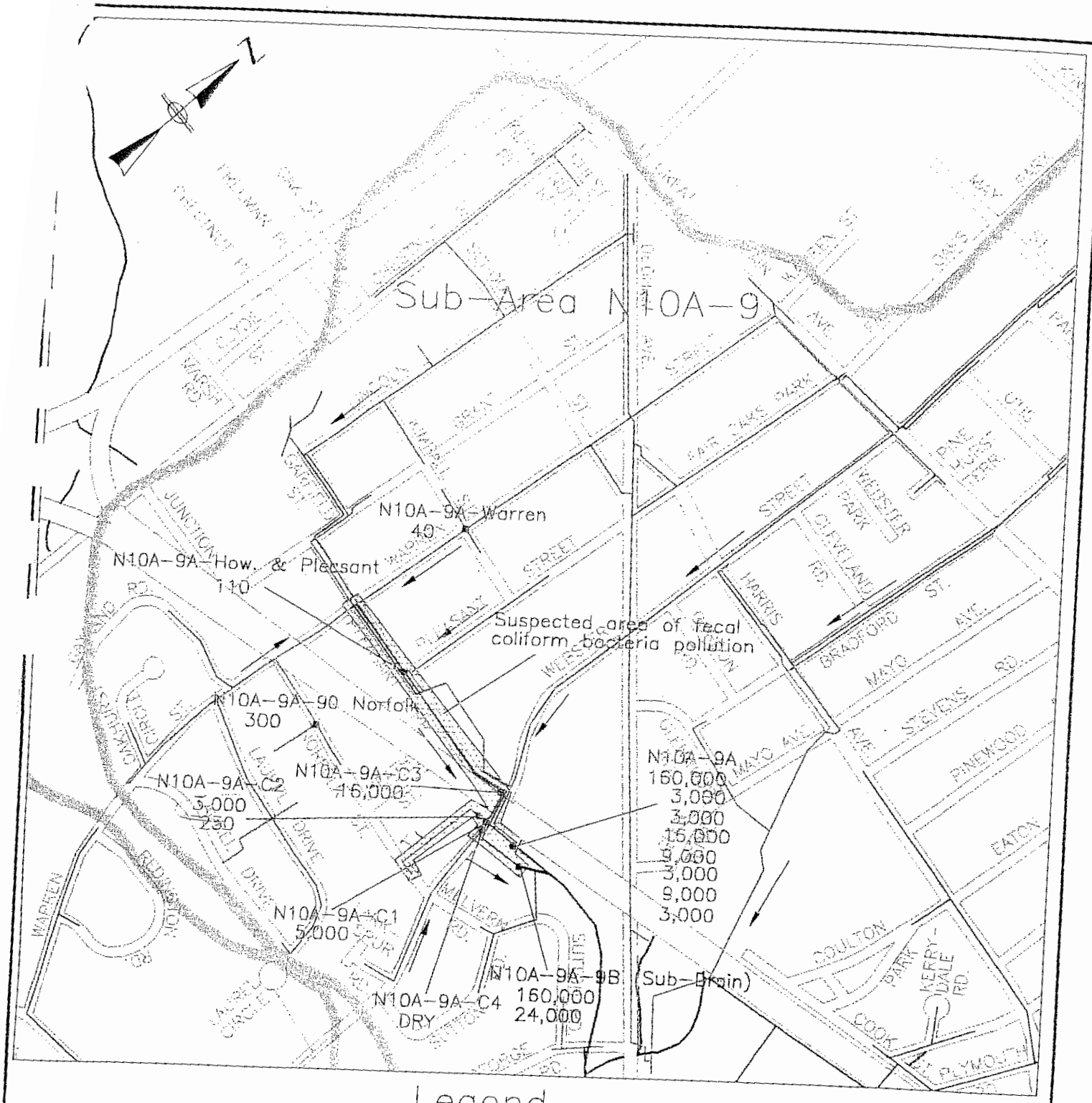
Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled

Legend

- N10A-1 – Sub-area Discharge/Sampling Location
- N10A – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material

- Water
- Town Line
- Sub-Area Boundary
- Stormwater Flow Direction
- Zoning Boundary

Not to Scale	Figure 3.27 – Area Layout Drainage Area – N10A Needham Stormwater Management	BETA ENGINEERING, INC. Engineers/Planners



Legend

N10A-7 – Sub-area Discharge
N10A – Discharge Point
300 – Fecal Coliform Bacteria
• – Sampling Location

— – Water
— – Town Line
— – Sub-Area Boundary
← – Stormwater Flow Direction

Not to Scale

Figure 3.41 – Sampling Results
Sub-Area – N10A-9
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-9

Date: 10/17/96 Time: 1:50 p.m.

Location: East of Webster St. Needham, MA

Weather: Dry

ANALYTICAL DATA

pH:	NS		Fluoride:	NS	mg/l
Conductivity:	NS	uohms	Fecal Coliform Bacteria:	1,600	MPN/100ml
Chloride:	NS	mg/l	Temperature:	NS	°c

SAMPLING DATA

Pipe Size:	36	in.	Flow Estimate:	3	gpm
Pipe Material/Condition:	RCP/Good		Last Precipitation:	10/9/96	
			Clarity of Flow/Turbidity:	Clear	

Comments: No organic material was noted in the pipe.

BETA Engineering, Inc.
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File name: N10A-9.pm6

Figure 3.42

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-9A

Date: 10/2/96 Time: 3:00 p.m.

Weather: Dry

Location: East of Webster St. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS uohms

Chloride: 120 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 160,000 MPN/100ml

Temperature: 11.5 °c

SAMPLING DATA

Pipe Size: 24 in.

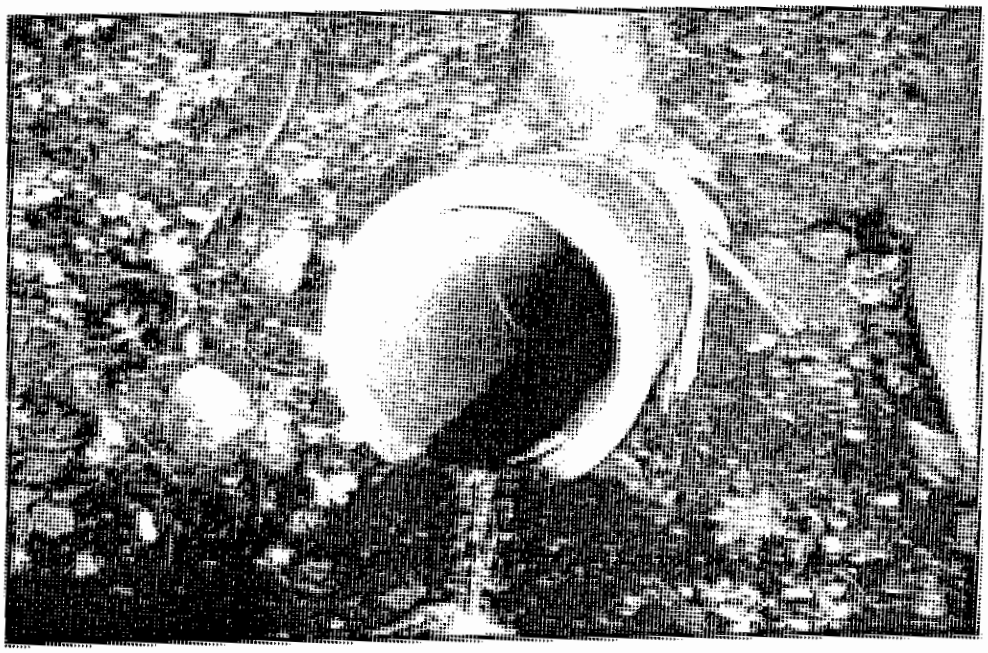
Pipe Material/Condition: RCP/Good

Flow Estimate: 10 gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: Clear

Comments: A slime layer was noticed on the bottom of the pipe.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N10A-9A.pm6

Figure 3.43

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-9B

Date: 11/7/96 Time: 10:30 a.m.

Weather: Dry

Location: East of Webster St. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS umhos

Chloride: 93 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 24,000 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 8 in

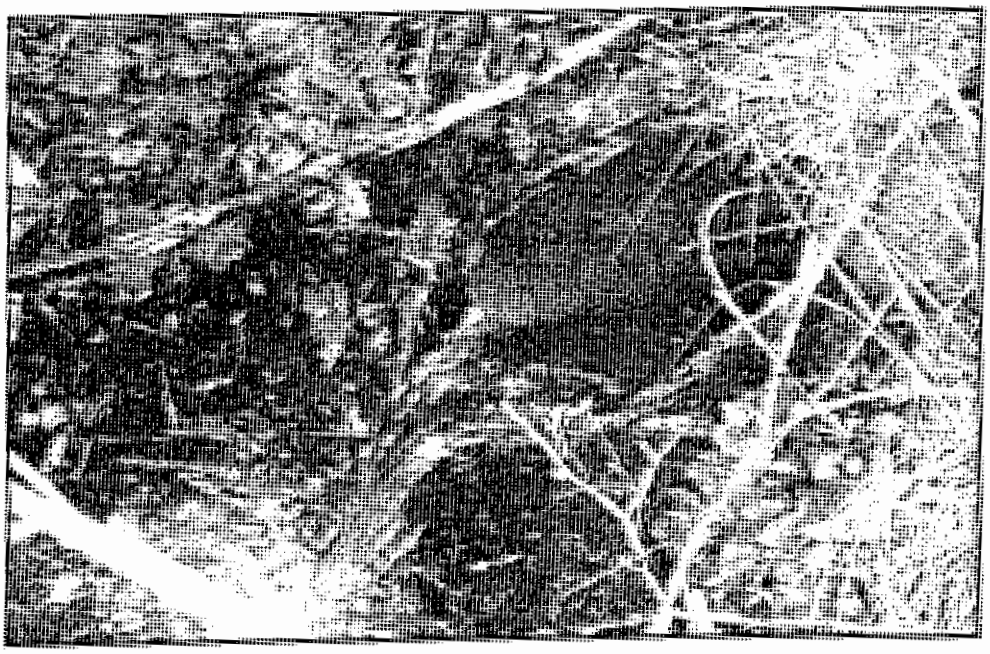
Pipe Material/Condition: Asbestos Concrete/ Good

Flow Estimate: 5 gpm

Last Precipitation: 11/7/96

Clarity of Flow/Turbidity: Clear

Comments: Brown flocculent was observed at the outfall.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N10A-9A.pm6

Figure 3.44

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-10

Date: 10/8/96 Time: 2:22 p.m.

Weather: Dry

Location: Northwest of Sutton Rd. Needham, MA

ANALYTICAL DATA

pH: 6.97

Conductivity: 440 uohms

Chloride: NS mg/l

Fluoride: NS mg/l

Fecal Coliform Bacteria: 3,000 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 12 in.

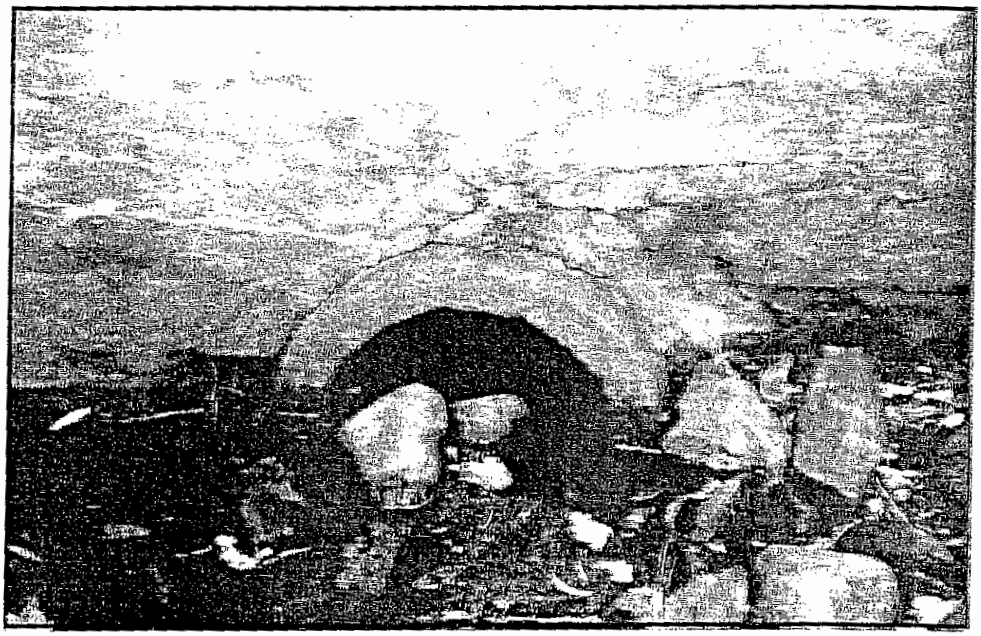
Pipe Material/Condition: RCP/Good

Flow Estimate: Stagnant gpm

Last Precipitation: 10/2/96

Clarity of Flow/Turbidity: Clear

Comments: No floatables were observed at the outfall. Flow partially blocked with debris.



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File name: N10A-10.pm6

Figure 3.45

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-11

Date: 10/2/96 Time: 3:20 p.m.

Weather: Dry

Location: East of Dedham Ave. Needham, MA

ANALYTICAL DATA

pH:	NS		Fluoride	ND	mg/l
Conductivity:	NS	uohm	Fecal Coliform Bacteria	80	MPN/100ml
Chloride:	75	mg/l	Temperature	12.4	°c

SAMPLING DATA

Pipe Size:	42	in	Flow Estimate	10	gpm
Pipe Material/Condition	RCP/Good		Last Precipitation:	9/29/96	
			Clarity of Flow/Turbidity:	Clear	

Comments: A slime layer was observed on the bottom of the discharge pipe.

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File name: N10A-11.pm6

Figure 3.46

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-11A

Date: 10/8/96 Time: 12:30 p.m.

Weather: Dry

Location: East of Dedham Avenue
Needham, MA

ANALYTICAL DATA

pH: 6.50

Conductivity: 390 uohm

Chloride: 38 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 500 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 12 in

Pipe Material/Condition: RCP/Fair

Flow Estimate: 3 gpm

Last Precipitation: 10/2/96

Color of Flow/Turbidity: Clear

Comments: **Iron bacteria noticed on the inside of the pipe and at the outfall.**

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File name: N10A-11A.pm6

Figure 3.47

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-12

Date: 10/8/96 Time: 2:50 p.m.

Weather: Dry

Location: East of Canterbury Lane
Needham, MA

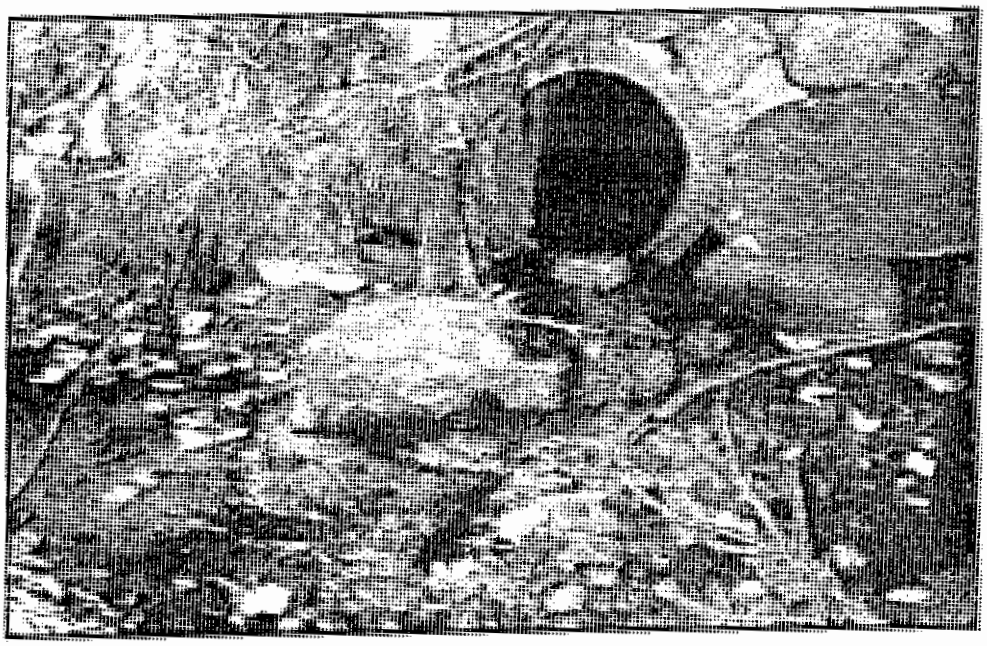
ANALYTICAL DATA

pH:	7.15		Fluoride	ND	mg/l
Conductivity	390	µmhos	Fecal Coliform Bacteria	23	MPN/100ml
Chloride:	74	mg/l	Temperature	11.9	°c

SAMPLING DATA

Pipe Size:	12	in	Flow Estimate:	<0.5	gpm
Pipe Material/Condition:	RCP/Good		Last Precipitation:	10/2/96	
			Clarity of Flow/Turbidity:	Clear	

Comments: Iron bacteria was located in the pipe and on the outfall rocks.



BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N10A-12.pm6

Figure 3.48

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-13

Date: 10/8/96 Time 2:15 p.m.

Weather: Dry

Location: George Aggot Road
Needham, MA

ANALYTICAL DATA

pH: NA

Fluoride: NA mg/l

Conductivity: NA uohms

Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l

Temperature: NA °c

SAMPLING DATA

Pipe Size: NS in

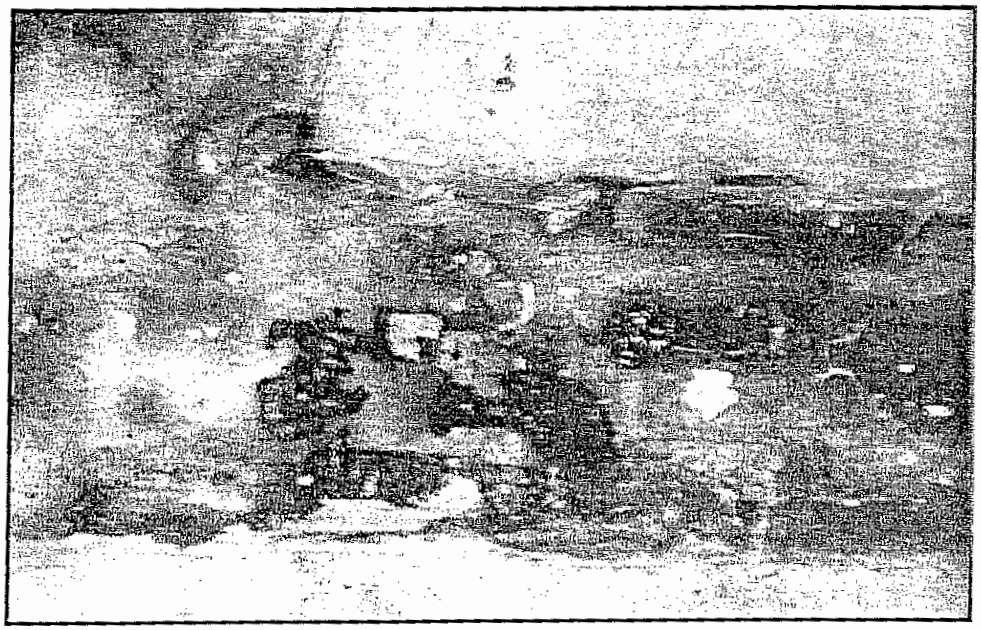
Flow Estimate: Dry gpm

Pipe Material/Condition: RCP/Good

Last Precipitation: 10/2/96

Clarity of Flow/Turbidity: NA

Comments: Animal feces located in a manhole on George Aggot Road.



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Scientists/Engineers/Planners

File name: N10A-14.pm6

Figure 3.49

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-14

Date: 10/8/96 Time: 2:55 p.m.

Weather: Dry

Location: West of Great Plain Avenue
Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA mohms

Chloride: NA mg/l

Fluoride: NA _____ mg/l

Fecal Coliform Bacteria NA _____ MPN/100ml

Temperature: NA _____ °c

SAMPLING DATA

Pipe Size: 24 in

Pipe Material/Condition: RCP/Good

Flow Estimate: Dry _____ gpm

Last Precipitation: 10/2/96

Clarity of Flow/Turbidity: NA

Comments: N10A-14 is located on the right hand side of the picture below, adjacent to N10A-6.

BETA Engineering, Inc.

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File name: N10A-14.pm6

Figure 3.50

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-15

Date: 10/8/96 Time: 2:10 p.m.

Weather: Dry

Location: West of Great Plain Ave. Needham, MA

ANALYTICAL DATA

pH: 6.70

Conductivity: 550 uohms

Chloride: 120 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 300 MPN/100ml

Temperature: 12.1 °c

SAMPLING DATA

Pipe Size: NA in

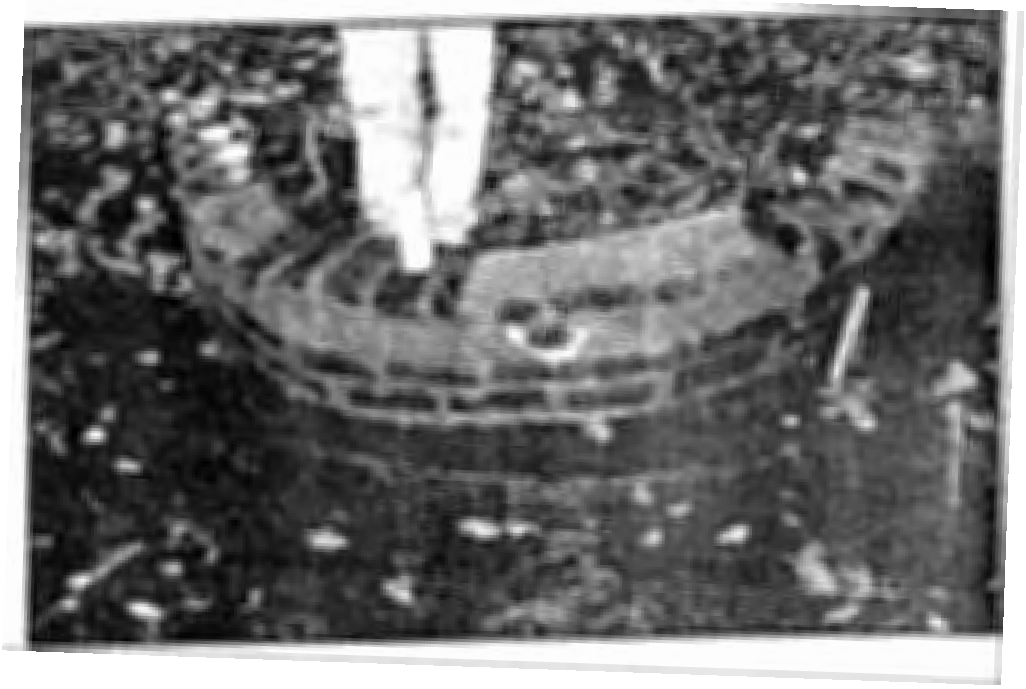
Pipe Material/Condition: NA

Flow Estimate: <0.5 gpm

Last Precipitation: 10/2/96

Clarity of Flow/Turbidity: Clear

Comments: The water appears to be groundwater flowing out of the ground.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N10A-15.pm6

Figure 3.51

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-16

Date: 11/5/96

Time: 11:30 a.m.

Weather: Dry

Location: Southwest of Great Plain Ave. Needham, MA

ANALYTICAL DATA

pH: 6.23

Fluoride: ND mg/l

Conductivity: 450 uohms

Fecal Coliform Bacteria: 500 MPN/100ml

Chloride: 94 mg/l

Temperature: 13.2 °c

SAMPLING DATA

Pipe Size: 21 in.

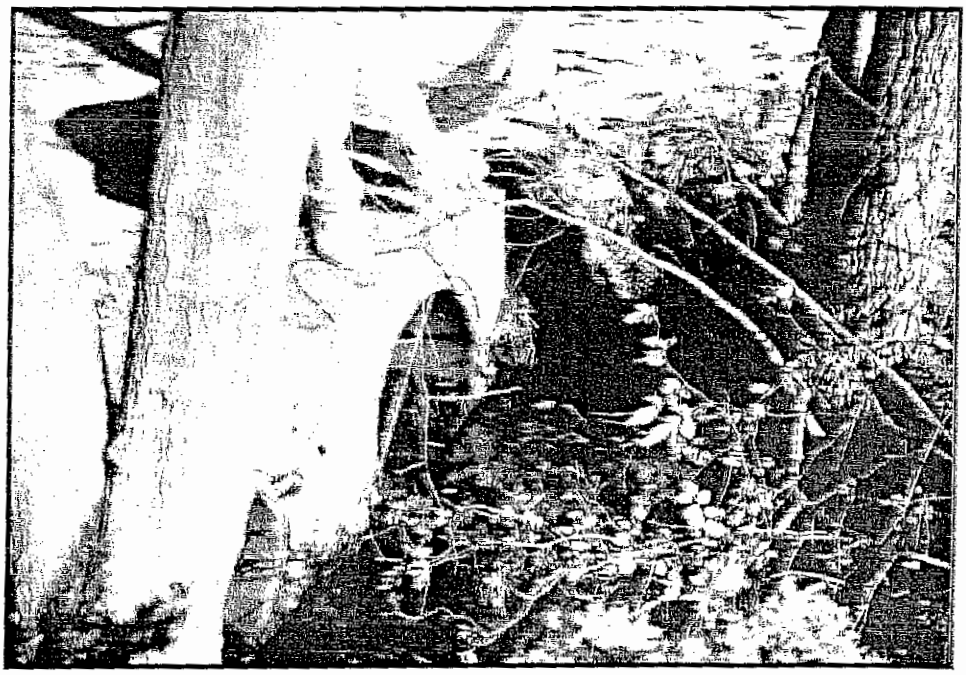
Flow Estimate: 15 gpm

Pipe Material/Condition: Clay/Good

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: Clear

Comments: No floatables or discoloration was noticed in the outfall or discharging pipe.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N10A-16.pm6

Figure 3.52

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-16A

Date: 11/5/96

Time: 11:30 a.m.

Location: Southwest of Great Plain Ave. Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: NA

Fluoride: NA mg/l

Conductivity: NA uohms

Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l

Temperature: NA °c

SAMPLING DATA

Pipe Size: 15 in.

Flow Estimate: Dry gpm

Pipe Material/Condition: Clay/Good

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: NA

Comments: No floatables were observed at the outfall.

BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N10A-16A.pm6

Figure 3.53

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-17

Date: 11/5/96 Time: 1:10 p.m.

Weather: Dry

Location: Northwest of Livingston Circle
Needham, MA

ANALYTICAL DATA

pH: NA

Fluoride: NA mg/l

Conductivity: NA mohms

Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in

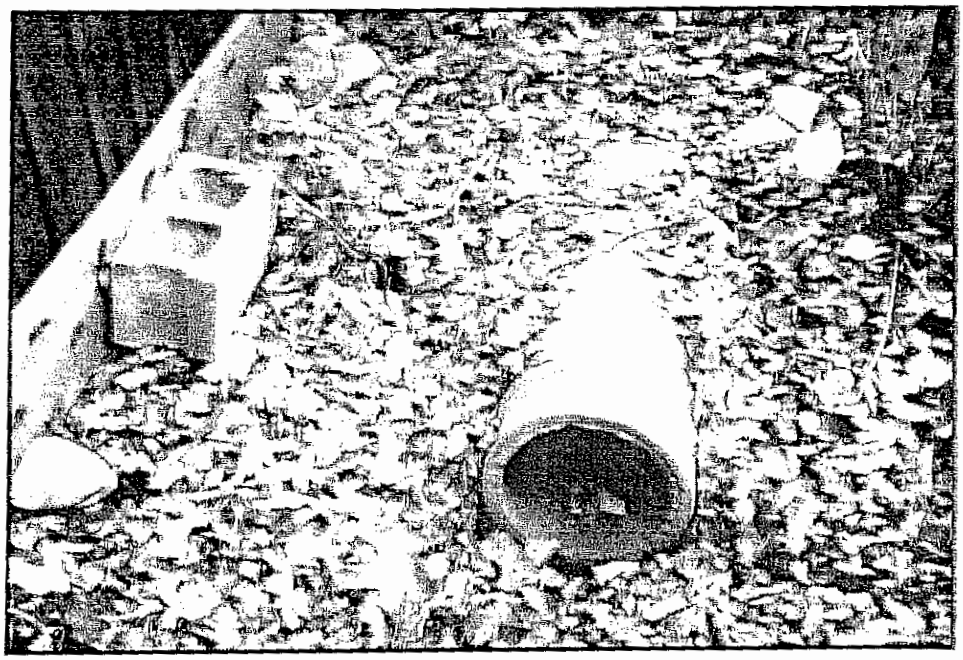
Flow Estimate: Dry gpm

Pipe Material/Condition: RCP/Good

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: NA

Comments: No evidence of recent flow.



BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N10A-17.pm6

Figure 3.54

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-18

Date: 11/5/96 Time: 1:20 p.m.

Weather: Dry

Location: Southwest of South Street
Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA mohms

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in

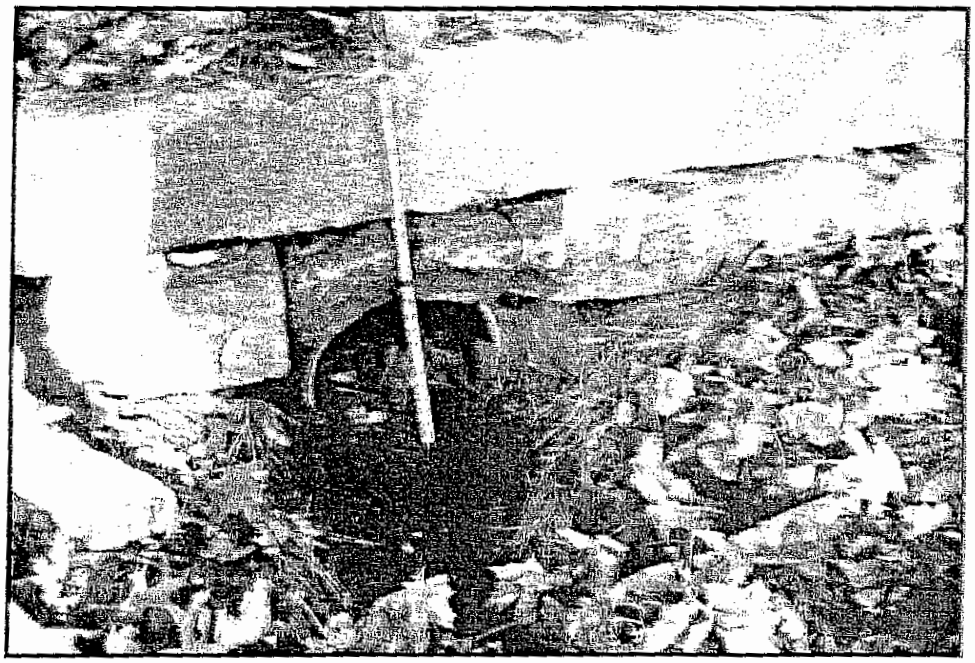
Pipe Material/Condition: PVC/Good

Flow Estimate: Dry gpm

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: NA

Comments: No evidence of recent flow.



BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N10A-18.pm6

Figure 3.55

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-19

Date: 11/5/96 Time: 1:25 p.m.

Weather: Dry

Location: Southwest of Great Plain Ave. Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA mohms

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 15 in

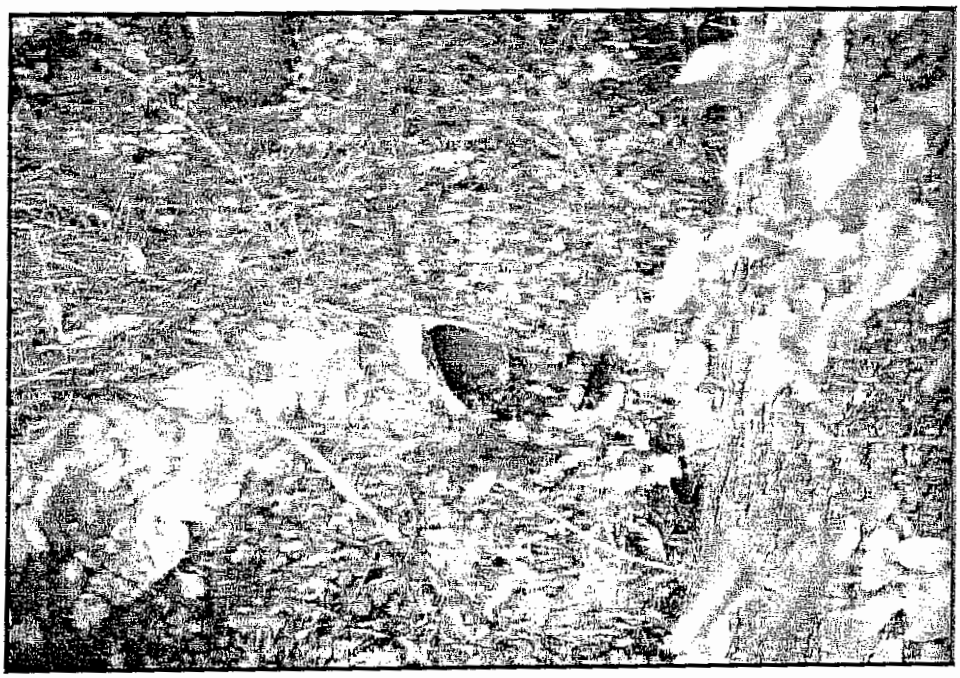
Pipe Material/Condition: PVC/Good

Flow Estimate: Dry gpm

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: NA

Comments: No evidence of recent flow.



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File name: N10A-19.pm6

Figure 3.56

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-22

Date: 11/5/96 Time: 10:00 a.m.

Weather: Dry

Location: DPW Parking Lot, Needham, MA

ANALYTICAL DATA

pH: 6.55

Conductivity: 410 mohm

Chloride: 410 mg/l

Fluoride: 0.23 mg/l

Fecal Coliform Bacteria: ND MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 12 in

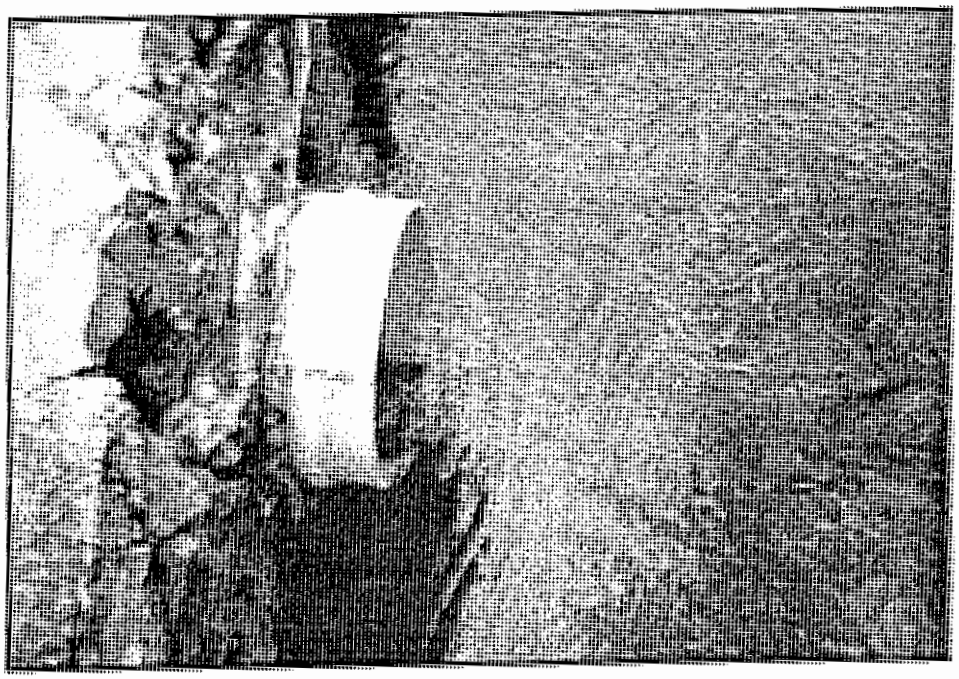
Pipe Material/Condition: PVC/Good

Flow Estimate: 0.5 gpm

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: Clear

Comments: Some iron bacteria was noticed on the bottom of the pipe.



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File name: N10A-22.pm6

Figure 3.57

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N10A

Discharge Point: N10A-23

Date: 11/6/96 Time: 2:00 p.m.

Weather: Dry

Location: South of Dedham Ave. Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS mohm

Chloride: NS mg/l

Fluoride: NS mg/l

Fecal Coliform Bacteria: 130 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 12 in

Pipe Material/Condition: RCP/Poor

Flow Estimate: Stagnant gpm

Last Precipitation: 10/30/96

Clarity of Flow/Turbidity: Clear

Comments: Sample was taken from inside the submerged pipe.

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Scientists/Engineers/Planners

File name: N10A-23.pm6

Figure 3.58

Drainage Area - N11

This drainage area is approximately 70 acres in size. The area is characterized by residential and commercial land uses. There is one (1) drainage discharge point to the Charles River. It is located to the east of South Street (see Figures 3.59 and 3.60).

Characteristics which could effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 7,200 linear feet
- drainage systems within area N11 include 72 catch basins
- all streets within the sub-area have sanitary sewers
- St. Sebastian's School has a major septic system, handling a flow from 320 students, and an additional 40 staff, located adjacent to the Charles River
- geese are problematic in the lower recreational fields of the school
- drainage from this pipe flows to a wetland area located to the east of the N-11 discharge.
- the discharge of N-11 is approximately 20 feet from the Charles River. This allows for some VOC volatilization, and settlement of oil, grease, total solids, total suspended solids, and associated metals.

Sub-area N11-1

This discharge point is located south of South Street. The sampling point was taken from a catch basin located down a steep embankment in a residential backyard (see Figure 3.61). The inflow pipe of the manhole had no flow, but BETA observed what appeared to be visually clear water infiltrating into the manhole from holes in the bricks. The manholes concrete bricks were deteriorated, indicating the presence of acidic groundwater. No flow was discharging from the manhole to the Charles River (N11).

Dry Weather Sampling

A sample was taken on October 2, 1996 at 2:45 p.m. from this location. BETA sampled the water entering through the bricks. The laboratory results revealed the following:

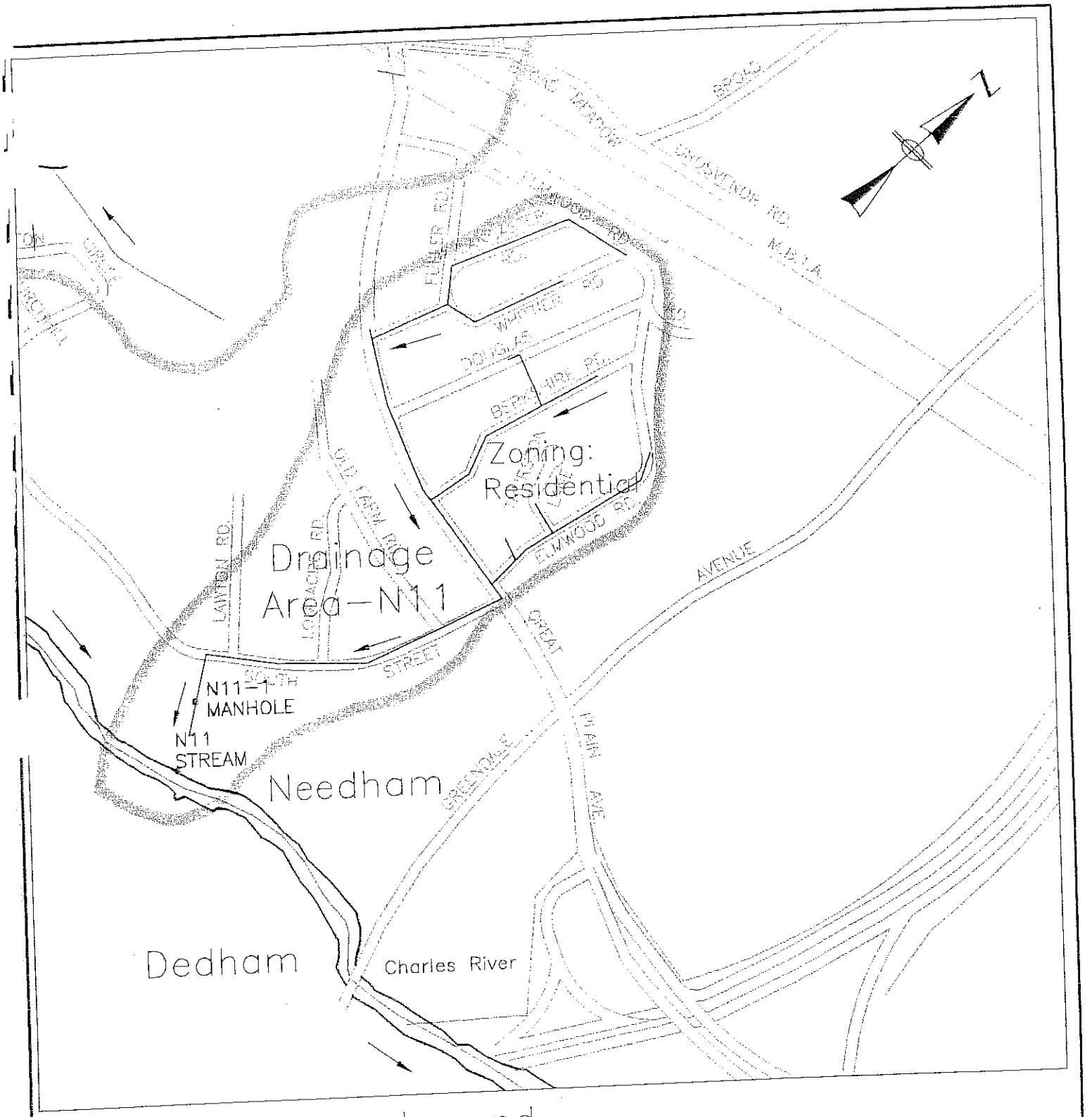
- chloride - 190 mg/l
- fluoride - ND
- fecal coliform - 50 MPN/100 ml.

Table 3.6 summarizes the dry weather sampling locations and results.

Table 3.6 Summary of Dry Weather Sampling for N11

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N11								
N11	South of South Street	12-RCP	DRY	10/2/96	14:40	NA	NA	**NA**
N11-1	South of South Street	12-RCP	0.1	10/2/96	14:45	190	ND	**50**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



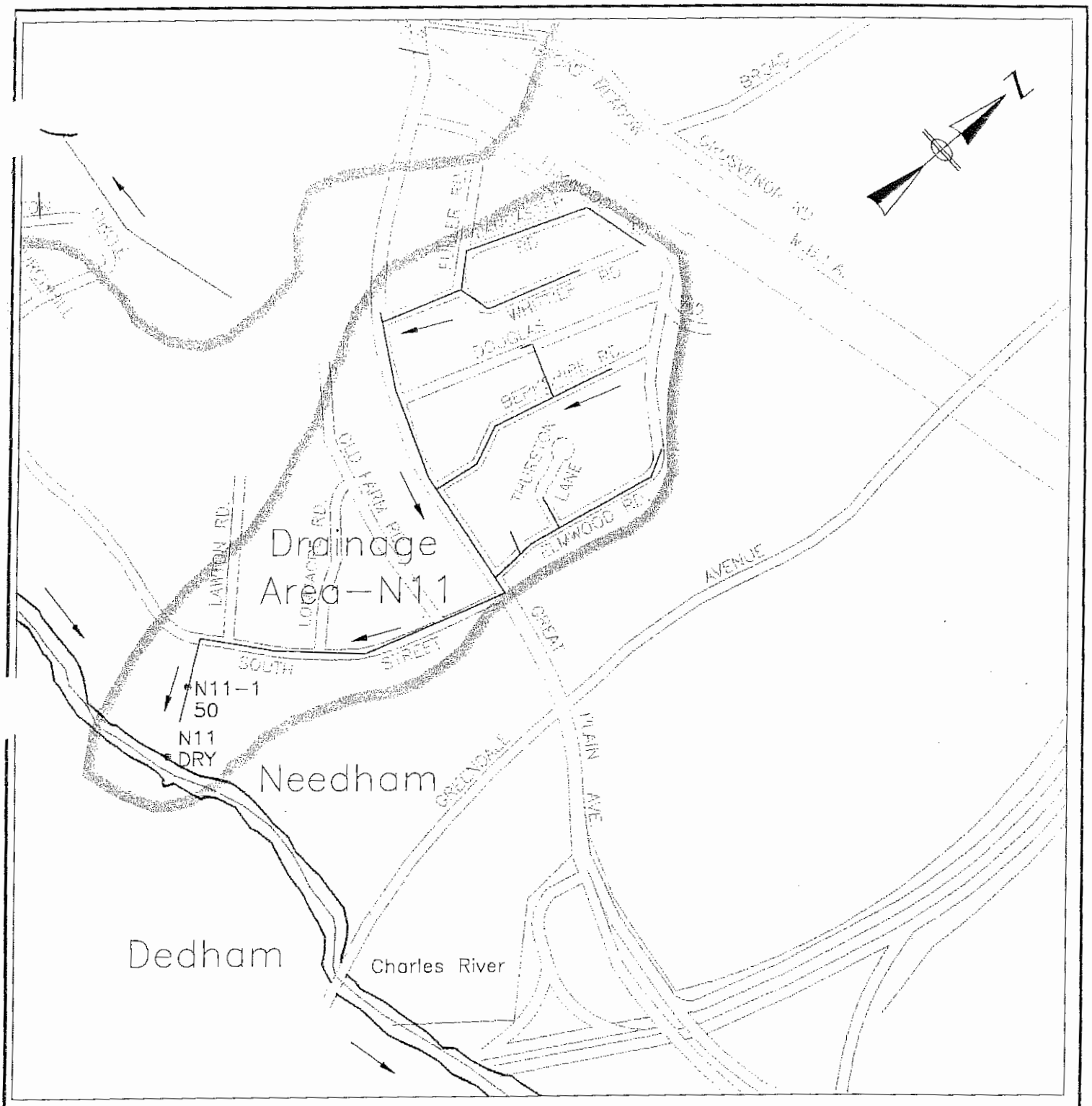
Legend

- • N11—1 — Sub—area Discharge/Sampling Location
- N11 — Discharge Point
- 12" — Pipe Size in Inches
- RCP — Pipe Material
- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale

Figure 3.59 — Area Layout
Drainage Area — N11
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners



Legend

N11—1	— Sub—area Discharge	———	— Water
N11	— Discharge Point	———	— Town Line
300	— Fecal Coliform Bacteria	▒▒▒	— Drainage Area Boundary
•	— Sampling Location	←———	— Stormwater Flow Direction

Not to Scale

Figure 3.60 — Sampling Results
Drainage Area — N11
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N11

Discharge Point: N11-1

Date: 10/2/96

Time: 12:40 p.m.

Location: South of South St.
Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: NA

Fluoride: NA mg/l

Conductivity: NA uohms

Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in.

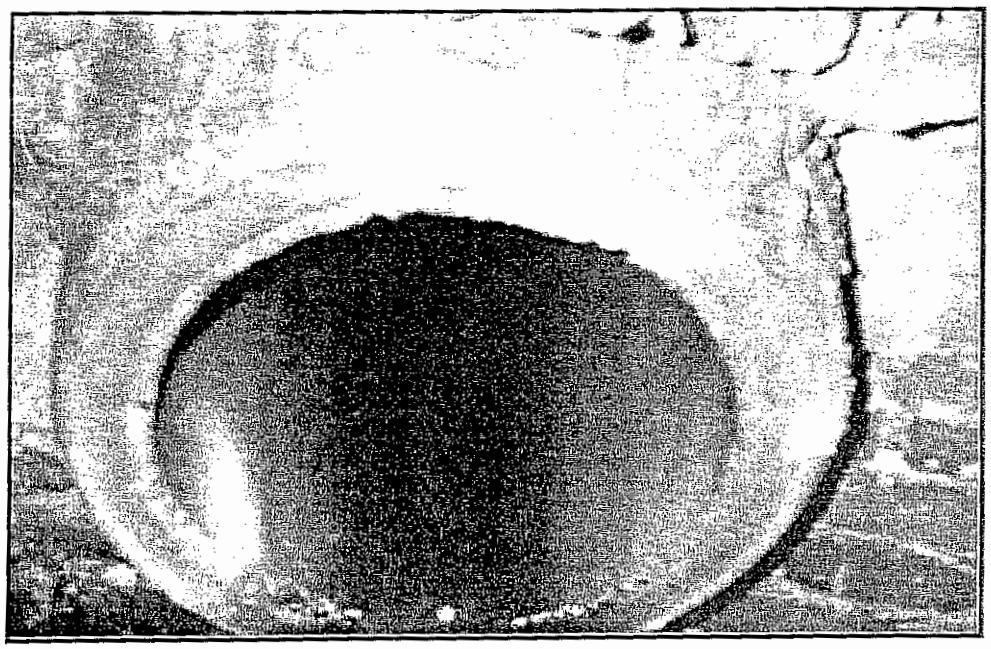
Flow Estimate: Dry gpm

Pipe Material/Condition: RCP/Fair

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: NA

Comments: Visually clear water was observed infiltrating into the manhole from holes in the bricks.



BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N10A-9A.pm6

Figure 3.61

Drainage Area - N14B

This drainage area is approximately 20 acres in size. The area is characterized by commercial land use. There is one (1) discharge point to the Charles River within the area, located south of Kendrick Street. The discharge pipe is approximately 300 feet from the Charles River (see Figures 3.62 and 3.63).

Some of the land use characteristics which could effect the water quality of this area include the following:

- total length of pipe in this area is approximately 1,320 linear feet
- drainage systems within area N14B include 72 catch basins
- all streets have sanitary sewers
- the land is industrial/commercial, with an abundance of impervious area
- roof drains and pigeons were noted during site inspection
- Flow is discharged to a wetland area approximately 300 feet from the Charles River. Flow of small storms infiltrate into the wetland soils, resulting in water quality improvements. The infiltration results in a reduction in total solids, total suspended solids and associated metals, nutrients and organic compounds.

  One industry has a "General Permit" under the National Discharge Pollutant Elimination System (NPDES) program to discharge to the stormwater system and the Charles River. This industry is:

  Polaroid Corp.
  140 Kendrick Street
  (SIC Code 3861) manufactures photographic equipment
  Permit No. MAR000A413

Discharge Point - N14B-1

This 30 inch RCP is located east of the intersection of Fourth Avenue and Kendrick Street (see Figure 3.64). The length of pipe in this sub-area is approximately 1,320 linear feet.

Dry Weather Sampling #1

This discharge was sampled on September 24, 1996 at 2:00 p.m. There was a flow of less than one (1) gpm Also, some foam was located at the outfall. The laboratory results revealed the following:

- chloride - 28 mg/l
- fluoride - 0.54 mg/l
- fecal coliform - 2,400 MPN/100 ml.

Dry Weather Sampling #2

The discharge was re-sampled on October 2, 1996 at 2:00 p.m. There was again minimal flow (0.2 gpm) of clear water discharging from the pipe. Again, some foam was located at the outfall. The laboratory results revealed the following:

- chloride - 14 mg/l
- fluoride - 0.77 mg/l
- fecal coliform - 80 MPN/100 ml.

Dry Weather Sampling #3

The discharge was re-sampled on October 17, 1996 at 12:30 p.m. There was minimal flow (0.1 gpm) of clear water discharging from the pipe. Again, some foam was located at the outfall. The laboratory results revealed the following:

- pH - 7.30 mg/l
- conductivity - 260 umhos
- fecal coliform - 4 MPN/100 ml.

Dry Weather Sampling #4

- The discharge was re-sampled on November 14, 1996 at 7:55 a.m. There was no flow discharging from the pipe.

Dry Weather Sampling #5

The discharge was re-sampled on November 15, 1996 at 6:50 a.m. There was minimal flow (0.1 gpm) of turbid water discharging from the pipe. Some foam was located at the outfall. The laboratory results revealed the following:

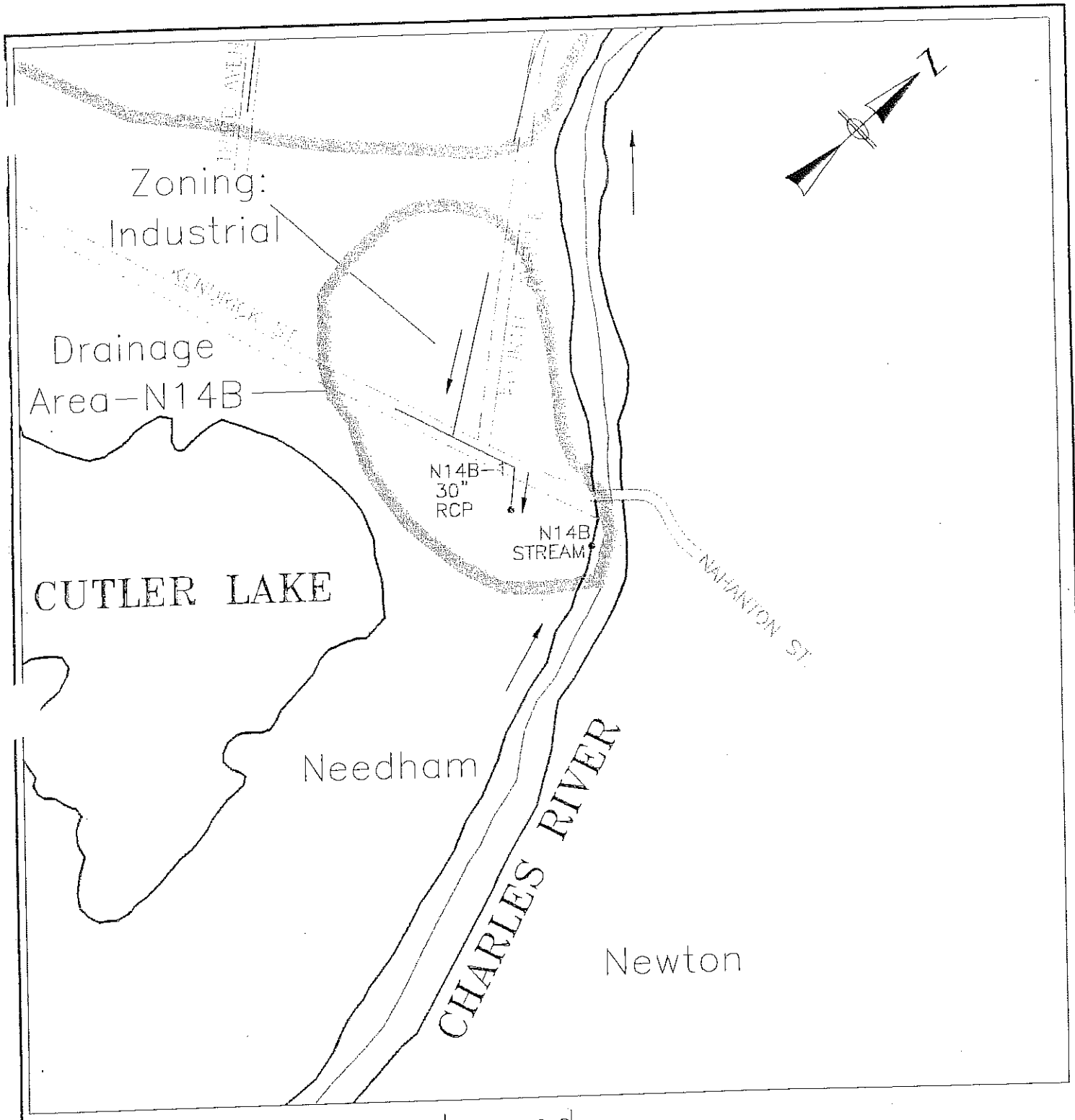
- fecal coliform - 16,000 MPN/100 ml.

Table 3.7 summarizes the dry weather sampling locations and results.

Table 3.7 Summary of Dry Weather Sampling for N14B

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N14B					
N14B-1	South of Kendrick Street	30-RCP	1	9/24/96	14:00	28	0.54	**2,400**
N14B-1	South of Kendrick Street	30-RCP	0.2	10/2/96	14:00	14	0.77	**80**
N14B-1	South of Kendrick Street	30-RCP	0.1	10/17/96	12:30	NS	NS	**4**
N14B-1	South of Kendrick Street	30-RCP	DRY	11/14/96	7:55	NA	NA	**NA**
N14B-1	South of Kendrick Street	30-RCP	<0.1	11/15/96	6:50	NS	NS	**16,000**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



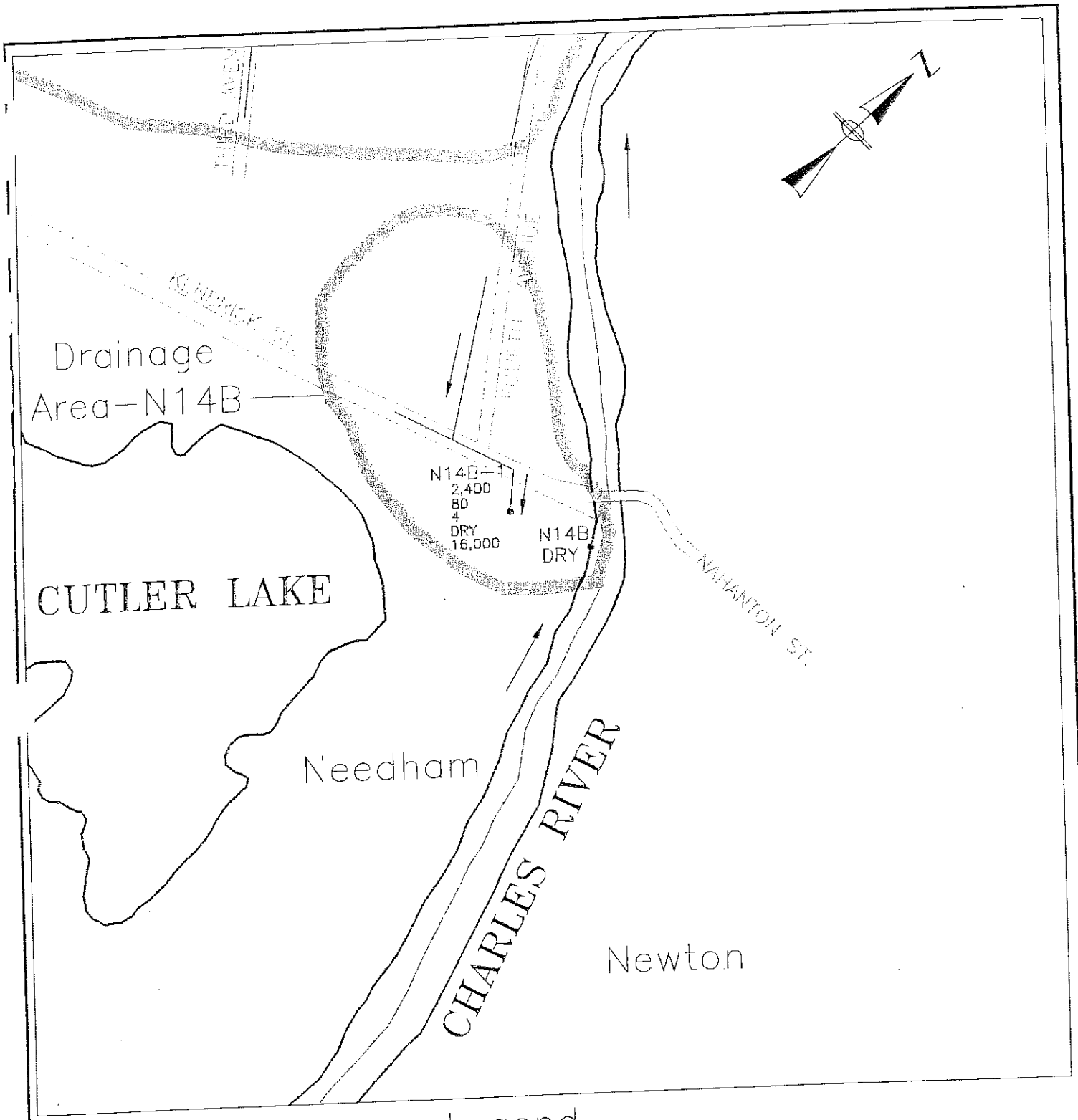
Legend

- N14B–1 – Sub–area Discharge/Sampling Location
- N14B – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material
- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction

Not to Scale

Figure 3.62 – Area Layout
Drainage Area – N14B
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners



Legend

N14B—1 – Sub—area Discharge
N14B – Discharge Point
300 – Fecal Coliform Bacteria
• – Sampling Location

— – Water
— – Town Line
— – Drainage Area Boundary
— – Stormwater Flow Direction

Not to Scale

Figure 3.63 — Sampling Results
Drainage Area — N14B
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N14-B

Discharge Point: N14-B-1

Date: 10/2/96 Time: 2:00 p.m.

Weather: Dry

Location: South of Kendrick Street
Needham, MA

ANALYTICAL DATA

pH: NS

Conductivity: NS uohms

Chloride: 14 mg/l

Fluoride: 0.77 mg/l

Fecal Coliform Bacteria: 80 MPN/100ml

Temperature: 11.2 °c

SAMPLING DATA

Pipe Size: 30 in.

Pipe Material/Condition: RCP/Good

Flow Estimate: 0.2 gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: Clear

Comments: Some foam was located at the outfall.

BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N14B-1.pm6

Figure 3.64

Drainage Area - N14

This drainage area is approximately 175 acres in size. The area is characterized by industrial and commercial business land use. There is one (1) discharge point to the Charles River within this area. The discharge is located northeast of Second Avenue, approximately fifteen (15) feet east of a railroad bridge (see Figure 3.65 and 3.66).

Some of the land use characteristics which could effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 10,860 linear feet
- drainage systems within area N14 include 63 catch basins
- the land use is industrial/commercial, with an abundance of impervious area
- all streets have sanitary sewers
- although no geese problem exists, other birds and associated feces (pigeons) were noted during site inspections. Numerous roof drains from buildings are connected to the drainage system.
- the discharge pipe flows directly into the Charles River
- Three industries have "General Permits" to discharge to the stormwater system and the Charles River under the NPDES program. These include the following:

GTE Government Systems
77 A Street
(SIC Code 3663) manufacture radio/television equipment
Permit No. MAROOA439

NRC, Inc.
110 A Street
(SIC Code 3339) smelting and refining non-ferrous
Permit No's. MAROOA392
MAROOA393

Coca Cola Bottling, New England
9 B Street
(SIC Code 2086) manufacture soft drinks
Permit No. MAROOB249

Discharge Point - N14-1

This discharge point is a 48 inch RCP that discharges directly to the Charles River, located north of Second Avenue (see Figure 3.67). The length of pipe in this sub-area is approximately 10,850 linear feet.

Dry Weather Sampling #1
The discharge point was sampled on October 2, 1996 at 1:30 p.m. Flow was approximately one (1) gpm. No floatables or discoloration were noted in flow of the discharge pipe. The laboratory results revealed the following:

- chloride - 270 mg/l
- fluoride - 0.27 mg/l
- fecal coliform - 1,600 MPN/100 ml.

Dry Weather Sampling #2
The discharge point was re-sampled on October 17, 1996 at 12:50 p.m. Flow was approximately one (1) gpm. Clear flow was again noted. The laboratory results revealed the following:

- pH - 7.30
- conductivity - 300 umhos
- fecal coliform - 30 MPN/100 ml.

Dry Weather Sampling #3
The discharge point was re-sampled on November 14, 1996 at 7:50 a.m. Flow was approximately one (1) gpm. Clear flow was again noted. The laboratory results revealed the following:

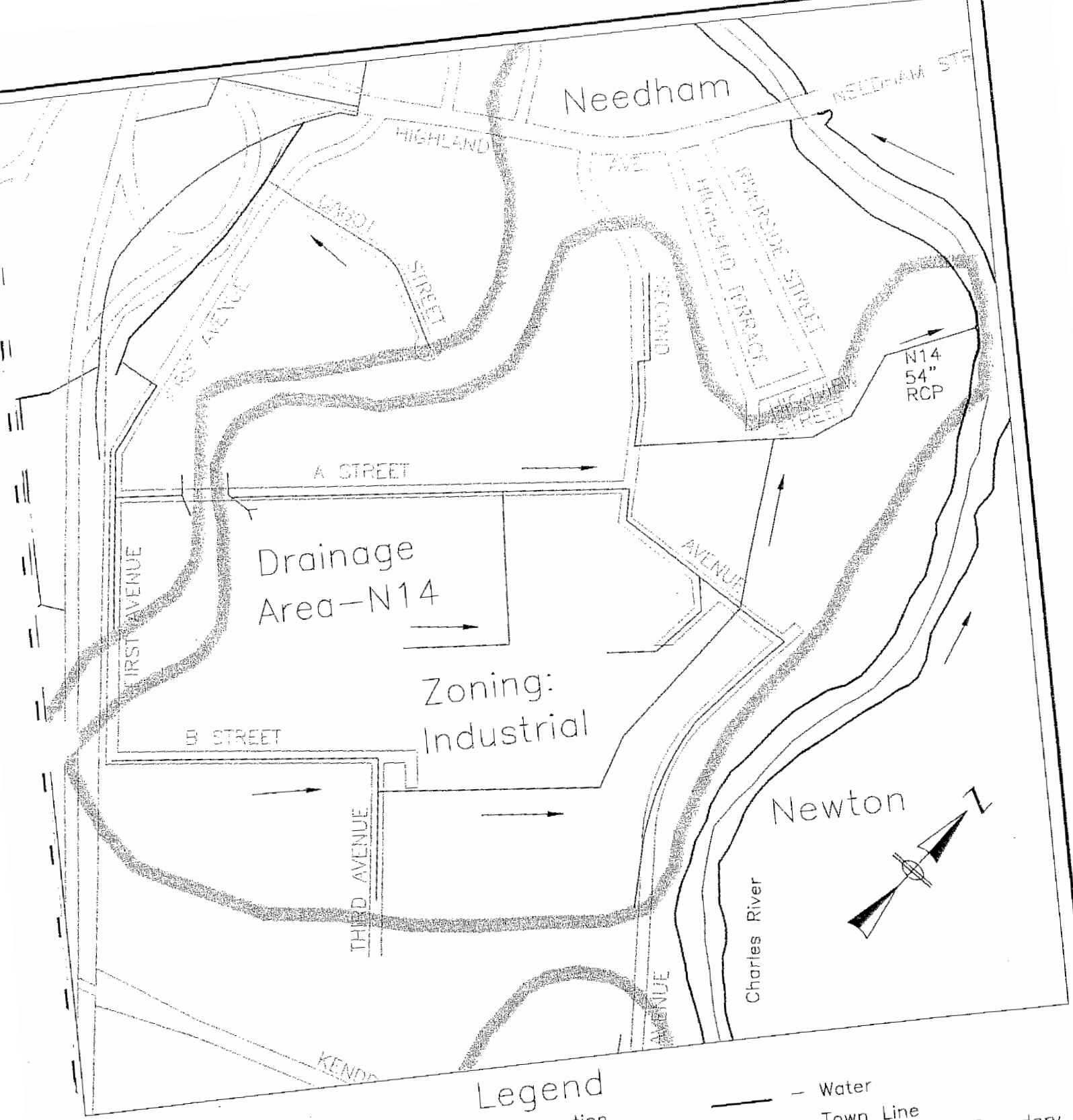
- chloride - 180 mg/l
- fluoride - 0.28 mg/l
- fecal coliform - 130 MPN/100 ml.

Table 3.8 summarizes the dry weather sampling locations and results.

Table 3.8 Summary of Dry Weather Sampling for N14

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N14					
N14	North of Second Avenue	54-RCP	1	10/2/96	13:30	270	0.27	**1,600**
N14	North of Second Avenue	54-RCP	1	10/17/96	12:50	NS	NS	**30**
N14	North of Second Avenue	54-RCP	1	11/14/96	7:50	180	0.28	**130**

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



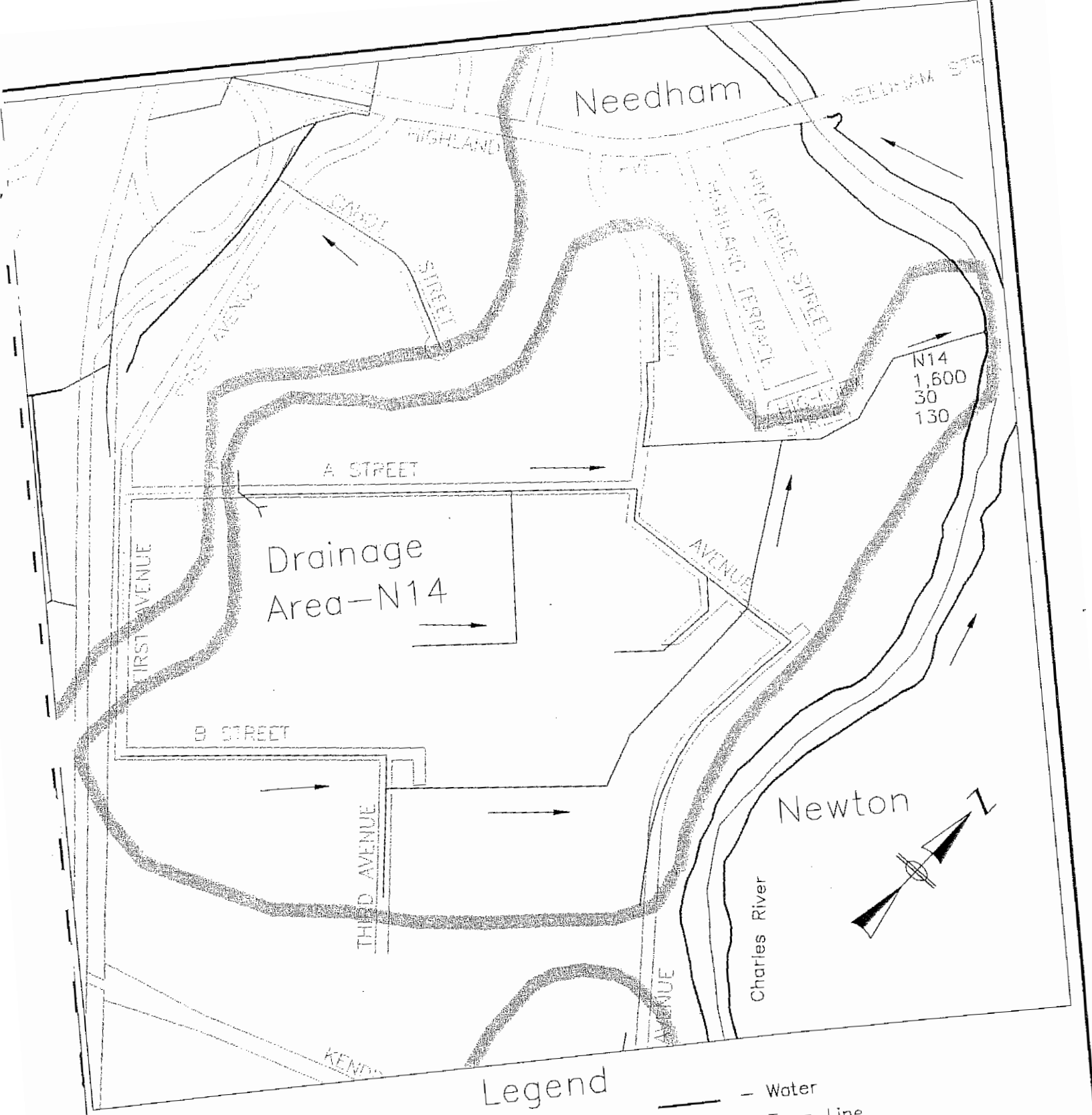
Legend

- N14–1 — Sub–area Discharge/Sampling Location
- N14 — Discharge Point
- 12" — Pipe Size in Inches
- RCP — Pipe Material
- Water
- Town Line
- Drainage Area Baundary
- Stormwater Flow Direction

Not to Scale

Figure 3.65 — Area Layout
Drainage Area — N14
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners



Not to Scale

Figure 3.66 — Sampling Results
Drainage Area — N14
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N14

Discharge Point: N14-1

Date: 10/2/96

Time: 1:30 p.m.

Location: North of Second Ave. Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: NS

Conductivity: NS

Chloride: 270 mg/l

Fluoride: 0.27 mg/l

Fecal Coliform Bacteria: 1,600 MPN/100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: 48 in

Pipe Material/Condition: RCP/Good

Flow Estimate: 1 gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: Clear

Comments: No floatables or discoloration were observed in the pipe.

BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N14-1.prn6

Figure 3.67

Drainage Area - N19

This drainage area is approximately 325 acres in size. The area is characterized by residential and commercial land uses which are separated by Route 128. All of the cumulative flow enters the Charles River through a discharge pipe located northeast of Charles Street (see Figures 3.68 and 3.69). The pipe flows directly into the Charles River.

Some of the characteristics which may effect the water quality of this area include the following:

- total length of drain pipe in this area is approximately 24,600 linear feet
- drainage systems within area N19 include 144 catch basins
- all of the streets have sanitary sewers
- investigations by the Town revealed that commercial floor drains were connected to main drain pipes during renovation projects at Casey Petroleum

Discharge Point N19-1

This 48 inch RCP discharges directly to the Charles River northeast of Charles Street. The length of pipe in this sub-area is approximately 2,400 linear feet (Figure 3.70).

Dry Weather Sampling #1

A sample was taken from this discharge on October 2, 1996 at 1:15 p.m. An approximate flow of 30 gpm of clear water was observed. BETA also observed iron bacteria flocculent in the pipe and on the stones of the outfall. The laboratory results revealed the following:

- chloride - 220 mg/l
- fluoride - ND
- fecal coliform - 70 MPN/100 ml.

Dry Weather Sampling #2

The flow was re-sampled on October 17, 1996 at 12:10 p.m. There was approximately 25 gpm discharging from the pipe. The iron bacteria flocculent was still present on the pipe and at the outfall. The laboratory results revealed the following:

- chloride - 190 mg/l
- fluoride - ND
- pH - 7.15
- conductivity - 850 umhos
- fecal coliform - 50 MPN/100 ml.

Dry Weather Sampling #3

The flow was re-sampled on November 14, 1996 at 8:10 a.m. There was approximately 25 gpm discharging from the pipe. The iron bacteria flocculent was still present on the pipe and at the outfall. The laboratory results revealed the following:

- chloride - 150 mg/l
- fluoride - ND mg/l
- fecal coliform - 80 MPN/100 ml.

Sub-area - N19-2
This twelve (12) inch RCP discharges into a stream west of First Avenue. The length of pipe in this sub-area is approximately 900 linear feet.

Dry Weather Sampling
BETA observed no flow from this pipe on November 15, 1996 at 9:45 a.m.

Sub-area - N19-3
This 18 inch RCP discharges into a stream west of First Avenue (see Figure 3.71). The length of pipe in this sub-area is approximately 120 linear feet.

Dry Weather Sampling
BETA observed no flow from this pipe on October 17, 1996 at 12:15 p.m.

Sub-area - N19-3A
This sampling location is a stream located perpendicular to discharge location N19-3 (see Figure 3.72).

Dry Weather Sampling
This stream flow was sampled on October 17, 1996 at 12:17 p.m. There was a flow of approximately 20 gpm in the stream. A flocculent layer of iron bacteria was noticed on the rocks and bottom of the entire stream. The laboratory results revealed the following:

- chloride - 210 mg/l
- fluoride - ND mg/l
- pH - 7.30
- conductivity - 900 umhos

Sub-area - N19-4
This twelve (12) inch RCP discharges into a stream west of First Avenue. The length of pipe in this sub-area is approximately 1,500 linear feet.

Dry Weather Sampling
No flow was observed from this pipe on October 17, 1996 at 11:50 a.m. The pipe was covered with debris (see Figure 3.73)

Sub-area - N19-5
This sub-area is located in the middle of Route 128. Due to the heavy traffic of that roadway, BETA did not sample or inspect this discharge. It is unlikely that an illicit connection exists in this area.

Sub-area - N19-6
This fifteen (15) inch RCP discharges northeast of Hunting Road. The length of pipe in this sub-area is approximately 1,740 linear feet.

Dry Weather Sampling
No flow was observed from this pipe on November 15, 1996 at 7:30 a.m.

Sub-area - N19-7
This pipe discharges in the middle of Route 128. Due to the heavy traffic, BETA did not inspect this discharge. Although a sample was taken from a manhole upstream of the discharge at the end of Woodbine Street. The length of pipe in this sub-area is approximately 7,980 linear feet.

Dry Weather Sampling
The manhole at Woodbine Street was sampled on November 15, 1996 at 7:50 a.m. A flow of approximately one (1) gpm was observed discharging from the upstream pipe. The laboratory results revealed the following:

- fecal coliform - 20 MPN/100 ml.

Sub-area - N19-8
This pipe discharges south of Wexford Street. The length of pipe in this sub-area is approximately 5,100 linear feet.

Dry Weather Sampling
No flow was observed from this pipe on November 15, 1996 at 9:40 a.m.

Manhole N19-8A
This manhole is located at the on ramp of Route 128. This manhole is upstream of the discharge point at N19-8. Please refer to the attached map for the approximate location.

Dry Weather Sampling
A sample was taken from the stagnant water at the bottom of the manhole on November 15, 1996 at 9:30 a.m. The laboratory results revealed the following:

- fecal coliform - ND

Sub-area - N19-9
This 42 inch RCP is located south of Wexford Street. The length of pipe in this sub-area is approximately 4,080 linear feet.

Dry Weather Sampling #1
This discharge was sampled on November 15, 1996 at 8:25 a.m. There was a flow of approximately twenty (20) gpm. The laboratory results revealed the following:

- chloride - 150 mg/l
- fluoride - ND
- fecal coliform - 70 MPN/100 ml.

Sampling Point - N19-9A
This sampling point was located downstream of N19-9. The sample was taken from the edge of the bank where iron bacteria and seepage were noted.

Dry Weather Sampling

This point was sampled on November 15, 1996 at 8:15 a.m. There was minimal flow coming from the side of the bank. The laboratory results revealed the following:

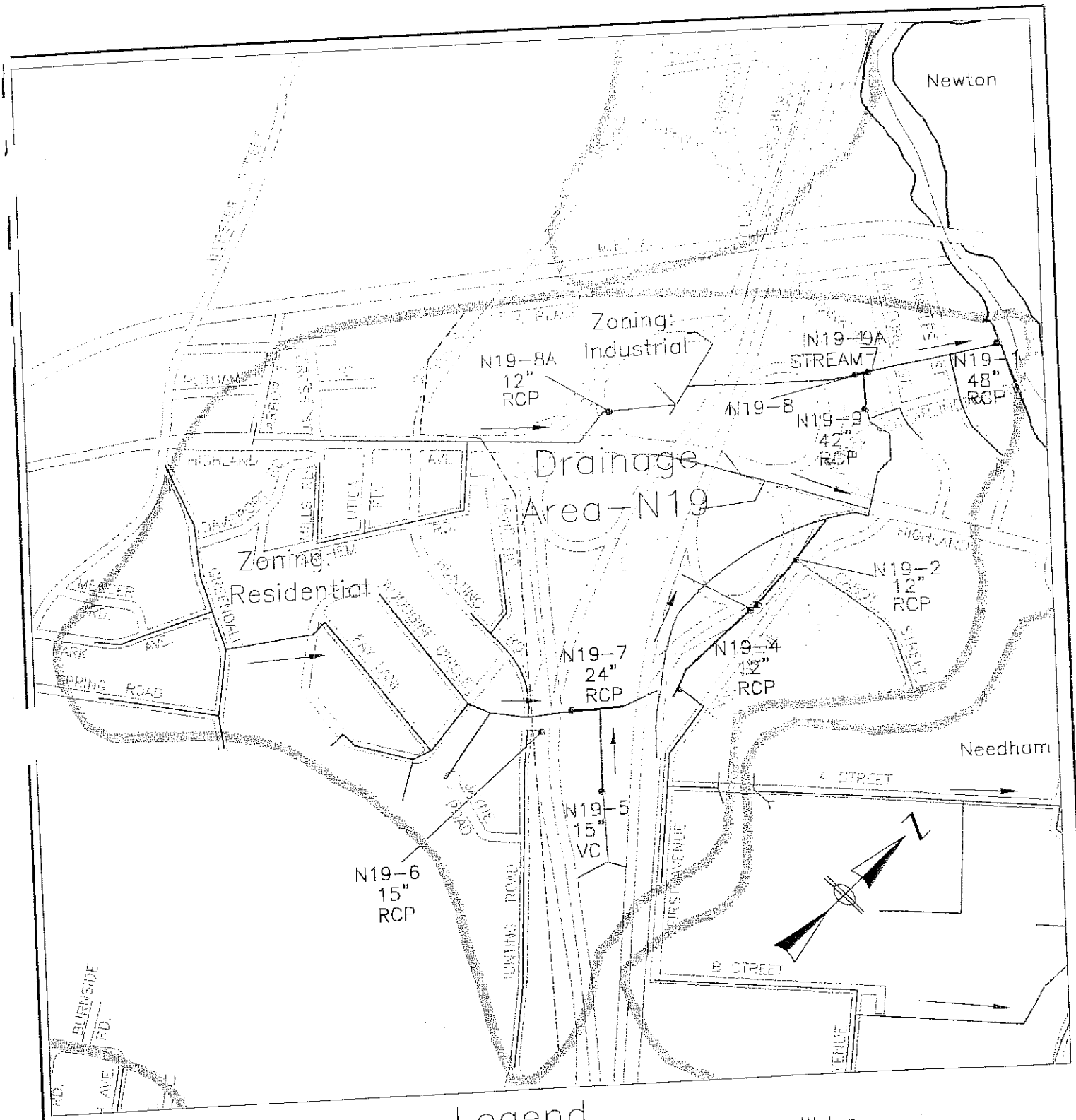
- fecal coliform - 40 MPN/100 ml.

Table 3.9 summarizes the dry weather sampling locations and results.

Table 3.9 Summary of Dry Weather Sampling for N19

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N19								
N19	Northeast of Charles Street	48-RCP	30	10/2/96	13:15	220	ND	**70**
N19	Northeast of Charles Street	48-RCP	25	10/17/96	12:10	190	ND	**50**
N19	Northeast of Charles Street	48-RCP	25	11/14/96	8:10	150	ND	**80**
N19-2	West of First Avenue	12-RCP	Dry	11/15/96	9:45	NA	NA	**NA**
N19-3	West of First Avenue	18-RCP	Dry	10/17/96	12:15	NA	NA	**NA**
N19-3A	West of First Avenue	STREAM	20	10/17/96	12:17	210	ND	**170**
N19-4	West of First Avenue	12-RCP	Dry	10/17/96	11:50	NA	NA	**NA**
N19-5	Off of Route 128	15-VC	NA	NA	NA	NS	NS	**NS**
N19-6	Off of Hunting Road	15-RCP	Dry	11/15/96	7:30	NA	NA	**NA**
N19-7	Off of Route 128	24-RCP	NA	NA	NA	NS	NS	**NS**
N19-8	Off of Route 128	NS	DRY	11/15/96	9:40	NA	NA	**NA**
N19-8A	On ramp of Route 128 South	12-RCP	Stagnant	11/15/96	9:30	NS	NS	**ND**
N19-9	South of Wexford Street	42-RCP	20	11/15/96	8:25	150	ND	**70**
N19-9A	South of Wexford Street	STREAM	0.1	11/15/96	8:15	NS	NS	**40**
N19-Woodbine	Woodbine Street	NS	1	11/15/96	7:50	NS	NS	**20**

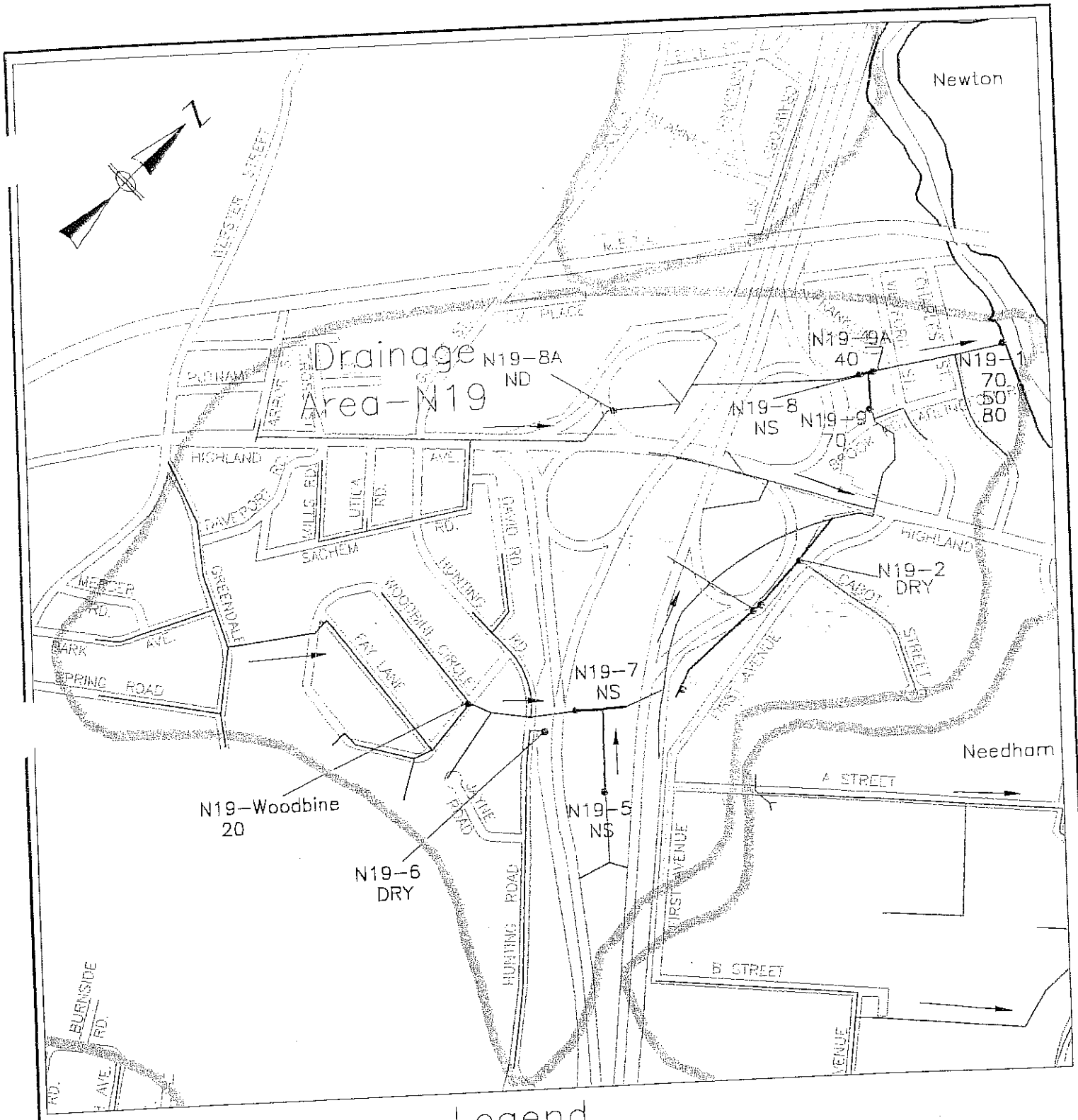
Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



Legend

- N19-1 – Sub-area Discharge/Sampling Location
- N19 – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material
- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction
- Zoning Boundary

Not to Scale	Figure 3.68 – Area Layout Drainage Area – N19 Needham Stormwater Management	BETA ENGINEERING, INC. Engineers/Planners



Legend

N19–1	– Sub–area Discharge		– Water
N19	– Discharge Point		– Town Line
300	– Fecal Coliform Bacteria		– Drainage Area Boundary
•	– Sampling Location		– Stormwater Flow Direction

Not to Scale

Figure 3.69 – Sampling Results
Drainage Area – N19
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N19

Discharge Point: N19-1

Date: 10/17/96 Time: 12:10 p.m.

Weather: Dry

Location: Northwest of Charles St. Needham, MA

ANALYTICAL DATA

pH: 7.15

Conductivity: 850 µohms

Chloride: 190 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 50 MPN/100ml

Temperature: 12.2 °c

SAMPLING DATA

Pipe Size: 48 in

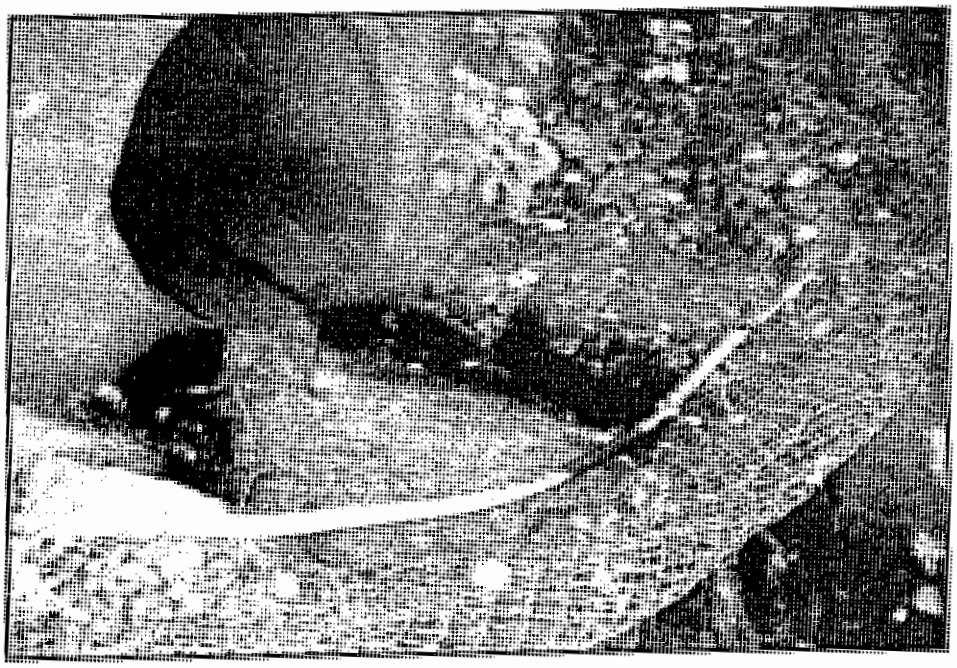
Pipe Material/Condition: Concrete/Good

Flow Estimate: 25 gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Iron bacteria was observed in the pipe and on the stones of the outfall.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N19-1.pm6

Figure 3.70

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N19

Discharge Point: N19-3

Date: 10/17/96

Time: 12:15 p.m.

Location: West of First Avenue
Needham, MA

Weather: Dry

ANALYTICAL DATA

pH: NA

Fluoride: NA mg/l

Conductivity: NA umhos

Fecal Coliform Bacteria: NA MPN/100ml

Chloride: NA mg/l

Temperature: NA °c

SAMPLING DATA

Pipe Size: 18 in.

Flow Estimate: Dry gpm

Pipe Material/Condition: RCP/Good

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: NA

Comments: No evidence of recent flow.

BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N19-3.pm6

Figure 3.71

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N19

Discharge Point: N19-3A

Date: 10/17/96 Time: 12:17 p.m.

Weather: Dry

Location: Stream perpendicular to N19-3
Needham, MA

ANALYTICAL DATA

pH: 7.30

Conductivity: 170 uohm

Chloride: 900 mg/l

Fluoride: ND mg/l

Fecal Coliform Bacteria: 170 MPN 100ml

Temperature: NS °c

SAMPLING DATA

Pipe Size: NA in

Pipe Material/Condition: NA

Flow Estimate: 20 gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: Clear

Comments: Iron bacteria layer was noticed on the rocks and bottom of the stream.

BETA Engineering, Inc.
Scientists/Engineers/Planners

File name: N19-3A.pm6

Figure 3.72

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N19

Discharge Point: N19-4

Date: 10/17/96 Time: 11:50 a.m.

Weather: Dry

Location: West of First Ave. Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA

Chloride: NA

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 12 in

Pipe Material/Condition: RCP/Fair

Flow Estimate: Dry gpm

Last Precipitation: 10/9/96

Clarity of Flow/Turbidity: NA

Comments: Pipe was covered with debris.

BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N19-4.pm6

Figure 3.73

Drainage Area - N22

This drainage area is approximately 50 acres in size. The area is characterized by residential and commercial land uses. There is one (1) discharge point to the Charles River (see Figures 3.74 and 3.75). The flow enters the Charles River through a rock lined channel behind a wastewater pump station on Reservoir Street.

Some of the land use characteristics which could effect the water quality of this area include the following:

- total length of the drain pipe in this area is approximately 6,000 linear feet
- drainage systems within area N22 include 32 catch basins
- all of the municipal streets in the area have sanitary sewers
- Route 128 divides the commercial and residential land uses. Commercial land use predominates east of 128, and residential land use to the west.
- the rip-rapped swale provides some treatment prior to stormwater discharge

Discharge Point N22-1

This discharge point is located east of Reservoir Street. The flow enters the Charles River through a rock lined channel behind a wastewater pump station on Reservoir Street (see Figure 3.76)

Dry Weather Sampling

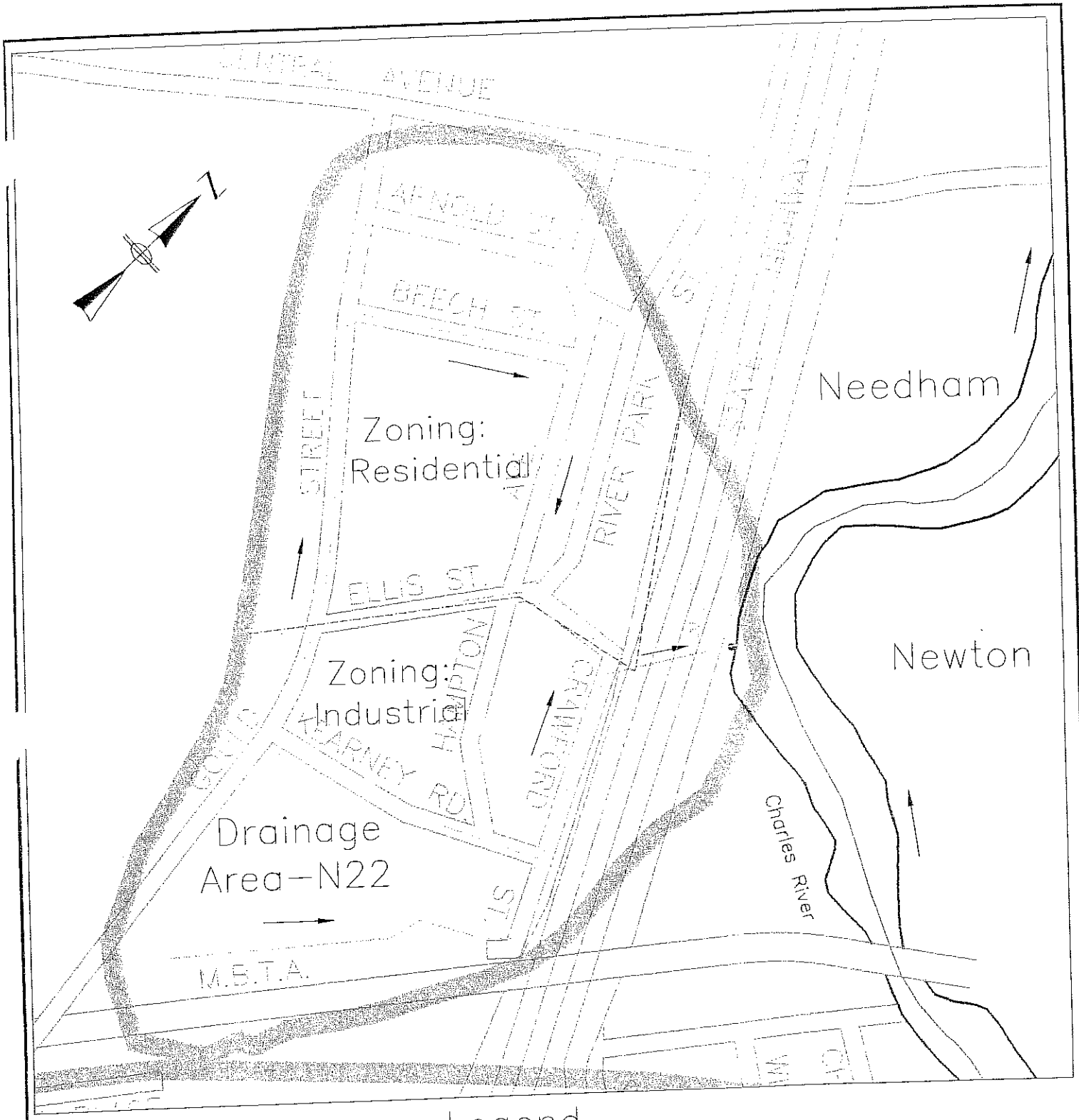
BETA observed no flow from this discharge point on October 2, 1996 at 12:50 p.m., October 17, 1996 at 11:30 a.m., November 14, 1996 at 8:25 a.m., or November 15, 1996 at 7:50 a.m.

Figure 3.10 shows the flow direction of the drainage system and the dry weather sampling locations and results.

Table 3.10 Summary of Dry Weather Sampling for N22

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N22					
N22	East of Reservoir Street	18-RCP	Dry	10/2/96	12:50	NA	NA	NA
N22	East of Reservoir Street	18-RCP	Dry	10/17/96	11:30	NA	NA	NA
N22	East of Reservoir Street	18-RCP	Dry	11/14/96	8:25	NA	NA	NA
N22	East of Reservoir Street	18-RCP	Dry	11/15/96	7:10	NA	NA	NA

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled



Legend

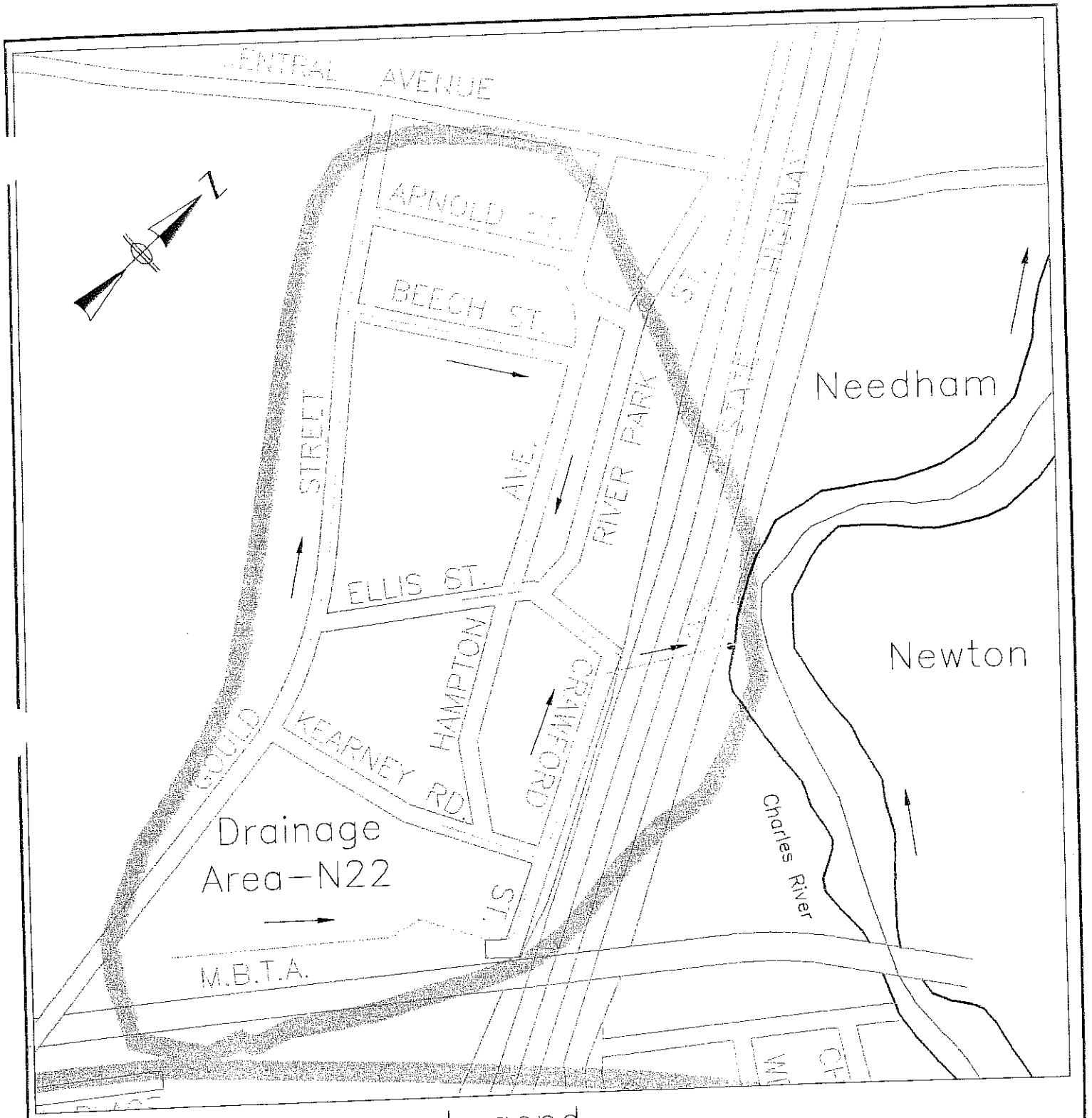
- • N22-1 – Sub-area Discharge/Sampling Location
- N22 – Discharge Point
- 12" – Pipe Size in Inches
- RCP – Pipe Material

- Water
- Town Line
- Drainage Area Boundary
- Stormwater Flow Direction
- Zoning Baundary

Not to Scale

Figure 3.74 – Area Layout
Drainage Area – N22
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners



Legend

N22–1	– Sub–area Discharge		– Water
N22	– Discharge Point		– Town Line
300	– Fecal Coliform Bacteria		– Drainage Area Boundary
•	– Sampling Location		– Stormwater Flow Direction

Not to Scale

Figure 3.75 – Sampling Results
Drainage Area – N22
Needham Stormwater Management

BETA ENGINEERING, INC.
Engineers/Planners

Stormwater Drain Outfall Inspection Report

PROJECT NAME: Needham, MA Stormwater Investigation

Subarea: N22

Discharge Point: N22-1

Date: 10/2/96 Time: 12:50 p.m.

Weather: Dry

Location: East of Reservoir St. Needham, MA

ANALYTICAL DATA

pH: NA

Conductivity: NA umhos

Chloride: NA mg/l

Fluoride: NA mg/l

Fecal Coliform Bacteria: NA MPN/100ml

Temperature: NA °c

SAMPLING DATA

Pipe Size: 18 in.

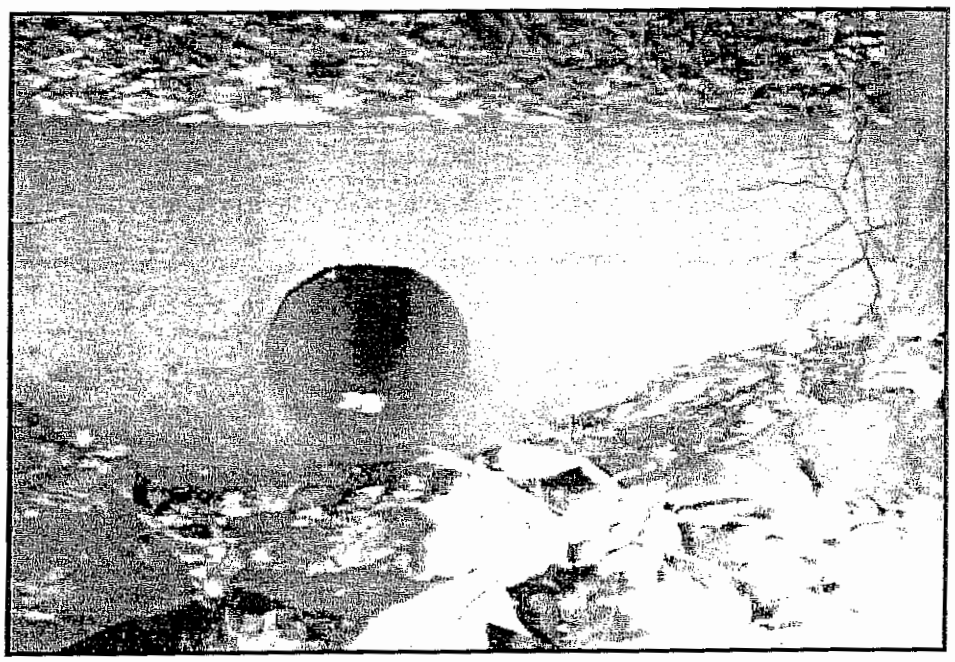
Pipe Material/Condition: RCP/Good

Flow Estimate: Dry gpm

Last Precipitation: 9/29/96

Clarity of Flow/Turbidity: NA

Comments: No evidence of recent flow.



BETA Engineering, Inc.

Scientists/Engineers/Planners

File name: N22-1.pm6

Figure 3.76

Charles River Entrance to Needham - C1

This sampling location is located north of Charles River Street where the Charles River enters Needham.

Dry Weather Sampling

BETA sampled the Charles River entering Needham on September 24, 1996 at 1:45 p.m. BETA observed a clean flow with minimal turbidity or floatable materials. The sample results revealed the following:

- fecal coliform - 170 MPN/100 ml.

Charles River Exit from Needham - C2

This sampling location is located north of Bridge Street where the Charles River enters Needham.

Dry Weather Sampling

BETA sampled the Charles River flowing out of Needham on September 24, 1996 at 2:10 p.m. The laboratory results of the sample revealed the following:

- chloride - 43 mg/l
- fluoride - ND
- fecal coliform - 80 MPN/100 ml.

Dry Weather Sampling Summary and Conclusions

Summary

The dry weather sampling results revealed that at least one (1) laboratory sample from six (6) out of the ten (10) drainage areas exceeded the fecal coliform bacteria limit for swimmable water of 200 MPN/100 ml. Correspondingly, the four (4) remaining drainage areas were below the 200 MPN/100ml limit. Thus, the investigation focused on the six (6) drainage areas (N1B, N1, N8, N10A, N14 and N14B) to determine the source of the fecal coliform bacteria. No further work was conducted for the four (4) remaining drainage areas (N6C, N11, N19 and N22).

Two areas, N14 and N14B, have industries which are permitted under the NPDES General Permit program to discharge to stormwater systems. For this reason, dry weather flows from these two areas might be expected. Certain types of non-stormwater discharges are allowed under this program, such as air conditioning condensate, etc. Table 3.11 provides a description of the NPDES discharges, inclnding the company name and SIC codes.

Table 3.11

Permit Number	Facility Name	Operator Name	Facility Address	Receiving Water	SIC Code
Area N14					
MAROOA439	GTE Government Sys.	GTE Government Sys.	77 A Street	Charles River	3663
MAROOA392	NBC, Inc.	NBC, Inc.	110 A Street	Charles River	3339
MAROOA393	NBC, Inc.	NBC, Inc.	110 A Street	Charles River	3339
MAROOB249	Coca Cola Bottling/N.E.	Coca Cola Bottling/N.E.	9 "B" Street	Charles River	2086
Area N14B					
MAROOA411	Polaroid Corp.	Polaroid Corp.	140 Kendrick Street	Charles River	3861

SIC Codes

3663	Manufacturing radio/television broadcast equipment
3339	Primary smelting and refining
3861	Manufacturing photographic equipment
2086	Manufacturing soft drinks and carbonated waters

Drainage Area N1B

Drainage Area N1B exceeded the swimmable water criteria during the first sampling round (900 MPN/100ml.). The sample was taken on September 24, 1996, from a stagnant pool of water where the pipe discharges. There was no flow coming from the pipe. Twelve inspections of the pipe revealed no dry weather discharges at any time. Subsequent sampling revealed a level of 4 MPN/100 ml. during the second round, and "none detected" during the third round. Based upon available data, all of the homes on Whitman Road have sanitary sewers.

During the first sampling event, numerous geese were noted in the field south of the cul-de-sac of Whitman Road. Additionally, geese feces were noted in the field adjacent to the discharge. Geese were not noted during subsequent inspections or sampling events, corresponding with less fecal coliform bacteria. These results indicate that the elevated coliform was not due to sanitary sewage or illicit connections, but native geese populations.

Drainage Area N1

Drainage area N1 also exceeded the swimmable water criteria. One sample in this drainage area, sampling point N1-3A, had a fecal coliform bacteria count of 16,000 MPN/100 ml. This location was at Walker Gordon Pond, where numerous geese were noted. A sample was taken from the shore of the Pond, in the location of the geese, to determine if the geese were resulting in fecal coliform bacteria pollution. The laboratory results showed a direct correlation with the geese population and fecal coliform bacteria. All sub-area discharge points, other than the pond sample, met the swimmable water criteria. For this reason, no further work is proposed for this drainage area.

Drainage Area N8

Several sub-areas in drainage area N8 exceeded the swimmable water criteria. Samples from N8 (300 MPN/100 ml) and N8-3 (500 MPN/100 ml) exceeded the fecal coliform bacteria criteria of 200 MPN/100 ml.

The elevated fecal coliform bacteria of Area N8 was likely caused by the geese population that live in and around the small pond. As detailed previously, numerous geese and geese feces were noted during the study, in the vicinity of the pond. Additionally, all samples taken from the two discharges into the Pond (N8-1) met swimmable water criteria. While the Pond likely improves water quality with respect to suspended solids removal, etc., the geese population generally increases the fecal coliform bacteria levels prior to discharge to the River.

These results indicate that the fecal coliform bacteria in this area were not due to illicit connections or sanitary sewage.

Drainage Area N10A

General

Drainage Area 10-A is the largest drainage area investigated during this study. The swimmable water criteria was exceeded at numerous locations. The exceedences were generally within three (3) sub-areas, however. These three sub-areas, N10A-9, N10A-9A and N10A-7, had results as high as 160,000 MPN/100 ml. of fecal coliform bacteria.

Sub-area 10A-7

The discharge of sub-area N10A-7 has consistently revealed elevated levels of fecal coliform bacteria. As shown in Figure 3.37, the highlighted area of drainage system was determined to be the area where fecal coliform pollution is impacting the drainage system. Field inspections have revealed that sanitary sewers, which parallel the drainage pipes, contribute to elevated levels of fecal coliform bacteria.

Two samples were taken from the 10A-7 discharge on October 8, 1996, approximately 45 minutes apart. The second sample was taken due to a rapid color change which was noted. The results revealed fecal coliform bacteria rose from 900 to 90,000 within 45 minutes. Drains in this area are scheduled for television inspection.

Sewers in this area have been documented by the Town to surcharge under wet weather conditions. This was confirmed by inspections during several storm events. The Town of Needham recently (November, 1996) replaced the sewers on Washington Street. The older clay sanitary sewers were likely leaking during the peak flow and/or surcharge conditions, and sewage migrating into the drainage system through groundwater and cracks/joints of the drain pipes. The new sewers will resolve this issue.

A television inspection program of the drain pipes is ongoing in the area which are not effected by the sewer rehabilitation project. The drain on Ivy Rd. was recently inspected. This drain discharges constant dry weather flow, and elevated fecal coliform have been consistent. The television inspection revealed infiltration at several joints, and an abundance of animal feces within the pipe and on the sill of the drain manhole. Evidently, a mammal, such as a raccoon, resides in this structure.

Subarea 10A-9A

Sub-area N10A-9A was tested numerous times due to a consistent elevated level of fecal coliform bacteria. BETA conducted testing throughout the system to determine the source of the fecal coliform pollution. The results revealed that the area of elevated fecal coliform was limited to a short section of drain pipe on Webster Street and Norfolk Street.

TV inspection of the sewer and drain pipes in the area was conducted to determine the location of "potential illicit connections", and to determine the integrity of the 15 inch and 18 inch sanitary sewers adjacent to the drainage pipes. The sewers were constructed in the 1920's and 1960's, and, due to their age, may be impacting the drainage system. TV inspection results revealed hairline cracks and sagging in the older (1926) sewer. Under surcharge conditions, which have been noted during this study, sewage may exfiltrate to the adjacent storm drains beneath them.

An illicit connection is suspected near Webster Street and the outfall of Area N10A-9A. Detergent suds were noted during several inspections, but only for a brief period of time. Television inspection of a private drain which flows into the municipal drainage system at this location revealed several connections. While these could be sump pumps, detergent suds and elevated fecal coliform have been documented from this private drain. The Town is currently investigating this issue.

Subarea N10A-9B

An area identified as sub-area N10A-9B consists of a sub-drain installed to drain the sewer trench during construction of the 15 inch sewer in 1926. The 8 inch sub-drain was constructed of asbestos concrete. The subdrain is directly beneath the sewer, and within the sewer trench. The excessive quantities of fecal coliform pollution discharging from the sub-drain are likely a result of the sewer leaking and sewage migrating into the sub-drain through cracks or joints, or overflow connections of the sewer to the subdrain. The sub-drain discharges approximately 25 gallons per minute to Alder Brook.

Other Area N10A issues

Elevated levels of fecal coliform bacteria detected in N10A-10 and N10A-Stream #4 are likely due to the areas being down-stream of the N10A-9A discharge. Additionally, N10A-Stream #6 and N10A-15 revealed elevated levels of fecal coliform bacteria as a result from being down-stream of N10A-7.

Two (2) other sampling locations, N10A-1B and N10A-16, exceeded the EPA criteria. Subarea N10A-1B is located on the Needham Country Club property, where geese are a problem. Subarea N10A-16 is located the Needham Country Club property also, but receives a majority of flow from the MBTA parking lot and rail system along Great Plain Avenue. Both of these areas drain into the Needham Reservoir. The water exiting the Reservoir had fecal coliform levels below the 200 MPN/100 ml. criteria.

Drainage Area N14

Drainage Area N14 collects stormwater from a large commercial/industrial area. Fecal coliform level were initially detected at 1,600 MPN/100ml. The majority of this area consists of commercial buildings and parking facilities. Subsequent inspections and testing have revealed levels of fecal coliform which meet the "swimmable water criteria". As discussed previously, three industries may discharge to the stormwater system under the NPDES program.

Drainage Area N14B

Sampling results of Area N14B, a relatively small commercial area, have revealed a possible illicit connection to the drainage system. The discharge pipe is located on Kendrick Street.

The first sampling event revealed a fecal coliform level of 2,400 MPN/100 ml. Due to this level, two additional samples were taken. These samples revealed minimal bacteria levels of 80 and 4 MPN/100 ml. The subsequent inspection revealed the RCP was dry, with no evidence of recent flow.

The drainage discharge pipe on Kendrick Street was dry on November 14th, but on November 15th (6:50 AM), the pipe discharged a small flow with a fecal coliform bacteria level of 16,000 MPN/100 ml. No evidence of flow was noted which would cause dry weather flows to increase during this period. This indicates that an illicit connection to the drainage system may exist, since no precipitation occurred, nor was any significant "water-use" activity noted during the inspection. An investigation and TV inspection of this drainage area is scheduled for this area. Polaroid Corp. is permitted to discharge to the drainage system under the NPDES program.

A summary of all of the dry weather sampling results is shown in Table 3.12. Laboratory data sheets for dry weather samples were submitted in BETA's November, 1996 Report.

Table 3.12 Summary of Dry Weather Sampling Results

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
			N1B					
N1B-1	South of Whitman Road	18-RCP	Stagnant	9/24/96	13:40	230	ND	900
N1B-1	South of Whitman Road	18-RCP	0.1	10/16/96	15:30	200	ND	4
N1B-1	South of Whitman Road	18-RCP	Stagnant	11/14/96	6:55	NS	NS	ND
N1B-2	Culvert at Charles River St.	12-RCP	Dry	11/5/96	11:45	NA	NA	NA
			N1					
N1	South of Oxbow Road	42-RCP	25	11/14/96	7:05	42	ND	20
N1-1	Oxbow Road	12-RCP	1	10/2/96	15:15	29	ND	130
N1-2	Oxbow Road	30-RCP	20	10/2/96	15:15	35	ND	11
N1-3	Culvert at Charles River St.	36-RCP	20	10/16/96	14:35	39	ND	22
N1-3A	Walker Gordon Pond	Pond	NA	10/16/96	14:40	32	ND	16,000
N1-4	Northwest of Walker Lane	12-RCP	Dry	10/16/96	15:05	NA	NA	NA
N1-5	North of Walker Lane	12-RCP	Dry	10/16/96	15:10	NA	NA	NA
N1-6	Southwest of Country Way	24-RCP	7	10/16/96	14:55	33	ND	8
N1-6A	Southwest of Country Way	6-AC	Dry	10/16/96	14:55	NA	NA	NA
			N6C					
N6C	Southwest of Crestview Road	18-RCP	Stagnant	9/24/96	13:50	54	ND	240
N6C	Southwest of Crestview Road	18-RCP	Stagnant	11/15/96	7:10	NS	NS	ND
			N8					
N8	South of Wildwood Drive	10'-Archway	5	9/24/96	13:15	54	ND	300
N8-1	South of Wildwood Drive	30-RCP	5	9/24/96	13:20	79	ND	140
N8-1	South of Wildwood Drive	30-RCP	12	11/14/96	6:45	74	ND	40
N8-2	South of Wildwood Drive	30-RCP	Dry	9/24/96	13:25	NA	NA	NA
N8-2	South of Wildwood Drive	30-RCP	Dry	10/16/96	13:40	NA	NA	NA
N8-3	Southeast of Fox Hill Road	15-CM	1	10/16/96	13:25	56	ND	500
N8-4	South of High Rock Street	20-RCP	0.1	10/16/96	13:15	66	ND	80
N8-5	South of Lantern Lane	12-AC	3	10/16/96	13:30	61	0.42	2
			N10A					
N10A-1	West of Green Street	24-RCP	Dry	10/8/96	13:20	NA	NA	NA
N10A-1A	West of Green Street	12-RCP	Dry	10/8/96	13:20	NA	NA	NA
N10A-1B	West of Green Street	12-RCP	2	10/8/96	13:20	130	ND	3,000
N10A-2	South of Great Plain Avenue	NS	Dry	11/5/96	13:28	NA	NA	NA
N10A-3	DPW Parking Lot	12-RCP	Dry	10/8/96	13:30	NA	NA	NA
N10A-4	Dedham Avenue	12-RCP	Dry	11/5/96	13:35	NA	NA	NA
N10A-5	West of Needham Athletic Fields	48-RCP	10	10/8/96	12:48	78	ND	80
N10A-5	West of Needham Athletic Fields	48-RCP	15	11/14/96	7:25	86	ND	60
N10A-5A	Dedham Golf Course	36-RCP	3	10/8/96	12:40	120	ND	170
N10A-6	Northwest of Harris Avenue	24-RCP	Dry	10/8/96	12:55	NA	NA	NA
N10A-7	South of Ivy Road	48-RCP	15	10/8/96	13:40	130	ND	900
N10A-7	South of Ivy Road	48-RCP	15	10/8/96	14:40	120	ND	90,000

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N10A-7	South of Ivy Road	48-RCP	NS	10/17/96	14:10	99	ND	5,000
N10A-7	South of Ivy Road	48-RCP	20	10/18/96	14:20	110	ND	1,100
N10A-7	South of Ivy Road	48-RCP	NS	11/7/96	9:30	NS	NS	1,700
N10A-7-Ivy Road	Ivy Road	12-RCP	0.5	10/18/96	14:35	NS	NS	9,000
N10A-7-Ivy Road	Ivy Road	12-RCP	0.5	11/5/96	12:00	NS	NS	1,900
N10A-7-C1	South of Wilshire Park	42-RCP	NS	10/18/96	12:15	69	ND	1,700
N10A-7-C2	Great Plain Avenue	36-RCP	NS	10/18/96	12:20	NS	NS	700
N10A-7-C3	Great Plain Avenue	24-RCP	5	11/6/96	11:30	57	ND	300
N10A-7-C4	Great Plain Avenue	42-RCP	25	11/6/96	11:30	86	ND	170
N10A-7-C5	Great Plain Avenue	36-RCP	5	11/6/96	11:30	73	ND	2,200
N10A-7-Beaufort	Beaufort Street	NS	DRY	11/18/96	15:00	NA	NA	NA
N10A-7-Ellicot	Ellicot Street	18-RCP	20	11/6/96	10:20	28	0.21	1,700
N10A-7-Greenwood	Greenwood Avenue	NS	DRY	11/6/96	9:40	NA	NA	NA
N10A-7-Wash/GT. Plain	Corner of Washington and Great Plain Avenue	36-RCP	NS	11/6/96	11:15	NS	NS	1,400
N10A-7-Washington	Washington Avenue	24-RCP	5	11/6/96	10:20	53	ND	2,400
N10A-7-Washington #2	Washington Avenue	NS	DRY	11/6/96	10:30	NA	NA	NA
N10A-7-Seargent St.	Sergeant Street	24-RCP	NS	10/18/96	15:15	77	ND	40
N10A-7-Woodlawn	Woodlawn Avenue	NS	DRY	11/6/96	9:30	NA	NA	NA
N10A-8	Southwest of Canterbury Lane	12-RCP	1	10/8/96	14:45	75	ND	80
N10A-9	East of Webster Street	36-RCP	3	10/2/96	15:00	50	ND	110
N10A-9	East of Webster Street	36-RCP	NS	10/17/96	13:50	NS	NS	1,600
N10A-9	East of Webster Street	36-RCP	NS	11/7/96	9:40	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	10	10/2/96	15:00	120	ND	160,000
N10A-9A	East of Webster Street	24-RCP	NS	10/11/96	14:20	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	NS	10/11/96	14:30	NS	NS	3,000
N10A-9A	East of Webster Street	24-RCP	5	10/16/96	13:00	NS	NS	16,000
N10A-9A	East of Webster Street	24-RCP	NS	10/17/96	13:50	NS	NS	9,000
N10A-9A	East of Webster Street	24-RCP	NS	10/18/96	12:00	130	ND	3,000
N10A-9A	East of Webster Street	24-RCP	NS	11/5/96	14:30	NS	NS	9,000
N10A-9A	East of Webster Street	24-RCP	NS	11/7/96	9:40	NS	NS	3,000
N10A-9A-C1	Webster Street	24-RCP	NS	10/18/96	12:15	130	ND	5,000
N10A-9A-C2	Webster Street	15-CLAY	NS	10/18/96	12:20	NS	NS	3,000
N10A-9A-C2	Webster Street	15-CLAY	NS	11/7/96	11:00	57	ND	230
N10A-9A-C3	Webster Street	14-RCP	NS	10/18/96	12:30	NS	NS	16,000
N10A-9A-C4	Webster Street	NS	DRY	10/18/96	11:30	NA	NA	NA

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N10A-9A-Corner of Howland and Pleasant	Corner of Howland and Pleasant	NS	NS	10/17/96	15:00	210	ND	110
N10A-9A-90 Norfolk St.	90 Norfolk Street	12-CLAY	2	10/18/96	13:50	160	ND	300
N10A-9A-302 Warren St.	302 Warren Street	12-CLAY	4	10/18/96	13:00	120	ND	40
N10A-9B	Northeast of Webster Street	8-AC	5	11/7/96	10:30	93	ND	24,000
N10A-9B	Northeast of Webster Street	8-AC	5	11/7/96	10:30	NS	NS	160,000
N10A-10	Northwest of Sutton Road	12-RCP	NS	10/8/96	14:22	NS	NS	3,000
N10A-11	East of Dedham Avenue	42-RCP	10	10/2/96	15:20	75	ND	80
N10A-11	East of Dedham Avenue	42-RCP	20	11/14/96	7:30	71	0.24	ND
N10A-11A	East of Dedham Avenue	12-RCP	3	10/8/96	12:30	38	ND	500
N10A-11A	East of Dedham Avenue	12-RCP	2	11/15/96	7:30	NS	NS	ND
N10A-12	East of Canterbury Lane	12-RCP	0.5	10/8/96	14:50	74	ND	23
N10A-13	George Abbot Lane	NS	Dry	10/8/96	14:15	NA	NA	NA
N10A-14	West of Great Plain Avenue	24-RCP	Dry	10/8/96	14:55	NA	NA	NA
N10A-15	West of Great Plain Avenue	Brick	0.5	10/8/96	14:10	120	ND	300
N10A-16	Needham Golf Course	21	15	11/5/96	11:30	94	ND	500
N10A-16A	Needham Golf Course	15	Dry	11/5/96	11:30	NA	NA	NA
N10A-17	Northwest of Livingston Circle	12-RCP	Dry	11/5/96	13:10	NA	NA	NA
N10A-18	Southwest of South Street	12-PVC	Dry	11/5/96	13:20	NA	NA	NA
N10A-19	Southwest of Great Plain Avenue	15-PVC	Dry	11/5/96	13:25	NA	NA	NA
N10A-20	South of Washington Avenue	12-RCP	Dry	11/5/96	13:45	NA	NA	NA
N10A-21	South St. and Dedham Avenue	NS	DRY	11/5/96	13:23	NA	NA	NA
N10A-22	DPW Parking Lot	12-PVC	0.5	11/5/96	10:00	410	0.23	ND
N10A-23	South of Dedham Avenue	12-RCP	NS	11/6/96	14:00	NS	NS	130
N10A-Stream #1	Southwest of Dedham Avenue	STREAM	NS	11/5/96	13:50	NS	NS	20
N10A-Stream #2	Southwest of Dedham Avenue	STREAM	NS	11/5/96	14:10	NS	NS	130
N10A-Stream #3	West of Needham Reservoir	STREAM	NS	11/5/96	14:10	NS	NS	80
N10A-Stream #4	Southwest of Dedham Avenue	STREAM	NS	11/5/96	14:15	NS	NS	500
N10A-Stream #5	Northwest of Needham Reservoir	STREAM	NS	11/5/96	14:30	NS	NS	220
N10A-Stream #6	North of Needham Reservoir	STREAM	NS	11/5/96	14:35	NS	NS	1,300
			N11					
N11	South of South Street	12-RCP	DRY	10/2/96	14:40	NA	NA	NA
N11-1	South of South Street	12-RCP	0.1	10/2/96	14:45	190	ND	50
			N14					
N14	North of Second Avenue	54-RCP	1	10/2/96	13:30	270	0.27	1,600
N14	North of Second Avenue	54-RCP	1	10/17/96	12:50	NS	NS	30
N14	North of Second Avenue	54-RCP	1	11/14/96	7:50	180	0.28	130
			N14B					
N14B-1	South of Kendrick Street	30-RCP	1	9/24/96	14:00	28	0.54	2,400
N14B-1	South of Kendrick Street	30-RCP	0.2	10/2/96	14:00	14	0.77	80
N14B-1	South of Kendrick Street	30-RCP	0.1	10/17/96	12:30	NS	NS	4

Sampling Location #	Sampling Location	Pipe Size (in.)-Material	Flow (gpm)	Date	Time	Chloride (mg/l)	Fluoride (mg/l)	Fecal Coliform Bacteria (MPN/100 ml)
N14B-1	South of Kendrick Street	30-RCP	DRY	11/14/96	7:55	NA	NA	**NA**
N14B-1	South of Kendrick Street	30-RCP	<0.1	11/15/96	6:50	NS	NS	**16,000**
			N19					
N19	Northeast of Charles Street	48-RCP	30	10/2/96	13:15	220	ND	**70**
N19	Northeast of Charles Street	48-RCP	25	10/17/96	12:10	190	ND	**50**
N19	Northeast of Charles Street	48-RCP	25	11/14/96	8:10	150	ND	**80**
N19-2	West of First Avenue	12-RCP	Dry	11/15/96	9:45	NA	NA	**NA**
N19-3	West of First Avenue	18-RCP	Dry	10/17/96	12:15	NA	NA	**NA**
N19-3A	West of First Avenue	STREAM	20	10/17/96	12:17	210	ND	**170**
N19-4	West of First Avenue	12-RCP	Dry	10/17/96	11:50	NA	NA	**NA**
N19-5	Off of Route 128	15-VC	NA	NA	NA	NS	NS	**NS**
N19-6	Off of Hunting Road	15-RCP	Dry	11/15/96	7:30	NA	NA	**NA**
N19-7	Off of Route 128	24-RCP	NA	NA	NA	NS	NS	**NS**
N19-8	Off of Route 128	NS	DRY	11/15/96	9:40	NA	NA	**NA**
N19-8A	On ramp of Route 128 South	12-RCP	Stagnant	11/15/96	9:30	NS	NS	**ND**
N19-9	South of Wexford Street	42-RCP	20	11/15/96	8:25	150	ND	**70**
N19-9A	South of Wexford Street	STREAM	0.1	11/15/96	8:15	NS	NS	**40**
N19-Woodbine	Woodbine Street	NS	1	11/15/96	7:50	NS	NS	**20**
			N22					
N22	East of Reservoir Street	18-RCP	Dry	10/2/96	12:50	NA	NA	**NA**
N22	East of Reservoir Street	18-RCP	Dry	10/17/96	11:30	NA	NA	**NA**
N22	East of Reservoir Street	18-RCP	Dry	11/14/96	8:25	NA	NA	**NA**
N22	East of Reservoir Street	18-RCP	Dry	11/15/96	7:10	NA	NA	**NA**
			Charles River					
C1	North of Charles River Street	River	NA	9/24/96	13:45	NS	NS	**170**
C2	North of Bridge Street	River	NA	9/24/96	14:10	43	ND	**80**

Note: 1) Please refer to the drawings attached in the report for the approximate sampling locations

Abbreviations:
AC - Asbestos Concrete
PVC - Polyvinylchloride Pipe
RCP - Reinforced Concrete Pipe
VC - Vitrified Clay
NA- Not Applicable
ND- Not Detected
NS- Not Sampled

Conclusions

Illicit Connections and Fecal Coliform Bacteria

No correlation was noted between fecal coliform bacteria, chloride and fluoride during this investigation, with the exception of Area N14 and N14-B. These two areas are the only two which have facilities with General Permits under the NPDES permit program. These permits allow certain non-stormwater discharges to the drainage system.

The Charles River was tested for fecal coliform bacteria on September 24, 1996, where the River flows into and out of Needham's Corporate limits. The samples were taken approximately 30 minutes apart. Fecal coliform levels were measured at 170 and 80 MPN/100 ml., respectively. This indicates that dry weather fecal coliform loads into the Charles River are minimal within Needham.

Four (4) of the ten (10) study areas either were dry or met the 200 MPN/100 ml. bacteria criteria during dry weather conditions (Areas N6C, N11, N19 and N22).

Areas N1B, N1, N8 and a portion of N10A-7 were documented to have fecal coliform levels which were the direct result of animal populations. The animals included mammals living within the pipes (N10A-13, N8 and N10A-7) and geese (N1B, N1, N8).

TV inspections of sewer and drain pipes in the areas identified in the Consent Order is ongoing. The investigation is focusing on four areas where possible illicit connections or other sources of pollutants exist in the municipal drainage system, owned and maintained by the Town of Needham.

Television inspection of approximately 1,200 feet of sewer and drain pipe have been inspected during this investigation. Wet weather conditions have hindered progress, however. In addition, the Town is conducting TV inspections of sewers independently under their infiltration/inflow (I/I) program.

Areas N10A-7, N10A-9A, N10A-9 and N14B have revealed consistently elevated fecal coliform bacteria levels which are not deemed due to wildlife impacts or non-point source pollution. Additional inspections are being conducted in these areas of high fecal coliform bacteria, as shown on Figure 3.77. The bacteria is possibly due to illicit connections and/or indirect connections from leaking sewers.

The Town recently reconstructed sewers in Washington Street (Area 10A-7). Coincidentally, our scope of work proposed a TV inspection of municipal sewers on Washington Street, due to the elevated fecal coliform bacteria levels detected during dry weather sampling. Follow-up testing of this drainage system is planned in January of 1997. Additionally, inspection of the drain on Ivy Rd. revealed animal feces and groundwater seepage to be the cause of elevated fecal coliform bacteria (see Figure 3.39).

Costs of Removal of Illicit Connections

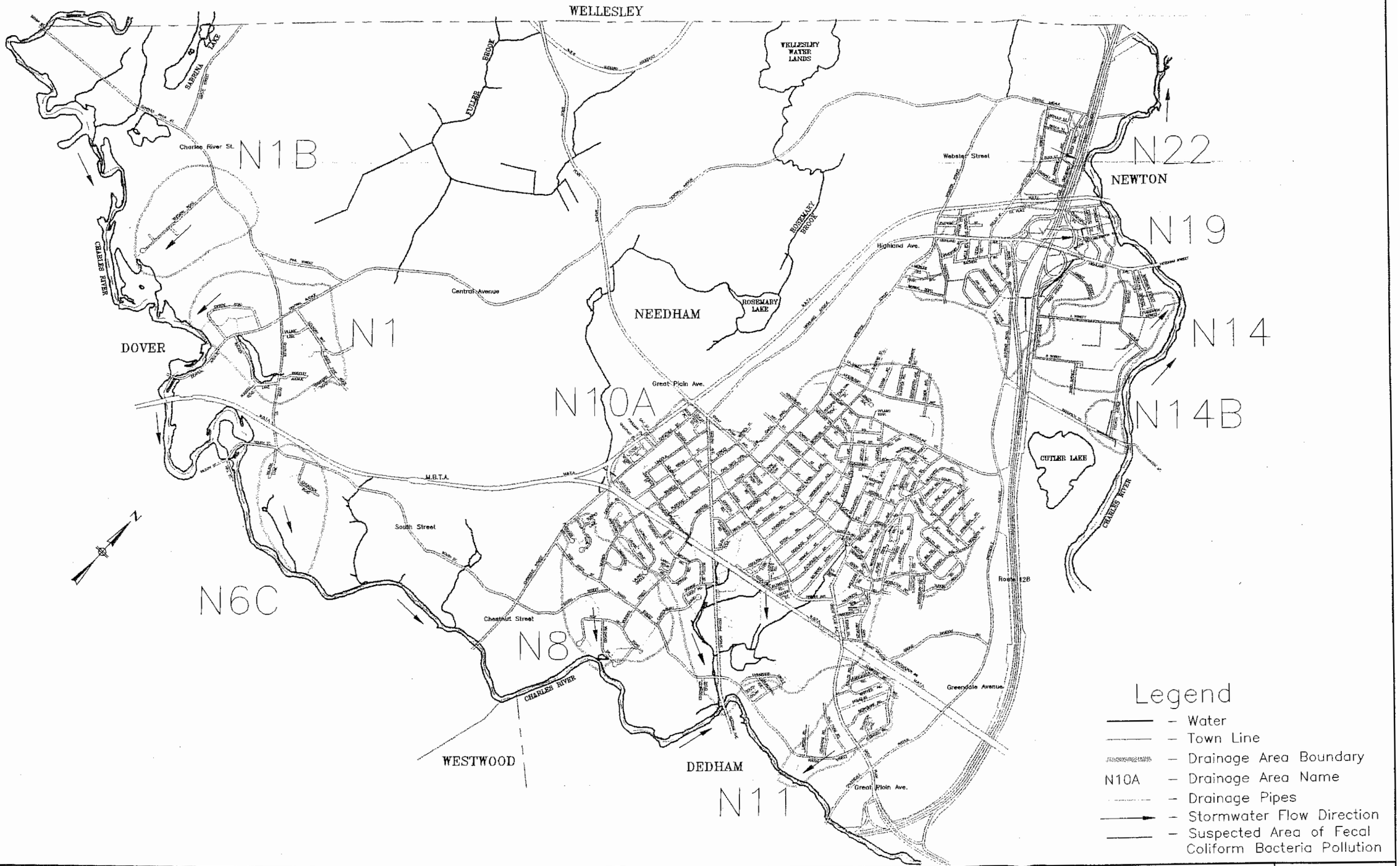
The costs of removal of illicit connections to the drainage system, as well as potential municipal sewer impacts to the drains, are currently being developed. The television inspection program has revealed the condition of the sewer and drain pipes in several areas of our study. Due to inclement weather, several areas of television inspection are pending.

The following alternatives are being evaluated to remove illicit connections and sewer impacts to the municipal stormwater system:

- replacement of the impacted municipal storm drains on Norfolk and Webster Streets
- replacement of the leaking municipal sanitary sewers (Webster Street, Washington Street completed)
- repair of storm drains (sealing pipe joints, structural cracks)
- repair of sanitary sewers (inversion lining, slip lining)
- physically sealing the sewer sub-drain in Area 10A-9B (concrete plug)

As detailed in the Administrative Consent Order (ACO), the Town is required to complete the design of projects necessary to remove illicit connections to the identified storm drains by February 28, 1997. In accordance with the ACO, the design will include an analysis of alternatives to remove the connections. The design will also include cost estimates to for the repairs.

Additionally, methods of limiting animal access to storm drains, such as metal grating, will be evaluated. Animal feces, as previously discussed, are a problem in at least four areas which were studied.



BETA ENGINEERING, INC.
Engineers/Planners

Figure 3.77 – Suspected Areas of Fecal Coliform Bacteria Pollution
Needham Stormwater Managment

SCALE: Not to Scale

JOB 917

FILE NO. NEEDHAM.DWG

PART II - STORMWATER MANAGEMENT PROGRAM

Section I - Wet Weather Sampling Procedures and Results

General

This Stormwater Management Program will address regulatory authority of the municipal stormwater system, existing stormwater flows and pollutant loads, and existing and proposed improvements to Needham's stormwater management program. An effective stormwater management program can help reduce pollutant loads to receiving waters during dry weather and wet weather conditions. Reduced pollutant loads to receiving waters results in improved water quality, which is the focus of the "Consent Order" and "Memorandum of Understanding" between Needham and the EPA.

Municipal and Regulatory Authority

The Town of Needham is a municipality as defined in Section 502(4), 33 U.S.C. section 1362(4). The municipality is the owner and operator of a stormwater drainage system which collects, conveys and discharges stormwater to receiving waters, including the Charles River.

Sanitary sewage flows from residents, businesses and industry are conveyed through a municipal sanitary sewer system, also owned and operated by the Town. Connections of sanitary sewers to the municipal stormwater system are prohibited by several local regulations of the Department of Public Works and the Health Department.

Other flows to the municipal stormwater system are regulated by federal regulations of the National Pollutant Discharge Elimination System (NPDES) program and State regulations of the State Stormwater Discharge Permit program. A list of these discharges, the type of businesses, locations and NPDES permit numbers are provided in Part I, Section III of this Report.

In Needham, enforcement and compliance with federal, state and local stormwater regulations are administered by the Environmental Protection Agency (EPA), the Department of Environmental Protection (DEP), and Needham's local government.

At the local level, the operation and management of the municipal stormwater system is conducted by the Department of Public Works (DPW). Inspections and monitoring of the municipal stormwater collection system are also conducted by the DPW. The DPW conducts maintenance of the drainage system, including catch basin cleaning, street sweeping, etc.

Where water quality constitutes nuisance conditions or public health issues, the Needham Health Department has regulatory authority. The Health Department also has authority

where water quality violations exist which impact the municipal drainage system. Examples include private drains, septic system overflows, and other sources of pollution on private property.

Stormwater Impacts to Receiving Waters

Stormwater runoff can be a significant non-point and point source of surface water pollution (FHWA, 1988). Past studies (FHWA, 1984) have shown that peak concentrations of metals and other pollutants (chloride, nutrients, oil & grease and TSS) in roadway runoff can exceed the EPA Aquatic Water Quality Criteria and/or Drinking Water Standards.

Constituent concentrations in roadway runoff are often site specific. Depending upon the type of land use adjacent to a road, roadways can be classified as being rural, suburban or urban. A rural area is typically more undeveloped with more open pervious area.

Urban development which is adjacent to a roadway reduces the pervious area and increases the impervious area (such as roof tops, streets, parking lots, and sidewalks). As detailed in Table 2.1.1, roads passing through urbanized areas typically have contaminant concentrations much higher than those passing through rural areas.

Table 2.1.1 Comparison of Road Runoff Contaminants from Urban and Rural Areas

Contaminant (mg/l)	Urban	Rural
Copper	0.054	0.022
Lead	0.40	0.08
Nitrate	0.76	0.46
Phosphate	0.40	0.16
TSS	142	41
Zinc	0.33	0.08

Source: Federal Highway Administration Publication WA/RD-88/006

Table 2.1.2 lists contaminants which were measured during wet weather sampling of this study, their impacts on receiving waters and their source(s). Nutrients and metals affect both human health and aquatic life if present in elevated levels. Fertilizers, animal feces, and decomposition of leaves during the Fall are several sources for nutrients in the environment (nitrates and phosphate). Metals are typically associated with motor vehicle traffic.

Table 2.1.2 Effects of Highway Runoff on Receiving Waters.

Constituent	EPA Guidance Critical Levels	Impact	Source(s)
Chloride	250 mg/L	Taste, domestic water supply	Deicing
Copper	<1 mg/L	Taste & odor	Engine
Iron	50 μg/L	Color, domestic water supply	Automobile rust
Lead	50 μg/L	Human health	Tire wear
Nitrate	10 mg/L	Domestic water supply	Fertilizers
Oil & Grease	Surface waters free from floating oils	Freshwater aquatic life	Oils & Greases
Phosphate	0.10 mg/L	Water quality/eutrophication	Fertilizers
TSS	Should not reduce the depth of the compensation point for photosynthetic activity by more than 10% from the seasonably established norm for aquatic life	Freshwater fish and other aquatic life	Pavement wear, sanding
Zinc	5 mg/L	Taste & odor	Oil, grease

Source: Resource Document for Environmental Assessments, Volume III,FHWA/RD-84/064.

Four metals; copper, iron, lead and zinc; were measured during wet weather sampling. The regulatory and guidance levels of these four metals are listed in Table 2.1.3. EPA Guidance Levels are critical levels for stormwater runoff. Drinking Water Regulations are published levels for public drinking water supplies. Chronic levels indicate levels where aquatic organisms show signs of stress, and acute levels are levels at which 50 % of organisms die (LC_{50}). While chronic and acute levels vary significantly and are dependent upon the hardness of the receiving stream (3), they are shown for comparison purposes to the levels obtained during wet weather sampling.

Table 2.1.3 Regulatory and Guidance Levels of Copper, Iron, Lead and Zinc

Metal	EPA Guidance Critical Levels (mg/l)	Drinking Water Standard (mg/l)	chronic level (mg/l)	acute level(1) (mg/l)
Copper	1.0	1.3	0.0065	0.0033
Iron	0.05	0.3(2)	1.0	NA
Lead	0.05	0.05	0.0013	0.158
Zinc	5.0	5.0(2)	0.059	0.169

(1) : acute toxicity level for flathead minnow
(2) : Secondary Drinking Water Standard (cosmetic/taste)
NA: No Standard
Source: EPA Guidelines and Regulations

Wet Weather Sampling, Analysis and Evaluation

Wet weather sampling was conducted on October 19-20, 1996. Four (4) samples from seven (7) discharges were taken during the storm. The samples included a baseline sample prior to the storm, a first flush sample and two additional samples approximately one hour apart. Approximately one (1) inch of rain fell during the duration of the sampling event.

The first flush samples were taken when rainfall was observed flowing into the drainage systems, and an increase in stormwater discharge was noted. The reason for sampling during this period was to determine the peak load of the pollutants discharged for the storm event. First flush samples reflect runoff which washes materials from roadway surfaces and drainage systems deposited during a previous, or antecedent, dry period. The pollutant loads of the first flush period often reflect peak pollutant loads. For this storm, the antecedent dry period was ten (10) days.

Weather Serviees Corp. of Lexington, MA was retained to assist with weather prediction. Weather Services advised BETA of precipitation events which appeared to meet our criteria. These criteria included the need of a defined storm system with a potential of 1/2-inch of rain in a six hour period, and a minimum antecedent dry period of 72 hours.

Sample Collection

Several bottle types were used to eollect runoff samples. All the bottles were prepared prior to sampling. Both glass and plastic (HDPE - High Density Polyethylene) bottles of different sizes were used depending upon the types of parameters to be analyzed. Table

2.1.4 lists the bottles used, their size and the type of preparation. All samples were grab samples collected at the stormwater discharges to the receiving water. The receiving waters were either the Charles River, or Alder Brook, a tributary to the Charles River.

Table 2.1.4 List of Type/Size and Preparation of Bottles Used for Sampling

Constituent(s)	Material	Size	Preparation
Metals	Plastic (HDPE)	100 ml.	HNO_3
Nutrients	Plastic (HDPE)	100 ml.	H_2SO_4
Total Petroleum Hydrocarbon	Glass	1000 ml.	H_2SO_4
TSS/TS, Chloride	Plastic (HDPE)	1000 ml.	None

To evaluate land use impacts upon stormwater quality, wet weather samples were collected from urban and residential areas. Three areas were characterized as urban, with a predominance of industrial/commercial activities and land uses within the drainage area. Four areas were characterized as residential/rural, with a predominance of residential land use and/or open space. The areas are defined in Table 2.1.5.

Table 2.1.5 Land Use of Wet Weather Sampling Areas

Subarea	Location	Land Use
N19-1	Charles Street	Rte. 95/ Commercial/ Industrial
N14-1	Highview Street	Commercial/ Industrial
N14B-1	Kendrick Street	Commercial/ Industrial
N10A-9	Webster Street	Residential
N10A-9A	Webster Street	Residential
N10A-7	Ivy Road (South)	Residential/Recreational
N10A-11	Dedham Avenue	Residential

Source: Needham Land Use and Zoning Map

Results of Wet Weather Sampling

The results of the wet weather sampling are discussed below, and are summarized in Table 2.1.6 Additionally, individual pollutant levels for all seven (7) areas are shown in Figures 2.1.1 through 2.1.10. Laboratory data sheets are provided in Appendix A.

Total Metals Results

Wet weather sampling for total metals was conducted for copper, iron, lead and zinc. The results of the wet weather sampling revealed the following:

Copper

- a first flush peak was noticed in six (6) of seven samples (see Figure 2.1.1).
- Area N14, a commercial area, revealed no first flush peak in concentration.
- there was no correlation between land use and copper concentration levels.
- all copper levels for all samples were below EPA Guidance levels and Drinking Water Regulation levels.
- all samples obtained during the storm were above chronic and acute levels (see Table 2.1.3).
- five of six copper samples had pre-rain levels below detection limits, indicating minimal dry weather levels. Area 14B was dry prior to rainfall.

Iron

- six of the seven areas showed a first flush peak for iron (See Figure 2.1.2).
- area N14B, a commercial area, revealed no first flush peak in concentration.
- residential areas revealed higher iron levels than commercial/industrial areas.
- all samples obtained during the storm were generally at or above both EPA guidance levels and Drinking Water Regulation levels.

  - **"Iron bacteria" are species of (lepotothrix and crenothrix) bacteria capable of metabolizing reduced iron into ferric oxide. The ferric oxide is precipitated either onto the stream bottom, or withiu the slimes that the bacteria secretes (Standard Methods, APHA, 1989). The reddish brown slimes often generate an unpleasaut odor for drinking water supplies, but pose no direct threat to water qnality or public health. In fact, the bacteria will often reduce the dissolved iron of water, thereby increasing water quality.**

    Iron for the bacteria may be obtained from pipes, steel re-bar of the pipes, or from flowing water. Typically, iron bacteria proliferate where conditions such as increased oxygenation occur. This occurs at numerous stormwater outfalls within our study area in Needham. BETA tested stormwater outfalls, where reddish slimes were evident, since this color may also indicate sanitary sewage. Many outfalls exhibit discoloration associated these bacteria, as detailed in the Figures of Part I, Section 3.

    Samples submitted for microscopic laboratory analysis revealed elevated levels of the iron bacteria. Generally, outfalls with iron bacteria slimes were associated with low fecal coliform bacteria. As previously mentioned, these bacteria actually reduce dissolved iron within the water, thereby improving water quality.

Lead

- Three of the seven areas (N10A-7, N10A-9 and N10A-9A) revealed a first flush peak for lead (see Figure 2.1.3). These are all residential areas.
- Lead was only detected in the three first flush samples referenced above.
- Lead was not detected in any of the commercial/industrial area samples.
- Lead exceeded the National Primary Drinking Water Regulation Standards (NPDWR), EPA Guidance, Acute and Critical levels in the three (3) residential samples.
- All three samples had elevated solids and suspended solids levels, as detailed in the following section. The "total lead" was likely within the solids of the first flush samples, and not "dissolved lead" within the stormwater. No dissolved metals analyses were conducted for this study.

Zinc

- All seven areas revealed a first flush peak concentration for zinc (see Figure 2.1.4)
- Area 10A-7 took several hours to reach a peak concentration.
- there was no correlation between land use and zinc concentrations.
- All zinc levels were below National Primary Drinking Water Regulation Standards (NPDWR) and EPA Guidance levels.
- Prior to the storm, most samples were below above acute and chronic levels. Nearly all samples were above acute and chronic levels during the storm.

Chloride, Nitrate and Phosphorus Results

Wet weather sampling was conducted for chloride, nitrate and phosphorus. The results for these parameters revealed the following, as shown in Figures 2.1.5 - 2.1.7.

- First flush peak concentrations for chloride were evident in four of the seven areas. Additionally, Area 10A-9A had a significant peak concentration later during the storm. The reason for this is unknown, but could be due to adjacent sewers surcharging, and exfiltration of sewage into the drain system, as detailed in Part I of this Report. The chloride peak is consistent with the period of time when rainfall intensified (1 inch per hour), likely resulting in surcharge conditions when the sample was taken from the outfall at 2:00 AM.
- Only two of the seven areas (N14 and N10A-11) had peak concentrations during the first flush for nitrate nitrogen. All samples met EPA guideline levels and NPDWR's.
- First flush peaks for phosphorus were evident in four of the seven areas (10A-9, 10A-9A, 10A-7 and 10A-11). These are all areas of residential land use.

Total Solids and Total Suspended Solids

Wet weather sampling results for total solids (TS) and total suspended solids (TSS) revealed the following:

- Peaks for TS and TSS were evident in N10A-7, N10A-9 and N10A-9A during the first flush period. These are three of the four residential land use areas within the

Table 4-6 Summary of Wet Weather Sampling Results

Sampling Location #	Sampling Location	Date	Time	Conductivity (uhmos)	pH	Temp (°C)	Nitrates (mg/L)	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)	Total Solids (mg/L)	Chloride (mg/L)	Total Petroleum Hydrocarbons (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Zinc (mg/L)
DRAINAGE AREA - N10A																
N10A-7	South of Ivy Road	10/19/96	20:28	560	7.85	14.2	2.55	0.673	ND	305	115	ND	ND	0.06	ND	0.04
N10A-7	South of Ivy Road	10/20/96	1:28	380	7.70	14.4	2.16	1.20	2560.0	2730	72.0	ND	0.07	**14.2**	**0.55**	0.19
N10A-7	South of Ivy Road	10/20/96	2:40	340	7.40	13.6	1.91	0.439	40.0	234	72.0	ND	0.02	**0.51**	ND	0.10
N10A-7	South of Ivy Road	10/20/96	3:10	350	7.30	14.0	2.46	0.566	21.0	241	72.0	ND	0.02	**0.68**	ND	0.10
DRAINAGE AREA - N10A																
N10A-9	East of Webster Street	10/19/96	20:08	410	7.39	12.2	2.21	0.547	ND	217	49.5	ND	ND	**0.50**	ND	0.07
N10A-9	East of Webster Street	10/20/96	24:47	320	7.30	13.5	1.94	2.34	2530	2530	97.0	ND	0.06	**28.7**	**0.18**	0.35
N10A-9	East of Webster Street	10/20/96	2:25	300	7.35	13.8	0.966	0.600	23.0	223	74.5	ND	0.02	**1.79**	ND	0.22
N10A-9	East of Webster Street	10/20/96	3:10	310	7.20	13.0	0.527	0.505	16.0	204	52.0	ND	0.01	**0.72**	ND	0.16
DRAINAGE AREA - N10A																
N10A-9A	East of Webster Street	10/19/96	20:05	570	7.37	11.2	2.05	0.342	ND	386	132	ND	ND	0.05	ND	0.04
N10A-9A	East of Webster Street	10/20/96	1:00	580	7.30	12.3	1.97	2.35	2500	2630	110	ND	0.09	**55.9**	**0.29**	0.39
N10A-9A	East of Webster Street	10/20/96	2:25	900	7.10	12.3	1.16	0.581	97.0	732	**284**	ND	0.07	**4.90**	ND	0.27
N10A-9A	East of Webster Street	10/20/96	3:15	320	6.90	12.0	0.775	0.608	64.0	246	57.0	ND	0.09	**1.13**	ND	0.27
DRAINAGE AREA - N10A																
N10A-11	East of Dedham Avenue	10/19/96	20:50	360	7.59	12.8	1.06	0.153	ND	217	72.0	ND	ND	0.09	ND	0.03
N10A-11	East of Dedham Avenue	10/20/96	1:37	410	6.70	13.5	3.06	0.539	41.0	301	97.0	ND	0.02	**4.86**	ND	0.11
N10A-11	East of Dedham Avenue	10/20/96	2:10	350	7.60	13.8	2.21	0.265	13.0	5330	67.0	ND	0.01	0.29	ND	0.03
N10A-11	East of Dedham Avenue	10/20/96	3:40	300	6.90	12.9	1.98	0.0862	2.0	180	62.0	ND	0.03	**0.42**	ND	0.06
DRAINAGE AREA - N14																
N14-1	North of Second Avenue	10/19/96	19:40	880	7.65	12.4	0.102	0.687	13.0	591	92.0	ND	0.12	**0.67**	ND	0.30
N14-1	North of Second Avenue	10/20/96	1:20	480	**6.40**	12.5	0.806	0.402	96.0	438	110	ND	0.08	**1.84**	ND	0.58
N14-1	North of Second Avenue	10/20/96	2:25	180	**6.40**	14.5	0.314	0.195	11.0	120	34.0	ND	0.02	0.30	ND	0.21
N14-1	North of Second Avenue	10/20/96	3:30	200	6.50	13.4	0.379	0.107	12.0	122	44.5	ND	0.02	**0.50**	ND	0.25
DRAINAGE AREA - N14B																
N14B-1	South of Kendrick Street	10/19/96	19:50	DRY												
N14B-1	South of Kendrick Street	10/20/96	24:37	240	7.05	11.6	0.482	0.278	14.0	156	34.5	ND	0.03	**0.71**	ND	0.18
N14B-1	South of Kendrick Street	10/20/96	1:38	190	6.80	12.7	0.459	0.162	7.0	132	54.5	ND	0.04	**0.33**	ND	0.32
N14B-1	South of Kendrick Street	10/20/96	2:15	180	6.70	13.0	0.379	0.185	13.0	123	37.0	ND	0.02	0.25	ND	0.23
DRAINAGE AREA - N19																
N19-1	Northeast of Charles Street	10/19/96	20:12	800	7.50	12.2	2.45	ND	36.0	474	191	ND	ND	**1.60**	ND	0.05
N19-1	Northeast of Charles Street	10/20/96	1:28	670	6.70	12.8	2.31	0.375	162	547	157	ND	0.04	**10.8**	ND	0.21
N19-1	Northeast of Charles Street	10/20/96	2:40	510	6.50	12.7	1.71	0.470	80.0	344	119	ND	0.06	**4.85**	ND	0.22
N19-1	Northeast of Charles Street	10/20/96	3:50	640	7.20	12.4	1.83	0.187	27.0	420	160	ND	0.04	**3.79**	ND	0.19
National Primary Drinking Water Regulation Standards				None	6.5-8.5[3]	None	10	None	None	None	250[3]	None	1.3	0.3[3]	0.05	5.0[3]

Note: 1) Please refer to the drawings attached in the report for the approximate sampling locations
2) Shaded values exceed published drinking water standard
3) Secondary drinking water standard
4) ND- Not Detected

study. Area 10A-11, the fourth residential area, revealed a significant peak for TS approximately two hours into the storm, with a minimal peak for TSS.

- Peak concentrations for TS and TSS correlated with metals concentrations.
- Commercial/Industrial areas had minimal peaks for TS and TSS during first flush conditions, if any (see Figures 2.1.8 - 2.1.9).

Total Petroleum Hydrocarbons (TPH)

Wet weather sampling was conducted to evaluate whether TPH levels were elevated during first flush conditions. Additionally, a comparison of commercial/industrial land use and residential land use impacts to TPH levels was planned. However, no TPH was detected in any sample during the wet weather sampling event.

Watershed Hydrology

All ten (10) watershed areas and their sub-areas were analyzed using the Soil Conservation Service (SCS) Technical Release 55 (TR-55) method. Using TR-55 times of concentration, runoff volumes and peak discharge rates were calculated at the outfall locations for a 10-year frequency storm (see Appendix B). The peak discharge rates were evaluated to determine the land area requirements to construct various BMP's (see Table 2.1.7).

Soil data was determined from the Soil Survey of Norfolk County, MA, prepared by the US Soil Conservation Service in 1989. The hydrologic soil classification for these ten watersheds varies from Group A to Group C.

Table 2.1.7 Watershed Analysis Summary

Drainage Area	Area (acres)	Pipe Size (inches)	Calculated Flow (cfs)
N1B	23.4	18	5.7
N1	180.4	30	39.5
N6C	13.3	18	18.4
N8-1	70.7	30	27.7
N8-2	53.9	30	40.8
N10A-5	52.5	42	30.5
N10A-6	6.6	24	18.4
N10A-7	220.9	48	274.3
N10A-9	61.2	36	28.8
N10A-9A	117.9	24	97.7
N10A-11	139.5	42	44.1
N11	60.4	12	25.6
N14	87.3	54	62.89
N14B	39.3	30	75.8
N19	260.4	48	127.2
N22	47.1	24	83.4

Figure 2.1.1: Total Copper

Wet Weather Sampling Results

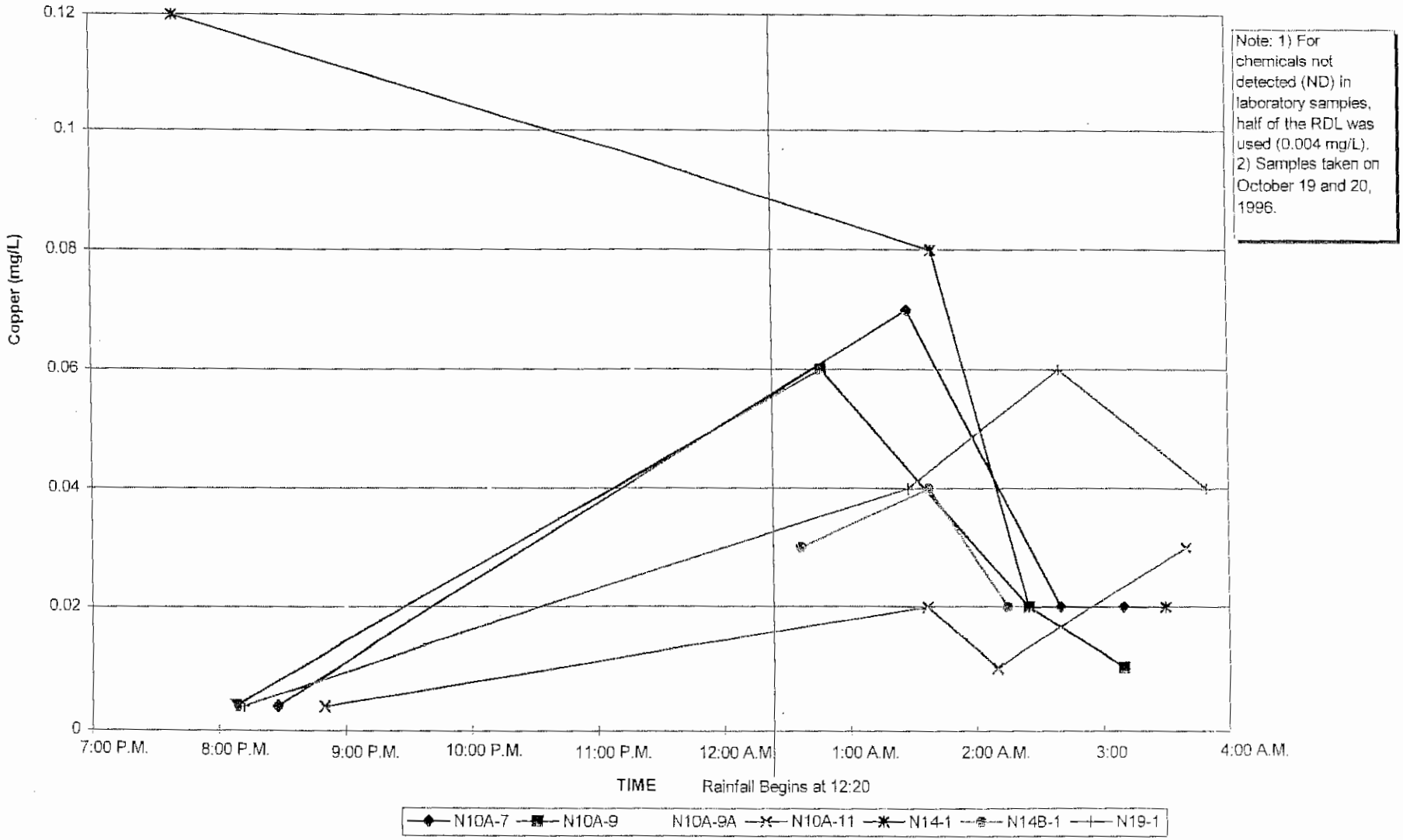


Figure 2.1.2: Total Iron

Wet Weather Sampling Results

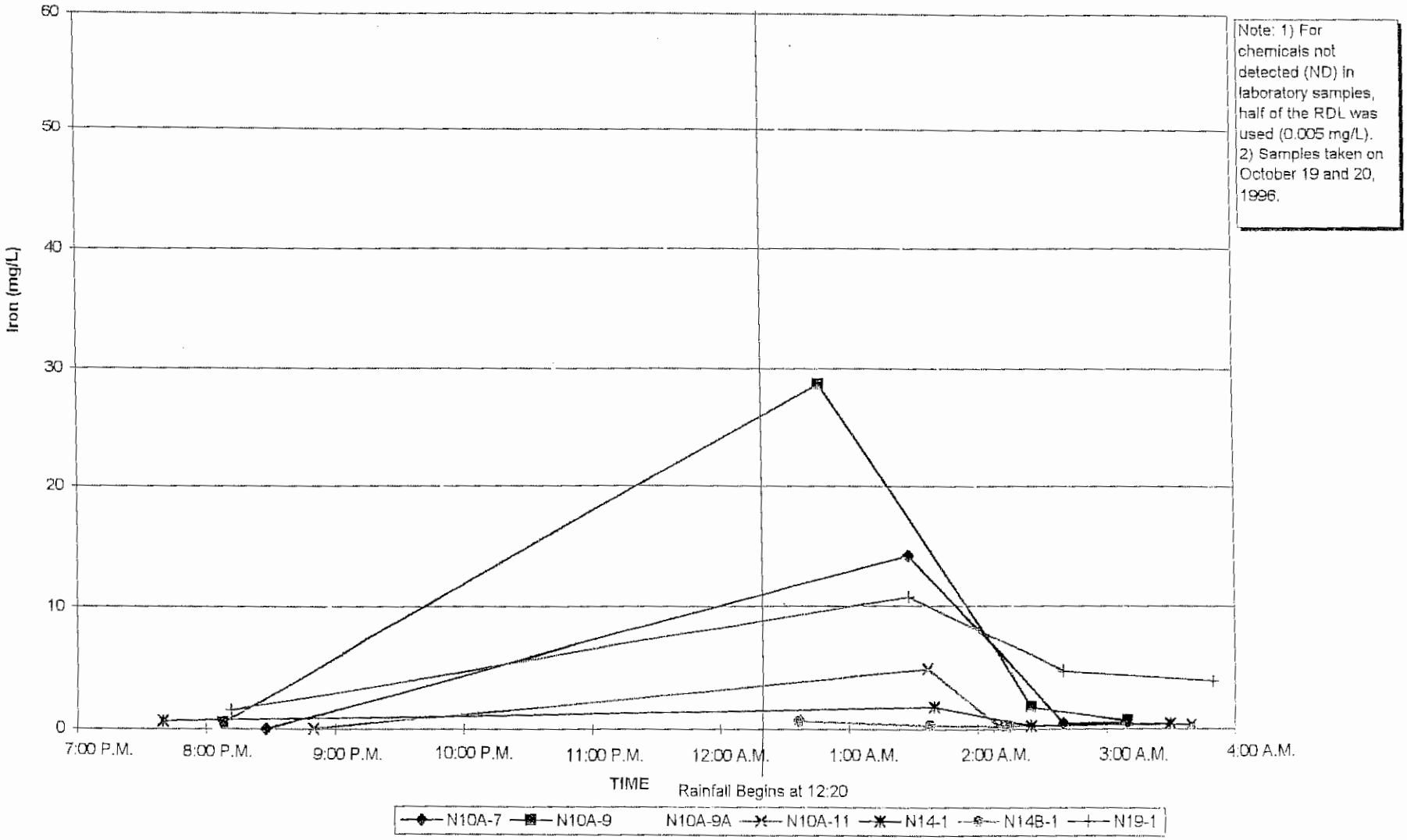
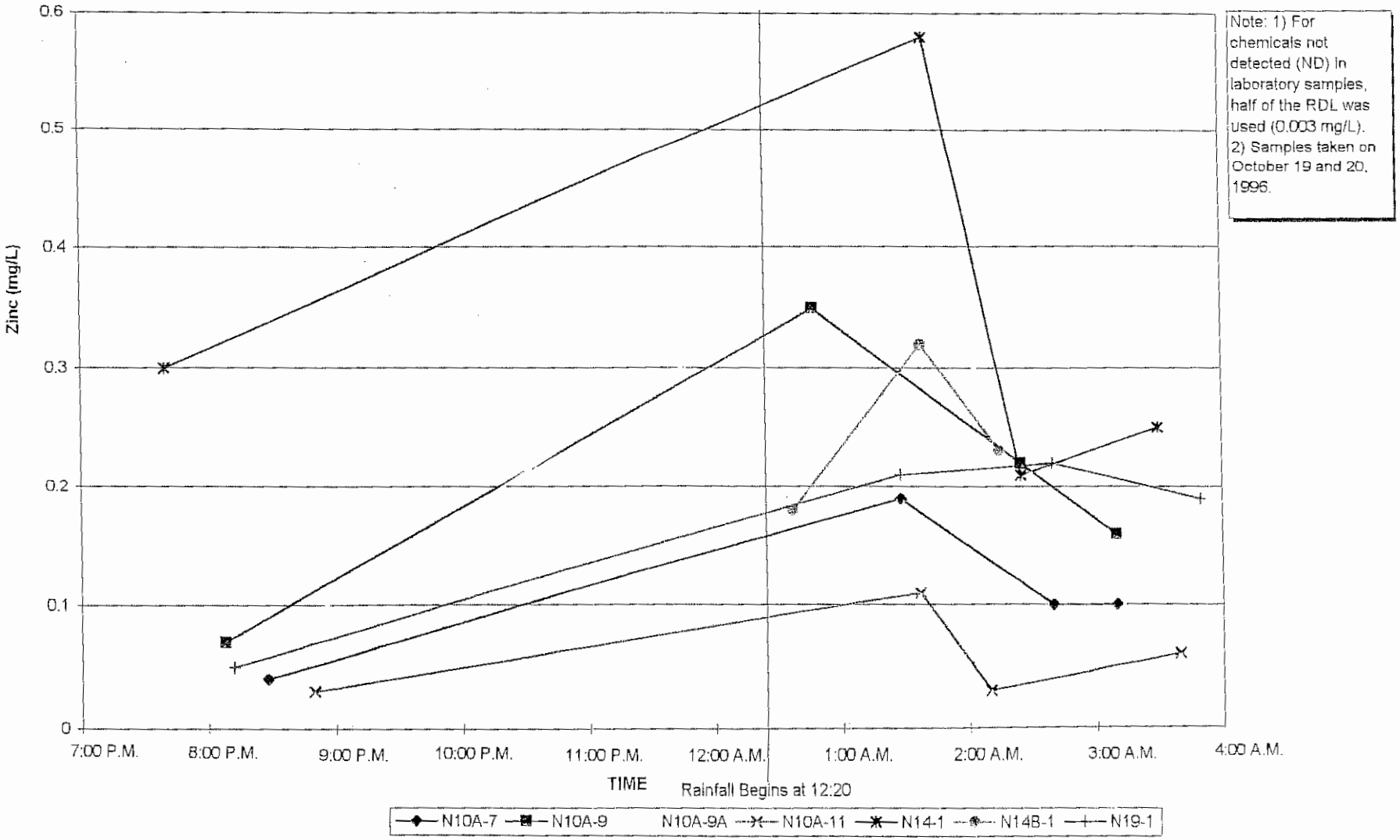


Figure 2.1.4: Total Zinc

Wet Weather Sampling Results



Note: 1) For chemicals not detected (ND) in laboratory samples, half of the RDL was used (0.003 mg/L).
2) Samples taken on October 19 and 20, 1996.

Figure 2.1.3: Total Lead

Wet Weather Sampling Results

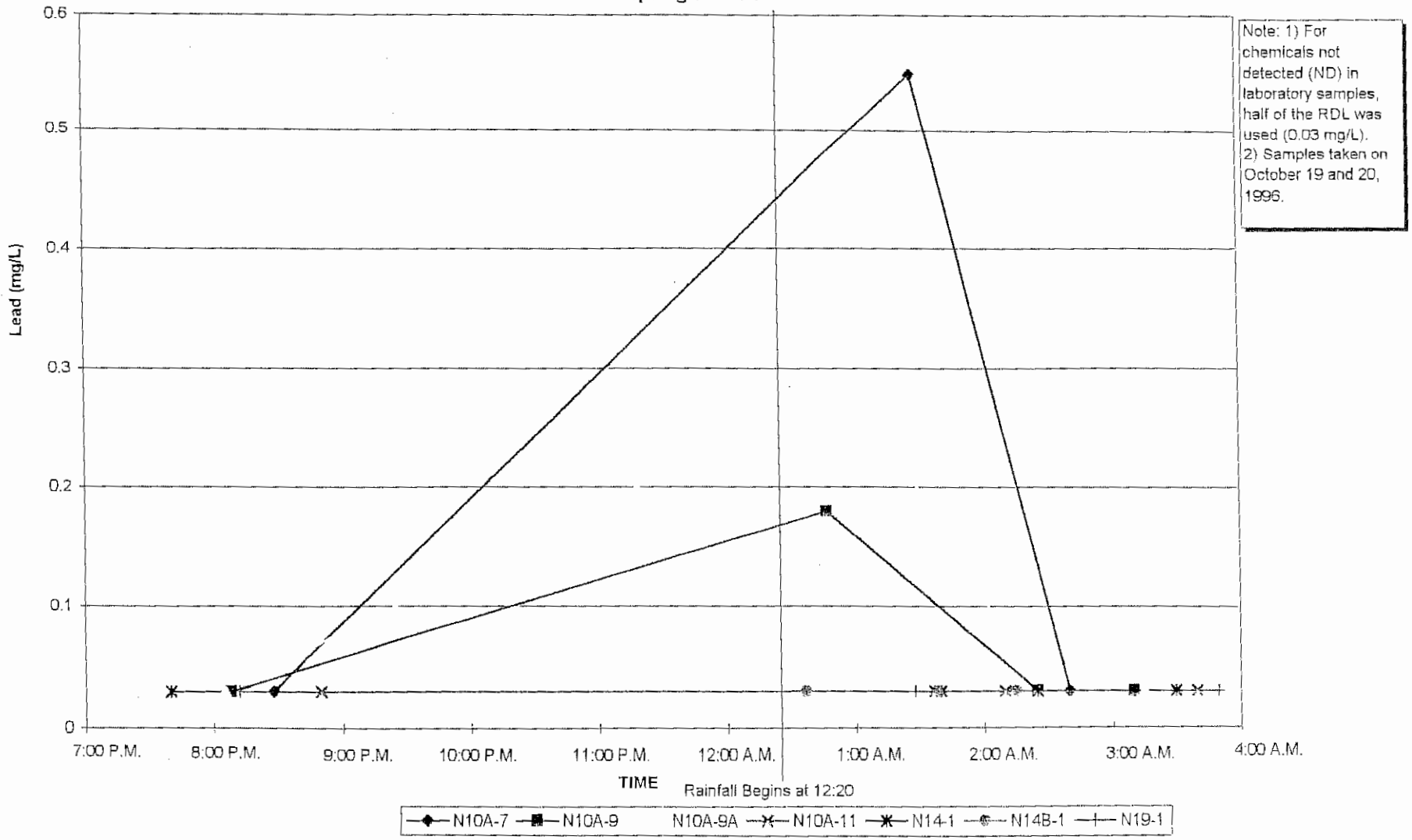


Figure 2.1.5: Chloride

Wet Weather Sampling Results

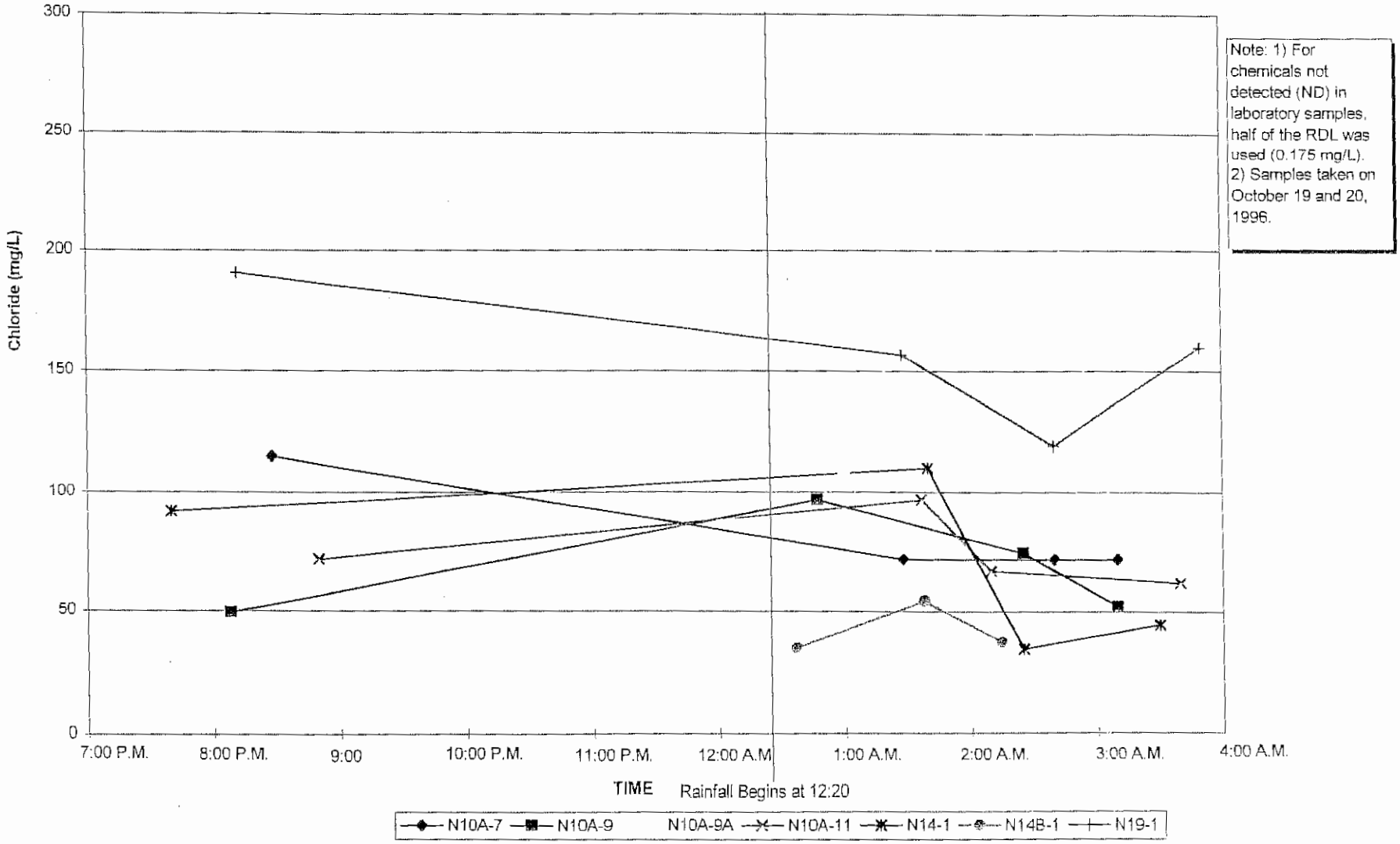


Figure 2.1.6: Nitrate Nitrogen

Wet Weather Sampling Results

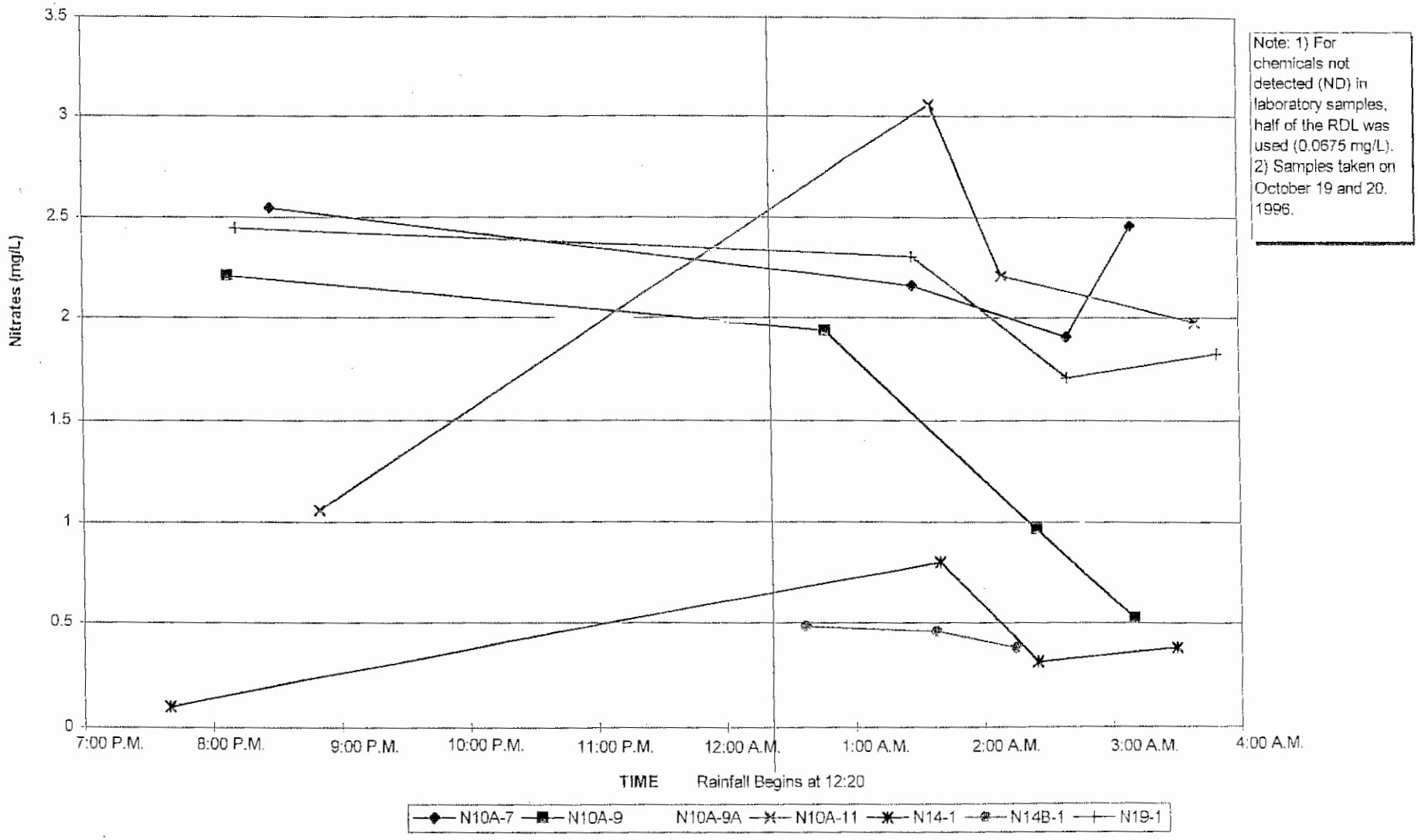


Figure 2.1.7: Total Phosphorus

Wet Weather Sampling Results

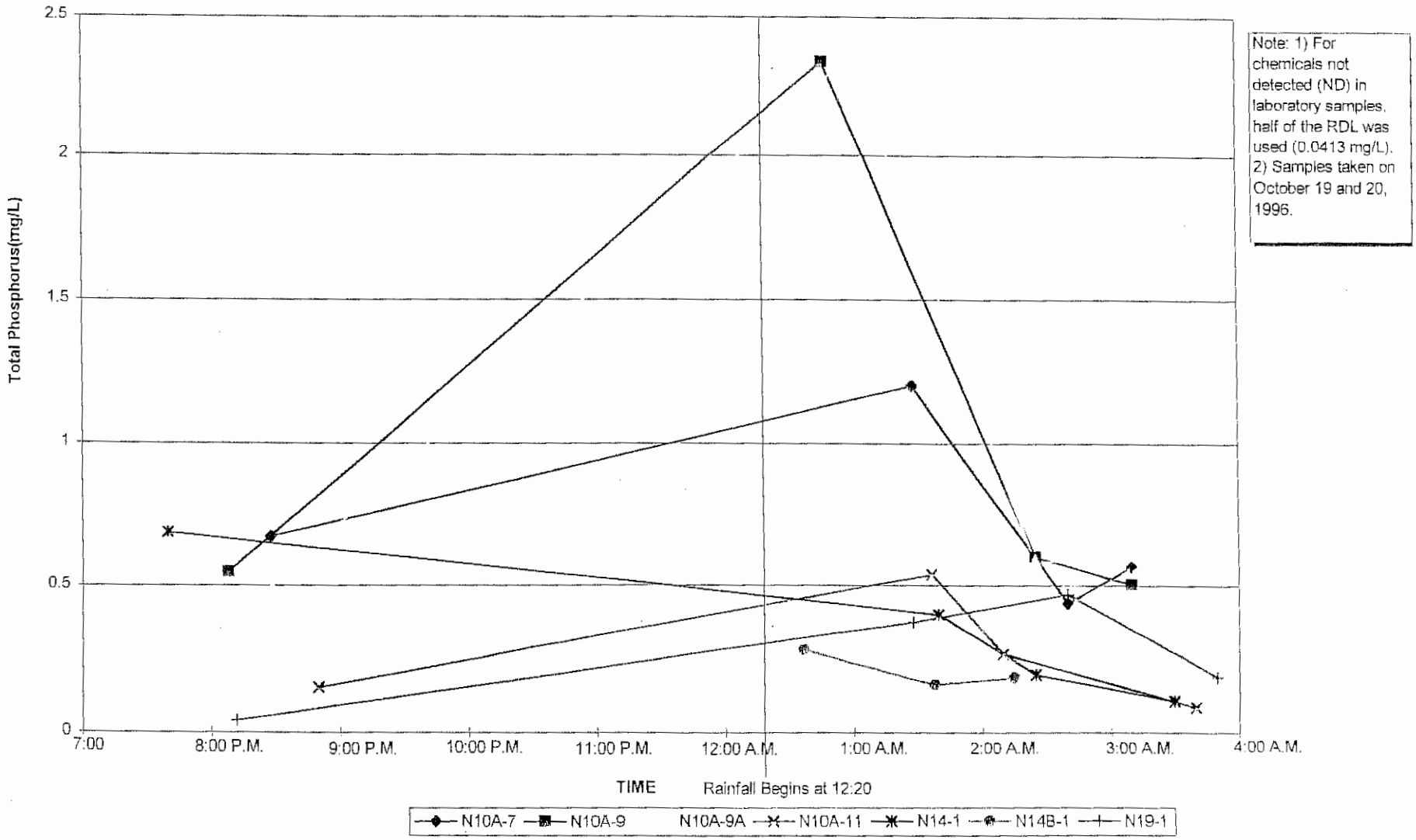


Figure 2.1.8: Total Solids

Wet Weather Sampling Results

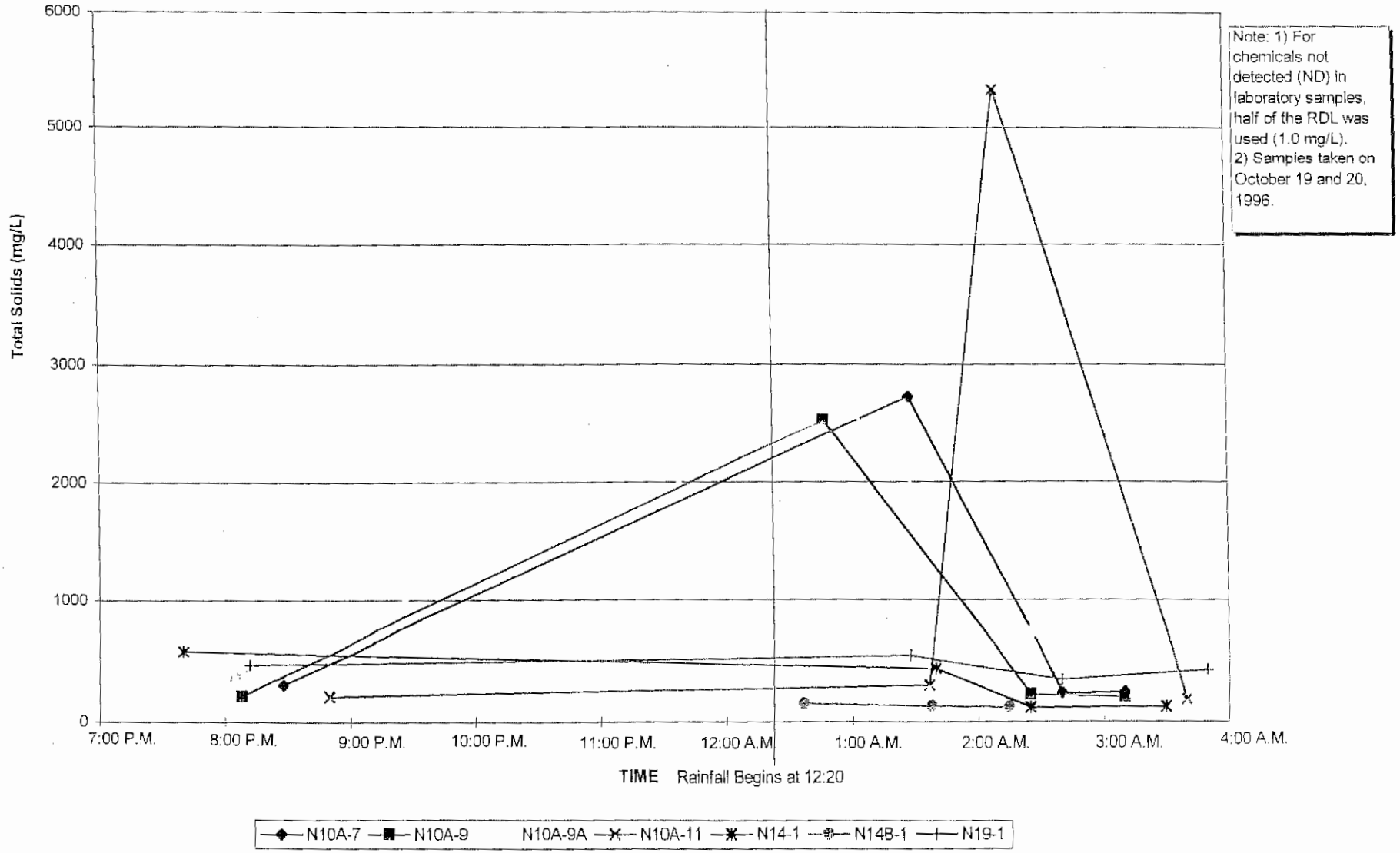


Figure 2.1.9: Total Suspended Solids (TSS)

Wet Weather Sampling Results

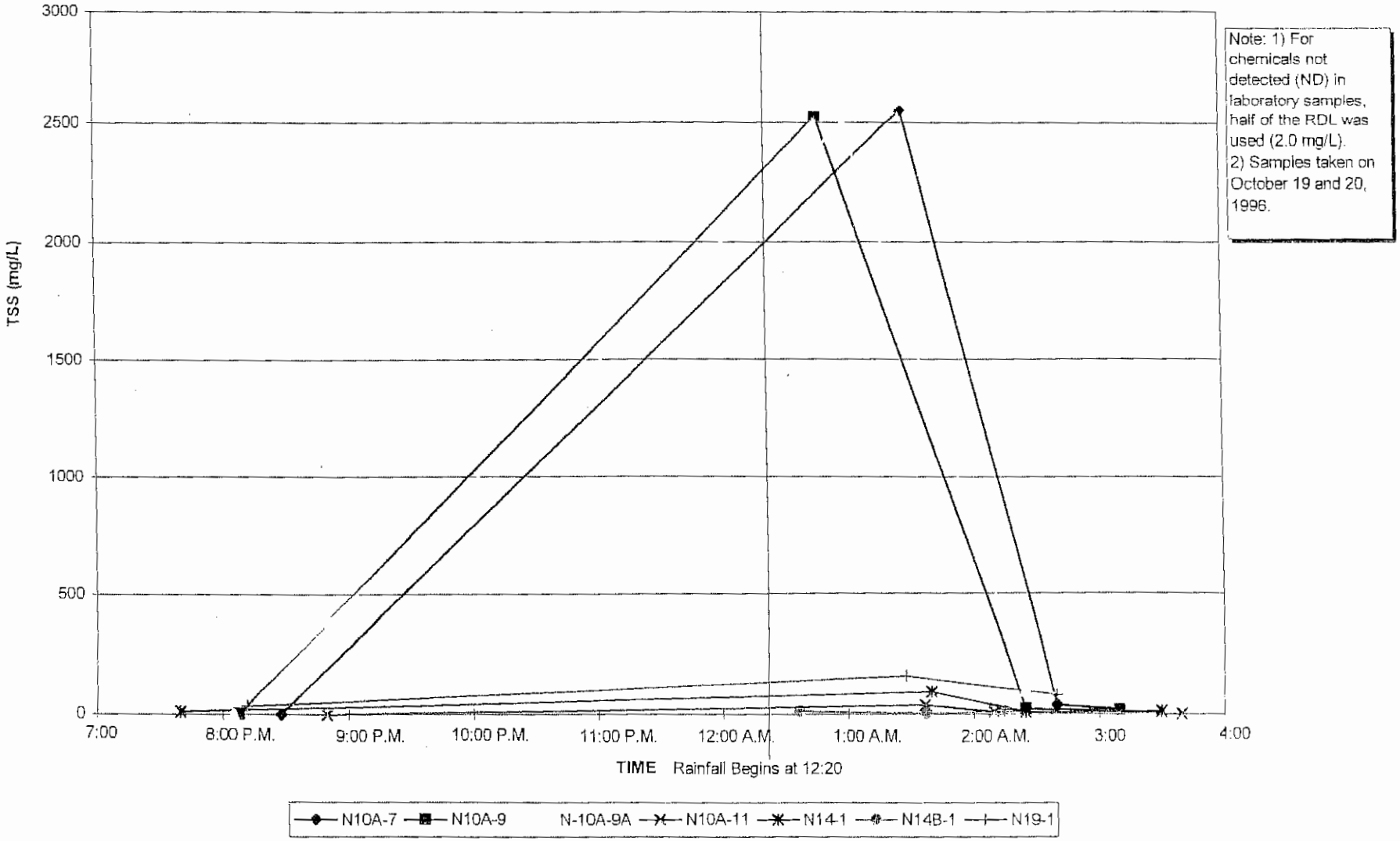
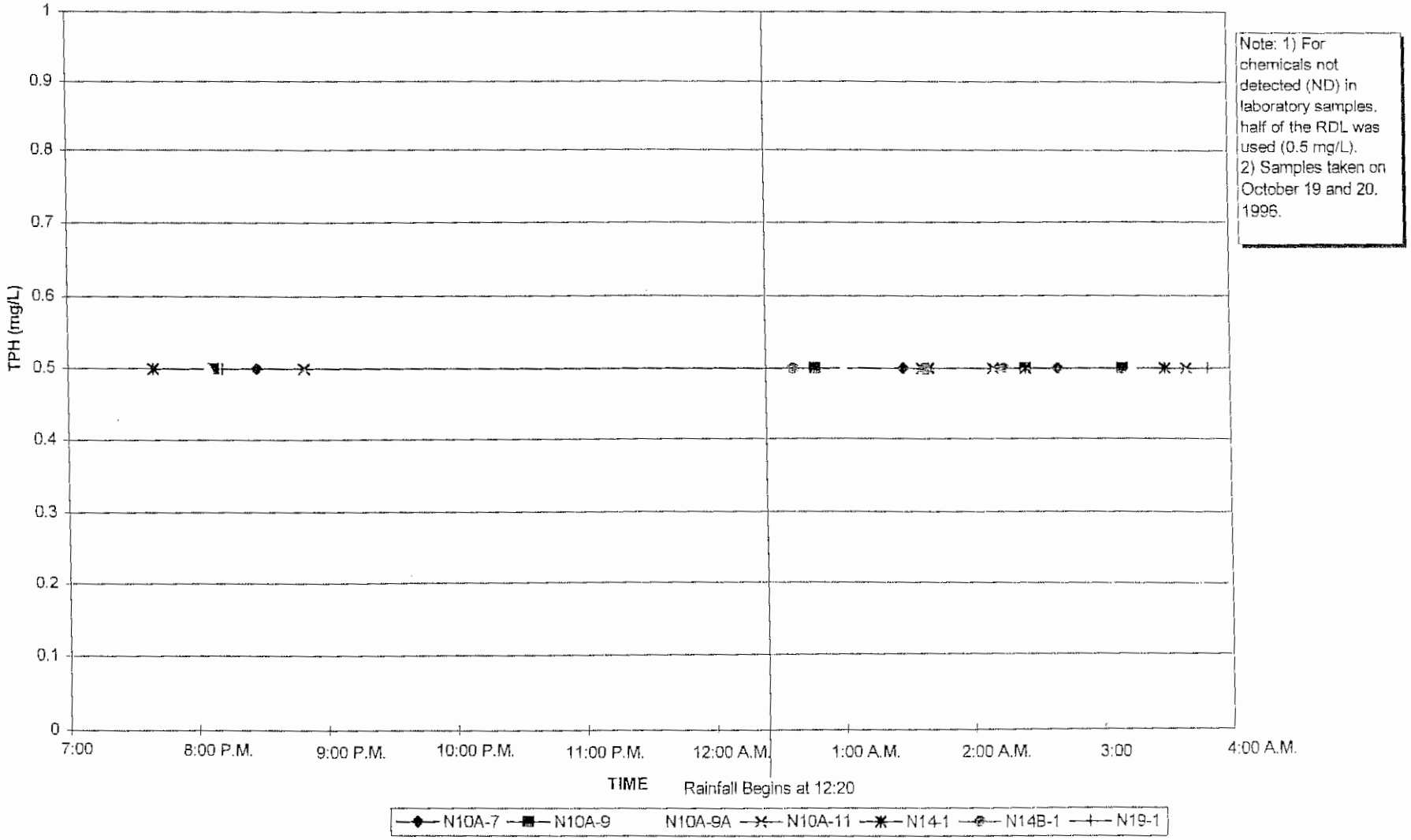


Figure 2.1.10: Total Petroleum Hydrocarbons (TPH)

Wet Weather Sampling Results



Conclusions

The total lead detected within the first flush samples of areas N10A-7, N10A-9 and N10A-9A) was likely due to solids of the first flush samples, and uot "dissolved lead".

As detailed in Figures 2.1.8 and 2.1.9, the total solids and total dissolved solids levels are similar, with the exception of Area N10A-11. No dissolved metals analyses were conducted for this study. The levels of total lead exceeded EPA guidance levels, National Primary Drinking Water Regulations (NPDWR's), and acute and chronic levels. We feel this was due to silt and sediment within the samples (see Table 2.1.3).

All samples collected from residential areas all met NPDWR's, with the exception of the first flush samples discussed above.

No other NPDWR's were exceeded in any samples for parameters which were tested. Iron exceeded secondary drinking water standards in 21 of 27 samples. Secondary standards are regulated for cosmetic and taste, but pose no direct health risks.

All samples collected from the industrial/commercial areas met NPDWR's, indicating that water quality of the commercial/industrial areas of Needham are inconsistent with federal studies referenced in Tables 2.1.1 and 2.1.2. During this study, there was little correlation of pollutant levels to land use, however, total solids and total suspended solids levels were higher in residential areas.

The outfalls which were monitored generally met primary drinking water and EPA guidance levels. Additionally, many of the stormwater outfalls are not direct discharges, and flow into freshwater wetland areas, small ponds and streams. These freshwater resource areas are effective in pollutant removal, and undoubtedly improve stormwater quality.

Additionally, construction of BMP's within these freshwater wetlands and resource areas would be extremely difficult from a regulatory standpoint. Large areas of federal and state regulated wetlands would need to be altered to construct the BMP's, since these are the only open space within eight of the ten areas which were studied.

Therefor, given that most of the stormwater samples met National Primary Drinking Water Standards for the parameters tested, and the extreme difficulty constructing a BMP, structural BMP's are not recommeuded.

We recommend non-structural BMP's be implemented, such as improvements to the existing inspection, cleaning and monitoring components of the municipal stormwater drainage system in accordance with Part II, Section II and Section III. These improvements, along with continued stormwater management programs already in place, will reduce levels of sediment (solids), suspended solids, nutrients and metals which are discharged to the Charles River and its' tributaries. Reduced fecal coliform bacteria

pollution will also result from inspection and maintenance programs detailed in Sections II and III of Part II of this Report.

While the Town of Needham has extensive stormwater and street cleaning programs, improved inspection and prioritization of stormwater system improvement programs are needed. The Town is currently developing a standard inspection program, as discussed in the following Section. Additionally, other improvements to Needham's existing stormwater management program are addressed.

Section II - Evaluation of Stormwater Management Practices

Hazardous Materials (HAZMAT) Response Plan

General

The Town of Needham's HAZMAT program is a cooperative effort between the Needham Fire Department, the Needham Department of Public Works and the Needham Health Department. Additionally, the Town has an agreement with the Westwood Fire Department. Westwood provides assistance with significant HAZMAT situations, and is equipped to respond to unknown chemical hazards.

HAZMAT Response

Coordinating all of Needham's HAZMAT programs is the Fire Department. Any accident involving vehicles and/or chemical releases is forwarded to the Fire Department. Each fire truck is eqnipped with chemical absorbent materials such as petroleum/gasoline pads and "sausages". Upon arrival at the scene of any accident, the Fire Department makes an assessment of the situation and notifies the applicable regulatory and/or cleanup agencies.

Minor Releases

Upon any release of petroleum and/or hazardous materials, one of the two local fire inspectors is notified, and makes an inspection of the release scene. Upon notification, the Inspector notifies the Needham Health Department and the Department of Environmental Protection - Northeast Regional Office. If state roadways or drainage systems are involved, the Massachusetts Highway Department is notified.

The immediate response of the Fire Department includes preventing a release from entering the storm drain system, including physically placing petroleum absorbent booms, etc. between the release and the storm drain system. The Department of Public Works is immediately notified if a release is in proximity to the municipal drainage system.

The DPW is often called for minor releases to supply additional manpower, materials (including sand, etc.) and plans of the drainage and sewer systems. The sewerage and drainage plans allow contingency plans to be made to intercept a release, should one reach these systems.

Major Releases

- Upon notification of a release which could be significant, the Fire Department immediately notifies the following:
- Civil Defense Office
- Department of Public Works
- Health Department
- Department of Environmental Protection, Northeast Regional Office

The Fire Department is equipped with a specialized truck for HAZMAT response. Should a response be characterized as a potential hazard, the truck is notified to respond. The vehicle is equipped with HAZMAT materials to prevent migration of a significant release to storm drains or sanitary sewers.

Upon arrival of the vehicle, and dependent upon site specific conditions, the Fire Department notifies either the Westwood Fire Department, equipped with HAZMAT chemical suits, or Clean Harbors, Inc. Both have an agreement with the Town to respond to chemical releases.

HAZMAT Corridors/Storage Facilities

There is one landfill in Needham which is operational. The site is located on Central Avenue, several miles from the Charles River. The surface water and stormwater systems in the area flow to the north, away from the Charles River. However, several chemical storage facilities are proximate to the Charles River. The two facilities on Charles Street are located in the industrial area of northern Needham. The MWRA facility is located on Chestnut Street in southern Needham. These storage facilities include the following:

	# ASTs	NOTES	Location
Casey Petroleum, Inc.	10	10,000 gallons gasoline, oil, diesel	Charles Street
Needham Oil, Inc.	10 ASTs, 2 USTs	gasoline, oil, diesel	Chestnut Street
MWRA Water Station	5	chlorine, ammonia	Charles Street

AST: Above ground storage tank UST: underground storage tank

Each of the facilities has a spill containment plan, and the Needham Fire Department is aware of the chemicals which are stored on the sites. Numerous other facilities in Needham have underground storage tanks (UST's). However, above ground storage tanks (AST's) pose the most direct threat to stormwater, due to the possibility of a significant release from AST's within a brief period of time.

UST's are also regulated by the Needham Fire Department. Anyone who removes a UST from the ground must obtain a permit from the local fire inspector. The permit requires an observation to be made of whether the tank appears intact, or whether there is evidence of a chemical release. If there is evidence of a release, the DEP is notified, and the owner of the tank is required to retain a Licensed Site Professional (LSP) to evaluate the site.

Additionally, Route 128 is a major HAZMAT corridor through the Town. Numerous hazardous waste haulers use Route 128 daily. The Charles River is adjacent to Route 128 near Great Plain Avenue and Highland Avenue in Needham. These are two areas where the HAZMAT program is critical to the River. Coordination of HAZMAT issues involves the Needham Fire Department (and Westwood, as needed), the Massachusetts Highway Department, the Department of Environmental Protection and the Needham Health Department.

Local Land Use Issues and Regulations

Needham's current population is estimated at 29,156 (Town Clerk, 12/96). Over 80% of the Town is residentially zoned as single residence or rural residence. Most of this area is saturated with development, however, limiting space for new residential development.

Exceptions include areas such as South Street, Chestnut Street, and High Rock Avenue where new development and subdivisions are underway. Several land use controls are in effect to regulate development, and protect water resources and the environment from development impacts. These regulations include the following:

- Needham Subdivision Regulations, Needham Planning & Zoning Departments
- Needham Floodplain Regulations, Needham Zoning Department
- Wetlands Protection Act, Needham Conservation Commission

These three regulations limit development impacts, including stormwater discharges, to wetlands and waterways within Needham.

Wetlands Protection Act

Additionally, development within freshwater wetlands and within 100 feet from wetland boundaries are regulated under the Wetlands Protection Act (310 CMR 10.00). These areas are regulated by the Needham Conservation Commission and the Massachusetts Department of Environmental Protection.

Residential and commercial subdivisions and land development activities must obtain an Order of Conditions from the Conservation Commission for activities within these regulated areas. The application must detail erosion and sedimentation controls, best management practices (BMP's) and other ways to mitigate impacts to wetlands and water resources.

Rivers Protection Act

In 1996, the Rivers Protection Act was passed into law. This regulation expands the jurisdiction of the Wetlands Protection Act (310 CMR 10.00) and the Needham Conservation Commission to include a new "Riverfront" area. Rivers and streams which flow throughout the year are regulated under the Act. The Needham Conservation Commission administers the Act under the Wetlands Protection Act provisions.

The Rivers Protection Act affects all alterations within 200 feet of banks of rivers regulated under the Act. The 200 feet is measured from the mean high water mark of the waterway.

Applicants proposing development within the 200 foot area are required to evaluate feasible alternatives which may result in less impacts to the Riverfront area. Perhaps most importantly, the Conservation Commission also reviews the alternatives analysis, and may prohibit alterations to the Riverfront area which are deemed unwarranted.

This Act significantly increased the protection of Rivers in Needham, including the Charles River, Alder Brook, Rosemary Brook and numerous other tributaries to the Charles River. Stormwater impacts to rivers and streams are now evaluated up to 200 feet from the riverbank.

Charles River Corridor Plan

The "Charles River Corridor Plan" recommended additional protection mechanisms in 1982. The Town of Needham adopted several regulations recommended by the Plan, inclnding:

- cluster zoning, including 300' setback bylaw
- scenic roads (M.G.L. Ch. 40, 5.15c)

These regulations further protected the Charles River watershed. Cluster zoning allows less land area within the River Corridor to be altered through smaller lot sizes. The Scenic Roads provisions restricts activities that aesthetically impair the roadways along the Charles River.

Stormdrain Cleaning and Maintenance Program

The Needham Department of Public Works (DPW) conducts routine cleaning and maintenance of the stormdrain system. This includes an intensive schedule of catch basin cleaning and line flushing throughout the year. The Needham DPW owns one (1) "Stetco" catch basin cleaner, which is utilized to clean debris and sediment from the Town's catch basins.

The DPW cleaning schedule includes 100% of the municipal catch basins annually, with a 30% redundancy factor. Therefore, each basin is cleaned once per year and 30% are cleaned a second time. Typically, the basins are cleaned when they are 40% full of solids. All of the materials cleaned from the catch basins are brought to Needham's municipal landfill for disposal. This results in a significant reduction in pollutants and solids discharged to waters with the Town.

Subdivision best management practices (BMP's) are designed in accordance with subdivision regulations. BMP's which are municipally owned and/or operated are maintained by the Department of Public Works.

BMP's which are privately owned and operated such as these within condominium associations, etc., are not maintained by the Town. Inspections and cleaning of private catch basins is also currently not conducted.

Problems which were noted by DPW officials included the lack of important data for many catch basins and stormwater collection pipes in Needham. Specifically, numerous catchbasins were constructed with no bottom (or invert). Traditionally, maintenance crews clean and excavate debris in these structures with no indication of the bottom of the structure. This practice has resulted in numerous catchbasins being undermined through "overcleaning". Impacts to water resources from overcleaning these catch basins have been documented, since the catchbasins collapse and offer no stormwater control.

Street Sweeping and Cleaning Program

The Town owns two street sweepers which are utilized throughout the year. Additionally, two street sweepers are "rented" through a local contractor to assist in seasonal (springtime) and major street artery sweeping programs. Street sweeping is conducted throughout the year, with exceptions in the winter months when snow plow operations are in effect. During this period, all DPW Highway personnel focus on plowing, and minimal sweeping is conducted.

De-icing of Municipal Streets

During the winter months, Needham utilizes road salt and sand to de-ice municipal roadways, and maintain access for vehicles. Road salt consists of sodium chloride, with a backup supply of calcium chloride. Sand, which is applied to the roads in winter months, is collected in the springtime through a rigorous street sweeping operation within the Town. There are no areas in Town where road salt use is not allowed, such as watershed areas, etc.

Sand and solids which enter the municipal stormwater system are also collected through the previously mentioned storm drain system cleaning program. All street sweeping and catch basin cleanings are disposed of in Needham's sanitary landfill, away from water resources.

Illicit Connection Identification and Removal Program

The Town of Needham recently conducted an investigation of illicit connections to the municipal stormwater system. The investigation included ten (10) areas identified in the Administrative Consent Order between the EPA and the Town. The results are included in Section III of Part I of this Report.

As detailed in Section III, the Town has several regulations which prohibit sanitary sewer connections to the stormwater systems. These regulations are enforced by the Department of Public Works and the Health Department.

The Town has municipal plans and records of the residences which are connected to the sanitary sewer system. The locations of the connections, and often times measurements to the connections, are shown in the Municipal Sanitary Sewer plans of the Town.

Additionally, the Needham Health Department has a listing of all septic systems and cesspools within Needham. While the list of septic systems is incomplete, it includes a large majority of the systems. Furthermore, discrepancies of the Health Department list can be compared to the sewer plans to reveal if the residence or business is connected to the sanitary sewer system.

The Town has conducted numerous investigations of illicit connections to the stormdrains in the past. The illicit connections located during previous investigations were removed from the stormdrain system.

The Stormwater Pollution Study, submitted in November, 1996, by BETA Engineering, indicated that several direct and indirect connections of the sanitary sewer system and/or residential connections to the stormdrain system may exist. These connections are currently being evaluated, and will be removed should they be determined to be illicit.

Septic System Inspection Program

The Needham Health Department conducts routine and mandatory inspections of residential septic systems in accordance with Title V of the State Sanitary Code (as revised in 1995). These inspections are conducted according to the Title V regulations and include documentation of chronic problems, such as surface discharge of systems, etc. During land sale transactions, the Title V inspections include documenting compliance with applicable setbacks to water resources and wetlands, as well as documenting evidence of surcharging of systems.

The Health Department ranks each system with either a pass or fail score. Failure indicates a chronic problem with the system, and the need for an upgrade. Systems which fail the Title V criteria must be upgraded within two (20) years of the system inspection failure. System upgrades and replacements include percolation testing, deep hole testing to determine the depth to groundwater and soil types, and design of a system in accordance with the Title V regulations. Plans of the new or upgraded systems must be submitted to and approved by the Health Department.

The Health Department also maintains records of all complaints which are made to their office. The records include the address of the property for which the complaint was filed, the date of the comp-laint, and the result of the inspection by the Health Inspector. These complaints include those associated with failing septic systems, chemical releases and storage, and odors.

Discussions with Needham's Health Inspector revealed that residences with septic systems are typically older homes with older septic systems. Many of these were installed prior to the original Title V State Sanitary Code regulations promulgated in 1976.

Typically, areas in Needham with sanitary sewers have a high rate of "tie-in". Only several homes within BETA's study area were determined to have "questionable connections" to the stormdrain system. These connections are currently being investigated.

Infiltration from Sanitary Sewers and Septic Systems

Due to the age of numerous sanitary sewers and septic systems in Needham, infiltration into the stormwater drainage system was investigated. Infiltration into stormdrains within the ten (10) areas identified in the Consent Order were the focus of the investigation.

The results of the investigation, as detailed in Part I, Section III, revealed two areas where infiltration from sanitary sewers into stormdrains occurs. Both areas have parallel sewers and drains of approximately equal depth. Additionally, both areas have older (1926-1940) sewers which had been confirmed by the Town and BETA to surcharge during peak flow periods, even during dry weather conditions. The areas included sewers in Washington Street and Webster Street.

The Town replaced the sanitary sewers in Washington Street in November of 1996. Sanitary sewers in Webster Street were inspected (television inspection), and revealed cracks in the pipes beneath the MBTA train tracks on Webster Street. The repairs of these pipes will be evaluated in early 1997.

Additional testing and television inspection of the storm drains revealed several possible impacts from septic systems. All but one were documented by BETA to be due to animals inhabiting the storm drains, as detailed in Section III.

The DPW inspects storm drains throughout the year, usually when there is a problem with the system, or when cleaning is scheduled. Additional storm water inspections are detailed in Part II, Section III.

Public Education and Outreach Programs

Twice per year, the Town conducts a household hazardous waste collection day. These events are advertised through the local newspapers, cable television and flyers which are distributed throughout the Town. Household hazardous waste includes waste oil and used petroleum products. Public advertisements for these hazardous waste collection days include information on the harmful effects of improper disposal of these materials. The collection of used motor oil on these days reduces materials which may otherwise be disposed of in municipal stormwater collection facilities, such as catch basins. Historically, storm drains have provided an easy disposal method for waste oil products.

In addition, two Needham Selectmen have a public awareness program on the local cable television network entitled "What's Up With That?". This program addresses local issues, and answers questions which residents ask over the telephone throughout the broadcast. The questions and issues deal with local infrastructure, such as sanitary sewer and storm drainage systems. Additionally, water quality, hazardous waste and other environmental

topics are discussed. This programming provides Needham residents with a forum in which to ask relevant municipal questions to the chief elected officials in the Town.

Capital Improvements Program

Existing Capital Improvements Program

Needham's public works budget, along with the budgets of all municipal departments, are part of the Town's capital plan. In Needham, a five (5) year capital plan is generated by all municipal departments, including the capital budget for the fiscal year (annual budget). The five year capital plan and the annual budget are financed through several methods, including bonding, user fees such as water and sewer rates, issuance of debt to the Town, and federal and state loans and grant monies.

The projects included in the five year capital plan, including those of the Department of Public Works, are prioritized by each Department, and the Board of Selectmen. Projects recommended for inclusion in these plans are placed on the Town Warrant, where they are voted on at the annual Town Meeting. The methods of capital financing are also voted on at Town Meeting.

In fiscal year 1996, the total authorized debt for Department of Public Works capital costs was approximately $11,400,000. Approximately $7,900,000 of this amount was issued. The remaining $4,600,000 was authorized debt which was not issued (see Appendix C).

Of the $11,400,000, a total of $5,500,000 was authorized debt for capital improvements for sewer and drainage projects (excluding landfill costs and water dept. projects). A total of $4,900,000 was debt which was issued, and the remaining $600,000 was authorized debt which was not issued.

Additional costs for Stormwater Management Improvements

The additional costs to implement improvements in Needham's stormwater management program detailed in Section VI are minimal. The Department of Public Works has the equipment and staff in place to conduct the stormwater system inventory and inspection program. Generation of a database to prioritize stormwater system improvements can also be conducted by existing staff with a computer system already owned by the Town. Costs to continue existing programs, such as television inspection under the I/I program, are already included in the Town's five year capital plan.

Section III. Proposed Stormwater Management Program Improvements

The Needham Department of Public Works (DPW) is currently developing improvements to their existing storm water management program. These improvements, as well as additional recommendations, include the following:

- Development of a standardized catch basin and storm drain inspection program, to include:
  - **Continued cleaning and maintenance of stormwater system components, under the existing program.**
  - **a standardized inspection form, which includes information regarding the condition of the structure, coustruction material (brick, precast concrete, etc.) depth to invert, size, condition and type of pipes into and out of the structure, aud condition of the frame and cover. The form should be completed during each catch basin, manhole or stormdrain cleaning operation (see Figure II-3-1). Evidence of illicit connections to the stormwater system, petroleum residues or chemical odors should also be included on the forms.**
  - **The inspection shonld also be conducted for sanitary sewer manholes, since evidence of surcharge, blockage and leakage may be evident in these structures (see Fignre II-3-2). This is important, since the Town has documented areas where surcharging sanitary sewers impact stormwater systems, snch as the recent replacement of the Washington Street sewers.**

- Development of a municipal database, where the results of the stormwater and sanitary sewer inspections are documented, prioritized and programmed into the database. The database will include adequate data to identify cleaning dates, amount of debris removed, repairs required, and other appurtenant information. This allows for the municipal cleaning program to be developed that will require cleaning the most critical catch basins more frequently than other, less critical catch basins. Tailoring the catch basin cleaning program to the specific needs of the system will allow the Town to be more effective in removing sediment in the basins, thereby reducing pollutant loads to the water resources. The database would be continually updated to reflect maintenance needs.

  Additionally, the database will contain critical information regarding the stormwater system and management programs which is not readily available. Currently, much of this information is known by municipal employees, but the information is lost when the employees retire or leave the Town.

CONDITION

EXCELLENT - E
VERY GOOD - VG
GOOD - G
FAIR - F
POOR - P
DOES NOT APPLY - DNA

TYPE

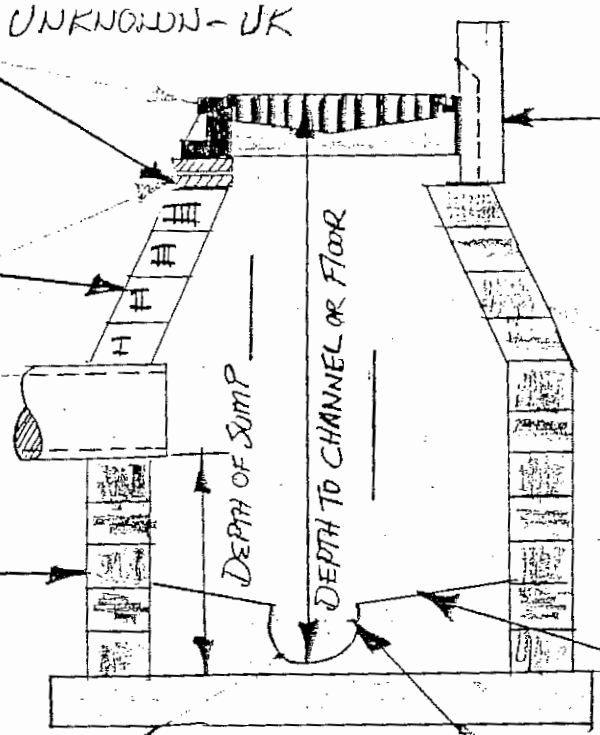
RED BRICK + CEMENT - RBC
WHITE BRICK + CEMENT - WBC
CAST-IN-PLACE CONCRETE - CIP
PRECAST CONCRETE - P.C.
CONCRETE BLOCK - CB
FIELD STONE - FS
COBBLE STONE - CS
UNKNOWN - UK
GRANITE STONE - GS
CAST IRON - CI
CLAY PIPE - VC
TRANSITE PIPE - AC
REINFORCED CONCRETE - RC
PLASTIC - PVC.

ADJUSTMENT BRICK
CONDITION _____
COMMENT _____

CONE
No of COURSES _____
TYPE _____
CONDITION _____
COMMENT _____

WALLS
TYPE: _____
CONDITION: _____
COMMENT: _____

BOTTOM PLATES / FLOOR
TYPE: _____
CONDITION: _____
COMMENT: _____



☐ MAN HOLE
☐ CATCH BASIN
☐ GREASE, OIL + GASOLINE SEPERATORS

CURB INLET
TYPE: _____
CONDITION: _____
COMMENT: _____

FRAME & COVER
TYPE: _____
CONDITION: _____
COMMENT: _____

TABLE
TYPE: _____
CONDITION: _____
COMMENT: _____

CHANNEL / INVERT
TYPE: _____
CONDITION: _____
COMMENT: _____

GENERAL COMMENTS: _____

NAME: _____
DATE: _____
TIME: _____

TOWN OF NEEDHAM
DRAIN STRUCTURE INSPECTION REPORT

LOCATION _____

STRUCTURE NO

FIGURE 2-3-1

CONDITION

EXCELLENT - E
VERY GOOD - VG
GOOD - G
FAIR - F
POOR - P

TYPE

RED BRICK & CEMENT - RBC
WHITE BRICK & CEMENT - WBC
CAST-IN-PLACE CONCRETE - CIP
PRECAST CONCRETE - PC
CLAY PIPE - VC
TRANSITE PIPE - AC
CAST IRON PIPE - CI
REINFORCED CONCRETE - RC
CAST IRON PIPE - CI
PLASTIC - PVC
STEEL - ST
ALUMINUM - AL
UNKNOWN - UK

ADJUSTMENT BRICK

No of COURSES - _____
TYPE - _____
CONDITION - _____
COMMENT - _____

CONE

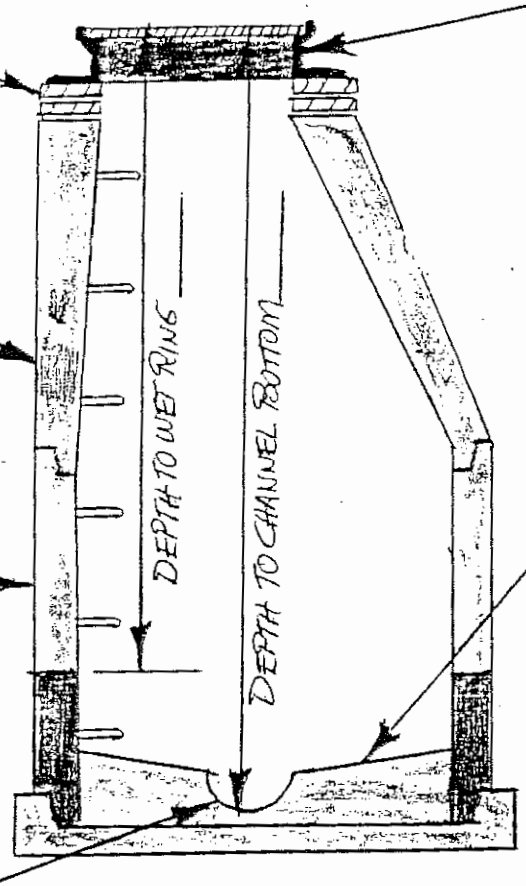
TYPE - _____
CONDITION - _____
COMMENT - _____

WALLS

TYPE - _____
CONDITION - _____
COMMENT - _____

CHANNEL/INVERT

TYPE - _____
CONDITION - _____
COMMENT - _____



FRAME + COVER

CONDITION - _____
COMMENT - _____

STEPS

TYPE - _____
CONDITION - _____
COMMENT - _____

TABLE

TYPE - _____
CONDITION - _____
COMMENT - _____

EVIDENCE OF LEAKAGE

COVER	____	DAMP	____
FRAME	____	SLIGHT	____
WALLS	____	LITTLE	____
TABLE	____	MODERATE	____
CHANNEL	____	HEAVY	____

GENERAL COMMENTS: _____

NAME - _____
DATE - _____
TIME - _____

TOWN OF NEEDHAM
SEWER MANHOLE INSPECTION REPORT

LOCATION: _____

MANHOLE NO.

FIGURE 2-3-2

- Continued television inspection of the sanitary sewers in Needham, under the existing Infiltration / Inflow (I / I) program. This program has revealed areas where sanitary sewers are in need of repair, and assists the Town in the prioritization of sewer and drainage improvement projects. In 1996, the Town conducted television inspection of several thousand linear feet of sanitary sewers and storm drains. Additionally, BETA plans on television inspection of 1,000 feet more of storm drains in Needham.

- Design and repairs to areas of the stormwater collection system where dry weather pollution has been documented. The sources of pollution include the following:

    - **indirect (municipal) connections to sanitary sewers on Webster Street**
    - **private (residential) drainage connections on Norfolk Street to Webster Street**
    - **direct (municipal) discharge from the sub-drain of the sanitary sewer located on Webster Street**

- Evaluate structural methods at storm water outfalls (identified in Part I) to inhibit access of animals which inhabit Needham's stormwater system. These methods may include metal grating, screening, etc. Animal populations were determined to be a major contribution to fecal coliform bacteria during dry weather sampling studies.

- The Town should consider classifying certain roadways within sensitive resource areas as "reduced salt areas". This could include areas of streets along the Charles River, and its' tributaries. Reduced salt in these sensitive areas would improve stormwater runoff quality in the winter months. Since hundreds of streets have stormwater systems which discharge to the Charles River, the reduced salt areas should focus on the streets directly adjacent to the River, and other sensitive resource areas.

- Implementation of these improvements could begin immediately, with commencement of a standardized inspection and maintenance program of the stormwater drainage system components. Throughout 1997, the Town should develop a database, which would serve as the framework for the long term maintenance program. Establishment of this database will take considerable time and effort, but once in place, it can be updated as needed to reflect maintenance needs.

- In accordance with EPA guidelines, the Town should develop an "Annual Report" which summarizes the results of the storm water management program, including enforcement, inspection and water quality issues. The Report should be submitted in December of 1997 to the EPA. Additionally, costs incurred to implement improvements to Needham's Storm Water Management Program for 1997, and predicted costs for 1998, should be included in the Report. Scheduling of stormwater management program improvements for each fiscal year should also be included in the Annual Report.

References:

1) Driscoll, E. D.; Shelly, E.P.; Streucker, E.W.; Pollutant Loadings and Impacts from Highway Stormwater, Volume I, Design Procedure, Federal Highway Administration, Office of Research and Development and Technology, FHWA-RD-88-06.

2) Dupuis, T.V.; Kobridger, N.P.; Kreutzberger, W.K.; and Trippi, V.; Effects of Highway Runoff on Receiving Waters - Volume III. Resource Document for Environmental Assessments, Federal Highway Administration, Office of Research and Development and Technology, FHWA-RD-84-064.

(3) Perry W. Langford and W. Wesley Eckenfelder, Jr., Toxicity in Industrial Effluents: (New York: Van Nostrand Reinhold, 1990), P. 99.

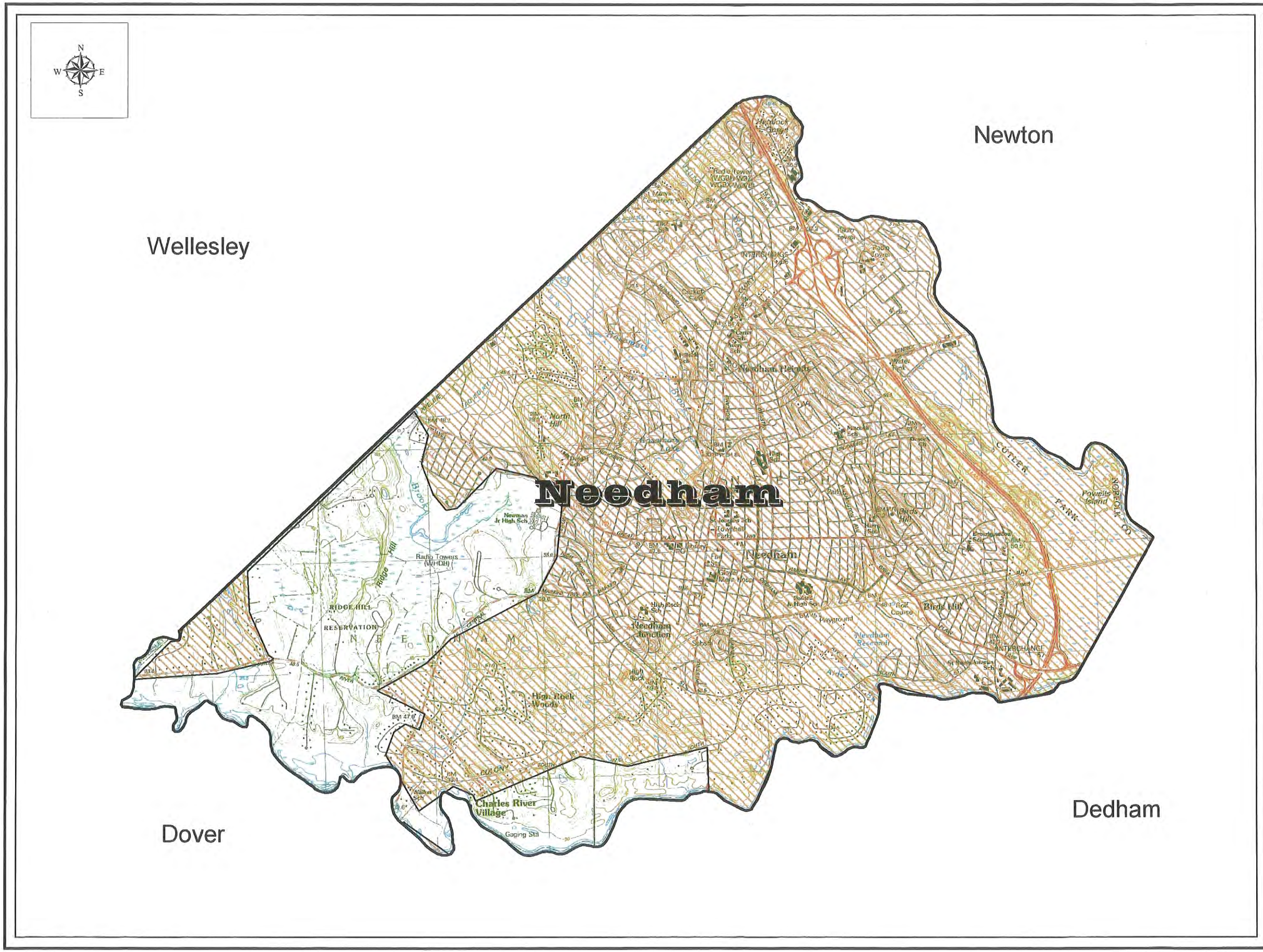
Section 1
Introduction

1.1 Overview

The Storm Water Phase II Final Rule is the Environmental Protection Agency's (EPA) effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. Common storm water pollutants include pesticides, fertilizers, oils, salt, litter, debris, and sediment, which cause water bodies to become impaired. Another concern is the possible illicit connections of sanitary sewers, which can transport harmful bacteria and other pollutants to water bodies.

Because Needham is the owner of a small Municipal Separate Storm Sewer System (MS4) and the majority of the Town is within an urban boundary, the Town is obligated to meet the Phase II Storm Water requirements within the Urbanized Areas (UAs) as defined by the 2000 Census (U.S. Census Bureau). The U.S. Census defines an "urbanized area" as an area with a population density of at least 1,000 people per square mile. Needham is considered an urban area, because its population density is 2,185 people per square mile. However, the southwestern section of Town has a population density less than 1,000 people per square mile; hence, this area is not regulated under the Phase II regulations (refer to Figure 1-1). The Town has previously dealt with many storm water regulations and issues as part of the Charles River Watershed Initiative to make the River swimmable and fishable by the year 2005. Needham's Phase II efforts described herein meet the requirements of the regulations and supplement previous efforts regarding storm water within the UAs, however, many of the measures outlined will be implemented on a town-wide basis thereby improving water quality outside the regulated areas.

The EPA determined there are six Minimum Control Measures which need to be addressed for the Phase II National Pollutant Discharge Elimination System (NPDES) program. These measures will be addressed by implementing Best Management Practices (BMPs)



Legend

Town Boundary

Surrounding Communities

Urban Areas

0.2 0 0.2 0.4 0.6 Miles

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Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 1-1

Town Location/ Urban Areas

Source: Town of Needham and MassGIS

appropriate for Needham's community. The BMPs will commence according to the schedules provided in this report. The six Minimum Control Measures for storm water monitoring are as follows:

1 – Public Education and Outreach
2 – Public Participation/Involvement
3 – Illicit Discharge Detection and Elimination
4 – Construction Site Runoff Control
5 – Post-Construction Runoff Control
6 – Pollution Prevention/Good Housekeeping

Town residents can contribute to the pollution transported via storm water by applying lawn pesticides, herbicides and fertilizers, not properly maintaining septic systems, littering, dumping pollutants into storm drains, failing to dispose of pet waste, and other actions, which can be detrimental to the quality of storm water discharging into water bodies. Many people are unaware that they are polluting when engaged in these activities. Therefore, public education and outreach and public participation/involvement will help minimize the amount of pollution contributed to Needham water bodies by local residents because many people will modify their behavior once educated on the potential harmful effects of their activities. Also, public education and outreach coupled with public participation/involvement allows Needham residents to have a voice with regard to storm water. It expands the expertise and credentials of the Town, because the citizens offer a wide range of experiences, local knowledge, and input valuable to storm water quality improvement programs.

Illicit discharge detection and removal lessens the amount of pollutants discharging to local water bodies. The Town has rigorously addressed this problem. In an effort to identify and remove illicit discharges, a Storm Water Master Plan and a Non-Point Source Pollution Study were completed. All storm water discharges were inspected and inventoried as part of the studies. In addition, the discharges were sampled and tested for pollutants. Section 4 provides detailed information about the Town's previous efforts.

Construction site runoff and post-construction site runoff should be reduced so that water bodies are not receiving additional pollutants or sediment. Sediment causes water bodies to become physically and biologically altered. Decreased habitat can result from significant amounts of sediment covering reproduction areas. Sediment suspended in the water prohibits light from penetrating the water surface. This causes problems with fish and plants in the water body. To address this water quality issue, the Town has adopted the Massachusetts Department of Environmental Protection's (DEP) Storm Water Management Policy in the eastern and southern portions of Town, which have direct discharges to the Charles River. The Town plans to enforce DEP's Storm Water Management Policy on a Town-wide basis.

Pollution prevention/good housekeeping is a critical minimum control measure because it concentrates on the maintenance of other control measures and municipal operations and it can make an immediate difference with local water body pollutant levels. Street sweeping and other maintenance activities prevent sediment, salt, and other pollutants from entering the drainage system thereby minimizing pollutant loads to local water bodies. The Town requires the submission of Operation and Maintenance (O&M) plans for all site plan applications and requires erosion and sediment controls as a condition of street occupancy permit applications. Section 4 of this report provides detailed information about the Town's efforts.

The Town of Needham is located within the Charles River Watershed. The Charles River Watershed is broken up into three distinct regions, which include the rural upper basin, the suburban lakes or middle region, and the urban lower basin. Needham is located in the urban lower basin. Charles River Watershed goals include the elimination of illicit discharges, reduction of urban runoff, enhancement of natural habitats, and improvement of river access for fish and recreational usage. Needham's Phase II plan will assist with these efforts because it specifically targets the elimination of illicit discharges and the reduction of urban runoff.

Fortunately, according to the Charles River Watershed and the Massachusetts Executive Office of Environmental Affairs, the Charles River has recently become substantially cleaner. In one year, the river received a grade "B", up from a "B-" the previous year. The river is available for boating at least 90% of the year, up from 83% in 1998. The river met swimming standards for almost 65% of the time, compared to 51% in 1998. Nevertheless, it would be beneficial to increase the percentage of time the River is clean and available for recreational activities. In addition, the stretch of the Charles River in Needham is impaired with priority organics, nutrients, pathogens and other contaminants, as described in Section 2.2.

1.2 Community Profile

Geography

Needham is located in eastern Massachusetts, slightly west of Boston in the metro-west suburbs, as shown in Figure 1-1. Needham is approximately 10 miles southwest of Boston and 30 miles east of Worcester. The Town is bordered by Wellesley on the west and northwest, Newton on the north and northeast, the West Roxbury section of Boston on the east, Dedham on the southeast and south, and Westwood and Dover on the south. Needham is approximately 12.7 square miles in area. The total length of roadway in the Town is approximately 145 miles. The total length of roadway owned by the State of Massachusetts is approximately 15 miles (Based on MassHighway Road Inventory File).

Greater than 80% of Needham is zoned residential, according to Massachusetts geographic information system (MassGIS). Because the Town is almost completely built-out, only a very small percentage of land is available for new development minimizing the potential for erosion and sedimentation from construction projects.

Demographics

Demographics are an important component of a storm water management program. Since education programs must focus on all citizens, including disadvantaged and minority citizens, it is critical to know population statistics. Table 1-1 illustrates Needham's

demographics. It is clear from these statistics that it is unnecessary to provide bilingual literature or programming in the Needham community. The 2000 Census yielded a population of 28,911. This represents an increase of approximately 5% from the 1990 Census value of 27,557.

Table 1-1
Town of Needham Demographics

Race	Percent
White	94.8
Asian	3.5
Black or African American	0.7
Two or more	0.7
Other	0.3

Source: U.S. Census Bureau, 2000 Census

Climate

The following statistics, obtained from the National Climatic Data Center, are Needham's normal weather parameters:

- Normal January Temperature = 25.3° F
- Normal July Temperature = 71.2° F
- Normal Annual Precipitation = 49.0"

Government

Needham's local government is run by a five member Board of Selectmen. The Board of Selectmen appoint a Town Administrator who performs the day to day services for the town. The Administrator is responsible for administering policies developed in Town Meetings. The Board of Selectmen make budget recommendations, authorize expenditures, etc. They also represent the Town for state and regional planning organizations, committees, etc.

The Needham Conservation Commission is comprised of seven volunteers who are appointed by the Board of Selectmen. There are two monthly meetings, which are held on the second and fourth Thursday of each month at 7:30 PM in the Department of Public Works (DPW) building.

1.3 Needham's Storm Water Management Program

In an effort to comply with the United States Environmental Protection Agency's (EPA) goal, the EPA and the Town of Needham entered into Consent Order Docket No. 96-08, dated April 11, 1996 and a Memorandum of Understanding (MOU) dated May 28, 1996. Under the MOU the Town developed a Storm Water Management Program for review by the EPA. The Consent Order and MOU are described below.

Consent Order

The Consent Order required the Town to submit the following information to the EPA by November 30, 1996, (see the Appendix):

- Map each of the municipal storm water discharge pipe and drainage areas flowing into the Charles River.
- Visually examine and sample each discharge during dry-weather conditions. The samples were analyzed for fecal coliform bacteria.
- Investigate and inventory potential illicit connections to the storm water drainage system.
- Provide a cost estimate to remove the illicit connections.

Memorandum of Understanding

The MOU required the Town to submit the following information to the EPA by December 31, 1996 (refer to the Appendix):

- A storm water management program in accordance with the MOU.
- An evaluation of management practices and programs to improve storm water quality, including source controls.
- Proof of adequate local funding mechanisms.
- An annual report summarizing the results of the program in December of each year.

Memorandum of Agreement

The Proposed Memorandum of Agreement (MOA) would require the Town to submit the following information to the EPA (see Appendix):

- A summary of how it intends to address each of the recommendations in the Areas for Improvement portion of CWP's comments.
- An Amendment to the Existing Plan with changes agreed to as a result of discussions.
- A proposed schedule with items in the Areas for Improvement that EPA and Needham agreed could not be immediately implemented.

The Town has corresponded with the Center for Watershed Protection (CWP), the EPA's consultant. The Town has not signed the MOA because the Town and CWP are still corresponding about its contents. Refer to the Appendix for all previous correspondences between the Town and CWP regarding the MOA.

The Storm Water Management Program has been revised and updated based on comments provided by the CWP. Many of the CWP suggestions are incorporated into this plan.

In an effort to continue to improve water quality in Needham, the Town applied for a loan of $500,000 from the DEP through the State Revolving Fund (SRF) to continue its storm water planning efforts. This funding, along with supplemental funding provided by the Town, was used to develop drainage mapping, complete the town-wide outfall inspections, perform hydrologic/hydraulic analysis and prepare a report entitled "Storm Water Master Plan" dated March, 2002. These reports clearly depict the extensive process that the Town has already undergone along with its future plans to lessen the effects of storm water runoff.

The Town is currently utilizing a variety of BMPs to minimize pollutant loads into the Charles River. The BMPs are described herein, in Section 4, under the Town's current practices for each Minimum Control Measure.

Many of the BMPs involved in Needham's Storm Water Management Plan (SWMP) are enforced by the DPW, at the local level. The operation, management, and maintenance of the municipal drainage system are the responsibility of the DPW. Inspections and monitoring of the municipal storm water collection system will also be conducted by the DPW as part of the FY04 budget.

1.4 Contacts

Town of Needham Contacts

Richard Merson	DPW Director
Anthony Del Gaizo, P.E.	DPW Town Engineer
Robert Lewis	Superintendent Water and Sewer Division
	470 Dedham Avenue Needham, MA 02492 (781) 455-7534

Board of Selectmen

Kate Fitzpatrick	Town Administrator
Gerald Wasserman	Chairman
Colleen Schaller	
William Powers	
Daniel Mattews	
John Cogswell	

Charles River Watershed

Peter Phippen	Team Leader
	Executive Office of Environmental Affairs 251 Causeway Street – 9th Floor Boston, MA 02114 (617) 626-1174

Charles River Watershed Association

Robert Zimmerman, Jr. Executive Director

2391 Commonwealth Avenue
Auburndale, MA 02466-1773
(617) 965-5975

Cutler Park to Commonwealth Avenue Stream Team

Andrew Adinolfi

74 Bryon Road #5
Chestnut Hill, MA 02467
(781) 721-4074

Section 2
Resource Protection

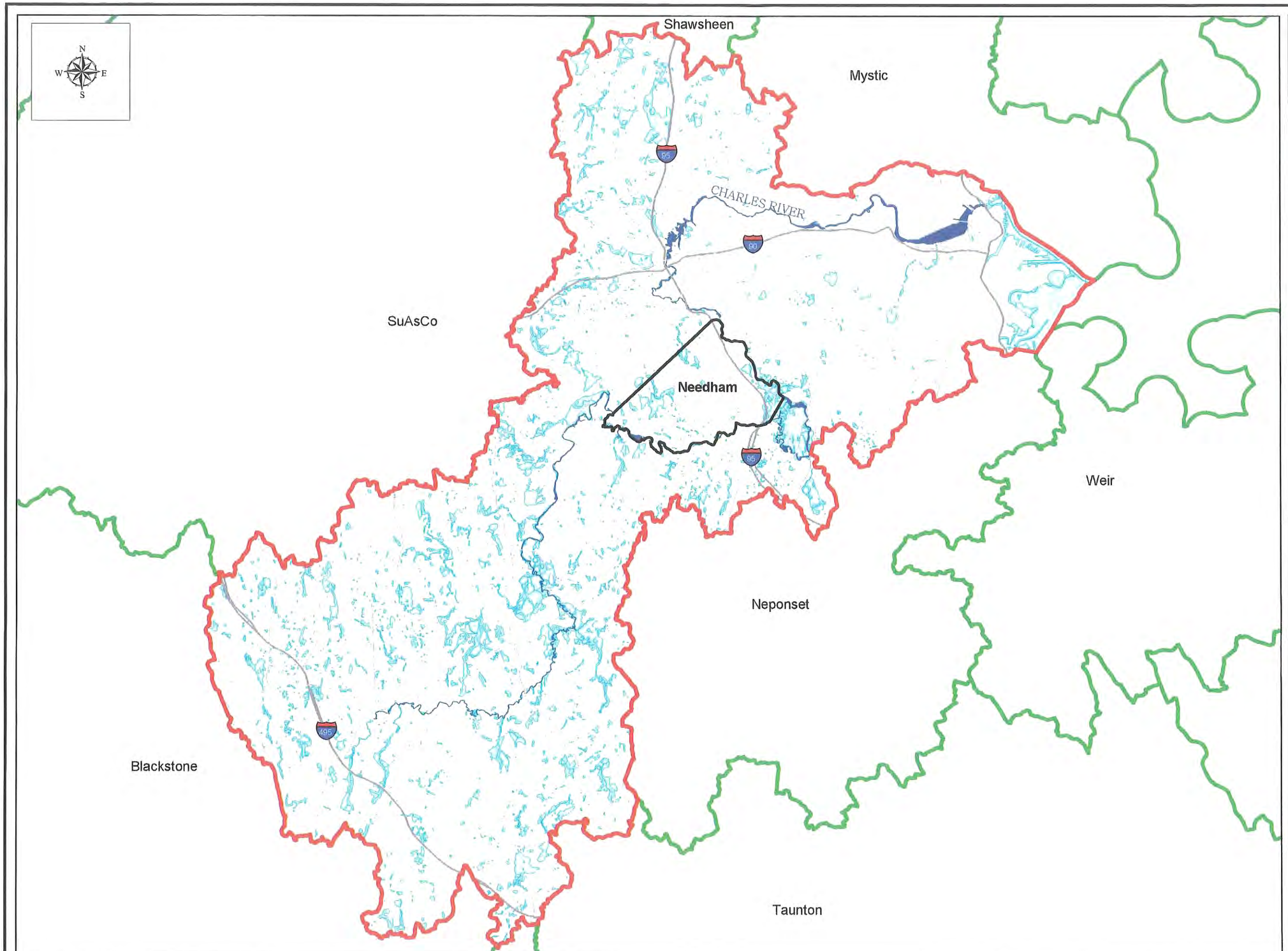
2.1 Charles River Watershed

The entire Town of Needham is located within the Charles River Watershed, as indicated in Figure 2-1. The Charles River Watershed includes a drainage area of nearly 308 square miles. Thirty-five cities and towns contribute to its drainage area. The watershed comprises 9,000 acres of protected wetlands (Natural Valley Storage areas). These areas assist in flood protection and provide a refuge for many animal and plant populations in the area.

According to the Massachusetts Executive Office of Environmental Affairs the "Top Five" watershed priorities for the Charles River Watershed are as follows:

- Work to eliminate point-source pollution by monitoring combined sewage overflows (CSOs) and other illicit discharges in the watershed.
- Reduce urban runoff and work to replenish natural groundwater aquifers through the Upper Charles "Regional" Groundwater Modeling project.
- Work to clean and recycle wastewater through de-centralized wastewater management planning.
- Create sustainable landscapes by managing growth and development, enhancing natural habitats, and strengthening ecosystem integrity.
- Improve access along the Charles River for fish passage and recreational purposes.

The Charles River Watershed Association (CRWA) was founded in 1965. Since that time, there have been many achievements made by the association that improved the water quality of the Charles River. However, the entire length of the Charles River located in Needham is impaired, and there are still many (dry weather) days during the year that the water is not suitable for swimming. As a result, there is still work required to continue improvement of the River's water quality.



Legend

Town Boundary

Major Roads

Charles River Watershed

Surrounding Watersheds

3 0 3 Miles

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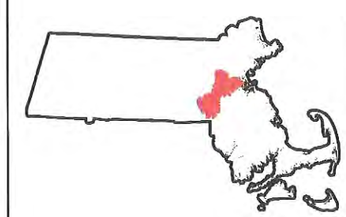


Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 2-1
Charles River Watershed

Source: Town of Needham and MassGIS

The CRWA has its own laboratories and volunteers monitor the Charles River frequently. The CRWA is recognized by the EPA, Natural Defense Council, and River Network for offering national leadership regarding watershed management. Some of its accomplishments include community outreach and education, water quality monitoring programs, and environmental zoning. The CRWA is a valuable resource for the Town of Needham regarding storm water information.

Development within freshwater wetlands, and within 100 feet of a wetland boundary, is regulated under the Wetland Protection Act (310 CMR 10.00). These areas are regulated by the Needham Conservation Commission and the Massachusetts DEP. Development within 200 feet of rivers and streams is regulated as well.

The "Charles River Corridor Plan" recommended additional protection mechanisms in 1982. The Town of Needham adopted several regulations recommended by the Plan, including:

- Cluster Zoning (including 300-foot setback by-law)
- Scenic Roads (M.G.L. Ch. 40, 5.15c)
- Residential Compound/PRD
- Aquifer Protection Zone
- Flood Zone
- Rural Residential Zone

These regulations further protected the Charles River Watershed. Cluster zoning allows less land area within the River corridor to be altered through smaller lot sizes. The Scenic Roads provisions restrict activities that aesthetically impair the roadways along the Charles River.

2.2 Impaired Water Bodies and TMDL Progress

Surface Water Quality Standards (SWQS) are provided by the DEP. They are determined for a water body's designated use. The SWQS designate the uses that surface waters are protected for, and an assessment is performed to determine if the designated uses are met by the water bodies. The use is not assessed in instances when there is insufficient data or

information. Assessment information is maintained by the DEP in the Water Body System (WBS) database, which is updated every two years. Designated uses include:

- Aquatic Life
- Fish Consumption
- Primary Contract Recreation (Swimming)
- Secondary Contact Recreation (Boating)
- Aesthetics

The aquatic life use is supported when suitable habitat is available in the water body to sustain a native and diverse aquatic environment. Impairments to the aquatic life use can result from anthropogenic sources of pollution. Organic enrichment, flow and habitat alteration, sedimentation (habitat destruction), and whole effluent toxicity are potential causes of water body impairment for this use.

The fish consumption use is met when pollutant concentrations are acceptable for edible marketable fish or shellfish or for the use of recreationally caught fish or other aquatic life for human ingestion.

The primary contact recreational use is any activity that involves prolonged contact with the water with a significant risk of ingestion. Activities include swimming, diving, water skiing, and wading, among others. The secondary contact recreational use includes any activity with incidental water contact including boating, fishing, and other activities.

The aesthetic use is supported when water bodies do not contain objectionable deposits, floating debris, scum, or other matter, which produces offensive odors, colors, taste or turbidity or produces noxious aquatic life.

Total Maximum Daily Loads (TMDLs) are the amount of a pollutant allowed to be discharged into a water body per day to assure attainment of the SWQS. The sum total of all pollutant load allocations cannot exceed the total maximum allowable pollutant load calculated for the water body.

Impaired water bodies are those that are not expected to meet the SWQS due to specific pollutants or stressors. However, numerical data is not available for every pollution indicator, so best available guidance in the literature may be applied. Not all water bodies are assessed; many small and/or unnamed water bodies are currently not assessed.

According to the Massachusetts Year Proposed 2002 List of Waters, there are five categories for water quality assessment.

- Category 1 – Unimpaired and not threatened for all designated uses
- Category 2 – Unimpaired for some uses and not assessed for others
- Category 3 – Insufficient information to make assessments for any uses
- Category 4 – Impaired or threatened for one or more uses but not requiring the calculation of a TMDL
- Category 5 – Impaired or threatened for one or more uses and requiring a TMDL

Category 4 Waters are further sub-divided into the following sub-categories.

- Category 4A – TMDL Completed
- Category 4B – Waters expected to attain all designated uses in the near future
- Category 4C – Impairment not caused by a pollutant

There are no Category 1, Category 2, Category 3, or Category 4 water bodies in Needham.

Needham Category 5 Waters

- Kendrick Street Pond
  Turbidity

- Alder Brook
  (Headwaters northwest of the Needham Reservoir, south of Penn Central railroad tracks, to confluence with Charles River, Needham).
  Cause Unknown, Nutrients, Organic Enrichment/Low DO

- Charles River
  (South Natick Dam, Natick to Chestnut Street, Needham)
  Priority Organics, Nutrients, Organic Enrichment/Low DO, Pathogens, Noxious Aquatic Plants, Turbidity

- Charles River
  (Chestnut Street, Needham to Watertown Dam, Watertown)
  Priority Organics, Nutrients, Organic Enrichment/Low DO, Pathogens, Noxious Aquatic Plants, Turbidity, Exotic Species

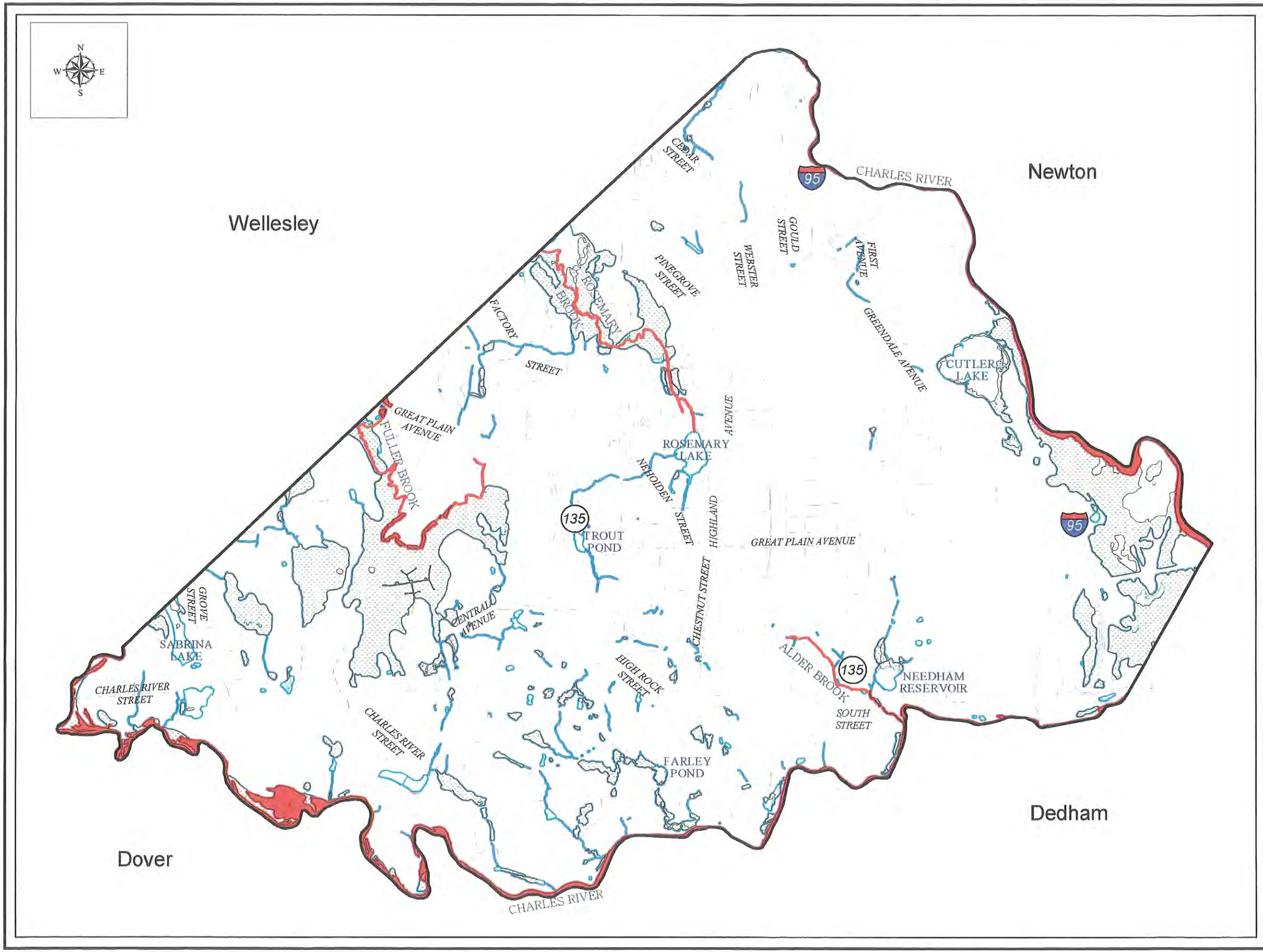
- Fuller Brook
  (Headwaters south of Route 135, Needham to confluence with Waban Brook, Wellesley)
  Cause Unknown; Organic Enrichment/Low DO; (Other Habitat Alterations); Pathogens; Oil and Grease; Taste, Odor, and Color

- Rosemary Brook
  (Headwaters, outlet Rosemary Lake, Needham to confluence with Charles River, Wellesley)
  Nutrients, Organic Enrichment/Low DO, Pathogens, Taste, Odor, and Color, Suspended Solids, Turbidity

The Category 5 Waters make up the 303(d) list and are reviewed and approved by the EPA. Figure 2-2 displays the impaired water bodies in Needham. TMDLs have not been established for the impaired water bodies in Needham thus far. The reason TMDLs have not been established is due to their varying complexity. Some TMDLs can be established through simple calculations, while many require complicated predictive models that require substantial data for proper calibration and verification.

2.3 Endangered and Threatened Species

There are two federally listed endangered species of concern located in Massachusetts, including the short nosed sturgeon and the dwarf wedge mussel. Neither of these two species is located in the Town of Needham or in Norfolk County. Accordingly, there is no reason to believe that the storm water discharges, allowable non-storm water discharges and discharge related activities will jeopardize any Federally listed endangered and threatened species or their associated critical habitat.



Legend

- Impaired Water Bodies
- Town Boundary
- Surrounding Communities
- Lakes and Ponds
- Rivers
- Upland
- Wetland Areas
- Streams and Brooks

1250 0 1250 2500 Feet

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Source: Town of Needham and MassGIS

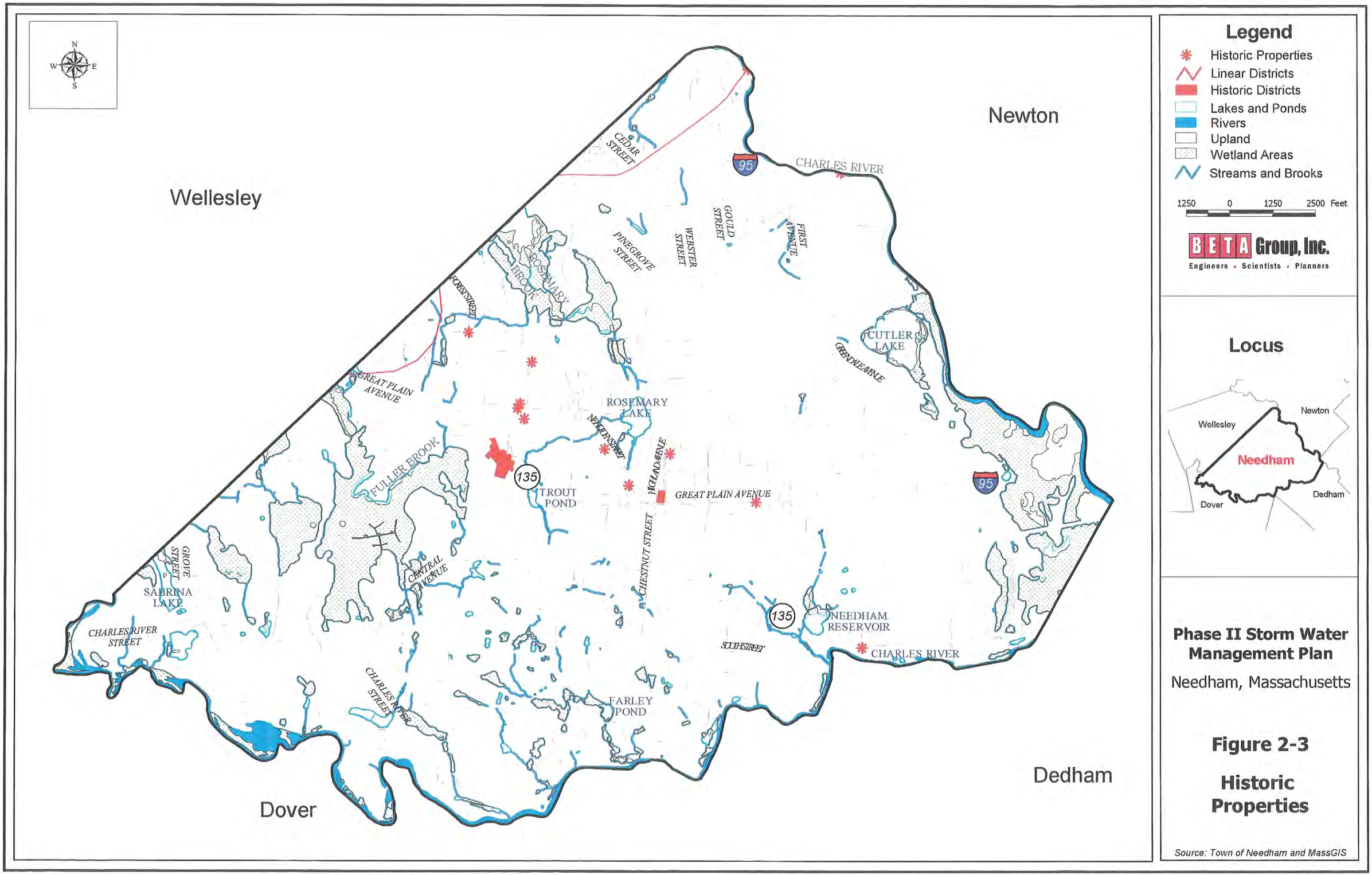
Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 2-2

Impaired Water Bodies

Source: Town of Needham and MassGIS



Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 2-3

Historic Properties

Source: Town of Needham and MassGIS

2.4 Historic Property

There are eighteen historic properties in the Town of Needham on the National Register of Historic Places based on the information contained in the State Register of Historic Places (1999 edition) prepared by the Massachusetts Historical Commission. The State Register provides a comprehensive listing of the buildings, structures, objects, and sites that have received local, state or national designations based on their historical or archaeological significance. The proposed BMPs outlined in Section 4 will not adversely affect any of the historic properties listed below and shown in Figure 2-3.

Needham Historic Properties

- Echo Bridge
  Crossing Charles River and Ellis Street from Needham to Newton Upper Falls
- Fuller, Amos House
  220 Nehoiden Street
- Fuller, Robert House
  3 Burrill Lane
- Grover, Emery Building
  1330 Highland Avenue
- Kingsbury, Whitaker House
  53 Glendoon Street
- Lewis, Joshua House
  178 South Street
- McIntosh Corner Historic District
  Roughly Great Plain Avenue and Central Avenue
- Mills, Davis House
  945 Central Avenue
- Needham Street Bridge
  Crossing Charles River at Needham Street, Newton Avenue and Highland Avenue
- Needham Town Hall Historic District
  Great Plain Avenue between Highland Avenue and Chapel Street
- Newton Multiple Resource Area
  2 bridges crossing the Newton/Needham Town Lines
- Newton Upper Falls Historic District
  Boylston Street, Elliot Street, and Oak Street, Newton and Charles Rivers

- Smith, James House
  706 Great Plain Avenue
- Sudbury Aqueduct Linear District
  Water Supply System of Metropolitan Boston
- Tolman, Gay House
  1196 Central Avenue
- Townsend House
  980 Central Avenue
- Water Supply System of Metropolitan Boston
  8 districts and 19 individual properties in 23 towns
- Whitney, Israel House
  963 Central Avenue

2.5 Outstanding Resource Waters

The Massachusetts Surface Water Quality Standards contain anti-degradation provisions to maintain existing uses and the level of water quality necessary to protect those uses. These provisions designate water bodies with exceptional socio-economic, recreational, ecological and/or aesthetic value as Outstanding Resource Waters (ORWs). ORWs include certified vernal pools and all Class A designated public water supplies and their bordering vegetated wetlands. Other waters designated as ORWs may include those found in National Parks, State Forests and Parks, and Areas of Critical Environmental Concern designated by the Secretary of Environmental Affairs and those protected by special legislation. Wetlands bordering the ORWs are also designated as ORWs to the boundary of the defined area.

Since ORW designation is appropriate for waters where existing use is so exceptional or perceived risk of harm is such that no lowering of water quality is permissible, these waters have more stringent requirements than other waters. Generally, new or increased discharges of pollutants are prohibited for storm water.

According to the Designated Outstanding Resource Waters of Massachusetts (1995) prepared by the Massachusetts Department of Environmental Protection, the only Outstanding Resource Waters in Needham is the certified vernal pool.

Section 3
Drainage System Description

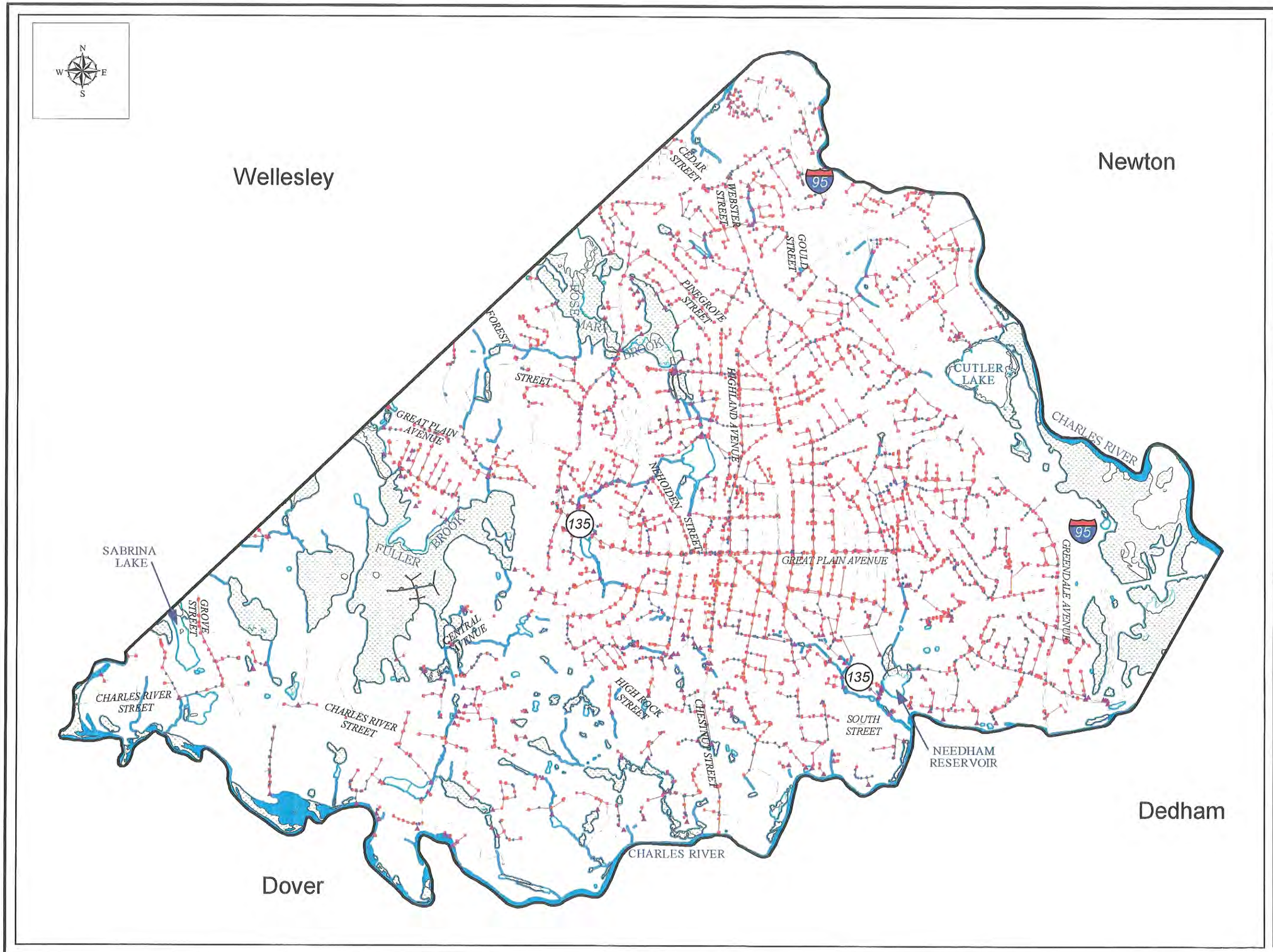
3.1 General

The Town of Needham has been subdivided into four major sub-watersheds all of which ultimately contribute to the Charles River Watershed. Needham's overall storm water collection system is composed of pipes, culverts, swales, ditches, detention basins, wetland areas, streams, lakes, ponds and rivers. A database has been established which contains Town-wide information for all of the drainage structures and conduits. An overall map of Needham's drainage system is provided in Figure 3-1. The Town has established priority areas for drainage improvements and modeled those systems. In addition, the Town has several GIS coverages including; buildings, pavement edges, parking lots, sidewalks, driveways, water bodies, two-foot contours, etc., which assist in determining storm water priority areas. As a result, Needham has a complete picture of its existing drainage system, sub-watersheds, and flooding problems.

3.2 Sub-Watershed Descriptions

The characteristics of the four major sub-watershed areas within the Town are depicted in Table 3-1 on the following page. Sub-watershed characteristics and locations are significant to the overall drainage system for the Town. The sub-watershed locations are illustrated in Figure 3-2.

Two of the major sub-watersheds discharge directly to the Charles River, while the other two discharge to the Charles River through the Town of Wellesley via tributary waters such as Fuller Brook and Rosemary Brook. The four areas vary significantly in size and land use characteristics.



Legend

- Manholes
- Catch Basins
- Outfall Locations
- Pipes
- Lakes and Ponds
- Rivers
- Upland
- Wetland Areas
- Streams and Brooks

1250 0 1250 2500 Feet

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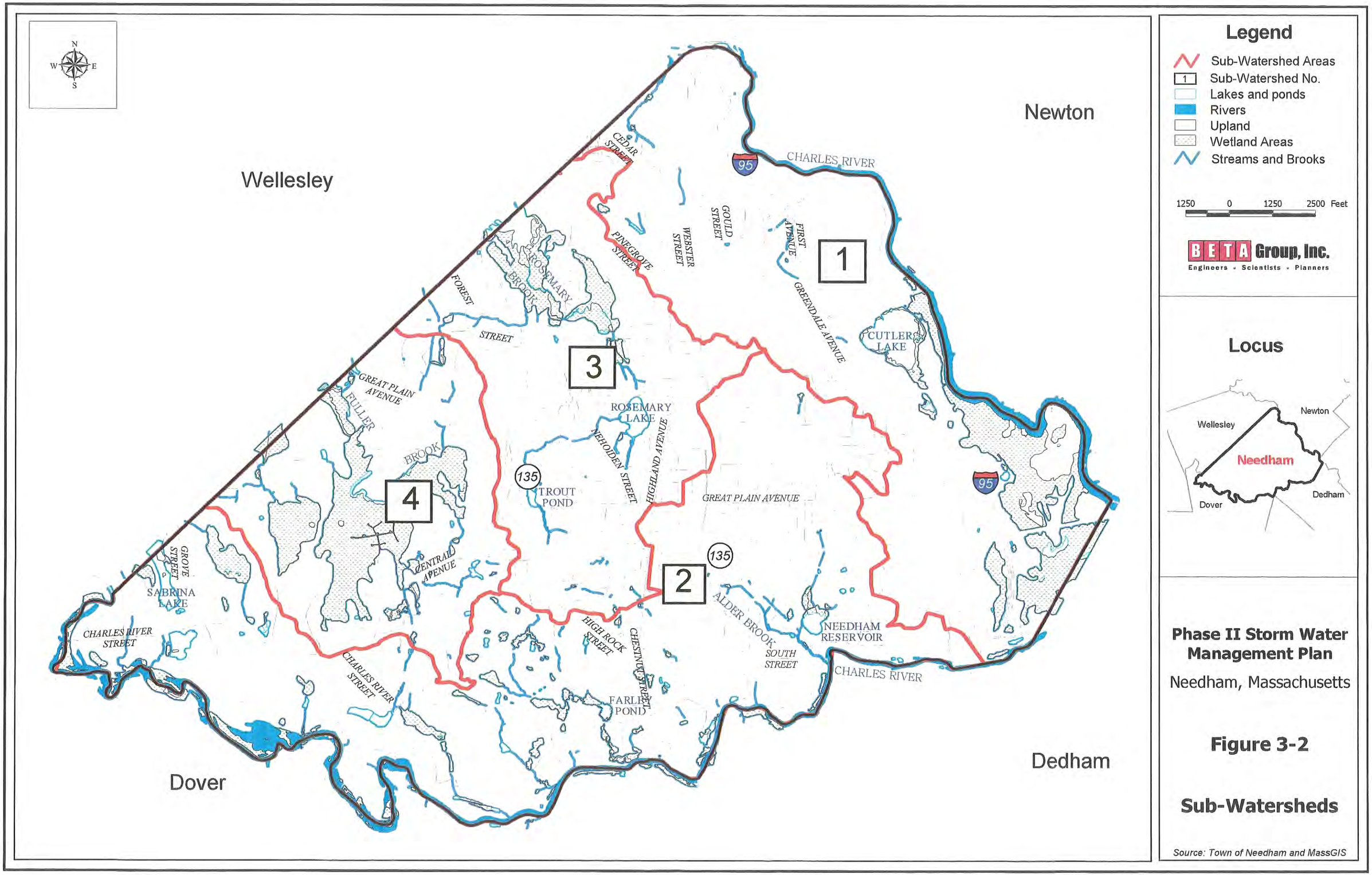
Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 3-1

Drainage System Map

Source: Town of Needham and MassGIS



Legend

- Sub-Watershed Areas
- 1 Sub-Watershed No.
- Lakes and ponds
- Rivers
- Upland
- Wetland Areas
- Streams and Brooks

1250 0 1250 2500 Feet

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Phase II Storm Water Management Plan

Needham, Massachusetts

Figure 3-2

Sub-Watersheds

Source: Town of Needham and MassGIS

Table 3-1
Sub-Watershed Characteristics

Sub-Watershed	1	2	3	4
Location	Route 128	Southern	Interior A	Interior B
Area (acres)	2228	3123	1553	1257
Area (square miles)	3.5	5	2.5	2
Length of Pipe (miles)	29	37	30	6.5
Number of Catch Basins	1139	1475	1333	278
Number of Manholes	397	479	430	86
Number of Discharges	54	121	86	34

Sub-Watershed 1

Sub-watershed 1 is located along the Town's eastern edge (formed by the Charles River) adjoining the City of Newton and to the east of Sub-watersheds 2 and 3. The area is bisected by the Route 128 corridor with a major (full clover leaf) interchange at Highland Avenue and a smaller interchange at Great Plain Avenue. The sub-watershed area is approximately 3.5 square miles and includes approximately 29 linear miles of pipe, 1,139 municipal catch basins, 397 drainage manholes, and 54 discharge points or outlets. The drainage systems within Sub-watershed 1 discharge to the State drainage system or directly to the Charles River.

The land use is predominantly single family residential with some forestland and a section of industrial land use. Major surface water bodies include the Charles River, Cutler Lake, and Hura Brook. The area also contains a large wetland located in the south-east corner between Route 128 and the Charles River.

Sub-Watershed 2

Sub-watershed 2 is located in the southern and central portion of Needham. The southern boundary is formed by the Charles River. The northern boundary is the southern limit of Sub-watersheds 3 and 4. Major transportation facilities and roadways include: the Commuter Rail Line, extending from the Town of Dover into Sub-watershed 1, Route 135, South Street, and Chestnut Street.

The sub-watershed is approximately 5 square miles and includes approximately 37 linear miles of pipe, 1,475 municipal catch basins, 479 drainage manholes, and approximately 121 discharge points or outlets. All discharges flow directly to the Charles River or ultimately flow to the River via wetland/stream systems.

The land use is predominantly single family and rural residential with some forestland and recreation areas. The area contains many surface water bodies including; the Charles River, Sabrina Lake, Needham Reservoir, Forbes, Walker and Farley Ponds, and Alder Brook. The area is also home to the Needham Golf Club, DeFazio Park, and a portion of the Ridge Hill Reservation.

Sub-Watershed 3

Sub-watershed 3 is located in central-northern section of Needham, with Wellesley to the north. Honeywell Street and Sub-watershed 2 are located along the eastern boundary and Sub-watersheds 2 and 4 form the southern and western boundaries, respectively.

The sub-watershed area is approximately 2.5 square miles and includes approximately 30 linear miles of pipe, 1,333 municipal catch basins, 430 drainage manholes, and 86 discharge points or outlets. All discharges flow to Rosemary Brook, through Wellesley and eventually to the Charles River.

The area has a variety of commercial, residential, and institutional uses. Needham Junction is located at the southern most point of the sub-watershed. Major surface water bodies in Sub-watershed 3 include Wellesley Water Works and Rosemary Lake, which are connected to Rosemary Brook. A major wetland area, bisected by Rosemary Brook, is also located in the vicinity of these water bodies. North Hill, the highest elevation in Town, is located in this sub-watershed.

Sub-Watershed 4

Sub-watershed 4 is located in western Needham bordering Wellesley, with Sub-watersheds 2 and 3 located south and east, respectively.

Sub-watershed 4 is approximately 2 square miles and includes approximately 6.5 linear miles of pipe, 278 municipal catch basins, 86 drainage manholes, and 34 discharge points or outlets. Discharges flow into wetland areas associated with Fuller Brook, through Wellesley and eventually to the Charles River.

The area in Sub-watershed 4 is characterized for forestland, wetland, and residential uses. The Ridge Hill Reservation and wetland areas comprise a large section of Sub-watershed 4. A majority of the development in this sub-watershed consists of a residential neighborhood located along Great Plain Avenue north of Fuller Brook. The Newman Junior High School, located on Central Avenue, is also located within this sub-watershed.

3.3 Drainage System Mapping

Utilizing Global Positioning System (GPS) technology, record plan information, aerial photography, and field inspections, the Town developed a comprehensive database for all town owned drainage structures and conduits.

Topographic map data was obtained from aerial photography completed in the spring of 1999 and compiled at a scale of 1"=40'. The base mapping was provided in ArcInfo format and consisted of numerous planimetric features including, but not limited to: infrastructure points, pavement edges, building footprints, water bodies, wetlands and 2-foot contours. Approximately 75% of the municipal drainage manholes and catch basins were located via photogrammetric methods, while the remaining 25% were located utilizing GPS or field survey.

There are 5,912 town owned structures in Needham's drainage system, including 4,225 catch basins, 1,392 drainage manholes, and 295 discharges. All of these structures are

included in a geographic information system (GIS) coverage with a connected database containing structure characteristics. It should be noted that outfall locations were determined and field inspected and are also included in the database. The drainage structure database contains the following information:

- Structure Type – Catch Basin, Manhole, Junction, Outfall, Headwall
- Street Name
- Record Plan Number
- Record Plan Date
- Record Plan Base Elevation
- Depth
- Rim Elevation
- Invert Elevations
- Notes and Comments – regarding any issues or assumptions in the database

The infrastructure points provided the framework for establishing the geographic location for drainage pipes using record plans provided by the Town. These plans contained plan and profile information that is critical to developing an accurate drainage system map and database. The conduit database includes the following information:

- Street Name
- Record Plan Number
- Record Plan Date
- Material
- Diameter or Dimensions
- Up Stream Invert
- Down Stream Invert
- Length
- Slope
- Notes and Comments – regarding any issues or assumptions in the database

The structure and pipe positions and databases are in GIS format and can be updated in the future to depict storm drain changes. This information allows the Town to track drainage system changes and prioritize areas of concern in the database.

Section 4
Minimum Control Measures

Needham is currently implementing a storm water management program to assist with the goal of a "fishable and swimmable" Charles River by Earth Day 2005. Therefore, the Town has already established many BMPs. There are additional measures that need to be implemented to achieve compliance with the Phase II requirements. Proposed BMPs and measurable goals are provided herein to fully adhere to the requirements.

The CRWA is currently addressing many BMPs that Needham will employ in the future. Town employees will work in conjunction with the association to administer the proper procedures for BMP implementation. Current measures used by Needham and the CRWA are outlined for each minimum control measure.

There are costs and time constraints associated with implementing these actions. That is the reason many of the measurable goals will be measured in phases and schedules. At this time funding is not in place for all of the BMPs, and the measurable goals set will not be accomplished if additional funding is not secured. The Town is committed to aggressively pursuing funding from local, state, and federal sources and is committed to accomplishing as many of the measurable goals as possible. The Department of Public Works proposed budget includes many of the actions outlined herein, (See Appendix) but ultimately the voters will decide budget levels at the Annual Town Meeting. As time goes by, and more funding becomes available, more aggressive and expensive BMPs and goals could be implemented. The goal of this plan is to reduce the overall effects of storm water pollutants to Needham water bodies to the "maximum extent practicable."

4.1 Public Education and Outreach

The DPW Director is responsible for ensuring the implementation of proposed BMPs and measurable goals regarding public education and outreach.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"The permittee must implement a public education program to distribute educational material to the community. The public education program must provide information concerning the impact of storm water discharges on water bodies. It must address steps and/or activities that the public can take to reduce the pollutants in storm water runoff."

Minimum Measure Objective

This plan of action is successful if Needham residents learn to feel a sense of responsibility regarding storm water pollution prevention. They will learn about actions that will directly benefit the cleanliness of local water bodies. This will create a supportive and educated community, which will foster support for funding initiatives and will benefit local water bodies greatly.

Current Practices

Twice per year, the Town conducts a household hazardous waste collection day. These events are advertised through local newspapers, cable television, and flyers that are distributed throughout the Town. A brochure explains the household hazardous waste days to Needham residents. It also gives a description of the type of wastes accepted on these days including; oil filters and oily rags, used oil and antifreeze, lead acid batteries, empty propane tanks, and other items that are hazardous to the environment. Public advertisements for these hazardous waste collection days include information regarding the harmful effects of improper disposal of these materials. The collection of used motor oil on these days reduces material, which may otherwise be disposed of in the municipal storm water system via catch basins or other storm water structures. These efforts will be continued to protect the drainage system from household pollutants.

The Town currently has many other brochures and flyers regarding recycling, conservation, hazardous materials and other issues. Additionally, flyers about recycling containing magnets are distributed. These magnets are equipped with a phone number and website to contact if questions arise about the program.

One of the brochures called "2002-2003 Needham Recycling Information" details the type of materials that can be brought to the Needham Recycling and Transfer Station (RTS). The items include latex and oil paint, motor oil, and various other household waste products. The flyers contain pictures of products that can be recycled, contact information to answer resident questions, and lists of household waste that can be brought to these events and to the RTS.

The Town has a Surplus Paint Program that is already scheduled for 2003. It is held on the third Saturday of each month from April to October. Oil, latex, stains, varnishes, alkyd-based paint, latex paint, enamels, linseed oil, thinners, and polyurethane including; interior stain, paint thinner, paint remover, turpentine, wood preservative, etc. are accepted by this program. Any labeled container with liquid inside of it is recycled on these days. There are two flyers distributed through Town, which educate residents about the Surplus Paint Program. One of the flyers educates residents about the paint program along with hazardous materials accepted by the Town. There is a Thermometer Exchange Program, which provides residents with digital thermometers for mercury thermometers.

There is also a flyer that provides residents with guidelines on how to conserve water use in the home. One of the suggestions is to water only the lawn, not the driveway or sidewalk. It instructs residents to use a broom to sweep driveways, walks, and garages rather than washing them with water. This flyer was reprinted by the Charles River Watershed Association and by the Needham DPW. To view an assortment of the Town's current flyer publications, refer to the Appendix.

Two Needham Selectmen have a public awareness program on the local cable television network entitled "Talk About Needham." This program educates the public about local issues including storm water. During the broadcast, residents learn about issues regarding local infrastructure, such as sanitary sewers and storm drainage systems. In addition, water quality, hazardous waste, and other environmental topics are discussed.

The DPW held several meetings about storm water for local home-school children. Children that are home-schooled are taught Math, English, Social Studies, Science and other types of courses at home by their parents. These students were interested in participating in a national competition. The DPW allowed them to use GIS information to put together an impressive storm water project. As a result, they won first place in the State of Massachusetts and also won first place in a national competition.

The Town also has a web page that provides residents with information about the Town. The Town's web site address is:
http://www.town.needham.ma.us/

The CRWA has published many storm water related articles in various newspapers. "Volunteers Make Clean Sweep for Earth Day" was printed in the Boston Herald on April 21, 2002. Also, On May 29, 2002 the Milford Daily News printed an article entitled; "Wanted: Residents to Recycle Water". There are many other articles that have been printed on behalf of the association. The CRWA also holds community meetings, lectures, classes, and workshops to educate the public about storm water issues. There is an annual meeting, which was located at the Newton Marriot on November 12, 2002.

The CRWA website provides helpful tips for residents who want to improve upon household storm water practices. The tips include information on water conservation, roof hookups, re-routing rainwater to pervious areas rather than pavement areas, septic system maintenance, etc. The website also contains tips for businesses planning to lessen the impacts they have on local water bodies. For example, it explains how to clean vehicles, recycle waste, minimize impervious surfaces, prevent erosion, clean storm drains, apply salt to pavement, fertilize land, store waste and materials, arrange work sites, and contain waste, among other tips. The following is CRWA's web site address:
http://www.crwa.org/index.html

There is a State of Massachusetts Adopt-A-Stream (AAS) program, which strives to assist communities with education, obtaining the resources to assess rivers, etc. The program

provides support for water quality and habitat improvement and land acquisition. The AAS Program has developed a toolbox for projects that involves fact sheets to provide project descriptions, background, resources, and cost estimates. The Cutler Park to Commonwealth Avenue (CPCA) Stream Team is part of this program. The CPCA Stream Team applied for a DEM grant to work on a blueway trail on the Charles River. The group has been involved in education initiatives in the Charles River Watershed and plans to expand on these efforts. The Team writes a newsletter to inform CRWA members, town officials, and others about its planned activities and accomplishments. Also known as the "Nonasties," they have become a 501c3 non-profit group. The team is working to assist on repairing fish ladders in the Charles River. With assistance from the stream team and other environmental groups, all ten Massachusetts representatives became co-sponsors to the Conservation and Reinvestment Act. The bill would guarantee financial support for the Land and Water Conservation Fund (LWCF) through 2015. LWCF is an important source of funding for expanding green space, upgrading playgrounds, establishing new parks, and improving river access. Previously funded projects have included the Rosemary Lake bathhouse project in Needham.

Best Management Practices and Measurable Goals

1. Classroom Education on Storm Water

Educational materials will be collected from EPA, CRWA, and DEP for distribution to schools at several grade levels. The teachers, as part of the appropriate curriculum, will present the materials. Educated volunteers will be invited to deliver storm water speeches to local public schools. In addition, volunteer groups such as the boy scouts and girl scouts will be taught about storm water pollutants including their affect on local water bodies and actions, which would reduce their presence. For example, they will learn to organize clean-up activities at the Charles River. The DPW will utilize the information given to home-schooled children to reach out to public school children. The League of Women Voters will be requested to assist with the Town's education program because the League has demonstrated interest.

Measurable Goals

- There will be three sets of educational materials distributed to local schools.
- Three grade levels will participate in storm water activities.
- There will be two workshops held for teachers regarding storm water education.

2. Flyer and Brochure Distribution and Web Site Link

Flyers and brochures will continue to be used to teach residents and businesses about storm water. Residents will be educated about environmentally friendly lawn and garden maintenance, pet waste management, trash management, and water conservation along with other precautions for cleaner storm water. Flyers will also focus more on methods to disconnect roof drains from discharging onto impervious areas. The Town will specifically educate residents about the importance of pet waste management in future flyer publications. Water usage in households is typically much higher than necessary. Therefore, Needham residents will continue to be educated about alternative methods to reduce the amount of water being consumed in their homes. The flyers and brochures will be expanded to list ways to properly dispose of landscape and garden chemicals, especially fertilizers and pesticides. Future flyers developed by the Town will also focus on septic system maintenance. The flyers will be obtained from sources such as; the DEP or EPA. For sample flyers and brochures, refer to the Appendix.

Illegal dumping education will help prevent contaminated runoff from entering wells and surface water. If residents notice a person dumping litter at abandoned industrial, commercial and residential buildings, vacant lots, and poorly lit areas they will be aware that the person is probably involved in an illegal dumping activity. Cleaning staff in many businesses may be unknowingly polluting by dumping mop water into a catch basin. Also, restaurants and automotive garages may be polluting by dumping grease, oil, or any petroleum products into the drainage system. These messages will also be developed in future flyers published by the Town and sent to local businesses and residents.

A hotlink will be added to the Town's official web site that connects to the Charles River Watershed homepage. This will give residents straightforward accessibility to storm water information pertaining to Needham.

Measurable Goals

- Determine the additional types of educational materials to be provided to the community by the end of year one.
- Gather one flyer and two fact sheets related to storm water and make them available to the public at the Department of Public Works, Town Hall, and the public library.
- Provide a link on the Town's web site to the Charles River Watershed web site by year five.

3. Using the Media

The media is a powerful inexpensive tool, which can make a significant difference regarding storm water. Almost everyone is exposed to some form of the media including newspapers, and television. Consequently, Needham has and will expand its use of the media. Television public service announcements, local cable programming, and newspaper articles will be utilized to inform the public of vital storm water information. The Needham Times will have articles with local storm water system information. The local cable show currently airing will be continued in the future as well.

Measurable Goals

- There will be one local cable public service announcement each year.
- There will be one storm-water-related press release each year.
- There will be one storm-water-related article each year.

4. Hazardous Waste Management

The Surplus Paint Program and the Hazardous Waste Days are ongoing programs that will remain the focus of Town efforts in reference to hazardous waste management. The public will continue to be educated about these programs through brochures and flyers distributed by the DPW.

Measurable Goals

- The amount of household hazardous waste collected on these days will be tracked.
- Educational materials about hazardous waste management will continue to be distributed at the DPW.

Figure 4-1 outlines the time constraints for education and outreach BMPs.

Figure 4-1
BMP Schedule – Public Education and Outreach

BMP	*Year*				
	1	2	3	4	5
Classroom Education on Storm Water					
Collect Materials from EPA, CRWA, and DEP and Distribute to Public Schools	■				
Teachers Instruct Classes and Present Material Gathered in Year One		■	■	■	■
Volunteers Assembled and Taught About Storm Water Issues		■			
Volunteer Outreach to Youth Groups and Public Schools			■	■	■
DPW use Home-School Model for Public Schools	■				
Flyer and Brochure Distribution and Web Site Link					
Determine Additional Educational Materials to be Provided to the Community Via Publications	■				
Supply the DPW, Town Hall, and Public Library with a Flyer and Fact Sheets		■	■	■	■
Distribute Flyers to all of Needham Residences			■		
Provide a Web Site Link on the Town's Web Site to the Charles River Watershed Web Site					■
Using the Media					
Continue Local Public Access Show "Talk About Needham"	■	■	■	■	■
Issue One Storm Water Related Press Release Per Year	■	■	■	■	■
Publish One Storm Water Related Article Per Year	■	■	■	■	■
Hazardous Waste Management					
Surplus Paint Program Continuation	■	■	■	■	■
Hazardous Waste Day Continuation	■	■	■	■	■

4.2 Public Involvement/Participation

The DPW Director is responsible for ensuring the implementation of proposed BMPs and measurable goals regarding public involvement/participation.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"All public involvement activities must comply with state public notice requirements at MGL Chapter 39 Section 23B.

- *The permittee must provide opportunity for the public to participate in the development, implementation and review of the storm water management program."*

Minimum Measure Objective

The goal is to have a community dedicated and actively involved with this storm water program. This will result in a community with a much bigger stake in water body cleanliness than an uninvolved community. As time passes, more volunteers and cleaner water bodies are the goals of this program.

Current Practices

The show "Talk About Needham" answers resident questions by receiving telephone calls throughout the broadcast. This programming provides Needham residents with a forum in which to ask relevant questions to the chief elected officials in the Town.

Under Needham's general by-laws, a dog being walked must be kept on a leash that is less than six feet long and can only perform natural body functions on the owner's property unless given approval by another property owner. If the dog owner fails to comply with these by-laws the first offense is a $25 fine and the second offense is a $50 fine.

The Selectmen permitted street name signs to be attached to the bridges over the Charles River. This allows boaters to identify their location as they navigate the river.

The CRWA has volunteers conduct monthly water monitoring of several sites along the Charles River including locations in Needham. The monitoring is usually performed on the third Tuesday of each month. The CPCA Stream Team performs sampling on water bodies in the Town. Sampling results from the associations are sent to the Town to evaluate its performance regarding storm water efforts. Volunteers are also responsible to maintain the CRWA website. In addition, the CRWA has river cleanup projects. There is a scheduled earth day clean up which will be held at various portions of the Charles River.

Youth organizations have stenciled some storm drains in Needham. The CRWA encourages storm water stenciling programs by providing communities with reusable stencils and procedures for implementing a stenciling project.

Best Management Practices and Measurable Goals

The Town of Needham will utilize CRWA knowledge and resources to establish its volunteer programs.

1. Adopt-A-Stream Programs

Adopt-A-Stream programs will be established as an inexpensive way to monitor and protect local water bodies. Local youth groups and any other Needham resident interested will feel a sense of responsibility to a specific water body which they will monitor and clean. A packet with trash bags and gloves, trash collector information, and an area map will be provided to all volunteers so they can monitor a stretch of water. They will become the primary people who work with that stretch of water. This program will be advertised via public service announcements and newspaper articles.

In addition, the CPCA Stream Team will monitor sites in Needham as well. The combined efforts of residents and the CPCA Stream Team will significantly reduce the amount of trash in Needham water bodies. In addition, it will be a method of gauging the level of water quality for many water bodies in Town.

Measurable Goals

- Two streams will be adopted by local volunteer groups.
- The quantity of trash removed by volunteers will be tracked.

2. Stencil Storm Drains

Youth organizations and other volunteer groups will stencil storm drain covers. The group will begin the process by stenciling in areas with pollutants found in the storm water discharges. The storm drains will say "Don't Dump Drains to Charles River" and a record will be kept of every storm drain stenciled during this initiative.

Measurable Goals

- Fifty storm drains will be stenciled per year.

3. Community Hotline

A community hotline will be established by the DPW so residents can speak with a trained Town employee regarding storm water issues. The hotline will allow residents to report illegal dumping and other issues. Town employees will investigate calls that report suspicious and destructive behavior. The hotline phone number will be printed in brochures and flyers, and shown on the local cable program.

Measurable Goals

- One hotline will be established.
- The number of phone calls will be tracked over time.
- The number of problems/incidents remedied as a result of hotline calls will be tracked.

4. Storm Water Committee

A Storm Water Committee will be formed to provide input and knowledge about local storm water problems from various perspectives. The committee will play a significant role in the Town's SWMP because the committee will assess the storm water program and provide guidance for possible changes to the plan. The committee could be composed of

representatives of the community including Needham residents, CRWA members, Planning Board members, DPW personnel, the Town Administrator, Board of Health representatives, etc. Committee discussions and ideas will be published in the flyers and brochures already being distributed throughout the Town. The League of Women Voters could be actively involved with this committee.

Measurable Goals

- Establish the Committee in year one.
- Hold annual meetings in years two through five.

5. Pet Waste By-Law

Pet waste can contribute fecal coliform bacteria to receiving water bodies. Pet waste may also cause eutrophication in water bodies. The Town enforces by-laws to restrict dogs from performing bodily functions on property other than the owner's. Signs will be posted in parks and any other areas that dogs are permitted to perform bodily functions. The public will be educated about pet waste via flyers and brochures as stated under minimum control measure #1.

Measurable Goals

- The number of signs posted stating regulations will be tracked.
- The number of educational materials distributed will be tracked.
- The number of dog licenses issues will be tracked.

Figure 4-2 depicts the scheduled time to execute each public involvement/participation BMP.

Figure 4-2
BMP Schedule – Public Involvement/Participation

BMP	*Year*				
	1	2	3	4	5
Adopt-A-Stream Programs					
Advertise Via Public Service Announcements and Newspaper Articles	■				
Establish Adopt-A-Stream Groups (2) and Organize Information for Volunteers		■			
Clean Adopted Local Water Bodies			■	■	■
CPCA Stream Team Adopt-A-Stream Program Continued	■	■	■	■	■
Stencil Storm Drains					
Prioritize Areas to be Stenciled	■				
Stencil 50 Storm Drains Per Year	■	■	■	■	■
Maintain Records of Stenciled Areas in Needham	■	■	■	■	■
Community Hotline					
Establish Hotline Phone Number		■			
Print Phone Number in Brochures and Display on the Local Cable Show			■		
Residents Use Hotline and DPW Personnel Investigate Illegal Dumping Reports			■	■	■
Storm Water Committee					
Establish Storm Water Committee	■				
Hold Annual Meetings		■	■	■	■
Print Ideas and Discussions in Brochures and Flyers			■	■	■
Pet Waste By-Law					
Post Signs Near Parks and Other Areas Where the Town By-law is Applicable			■		

4.3 Illicit Discharge Detection and Elimination

The DPW Director is responsible for ensuring the implementation of proposed BMPs and measurable goals regarding illicit discharge detection and elimination.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"The permittee must develop, implement and enforce a program to detect and eliminate illicit discharges.

- *The permittee must develop a storm sewer system map. At a minimum the map must show the location of all outfalls and the names all waters that receive discharges from those outfalls.*

- *The permittee must effectively prohibit, through an ordinance or other regulatory mechanism, non-storm water discharges into the system.*

- *The permittee must develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, into the system.*

- *The permittee must inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper waste disposal."*

Minimum Measure Objective

The number of illicit discharges tested will be tracked, and the number of polluted areas should decrease as proposed BMPs are implemented. Also, the number of people who report suspicious activity such as; dumping should increase due to the public education BMPs.

Current Practices

A Storm Water Pollution and Management Program was submitted to the EPA in November of 1996, a copy is provided in the Appendix. The main focus of the project was to identify

illicit connections to the storm water drainage system. This effort involved a physical inspection of ten drainage areas and their associated sub-areas. These ten drainage areas have been identified by the EPA (through the Charles River Watershed Association) as contributing significant fecal coliform bacteria to the Charles River. Improvements to the storm water and sanitary sewer systems were constructed by the Town in 1996 and 1997 in an effort to eliminate the illicit discharges to the Charles River.

Town wide discharge point inspection, sampling, and testing was conducted by BETA Group, Inc. in 1999 as part of this project. The investigation included all discharges at headwalls and pipe ends with the exception of discharges to the State drainage system.

The previous Storm Water Pollution and Management Program involved investigating the drainage characteristics of ten watersheds in Needham identified as problem areas that discharge directly to the Charles River. That investigation was considered the first step of a comprehensive storm water management program being undertaken by the Town. Project tasks included data research, mapping, visual inspections, dry/wet weather sampling of drainage systems, and television inspection of drainage and sewer pipes.

This study included dry weather investigation of all of the pipe discharges identified in the Town excluding those discharges that connect to the State drainage system. Dry weather investigations were conducted when an antecedent condition of three or more dry days occurred. The inspections included documentation of the discharge with respect to pipe size, condition, flow rate estimate (if flow was present), evidence of chemical contamination or fecal matter, photographing the discharge and obtaining samples of the flow discharging from the pipe (if flow was present).

Sampling of residential sub-areas was conducted during periods of anticipated sewer use, such as early morning and evening hours. In large sub-areas, samples were taken at a time that reflected time of travel for flows through the sub-area drainage system. Testing times for commercial and industrial sub-areas reflected those periods when businesses were

observed operating with a full staff, such as mid-day. If no flow existed during dry weather inspections, the area was determined to have no illicit connections.

Samples were tested for the following parameters:

- Ammonia Nitrogen (>0.4 mg/l. indicates sewage contamination)
- Surfactants (>0.1 mg/l. indicates sewage contamination)
- Fecal Coliform Bacteria (>200 MPN/100 ml. indicates sewage contamination)
- Total Dissolved Solids (TDS) (>700 ppm, except for saline waters, i.e. >60 ppm as $CaCO_3$
- Flouride (>1.0 mg/l.)
- Enterococcus (>30 MPN/100ml.)
- E. Coli (>125 MPN/100ml.)

Of the 295 outfalls investigated, during both sampling and testing programs, sixteen were flowing with liquid and eight were determined to have elevated levels of fecal coliform bacteria. Eight areas that require additional investigation are listed in Table 4-1 and their locations are depicted in Figure 4-3A.

The Town formed a comprehensive database, as described in Section 2, for Needham's drainage system. There are 5,912 Town owned structures in Needham's drainage system including 4,225 catch basins, 1,392 drainage manholes, and 295 drainage discharges. All of these structures are included in a GIS coverage with a connected database containing structure characteristics. Outfall locations were determined, field inspected and are included in the database. This information is very useful because the Town can track areas with problems and prioritize them for future improvements to the drainage system.

The CRWA has monitored the Charles River that has helped to influence organizations and environmental agencies regarding illicit connection and combined sewer overflow controls.

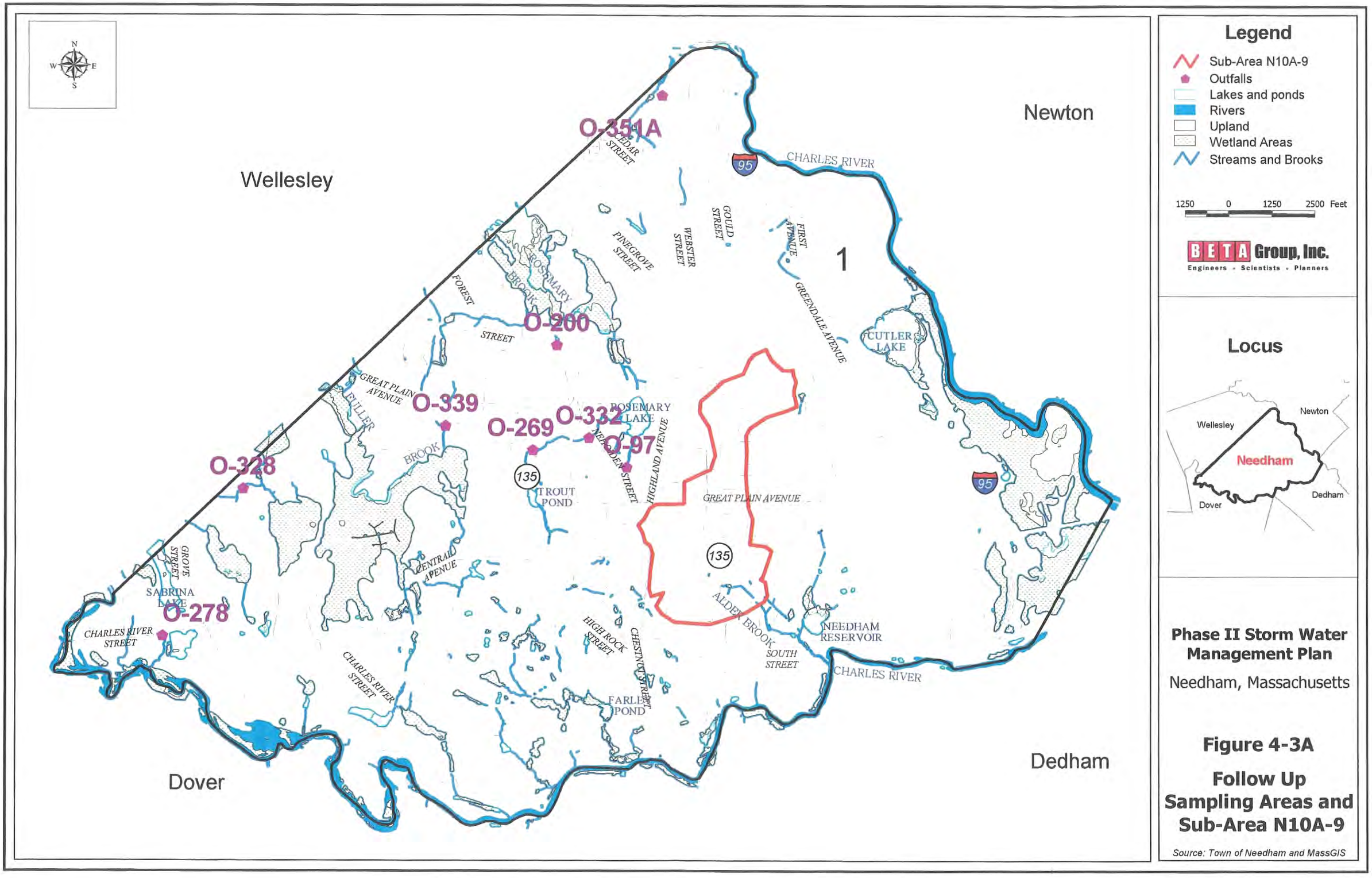
Legend
Sub-Area N10A-9
Outfalls
Lakes and ponds
Rivers
Upland
Wetland Areas
Streams and Brooks
1250 0 1250 2500 Feet
BETA Group, Inc.
Engineers • Scientists • Planners
Locus
Wellesley
Newton
Needham
Dedham
Dover
Phase II Storm Water Management Plan
Needham, Massachusetts
Figure 4-3A
Follow Up Sampling Areas and Sub-Area N10A-9
Source: Town of Needham and MassGIS
Wellesley
Newton
Dedham
Dover
O-351A
O-200
O-339
O-269
O-332
O-97
O-328
O-278
1
CHARLES RIVER
CUTLER LAKE
ROSEMARY LAKE
TROUT POND
SABRINA LAKE
NEEDHAM RESERVOIR
FARLEY POND
ALDEN BROOK
GREAT PLAIN AVENUE
GREENDALE AVENUE
HIGHLAND AVENUE
NEEDHAM STREET
CENTRAL AVENUE
HIGH ROCK STREET
CHESTNUT STREET
SOUTH STREET
CHARLES RIVER STREET
GROVE STREET
FULLER BROOK
ROSEMARY BROOK
FOREST STREET
PINEGROVE STREET
WEBSTER STREET
GOULD STREET
FIRST AVENUE
CEDAR STREET
95
135

Table 4-1
Sampling and Testing Results

Outfall ID	Outfall Location	Pipe Size (in.) - Material	Flow (gpm)	Total Dissolved Solids (ppm)	Ammonia Nitrogen (mg/l)	Surfactants MBA's (mg/l)	Fluoride (mg/l)	E. Coli (MPN/100 ml)	Entero-coccus (MPN/100ml)	Fecal Coliform Bacteria (MPN/100ml)
O - 332	West of Nehoiden Road	36-RCP	8	260	Not Detected	Not Detected	Not Detected	Positive	1600	1500
O- 269	South of Maller and Hancock Rd. Intersection	30-RCP	8	180	0.08	Not Detected	Not Detected	Positive	300	340
O - 339	West of Fuller Brook Ave.	30-RCP	Stagnant	190	0.4	Not Detected	Not Detected	Positive	900	500
O - 200	West of Ludwig Circle	24-RCP	5	170	Not Detected	Not Detected	Not Detected	Positive	300	1500
O - 97	Northeast of May Street	24-RCP	10	390	Not Detected	Not Detected	Not Detected	Positive	900	1600
O - 351(A)	End of Seabeds Way	12-RCP	3	160	Not Detected	Not Detected	Not Detected	Not Detected	900	230
O - 328	East of Lehigh Road	24-RCP	Stagnant	270	1.1	0.26	Not Detected	25000	80	310
O - 278	Southeast of Locust Lane	30-RCP	Stagnant	180	Not Detected	Not Detected	Not Detected	25000	<1	410

Where water quality constitutes nuisance conditions or public health issues, the Needham Health Department has regulatory authority. The Health Department also has authority where water quality violations exist which impact the municipal drainage system. Examples include private drains, septic system overflows, and other sources of pollution on private property. When there is an illegal dumping occurrence that requires reporting, either the Board of Health or the Fire Department receives the complaints. The Fire Department is the first respondent of any incidents and the department is equipped with the tools to handle hazardous situations. The incidents are reported to DEP.

The Needham Health Department has a listing of all septic systems and cesspools within Needham. The Health Department conducts routine and mandatory inspections of residential septic systems in accordance with Title V of the State Sanitary Code (as revised in 1995). These inspections include documentation of chronic problems, such as surface discharge of systems, etc. During land sale transactions, the Title V inspections include

documenting compliance with applicable setbacks to water resources and wetlands, as well as documenting evidence of surcharging systems. The Health Department ranks each system with a pass or fail score. Failure indicates a chronic problem with the system, and the need for an upgrade. Systems which fail the Title V criteria must be upgraded within two years of the system inspection. System upgrades and replacements include percolation testing and deep hole testing to determine the depth to groundwater and soil types, and design of a system in accordance with the Title V regulations. Plans of the new or upgraded systems must be submitted to and approved by the Health Department. Where water quality constitutes nuisance conditions or public health issues, the Needham Health Department has regulatory authority. The Health Department also has authority where water quality violations exist which impact the municipal drainage system. Examples include private drains, septic system overflows, and other sources of pollution on private property.

The Health Department also maintains records of all complaints, which are made to their office. The records include the address of the property for which the complaint was filed, the date of the complaint, and the result of the inspection by the Health Inspector. These complaints include those associated with failing septic systems, chemical releases and storage, and odors.

Discussions with Needham's Health Inspector revealed that residences with septic systems are typically older homes with older septic systems. Many of these were installed prior to the original Title V State Sanitary Code regulations promulgated in 1976.

Best Management Practices and Measurable Goals

1. Outfall Testing Program

Additional follow up testing will commence during the second year of this plan in the eight areas identified in Table 4-1 (depicted in Figure 4-3A) which had somewhat elevated pollutant levels. The goal of this testing will be to determine if the problems still exist and to identify specific reaches of pipe where problems exist so that measures can be taken to correct them. Specifically, each drainage discharge will be inspected during dry weather conditions as part of the Town's sampling program. Any evidence of chemical

contamination or fecal matter will be recorded and samples will be collected if discharges are flowing during dry weather conditions. Photographs will be taken at discharge locations where samples are gathered.

The samples will be analyzed for the following parameters:

- Ammonia Nitrogen (>0.4 mg/l indicates sewage contamination)
- Surfactants (>0.1 mg/l indicates sewage contamination)
- Fecal Coliform Bacteria (>200 MPN/100 ml indicates sewage contamination)
- Total Dissolved Solids (TDS)
- Total Nitrogen
- Nitrate Nitrogen
- Fluoride

Storm water collected in area N10A-9, depicted on Figure 4-3A, discharges into a thirty-six inch pipe, east of Webster Street. Storm water captured from this area discharges to Alder Brook approximately 3,600 feet from the Charles River. The discharge has been sampled numerous times and the results revealed elevated fecal coliform bacteria levels. For example, on November 7, 1996 the discharge had a fecal coliform bacteria level of 3,000 MPN/100 ml which is significantly higher than the threshold of 200 MPN/100 ml. Therefore, additional inspections of drainage pipes within sub-area N10A-9 are warranted, due to the continued levels of fecal coliform bacteria in dry weather storm water discharges. Television inspections may be required to separate various pipe reaches to determine possible sources of the bacteria.

The results will indicate if sewage overflows have contaminated the discharges. Additional investigations will be required if samples show signs of sewage contamination.

All of the Town's 295 outfalls will be re-sampled in the fifth year of this plan's execution. They will be re-sampled by analyzing the same parameters used for the follow-up testing areas.

Measurable Goals

- Follow-up testing performed for the eight areas.
- Study performed to verify if television inspections are required for area N10A-9.

2. Illegal Dumping Education

Illegal Dumping can result in adverse affects on local water bodies. Therefore, flyers, posters and other public education tools will be created in the first year to inform citizens about illegal dumping, as described under the Public Education and Outreach and the Public Involvement/Participation minimum control measures. For example, the citizens will be able to utilize the community hotline to inform the Town of illegal dumping occurrences.

Measurable Goals

- The number of flyers, posters, or other public education tools distributed.
- The number of illegal dumps reported by citizens.
- The number of penalties enforced upon the participants of illegal dumps.
- The number of meritorious acknowledgements for reporting an illegal dump.

3. Septic System Controls (Board of Health)

Needham residents will be educated about septic system maintenance and operation via flyers, brochures, and the Town's web site. The public will be educated and instructed to divert roof drains away from septic systems. The water conservation information provided by the Town when followed (as described under the Public Education and Outreach minimum control measure) lessens the likelihood of hydraulic overloading in the septic systems. Failing septic systems lead to untreated wastewater flowing to water sources. The Board of Health will continue its efforts with respect to fixing failing septic systems in Needham. In addition, the eight areas depicted in Table 4-1 that are being re-sampled, during this plan's implementation, will be evaluated for proximity to septic systems, sanitary sewers, and groundwater table elevations.

Measurable Goals

- The number and location of septic systems.

- The number of systems that are inspected and maintained regularly.
- The number of reminder and educational flyers distributed.
- The number of people trained in inspection and installation of septic systems.
- The number of failed septic systems.

Figure 4-3B provides time frames to act upon each illicit discharge detection and elimination BMP.

Figure 4-3B
BMP Schedule – Illicit discharge Detection and Elimination

BMP	*Year*				
	1	2	3	4	5
Outfall Testing Program					
Follow-Up Testing in Eight Areas (Table 4-1)		■			
Analyze Results			■		
Study Performed for Area N10A-9			■		
Illegal Dumping Education					
See Minimum Control Measures #1 and #2	■	■	■	■	■
Septic System Controls					
Continue Board of Health's Procedures	■	■	■	■	■
Evaluate the Eight Testing Areas (Table 4-1) for Proximity to Septic Systems, Sanitary Sewers, and Groundwater Elevations	■				
Educate Residents About Septic System Maintenance			■		

4.4 Construction Site Storm Water Runoff Control

The Town Engineer is responsible for ensuring the implementation of proposed BMPs and measurable goals regarding construction site storm water runoff control.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"The permittee must develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. The permittee must include disturbances less then one acre if part of a larger common plan.

At a minimum, the program must include:

- *An ordinance or other regulatory mechanism to require sediment and erosion controls at construction sites.*
- *Sanctions to ensure compliance with the program.*
- *Requirements for construction site operators to implement a sediment and erosion control program which include BMPs that are appropriate for the conditions at the construction site."*

Minimum Measure Objective

Existing policies and procedures will be continued and augmented to require a variety of BMPs to minimize the harmful affects of construction site activities. Soil and Erosion Control Plans will be assessed based on the reduction of suspended solids and debris found in discharges in proximity to construction activities. To ensure that all procedures are completed, Town officials will inspect the sites. The citizen panel will discuss alternatives to this plan if the water quality does not improve.

Current Practices

All Needham development and re-development projects are under the jurisdiction of the Planning Board, Zoning Board of Appeals, and Building Department and are reviewed by the DPW, through the Town Engineer's Office. The Board of Health reviews subdivision plans as well. The Town Engineer ensures that proposed erosion and sediment controls are adequate. The Town adopted the Massachusetts Department of Environmental Protection (DEP) Storm Water Management Policy in all areas that discharge into the Charles River as

required by the MOU. All subdivisions and site development projects within these areas are required to comply with the Massachusetts Storm Water Management Policy.

The majority of Needham is developed, limiting space for new development. For the few areas that may be developed, several land use controls are in effect to regulate development and protect water resources and the environment from developmental impacts. These regulations include the following:

- Subdivision Regulations, Needham Planning & Zoning Departments
- Zoning By-Law, Needham Planning & Zoning Departments
- Wetlands Protection Act, Needham Conservation Commission
- MOU from DEP/EPA that requires conformance with the Massachusetts Storm Water Policy town-wide
- Street Occupancy Permit Procedures
- Storm Drainage Connection Permit Requirements

Plans are required for subdivisions and site development that must accurately depict the proposed drainage system and all proposed construction. The Town Engineer's Office currently reviews all subdivision plans and site development plans. The Building Inspector also reviews all site plans associated with residential construction and minor commercial construction. The site plan reviews ensure that appropriate soil and erosion control practices are being implemented and that all development complies with the Massachusetts Stormwater Management Policy.

The Needham Conservation Commission and the Massachusetts DEP regulate development within freshwater wetlands and 100 foot buffer zones surrounding wetland boundaries. Any land development must obtain an Order of Conditions from the Conservation Commission. The application must detail erosion and sedimentation controls, BMPs, and other ways to mitigate wetland and water resource impacts. Under the Rivers Protection Act, applicants proposing development within the 200 foot riverfront area are required to evaluate feasible alternatives which may result in less impact to the riverfront area. Perhaps most

importantly, the Conservation Commission also reviews the alternatives analysis, and may prohibit alterations to the riverfront area which are deemed unwarranted.

Best Management Practices and Measurable Goals

1. Policy and Procedure Review and Updates

The Town will revise existing policies and procedures to address construction related erosion and sediment control measures for all site or land disturbance activities. At a minimum, the policies and procedures will adopt "Standard 8-Erosion and Sediment Control," of the DEP's Storm Water Management Policy, and will include requirements for project review and inspection by the DPW. The policies and procedures will include enforcement provisions to ensure compliance. Also, standard policies will be used for the control of wastes related to construction activities.

Measurable Goals

- Revise existing policies and procedures to address erosion and sediment control.
- Develop a Storm Drain Connection Permit Requirement.

2. Construction Reviews

A construction review will be performed by the DPW's Engineering Division for construction sites periodically during construction activity. A note will be made for any inadequacies on sites/plans found by inspectors. Any violations will be submitted to the contractor in a report within five days of the review.

Measurable Goals

- Whether or not a requirement was developed indicating that sites be inspected.
- The number of inadequate sites/plans reported by inspectors.
- The number of non-compliant permits reported.

Figure 4-4 depicts the amount of time proposed to employ each BMP.

Figure 4-4
BMP Schedule – Construction Site Storm Water Runoff Control

BMP	*Year*				
	1	2	3	4	5
Policy and Procedure Review and Updates					
Revise Existing Policies and Procedures					
Develop a Storm Drain Connection Permit Requirement					
Construction Reviews					
DPW Periodically Review Construction Activities					

4.5 Post Construction Site Storm Water Runoff Control in New Development/Redevelopment

The Town Engineer is responsible for ensuring the implementation and compliance of proposed BMPs and measurable goals regarding post construction site storm water runoff control in new development/redevelopment.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"The permittee must develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than one acre and discharge into the municipal system. The program must include projects less than one acre if the project is part of a larger common plan of development.

The post construction program must include:

- *An ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment.*
- *Procedures to ensure adequate long term operation and maintenance of best management practices.*

- *Procedure to ensure that any controls that are in place will prevent or minimize impacts to water quality."*

Minimum Measure Objective

The overall goal is to require development and redevelopment projects to include water quality BMPs in the development plans on a town wide basis. Town officials will require that O&M procedures are created to prevent or minimize the impacts to water quality. The storm water committee will discuss alternative BMPs that may be added to the review process if current practices are deemed ineffective.

Current Practices

As stated under the Construction Site Storm Water Runoff Control minimum control measure, the Town has zoning and subdivision regulations and policies, procedures and permit requirements in place that address many storm water issues.

Aquifer Protection Districts exist to prevent groundwater contamination. Liquid petroleum products, sludge and septage, individual sewage disposal systems, de-icing chemicals, animal manure, and commercial fertilizers are generally prohibited or restricted within the Aquifer Protection Districts. Within Aquifer Protection Districts contaminant removal may occur by employing detention basins with sub-surface drains or perforated raisers, oil and grit separator catch basins, or similar devices where appropriate. Pesticide application requires a special permit by the Planning Board. Also, any use that will create more than 15% or 2,500 square feet of any lot impervious requires a special permit. The permits involve recommendations from the Board of Health, the Conservation Commission, and the DPW. The Planning Board is allowed to limit activities to ensure the proper implementation of the Subdivision Control Law and Regulations. In accordance with Section 81-B of Chapter 41 of the Massachusetts General Laws, members of the Planning Board can enter a site and carry out necessary inspections. The DPW Director is permitted to inspect the construction of streets and the installation of municipal services and utilities in subdivisions.

Storm drains are required to be installed with a slope and size adequate to accomplish all runoff over the area within the subdivision. Natural watercourses are mandated to be preserved if possible under the subdivision regulations. Oil, gasoline, and grease separators are required to be installed prior to drainage basin installations in new subdivisions.

Planned Residential Development provides an alternative to conventional development by fostering innovative site planning based on land characteristics. Planned residential development encourages open space conservation.

The Site Plan Reviews conducted are comprehensive review procedures for construction projects to ensure the Zoning By-Law is adhered to, in an effort to minimize adverse impacts and to promote development, which is harmonious with surrounding areas. Adjoining premises are required to be protected from adverse impacts via provisions for surface water drainage.

The Zoning Board of Appeals has jurisdiction over appeals regarding the construction or alteration of property. Permitted uses in Flood Plain Districts include uses directly related to water conservation and plant and wildlife preservation; grazing and farming; wildlife management areas; etc. For areas that require a special permit in Flood Plain districts, the Zoning Board of Appeals requires adequate drainage to reduce exposure to flood hazards in flood-prone areas. The Board also requires that adjacent communities be notified before a watercourse is altered. A copy of this notification is directed to be sent to the Administrator of the Federal Emergency Management Agency (FEMA).

Best Management Practices and Measurable Goals

1. Policy for Post Construction Runoff

A policy will be developed for post construction runoff to limit surface runoff volumes and pollutants in the runoff. The policy will include compliance with DEP Storm Water Policy Standards, 2, 3, 4, and 7 on a Town wide basis for all new and redevelopment construction related projects submitted for review. Inspections will be performed for all sites after

construction is completed. The policy will include enforcement provisions to ensure compliance.

Since drainage from the Town eventually reaches the Charles River, the new policy will require compliance with Standard 3 of the Department of Environmental Protection Agency's Storm Water Management Policy. Standard 3 requires that infiltration measures should be used to the maximum extent practicable to minimize the loss of annual recharge to groundwater. The policy encourages maintaining groundwater recharge rates to the aquifers via infiltration measures and careful site design. Existing pre-development soil types are required to be identified to calculate the volume of runoff per storm. Infiltration of storm water from areas with higher potential pollutant loads is prohibited without pretreatment under Standard 3 of DEP's Storm Water Management Policy. Needham will promote recharge to groundwater aquifers and prefer BMPs that include aquifer recharge.

Measurable Goals

- Develop a Town-wide policy to implement post construction site storm water runoff control in new development/redevelopment.
- Develop a Storm Drain Connection Permit Requirement.
- Develop and implement standard construction details and policies.

2. BMP Inspection and Maintenance

BMP inspection and maintenance will serve to measure the effectiveness of implemented storm water BMPs. BMP failure can become detrimental to property, cause injury, or worsen the affects of storm water on the environment. Some BMPs may require more frequent inspection than others. The Town will establish standard procedures for field inspection of BMPs including development of inspection checklists. The checklists will include the BMP requirements, expectations, design criteria, date of implementation, etc.

Measurable Goals

- Inspect all Town maintained structural BMPs once per year.
- Document the number of problems that were identified and remedied.

- Changes in water quality of effluent from BMPs through observation and cleaning records.

Figure 4-5 illustrates the time constraints for implementing the proposed BMPs.

Figure 4-5
BMP Schedule – Post Construction Site Controls

BMP	*Year*				
	1	2	3	4	5
Policy for Post Construction Runoff					
Develop a Town-Wide Policy to Implement Post Construction Site Storm Water Runoff					
Develop a Storm Drain Connection Permit Requirement					
Develop and Implement Standard Construction Details and Policies					
BMP Inspection and Maintenance					
Inspect All Town Maintained Structural BMPs Once a Year					
Document Problems With BMPs					

4.6 Pollution Prevention/Good Housekeeping for Municipal Operations

The DPW Director is responsible for ensuring the implementation of proposed BMPs and measurable goals regarding pollution prevention/good housekeeping for municipal operations.

Massachusetts Small MS4 Storm Water Management Program General Permit Requirements

"The permittee must:

- *Develop and implement a program with a goal of preventing and/or reducing pollutant runoff from municipal operations. The program must include an employee training component."*

Minimum Measure Objective

This measure will improve the efficiency of municipal operations and reduce the amount of pollution from Town-owned facilities and the drainage system. Proper operation and maintenance procedures are key factors that will ensure that this goal is realized.

Current Practices

The Town is currently implementing many BMPs to ensure pollution prevention and good housekeeping. Some of the BMPs already developed include; storm drain cleaning, maintenance programs, de-icing practices, and street sweeping.

The DPW conducts routine cleaning and maintenance of the storm drain system. This includes an intensive schedule of catch basin cleaning and line flushing throughout the year. The Needham DPW owns a "Stetco" catch basin cleaner, which is utilized to clean debris and sediment from the Town's catch basins. Most of the catch basins in Town have not been found to be full of debris.

The DPW cleaning schedule includes 100% of the municipal catch basins annually, with a 30% redundancy factor. Therefore, each basin is cleaned once per year and 30% are cleaned a second time. Typically, the basins are cleaned when they are approximately 40% full of solids. The Town tracks the weight of material gathered during catch basin cleanings. All of the material removed from the catch basins is transported to Needham's municipal transfer and recycling facility for handling and disposal. As a result, there is a significant reduction in pollutants and solids discharged to waters within the Town.

The Town owns two street sweepers which are utilized throughout the year. Additionally, two street sweepers are contracted through a local contractor to assist in seasonal (springtime) and major street artery sweeping programs. Street sweeping is conducted throughout the year, with exceptions in the winter months when snow plow operations are in effect. During this period, all DPW Highway personnel focus on plowing, and minimal sweeping is conducted. The Town tracks the weight of collected material resulting from street sweeping.

To treat roads during winter months, the Town has evaluated alternative de-icers and found that the Ice Ban® product is a cost effective additive to salt and is presently using it throughout Needham. The Ice Ban® product is a mixture of magnesium chloride and a natural liquid concentrate residue resulting from the milling of corn and the production of alcohol. The Ice Ban® product increases de-icing efficiencies by lowering the freezing point of solutions while melting occurs and accelerating ice melting. It also adds nutrients to soil and may enhance vegetative growth. This has allowed the Town to reduce salt application to the roadway from 800 lbs./lane mile to as little as 400 lbs./lane mile. The Town sprays the Ice Ban® product on salt prior to storm events unless an unexpected storm occurs causing inadequate time to treat the salt stockpile. The Town will continue to use Ice Ban® in the aquifer protection district, hills and bridges, as is current practice, and will use it town wide when it is economically feasible.

During ice storms the town also uses sand to treat the roadways. Sand that is applied to the roads in winter months is collected in the springtime through a rigorous street sweeping operation within the Town.

Sand and solids which enter the municipal storm water system are also collected through the previously mentioned storm drain system cleaning program. All street sweeping and catch basin cleanings are transported to Needham's Recycling and Transfer Station, away from water resources.

An Integrated Pest Management (IPM) policy was developed to reduce pesticide use for public properties and it has been adopted by several boards and commissions including the Board of Health and the Board of Selectmen, refer to the Appendix. The IPM is designed to prevent and control the growth of undesirable plants and the presence of insects and rodents. This program involves the analysis of site specific information including environmental conditions, and pest biology and behavior to control pests that interfere with a site's intended purpose. In the event that pest populations need to be controlled, the following

methods are utilized: modifying the habitat, modifying maintenance practices, modifying user behavior, and as a last resort, applying pesticides (least toxic selection).

The IPM requires that site specific plans adhere to the Massachusetts statute "An Act Protecting Children and Families From Harmful Pesticides," Chapter 85 of the Acts of 2000. A copy of this act is provided in the Appendix. It protects children in schools, day care centers, and other school age children programs from the harmful effects of pesticide exposure indoors and outdoors.

Best Management Practices and Measurable Goals

1. Predictive Catch Basin Program

The development of a standardized catch basin and storm drain inspection program will continue in the future to include subsequent inspections, cleaning operations, and maintenance operations of storm water system components.

The existing standardized inspection form will be modified to include information regarding the condition of the structure, construction material (brick, precast concrete, etc.) depth to invert, size, condition and type of pipes into and out of the structure, and condition of the frame and cover. The form shall be completed during each catch basin, manhole or storm drain cleaning operation. Evidence of illicit connections to the storm water system, petroleum residues or chemical odors shall also be noted on the forms.

Subsequently, data will be collected for a few years, in-order, to prioritize cleaning operations for catch basins. This data will be entered into the GIS structure database including the amount of debris collected and the physical condition of the structures. Trends will be entered into the database so catch basins that collect a lot of debris or in poor condition will be cleaned more often than ones with no issues. This process will also be performed for detention basins. It will be relatively simple to determine which detention basins require cleaning because they are visible from the road.

Measurable Goals

- Develop program.
- Collect the appropriate data.
- Refine Program based on the formulated trends.

2. Street Cleaning

The Town will continue to clean all of the streets once per year for the first two years of this plan. The Town proposes to increase street sweeping from one to two times per year in year 3 of this plan. The Town has allocated funds to clean the streets and to dispose of the collected debris. In business districts the streets are swept on Fridays in the early morning (non-winter months). Town parking lots are swept annually and will continue to be swept during this plan's implementation. Municipal Parking lots in Town will be prioritized to determine the order of cleaning operations.

Measurable Goals

- Sweep all roads once, town wide in years one and two.
- Sweep all roads twice, town wide in years three through five.
- Sweep all Town-owned parking lots annually.
- Document the pounds of debris collected from street sweeping.

3. Pipe Inspections

The Town has budgeted money to inspect drain lines via CCTV inspections. Ten percent of the entire drainage system will be analyzed annually. Therefore, by the fifth year of this plan's initiation, 50% of the system will be inspected.

Measurable Goals

- Inspect 50% of the system by the fifth year of this permit.

4. Pipe Cleaning

Drainage system cleaning reduces the pollutant loads to receiving waters. Each year, the Town has allocated funding to clean 4,750 feet of drainage pipe. This represents one

percent of the total drainage system. Another 19,000 feet of drainage pipe will undergo jet flushing per year; this represents 4% of the total system or 40% of the pipes inspected annually. Pipes that collect silt or other materials quickly and/or are located within environmentally sensitive areas will be cleaned prior to other pipes.

Measurable Goals

- Clean or flush 25% of the system by year five.

5. New Pipe and Structure Installations

The Town will replace 475 feet of drainage pipe per year, which represents 0.1% of the total drainage system. The Town will also replace 10 catch basins per year (0.25% of the total system) and install deep sump basins.

Measurable Goals

- Replace 475 feet of drainage pipe per year.
- Replace 10 catch basins per year and install deep sump basins.

6. Investigate Town Owned BMPs for Retrofit Opportunities

The Town has eight detention basins and other structural BMPs utilized for flood control. However, they may only provide storm water with minimal water quality enhancement. The Town will investigate and determine if there is an opportunity to achieve more water quality benefits from these basins.

Measurable Goals

- Inspect three structural BMPs per year.
- Implement two retrofit projects, if required, by year five.

7. Integrated Pest Management

Since it is a widely accepted program, the Town will continue its current practices for integrated pest management.

Measurable Goals

- Continue already developed program in the future.

Figure 4-6 illustrates the time constraints for implementing the proposed BMPs in reference to pollution prevention/good housekeeping.

Figure 4-6
BMP Schedule – Pollution Prevention/Good Housekeeping

BMP	*Year*				
	1	2	3	4	5
Predictive Catch Basin Program					
Develop the Program	■				
Finish the Inspection Form	■				
Develop Structure Database to Enter Data about Catch Basins and Collect Data	■	■	■	■	
Refine Program Based on Formulated Trends					■
Street Cleaning					
Sweep Streets Once Per Year	■	■			
Sweep Streets Twice Per Year			■	■	■
Sweep All Town Parking Lots Once Per Year	■	■	■	■	■
Document Amount of Collected Debris	■	■	■	■	■
Pipe Inspection					
Analyze 10% of the Drainage System Per Year	■	■	■	■	■
Pipe Cleaning					
Clean 4,750 Feet of Drainage Pipe Per Year	■	■	■	■	■
Perform Jet Flushing on 19,000 Feet of Drainage Pipe Per Year	■	■	■	■	■
New Pipe and Structure Installations					
Replace 475 Feet of Drain Per Year	■	■	■	■	■
Replace 10 Catch Basins Per Year With Deep Sump Basins	■	■	■	■	■
Investigate Town Owned BMPs for Retrofit Opportunities					
Inspect Three Structural BMPs Per Year	■	■	■	■	■
Implement Two Retrofit Projects					■
Integrated Pest Management					
Continue Current Program	■	■	■	■	■

Figure 4-7 illustrates the time constraints for implementing the proposed BMPs for all minimum control measures outlined in this report.

4.7 Control of Pollutants of Concern to Impaired Waters

The pollutants of concern for the impaired water bodies in Needham (see Section 2.2) include turbidity; nutrients; organic enrichment/low DO; priority organics; pathogens; noxious aquatic plants; exotic species; oil and grease; taste, odor, and color; and suspended solids. Some of the current practices occurring in Needham are reducing pollutant loads to Needham water bodies. Nonetheless, the BMPs proposed for each minimum control measure are structured to further lessen pollutant loads individually and collectively. The BMPs for the six minimum control measures improve water quality for the pollutants of concern and other pollutants. For example, BMPs for Public Education and Outreach including the classroom education component, flyers and brochures, articles, etc. will instruct the community about storm water topics and encourage people to modify their behavior. This will lessen the amount of fertilizers, pesticides, pet waste and other sources of nutrients from entering the storm water system. The DO levels will increase as fewer nutrients are discharged into water bodies. This also encourages the growth of native plants rather than algae and noxious aquatic plants.

For the Public Involvement and Participation minimum control measure, the community hotline and stenciled storm drains will assist with reducing the amount of non-storm water discharges into the storm water system. Non-storm water discharges may be the source of pathogens and many other pollutants entering water bodies in Needham. The pet waste bylaw reduces the amount of nutrients entering into the water bodies. The adopt-a-stream program will corroborate that the water bodies are becoming cleaner.

The Illicit Discharge Detection and Elimination minimum control measure is structured to help reduce the amount of pathogens, oil and grease, and organics in the water bodies. The sampling program identifies areas that indicate the presence of fecal coliform bacteria and organic enrichment. The presence of fecal coliform bacteria can indicate the presence of

pathogens. Septic system controls and the proposed illicit discharge education will reduce the amount of illicit connections to the storm water system thereby addressing these pollutants of concern.

BMPs outlined for Construction Site Storm Water Runoff Control and Post Construction Site Controls include inspections which will significantly reduce pollutant loads to water bodies in Needham. Construction sites will be monitored to ensure that proper procedures are performed which coincide with lessening the effects of runoff from the associated areas of disturbance. The pollutants transported via runoff contribute to low DO levels because micro-organisms consume oxygen as they break down runoff contents. The amount of organics and sediment entering the drainage system will be lessened as these BMPs, which result in less runoff, become implemented.

The BMPs to be implemented for Pollution Prevention and Good Housekeeping will reduce the amount of pollutants entering water bodies in Needham. These are important BMPs because most of them relate to drainage system maintenance. The amount of sediment entering the water bodies will be reduced which may reduce problems associated with turbidity, suspended solids and other pollutants in the water bodies. Also, the runoff will be cleaner as a result of the maintenance activities.

Figure 4-7
Composite BMP Schedule - All Minimum Control Measures

BMP	Year 1	Year 2	Year 3	Year 4	Year 5
Public Education and Outreach					
Classroom Education on Storm Water					
Collect Materials from EPA, CRWA, and DEP and Distribute to Public Schools	■				
Teachers Instruct Classes and Present Material Gathered in Year One		■	■	■	■
Volunteers Assembled and Taught About Storm Water Issues		■			
Volunteer Outreach to Youth Groups and Public Schools			■	■	■
DPW use Home-School Model for Public Schools	■				
Flyer and Brochure Distribution and Web Site Link					
Determine Additional Educational Materials to be Provided to the Community Via Publications	■				
Supply the DPW, Town Hall, and Public Library with a Flyer and Fact Sheets		■	■	■	■
Distribute Flyers to all of Needham Residences			■		
Provide a Web Site Link on the Town's Web Site to the Charles River Watershed Web Site					■
Using the Media					
Continue Local Public Access Show "Talk About Needham"	■	■	■	■	■
Issue One Storm Water Related Press Release Per Year	■	■	■	■	■
Publish One Storm Water Related Article Per Year	■	■	■	■	■
Hazardous Waste Management					
Surplus Paint Program Continuation	■	■	■	■	■
Hazardous Waste Day Continuation	■	■	■	■	■
Public Involvement/Participation					
Adopt-A-Stream Programs					
Advertise Via Public Service Announcements and Newspaper Articles	■				
Establish Adopt-A-Stream Groups (2) and Organize Information for Volunteers		■			
Clean Adopted Local Water Bodies			■	■	■
CPCA Stream Team Adopt-A-Stream Program Continued	■	■	■	■	■
Stencil Storm Drains					
Prioritize Areas to be Stenciled	■				
Stencil 50 Storm Drains Per Year	■	■	■	■	■
Maintain Records of Stenciled Areas in Needham	■	■	■	■	■
Community Hotline					
Establish Hotline Phone Number		■			
Print Phone Number in Brochures and Display on the Local Cable Show			■		
Residents Use Hotline and DPW Personnel Investigate Illegal Dumping Reports			■	■	■
Storm Water Committee					
Establish Storm Water Committee	■				
Hold Annual Meetings		■	■	■	■
Print Ideas and Discussions in Brochures and Flyers					
Pet Waste By-Law					
Post Signs Near Parks and Other Areas Where the Town By-law is Applicable			■		
Illicit Discharge Detection and Elimination					
Outfall Testing Program					
Follow-Up Testing in Eight Areas (Table 4-1)		■			
Analyze Results			■		
Study Performed for Area N10A-9			■		
Illegal Dumping Education					
See Minimum Control Measures #1 and #2	■	■	■	■	■
Septic System Controls					
Continue Board of Health's Procedures	■	■	■	■	■
Evaluate the Eight Testing Areas (Table 4-1) for Proximity to Septic Systems, Sanitary Sewers, and Groundwater Elevations	■				
Educate Residents About Septic System Maintenance			■		
Construction Site Storm Water Runoff Control					
Policy and Procedure Review and Updates					
Revise Existing Policies and Procedures	■				
Develop a Storm Drain Connection Permit Requirement		■			
Construction Reviews					
DPW Periodically Review Construction Activities	■	■	■	■	■
Post Construction Site Controls					
Policy for Post Construction Runoff					
Develop a Town-Wide Policy to Implement Post Construction Site Storm Water Runoff	■				
Develop a Storm Drain Connection Permit Requirement		■			
Develop and Implement Standard Construction Details and Policies		■	■	■	■
BMP Inspection and Maintenance					
Inspect All Town Maintained Structural BMPs Once a Year	■	■	■	■	■
Document Problems With BMPs	■	■	■	■	■
Pollution Prevention/Good Housekeeping					
Predictive Catch Basin Program					
Develop the Program	■				
Finish the Inspection Form	■				
Develop Structure Database to Enter Data about Catch Basins and Collect Data	■	■	■	■	
Refine Program Based on Formulated Trends					■
Street Cleaning					
Sweep Streets Once Per Year	■	■			
Sweep Streets Twice Per Year			■	■	■
Sweep All Town Parking Lots Once Per Year	■	■	■	■	■
Document Amount of Collected Debris	■	■	■	■	■
Pipe Inspection					
Analyze 10% of the Drainage System Per Year	■	■	■	■	■
Pipe Cleaning					
Clean 4,750 Feet of Drainage Pipe Per Year	■	■	■	■	■
Perform Jet Flushing on 19,000 Feet of Drainage Pipe Per Year	■	■	■	■	■
New Pipe and Structure Installations					
Replace 475 Feet of Drain Per Year	■	■	■	■	■
Replace 10 Catch Basins Per Year With Deep Sump Basins	■	■	■	■	■
Investigate Town Owned BMPs for Retrofit Opportunities					
Inspect Three Structural BMPs Per Year	■	■	■	■	■
Implement Two Retrofit Projects					■
Integrated Pest Management					
Continue Current Program	■	■	■	■	■