REQUEST FOR QUALIFICATIONS FROM ENGINEERING FIRMS

The City of Rochester, New Hampshire is accepting qualifications from Engineering Consulting firms for the following:

WASTEWATER TREATMENT PLANT DESIGN AND IMPLEMENTATION
And/or
SEWER CAPACITY MANAGEMENT, OPERATION, AND MAINTENANCE (CMOM)
Qualification packages must be submitted in a sealed envelope plainly marked:

Statement of Qualifications for Wastewater Engineering Services
"Bid # 09-35"

City of Rochester
31 Wakefield Street
Rochester, NH 03867
Attn: Purchasing Agent

All qualification packages must be received no later than *"May 7, 2009"* ***at*** *"2:45"* ***p.m. No late submittals will be accepted. Details on requirements of the qualifications submittal and specifications may be obtained by visiting www.rochesternh.net, or emailing purchasing@rochesternh.net, or by contacting the Purchasing Agent at City Hall, 31 Wakefield Street, Rochester, NH 03867, (603) 335-7602. All bid questions must be submitted in writing (email preferred) to the Purchasing Agent.***

City of Rochester, New Hampshire

RFQ No. 09-35

REQUEST FOR QUALIFICATIONS FOR GENERAL ENGINEERING SERVICES FOR WASTEWATER TREATMENT DESIGN / IMPLEMENTATION and SEWER CAPACITY MANAGEMENT, OPERATION, AND MAINTENANCE (CMOM)

I. Introduction

The Rochester, New Hampshire Department of Public Works (herein referred to as Rochester DPW) is soliciting Statements of Qualifications and Requests for Proposals for Engineering Services in support of assisting the City of Rochester to meet its anticipated requirements when it is reissued its discharge permit for the Wastewater Treatment Facility by the US Environmental Protection Agency (USEPA) under the National Pollutant Discharge Elimination System (NPDES). It is anticipated that the selected firm(s) will enter into an intermediate to long-term relationship with the City to assist in the scope of services located in Section III and Section IV.

This is one Request for Qualifications with two separate scopes of service. Section III is for Wastewater Treatment Facility Permitting & Implementation Services and Section IV is for Preparation of a Collection System Capacity, Management, Operation, and Maintenance (CMOM) Program.

Engineering firms may choose to submit Statement of Qualifications for either one or both of the requested scope of services. If submitting RFQ's for both scopes of service please submit separate and distinct sections of a single qualifications submittal package.

Sections: VI. Timeframe, VII. Insurance, VIII. Proposal Evaluation, and IX. Submission of Information are intended and required for both Section III and Section IV. .

II. Background

The City of Rochester is the fourth largest city and fifth largest population (estimated population 30,800) center in New Hampshire. Approximately 40 percent of the community is on municipal sewer with over 80 miles of sewer collection mains and 28 pump stations, which bring an average flow of 3.6 million gallons a day of raw wastewater to the treatment facility. The treatment facility was designed to handle 5.03 million gallons per day and has seen peak wastewater flows in excess of 15 million gallons per day for durations of up to 72 hours. The city is a mixture of dense, highly concentrated development, suburban, and rural environments. It has six industries, which are regulated under the industrial pretreatment program and treats over 2.2 million gallons of septage per year.

In 2000, the City completed an expansion of its wastewater facility that established advanced treatment at the facility at the cost of over 18 million dollars. The new processes that were installed at that time included: 1) Modifications to the existing pump station to include new generator, motors, pump rehab, VFD's, SCADA System; 2) A new vortex grit removal system; 3) A new activated sludge system (extended aeration) to provide nitrification and denitrification; 4) Cloth disk filters for effluent polishing; 5) Self cleaning ultraviolet disinfection; 6) Post aeration to raise the dissolved oxygen in the final effluent; 7) Incorporated the existing lagoons (#1 & #2) into the new treatment facility design to provide flow equalization and solids handing and storage (WAS, Filter backwash, Septage receiving and Alum sludge decant); 8) The facility is controlled with the assistance of a SCADA system located in the administration building, which also houses a laboratory for both permit and process control testing.

Existing NPDES Permit Limits:

CBOD & TSS (average monthly): 6 mg/l / 13 mg/l (summer/ winter)
Total Ammonia as NH3 (average monthly): 3.61 mg/l / 7.65 mg/l (summer / winter)
pH: 6.5 to 8.0 SU.
Dissolved Oxygen: Not less than 7.0 at any time.
E-coli: 126/100 ml (geo mean), 406/100 ml (max daily)
Dissolved Metals: Lead, Copper & Zinc: Monitor & Report mg/l (monthly average & daily max)
Flow: Monitor & Report MGD (monthly average & daily max).
Toxicity (quarterly): LC50 100%, C-NOEC >69%

Previously in 1986, the City installed a new secondary treatment system at a cost of 8 million dollars. This treatment facility was designed to handle an average flow of 3.9 million gallons per day. The treatment facility was constructed on two sites that are about a mile apart. The preliminary treatment (bar screen & grit removal) and pumping were provided at one site, and secondary treatment and disinfection (chlor/de-chlor) was provided at the aerated lagoon site. This treatment process provided the third best secondary treatment in the state but with new nutrient limits required by EPA and NHDES advanced treatment was required.

The City's first wastewater treatment effort at this location was back in 1968 when a series of facultative lagoons were installed with a surface area of more than 125 acres. When soil-related problems occurred and with limit resources available at the time, these lagoons were abandoned until the early 1980's when a secondary treatment system was installed to meet EPA and NHDES secondary permit limits.

III. Scope of Services #1: Wastewater Treatment Facility Permitting and Implementation Services

The City of Rochester is currently operating under an NPDES permit that expired on June 30, 2002. The City has been notified that the Environmental Protection Agency (EPA) has identified Rochester's permit as a priority permit for issuance of a draft permit by September 30, 2009. It is envisioned that the City will engage the services of one engineering firm who has demonstrated a track record of assisting NPDES permit holders to meet the requirements of the permit in a cost effective, yet environmentally

sensitive manner utilizing state of the art technology and processes. The City will rely on the engineering firm to assist in the following.

1) Evaluation of permit when issued
2) Establish a strategy that will enable the City to meet the requirements of the permit in a cost-effective manner, at a minimum:
    a) Develop a dynamic computer model (preferably Bio-Win) of the wastewater treatment facility to evaluate the current operations and potential modifications to the current permit.
    b) Identify preliminary wastewater treatment modifications to meet future limits and estimate costs to those modifications.
    c) Recommend a protocol and oversee its implementation as necessary to characterize wastewater and side stream flows.
3) Work with Rochester DPW to promote the selected strategy to local officials and state / federal regulators as necessary.
4) Coordinate and attend meetings with the City administrators, elected officials and residents as necessary.
5) Coordinate and attend meetings with the state and federal regulators representing the City and recommend if a third party legal council should be utilized to represent the City.
6) Evaluate the Estuary Study released by NH Department of Environmental Services in 2008 – evaluation shall include a general review of the report as well as specific impacts of Rochester's effluent discharge to receiving waters.
7) Conduct the necessary studies to identify and develop any needed changes to the wastewater collection system and/or treatment processes to comply with the permit requirements within the City's current financial resources.
8) Serve as technical advisor to the City staff in the event that it will be difficult for the City to comply with the permit requirements without placing a significant added financial burden to the ratepayers.
9) Prepare general and then detailed designs for any and all equipment associated with the implementation of any needed changes to existing or creation of new treatment processes deemed necessary with the permit.
10) Serve as contract administrator to ensure the satisfactory and timely implementation of any needed changes to existing or creation of new treatment processes and the construction of any facilities in support of its implementation.
11) Work with the City staff to analyze, develop, test, and implement any needed changes to existing treatment operations or protocols that will aid in achieving compliance with the new permit.
12) Provide extensive training to the City staff on process control strategies, operations and maintenance of the new treatment facility. It is expected that the engineering firm will take responsibility for its design and ensure that the City staff is properly trained to consistently meet and exceed NPDES permit limits in a cost effective manner.
13) Work diligently on the City's behalf to identify and secure any and all state or federal grants and low interest loans. The consultant will be required to work with Rochester to present all funding applications accurately and use of all available resources to follow-up any funding application with persistent formal inquires and meeting with key officials to help gain funding approval. The City is

looking for the engineering firm to be creative about getting monies and identifying sources.

14) Firms must be on the State of New Hampshire Department of Environmental Services Roster of Pre-qualified Engineers.
15) Review and, if necessary, provide a scientifically-based counter argument to current studies being performed by various governmental, academic, and non-governmental agencies that pertain to the ability of the receiving waters in the Cocheco River watershed and its downstream water bodies to assimilate potential contaminants, particularly, but not limited to, nitrogen and phosphorus that might have a bearing the content of the permit.

IV. Scope of Services #2: Collection System Capacity, Management, Operation, and Maintenance (CMOM) Program

In preparation of the NPDES permit Collection System CMOM requirements the City of Rochester is also requesting Statement of Qualifications from full service engineering firms to assist in the development and implementation of the program**.** For this section **only** the length of the Statement of Qualifications shall be limited to 20 pages, double sided, and shall include, as a minimum, the following information:

1) Introductory cover letter
2) Information relating to your firm's recent (past 10 years) experience in:

    - CMOM programs
    - Collection system evaluations / assessments
    - Capacity assessments
    - Collection system modeling
    - Collection system rehabilitation construction contract development and implementation
    - Trenchless technology protocols (e.g. directional drilling, pipe lining, pipe bursting, etc.)
    - Collection system asset management system development and implementation

3) Information describing the roles and qualifications of each key team member assigned to the CMOM project including Project Manager, Project Engineer, key discipline "experts" and anticipated sub-consultants.
4) List at least 5 recent references (past 10 years) related to CMOM programs, collection system evaluation / assessments, capacity assessments, collection system modeling, collection system rehabilitation, trenchless technology, and asset management.
5) Firms must be on the State of New Hampshire Department of Environmental Services Roster of Pre-qualified Engineers.

V. Representative Project For Section III – Wastewater Treatment Facility Permitting and Implementation Services

As a tool to aid the City to evaluate the qualifications of engineering firms responding to this request for qualifications, the city desires a proposal on how to design and implement the following project:

During the week of March 23, 2009, New Hampshire Department of Environmental Services issued a "Draft Methodology to Determine Wasteload Allocation for Wastewater Treatment Facilities in the Cocheco River Watershed" (attached). This wasteload allocation, in effect, establishes limits on the quantity of nitrogen that can be discharged into the Cocheco River from both point and non-point sources. If implemented as proposed, these limits could have significant consequences to the City as it grapples with meeting these limits. It appears that the analysis and methodology was hastily prepared and significant liberties were taken with the assumptions used.

All firms presenting their statement of qualifications shall review this Draft methodology and prepare a commentary of the approach presented by NHDES. Identify data gaps, weak or overly broad assumptions, and/or how the methodology could or should be changed. The commentary should be concise and to the point, however all assertions should be backed up by annotated references. We ask that this analysis and commentary be in summary form and limited to not more than four pages: in essence an "executive summary".

The City may and has the right to use any and all assertions by all submitting firms as a basis for formal commentary to NHDES in response to this Draft Methodology. The City will be relying on the firm selected to assist the City in this regard. Because NHDES has indicated that it intends to finalize this methodology by June 2009, time will be of the essence for the firm selected.

VI. Experience and References for Section III – Wastewater Treatment Facility Permitting and Implementation Services

A. The consultants shall provide a summary of experience that pertains to the disciplines described in section III. The firm shall provide summaries of the location and scope of wastewater treatment projects aimed at insuring compliance with new or existing NPDES permits and general engineering projects performed elsewhere for state, municipal, and/or private clients. An emphasis should be made on infrastructure work that was performed which required limits of technology treatment for nutrient removal (phosphorus, total nitrogen, etc), metals removal (lead, copper & zinc) and removal of conventional pollutants in cold weather climate States in the USA, that are similar to New Hampshire's. Provide any relevant work experience performed or in the active process of being performed in New Hampshire communities.

B. Demonstrate knowledge of the federal NPDES program as managed by the Environmental Protection Agency, primarily. Examples may be submitted of working with a permitted discharger under a program managed by a delegated state, but preference will be given to those with experience dealing with EPA directly, as New Hampshire has not been delegated NPDES oversight

responsibility. Explain the issue, the requirements under the permit and what was done to ensure the permittee achieved the requirements of the permit.

C. Demonstrate experience and skill in negotiating conflicting technical and/or regulatory/legal issues between the owner/permittee and state and federal regulators at various stages in the permitting process: evaluation, interpretation, design, construction, operations, process control strategies.

D. Demonstrate knowledge and competency in various wastewater treatment processes and process control. Provide a summary of experience with the development and implementation of various wastewater treatment process and process control as it relates to achieving compliance with NPDES permits with low nutrient limits.

E. Resumes of key persons, who would likely be working with the staff in Rochester, shall be inserted, particularly the designated program/client manager, project managers, and key discipline "experts". Key persons shall have significant experience work with the Environmental Protection Agency (EPA) and New Hampshire Department of Environmental Services (NHDES).

F. List of at least 5 references for which you have performed work of a similar nature. Include names of contact persons, with address and telephone numbers, so that the City can contact them. At least one of similar size and complexity should be from New Hampshire and all should be from cold weather climates of at least similar size, complexity and anticipated permit limits.

VII. Timeframe:

It is envisioned that the City will have a relationship with the primary selected consultant (s) between now and the time that the City has met the terms of the new permit, however the City has the right to evaluate the relationship in terms of making timely progress toward the achieving permit compliance and terminate the relationship at the city's option, if it is felt that satisfactory progress is not being made.

The City will specify when the work will begin, but once the City has issued an authorization to proceed, time will be of the essence and the consultant(s) will be expected to adhere to a mutually agreed upon schedule to complete the scope(s) of the project(s) within the agreed upon schedule. **The consultant will be expected work assertively and collaboratively with City Engineering staff to meet an agreed upon schedule**.

The City of Rochester's Public Works Department, Engineering and Wastewater Treatment Sections are leanly staffed and are expected to accomplish a multitude of tasks. Therefore, once a project is authorized, the consultant is expected to work independently, providing the City with regular progress updates so that critical decisions can be made.

VIII. Insurance

The firm shall include evidence of insurance as listed on page 13 including but not limited to general liability, property and casualty, errors and omissions, and worker's compensation insurance in the amount specified in the general contract/terms and conditions attached herein. This evidence shall be shown on a certificate of insurance issued by the firm's insurance carrier(s).

IX. Proposal Evaluation

This will be a quality based proposal evaluation process. The evaluation team will evaluate all submittals focusing the following criteria in order of precedence:

- Experience with municipal engineering services in the area of and wastewater treatment and collection systems with an emphasis on process evaluation to meet changing permit requirements.
- Familiarity and experience with the federal NPDES program as managed by EPA Region 1.
- Staff and corporate knowledge and experience in wastewater treatment and collection systems; process and process control and environmental permitting.
- Staff and corporate knowledge and experience with construction management and construction oversight.

Based on the information contained in the RFQ submittal, the City of Rochester will select from three "finalists" and interview key members of each firm to assess the quality of the qualifications presented above as well as to assess the ability of the City to develop and maintain a working relationship with the principal contacts on the project. The City will provide an opportunity for the three "finalist" to visit the site prior to their interview.

Following the interviews, the City of Rochester will select a consultant that in its collective judgment will provide the city with competent and cost-effective consultation, design, construction administration and inspection support (if necessary) to meet the requirements of the re-issuance of its NPDES permit. It is expected that the selection will be based on the following criteria.

• Wastewater system process design and implementation and collection system operation and management experience	30 percent
• Experience in working with and negotiating an implementation strategy with key regulators.	25 percent
• Experience and qualifications of key staff components	15 percent
• Interview / Proposal Results	15 Percent
• Construction Management Experience	15 percent

The City requires that the firm maintain an office within 3 hours vehicular travel time of the City of Rochester, or be willing to establish one that meets this requirement before December 2009.

The City reserves the right to reject any and all submittals if it is determined to be in its best interest and to waive any deficiencies in proposals.

X. Submission of Information

A. Proposals must be received by the Business Office, City of Rochester, 31 Wakefield Street, Rochester, NH 03867 not later than **2:45 PM, Thursday May 7, 2009.**

B. Questions and requests for clarification must be in writing and received by the Purchasing Agent, City of Rochester, 31 Wakefield Street, Rochester, NH 03867 (purchasing@rochesternh.net - e-mail) by 12 Noon, **Friday May 1, 2009.** All requests for clarification and responses will be e-mailed or faxed by 5 PM, Tuesday May 5, 2009 to each consultant who has obtained a copy of the RFP and has provided an e-mail address or FAX number.

C. Submittal Packages should be either GBC bound with spines not to exceed ½ inch or placed in a three ring binder with rings not to exceed ¾-inch in diameter. Pages shall be double sided. Six (6) copies of the Statement of Qualifications shall be submitted by placing them in a suitably sized envelope or shipping box and labeled with the words. Any firm desiring to be considered must select which aspect of the request they will be responding to by checking the appropriate box on the form located at the end of this request for qualifications. The form must then be inserted as the first page (immediately behind any cover stock), so that the reviewers clearly know for what you want to be considered for:

"City of Rochester, New Hampshire Wastewater Treatment Facility Permitting and Implementation Services Statement of Qualifications;

AND/OR

"City of Rochester, New Hampshire Collection System Capacity, Management, Operation, and Maintenance (CMOM) Program Services State of Qualifications:

We, _____
(Firm Name)

of _____
(City and State)

request to be considered to assist the City of Rochester

- ❑ with Wastewater Treatment Facility Permit Implementation Services ONLY

- ❑ with Collection System Capacity Management, Operation and Maintenance (CMOM) Implementation ONLY

- ❑ with BOTH Wastewater Treatment Facility Permit Implementation Services AND Collection System Capacity Management, Operation and Maintenance (CMOM) Implementation

check one only and insert just inside the front cover of your statement of qualifications.

APPENDIX A

I. INSTRUCTIONS TO BIDDERS

A. Firm Submitting a Statement of Qualifications must know that…

1. Since this will be a qualifications based selection process, no monitary bids will be needed at this time.
2. Some of the information below is standard language that the city published for all requests for proposal to ensure consistency in presentation and form. Many times the city has to accept the lowest monetary bid, so much of the language below is geared toward that purpose. Since the selection for this is a qualifications base selection process some of the standard information may not apply. The selected firm will be required to adhere to the requirements of any other person entering into a contract with the city in terms of insurance, working hours, work rules, and similar requirements contained herein.
3. Where there are conflicts in the instructions contained in the main scope of work and this appendix, the instructions contained in the main scope of work shall govern.
4. Direct any questions concerning any details of the qualifications requirements to the Purchasing Agent via e-mail: purchasing@rochesternh.net. Reponses shall be in writing and will be posted as an addendum to the Request for Qualifications on the purchasing section of the City's website – www.rochesternh.net within three business days of receipt.

B. Irregular Proposals - Bid proposals will be considered irregular and may be rejected for any of the following reasons:

1. If the proposal is on a form other than furnished by the Owner, or otherwise specified, or if the form is altered or any thereof is detached.
2. If there are unauthorized additions, conditional or alternated bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
3. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
4. If the proposal does not contain a unit price for each pay item listed, except in the case of authorized alter pay items.

C. Interpretations - No oral interpretations will be made to any vendor as to the meaning of the specifications or terms and conditions of this sealed proposal invitation.

D. Delivery of Bid Proposals

1. When sent by mail, the sealed proposal shall be addressed to the owner at the address and in the care of the official in whose

office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in the invitation for bids. Proposals received after the time for opening of the bids will be returned to the bidder, unopened. Faxed bid proposals are not acceptable.

E. Withdrawal of Bid Proposals

1. A bidder will be permitted to withdraw his proposal unopened after it has been deposited if such request is received in writing prior to the time specified for opening the proposals.
2. No bid may be withdrawn, for a period of (60) sixty days subsequent to the opening of bids, without express written consent of the City of Rochester, NH.

F. Public Opening of Proposals

1. Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present. Since there will be no monetary bid associated with this proposal, only the firm name submitting a qualification package will be read. All firms that submitted packages will be posted on the City's website.

G. Disqualification of Bidders - Either of the following reason may be considered as being sufficient for the disqualification of a bidder and the rejection of his proposal of proposals:

1. More than one proposal for the same work from and individual, firm, or corporation under the same or different name.
2. Evidence of collusion among bidders. It is appropriate to include qualifications on any firm that you intend to partner with to accomplish the requirements contained herein.
3. Failure to supply complete information as requested by bid specifications.

II. **BID EVALUATION**

A. In addition to the bid amount, additional factors will be considered as an integral part of the bid evaluation process including, but not limited to:

1. The bidder's ability, capacity, and skill to perform within specified time limits.
2. The bidder's experience, reputation, efficiency, judgment, and integrity.

3. The quality, availability and adaptability of the supplies and materials sold.
4. Bidder's last performance.
5. Sufficiency of bidder's financial resources to fulfill the contract.
6. Bidder's ability to provide future maintenance and/or services.
7. Other applicable factors as the City determines necessary or appropriate (such as compatibility with existing equipment).

III. AWARD AND EXECUTION OF CONTRACT

A. Consideration of Proposals

1. Names of Bidders will be made public at the time of opening and may be publicly reviewed only after they have been properly reviewed by authorized personnel and a shortlist has been prepared.
2. The right is reserved to reject any or all proposals, to waive technicalities or to advertise for new proposals, if in the judgment of the City, the best interest of the City of Rochester will be promoted thereby.

B. Award of Contract

1. If a contract is to be awarded, the award will be made to the firm that best presents their statement of qualifications and best represents their capabilities and experience following a structured interview process. No bid shall be withdrawn for a period of (60) sixty days subsequent to the opening of bids, without the consent of the city of Rochester. The successful bidder will be notified, at the address listed on the proposal, that the bid has been accepted and contract negotiations shall follow.

C. Cancellation of Award

1. The City reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability against the City.

Conditions At Site

Bidders may visit the site, only after they have been notified that they have been shortlisted and will be requested to be interviewed by appropriate personnel. Bidders shall be responsible for having ascertained pertinent local conditions, such as: location, accessibility and general character of the site(s) using open source methods using information publicly available. All questions pertaining to details of the City of Rochester's sewer system shall be directed through the City's Purchasing Agent Only. Employees of the Department of Public Works including the wastewater treatment division, engineering division, water treatment division shall not be contacted directly. The character and extent of existing work within or adjacent to the site, and any other work being performed thereon at the time of the submission of his bid.

Laws, Permits and Regulations

D. The Contractor shall obtain and pay for all licenses and permits as may be required of him by law, and shall pay for all fees and charges for connection to outside services, and use of property other than the site of the work for storage of materials or other purposes

E. The Contractor shall comply with all State and Local laws, ordinances, regulations and requirements applicable to work hereunder, including building code requirements. If the Contractor ascertains at any time that any requirement of this Contract is at variance with applicable laws, ordinances, regulations or building code requirements, he shall promptly notify the City of Rochester in writing.

Contractor's And Subcontractor's Insurance

1. The Contractor shall deliver at the time of execution of the Contract, certificates of all insurance required hereunder and shall be reviewed prior to approval by the City of Rochester. The certificates of insurance shall contain the description of the Project, and shall state that the companies issuing insurance will endeavor to mail to the City of Rochester ten (10) days notice of cancellation, alteration or material change of any listed policies. The Contractor shall keep in force the insurance required herein for the period of the Contract. At the request of the City of Rochester, the Contractor shall promptly make available a copy of any and all listed insurance policies. The requested insurance must be written by a Company licensed to do business in New Hampshire at the time the policy is issued.

2. The City of Rochester, NH shall be listed as additional insured on all the Certificates of Insurance.

1. The Contractor shall require each Subcontractor employed on the Project to maintain the coverage listed below unless the Contractor's insurance covers activities of the Subcontractor on the Project.

2. No operations under this Contract shall commence until certificates of insurance attesting to the below listed requirements have been filed with and approved by the Department of Public Buildings & Grounds, and the Contract approved by the City Manager.

   a. Workmen's Compensation Insurance

      Limit of Liability - $100,000.00 per accident

   b. Commercial General Liability

      Limits of Liability

      Bodily Injury: $1,000,000.00 per occurrence, $1,000,000.00 aggregate

      Property Damage: $500,000.00 per occurrence, $500,000.00 aggregate

      Combined Single Limit, Bodily Injury and Property Damage:

      $5,000,000.00 aggregate

   c. Automobile Liability

VI. Limits of Liability - $500,000.00 per accident

   d. Errors and Omissions Insurance

Two times the contract value.

3. The Contractor shall indemnify, defend, and save harmless the City of Rochester and its agents and employees from and against any suit, action or claim of loss or expenses because of bodily injury. Including death at any time resulting there from, sustained by any person or persons or on account of damage to property, including loss of use thereof, whether caused by or contributed to by said City of Rochester, its agents, employees or others.

Accident Protections

It is a condition of this Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract. That a Contractor and any Subcontractors shall not require any laborer or mechanic employed in the performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to health or safety. As determined by construction safety and health standards of the Occupational Safety and Health Administration, United States Department of Labor, which standards include, by reference, the established Federal Safety and Health regulations for Construction. These standards and regulations comprise Part 1910 and Part 1926 respectively of Title 29 of the Code of Federal Regulations and are set forth in the Federal Register. In the event any revisions in the Code of Federal Regulations are published, such revisions will be deemed to supersede the appropriate Part 1910 and Part 1926, and be effective as of the date set forth in the revised regulation.

Subcontracts

1. Nothing contained in the Specifications or Drawings shall be construed as creating any contractual relationship between any Subcontractor and the City of Rochester. The Division or Sections of the Specifications are not intended to control the Contractor in dividing the work among Subcontractors or to limit the work performed by any trade.
2. The Contractor shall be as fully responsible to the City of Rochester for the acts and omissions of Subcontractors and of persons employed by him, as he is responsible for the acts and omissions of persons directly employed by him.

Protection of Work and Property

The Contractor shall, at all times, safely guard the City's property from injury or loss in connection with this Contract. He shall, at all times, safely guard and protect his own work and that of adjacent property from damage. All passageways, guard fences, lights and other facilities required for protection by State or Municipal laws, regulations and local conditions must be provided and maintained.

Use of Premises and Removal of Debris

The Contractor expressly undertakes at his own expense:

1. To take every precaution against injuries to persons or damage to property;
2. To comply with the regulations governing the operations of premises which are occupied and to perform his Contract in such a manner as not to interrupt or interfere with the operation of the Institution;
3. To perform any work necessary to be performed after working hours or on Sunday or legal holidays without additional expense to the City, but only when

requested to do so by the City;

4. To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other Contractors;
5. Daily to clean up and legally dispose of (away from the site), all refuse, rubbish, scrap materials and debris caused by his operation. Including milk cartons, paper cups and food wrappings left by his employees, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance;
6. All work shall be executed in a workmanlike manner by experienced mechanics in accordance with the most modern mechanical practice and shall represent a neat appearance when completed.

Materials and Workmanships

Unless otherwise specified, all materials and equipment incorporated into the work under the Contract shall be new. All workmanship shall be first class and by persons qualified in their respective trades.

IV. EXTRAS

A. Except as otherwise herein provided, no charge for any extra work or material will be allowed unless the same has been ordered, in writing, by the City of Rochester.

V. GUARANTEE OF WORK

A. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects result in from the use of inferior materials, equipment or workmanship for one (1) year from the Date of Final Acceptance.

B. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

C. In any case, wherein fulfilling the requirements of the Contract or of any guarantee, should the Contractor disturb any work guaranteed under another contract, the Contractor shall restore such disturbed work to a condition satisfactory to the Director of Public Works. And guarantee such restored work to the same extent as it was guaranteed under such other contracts.

D. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the City of Rochester may have the defects corrected and the Contractor shall be liable for all expense incurred.

E. All special guarantees applicable to definite parts of the work that may be stipulated in the Specifications or other papers forming a part of the

Contract shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

VI. MAINTENANCE OF PLANT OPERATION AND SEQUENCE OF CONSTRUCTION

A. The wastewater treatment facilities will be maintained in continuous operation by the City at all times during the entire construction period. The Contractor shall schedule and conduct his work such that it will not impede the quality any treatment process, create potential hazards to operating equipment and/or personnel, reduce the quality of the plant effluent, or cause odor or other nuisance.

B. The City will continue to operate the treatment facilities during the construction period and will be responsible for maintaining effluent quality to comply with NPDES limits. The contractor shall fully cooperate with the City, coordinate the construction schedule with the City and Engineer, and provide the necessary labor, equipment, and materials to prevent interruption to flow and treatment. The City and Engineer have the right to modify or expand the schedule during construction to meet prevailing conditions.

C. The contractor shall not make any alterations to affect operation of the treatment facility without giving two weeks prior written notice to the City and Engineer requesting authorization to proceed. Expect as noted in scope of work, the City will perform all operation of existing valves or equipment.

D. Operation of valve by the City may be limited to specific occasions of process limitations or unavailability of personnel. Delays caused by such limitations shall be expected and shall not be the basis for claim of extra costs by the Contractor.

E. The work specified herein shall be accomplished at such times that will be convenient to the City. Overtime work by the Contractor to conform to these requirements shall be considered as normal procedure under this Contract, and the Contractor shall make no claim for extra compensation as a result thereof.

F. Overtime work by the Contractor, which will require City personnel to be on site, may be limited on occasions because of unavailability of personnel. When the Contractor is on site City personnel will be required to be on site for the same duration of time. Determination of overtime and compensation shall be governed by City policy and contractual agreements. The Contractor shall be responsible for reimbursing the City in full any and all City personnel wages, benefits, taxes etc. that is due to the employee(s) and required by the City at existing pay rate(s). The normal workday shall be scheduled from 7:00 AM to 3:00 PM, Monday through Friday (excluding holidays). Written notice to the City and Engineer requesting authorization to proceed with overtime work must be

submitted and pre-approved. The Contractor shall make no claim for extra compensation as a result thereof.

G. Vehicular access for the City's personnel to the facility site and to all operating treatment units shall be maintained at all times.

H. City personnel shall have access to all areas, which remain in operation.

I. Portable water supply and sanitary facilities shall remain operational at all times.

J. Provisions for accepting septage shall be maintained at all times. If the septage receiving facilities are unavailable, septage may be discharged at an alternate location approved by City and Engineer. All costs associated with alternate disposal, above those costs typically charged by the City's facility, shall be the responsibility of the Contractor.

VII. DEFAULT AND TERMINATION OF CONTRACT

A. Cause – Any of the following reasons, but not limited to, may be cause for termination of the contract or agreement entered into between the City and vendor.

i. Fails to begin work under Contract within the time specified in the notice to proceed.
ii. Fails to perform the work with sufficient workmen and equipment, or with sufficient materials to assume prompt completion of said work.
iii. Performs the work unsuitably or neglects or refuses to remove materials or to perform a new such work as may be rejected as unacceptable and unsuitable.
iv. Discontinues the prosecution of the work.
v. Fails to resume work, which has been discontinued, within a reasonable time after notice to do so.
vi. Becomes insolvent or has declared bankruptcy, or commits any act of bankruptcy or insolvency.
vii. Makes an assignment for the benefit of creditors.
viii. For any other causes whatsoever, fails to carry on the work in an acceptable manner the City of Rochester will give notice, in writing, to the Contractor for such delay, neglect, and default.
    a. If the Contractor does not proceed in accordance with the Notice, then the City of Rochester will have full power and authority without violating the Contract to take the prosecution of the work out of the hands of the Contractor. The City of Rochester may enter into an agreement for the completion of said Contract according to the terms and conditions thereof, or use such other methods as in his opinion will be required for the completion of said Contract in an acceptable manner.

b. All extra costs and charges incurred by the City of Rochester as a result of such delay, neglect or default, together with the cost of completing the work under the Contract will be deducted from any monies due or which may become due to said Contractor. If such expenses exceed the sum which would have been payable under the contract, then the Contractor shall be liable and shall pay to the City of Rochester the amount of such excess.

DRAFT

APPENDIX B

Discussion Draft

Draft Methodology to Determine Wasteload Allocations for Wastewater Treatment Facilities in the Cocheco River Watershed

Philip Trowbridge, P.E.
Watershed Management Bureau
N.H. Department of Environmental Services

Purpose

The purpose for this methodology is to determine total nitrogen loading targets and wasteload allocations for the Cocheco River subestuary such that nitrogen concentrations in this subestuary meet the water quality criteria that have been proposed by DES (DES, 2008).

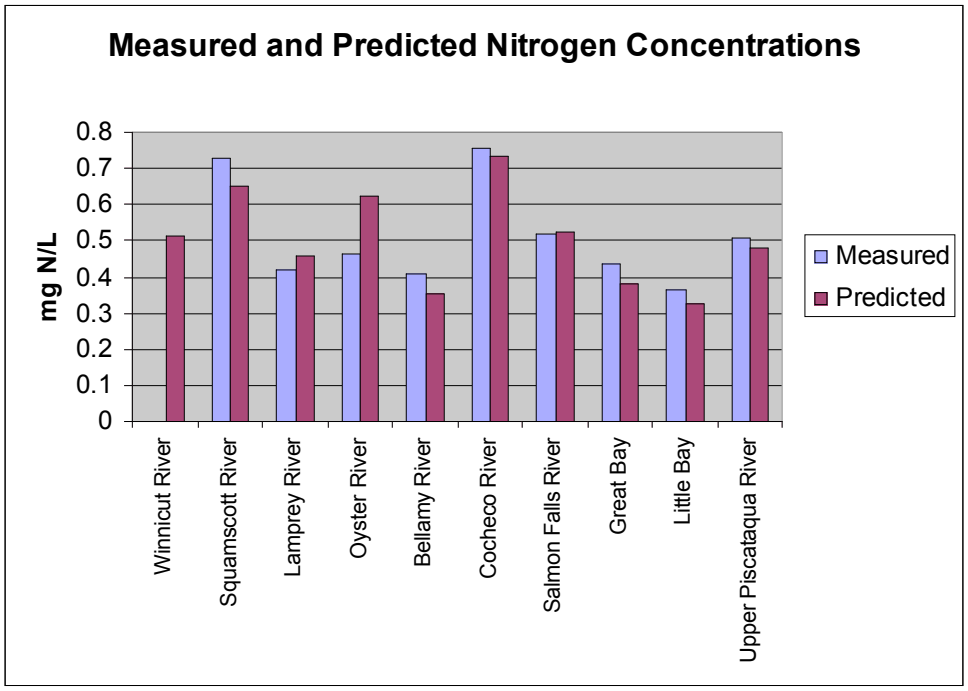
Methods

Water Quality Model

In well mixed subestuaries, a simple mass balance model can be used to estimate central tendency nitrogen concentrations (Fischer et al., 1979, Section 7.5.2). The model combines total loads of nitrogen from wastewater treatment facilities (WWTFs), nonpoint sources (NPS), atmospheric deposition, and ocean water with the flushing rate from fresh and ocean waters. The nitrogen loading rate (in mg/s) divided by the flushing rate (in L/s) is equal to the median nitrogen concentration in the subestuary (in mg/L). Available dilution by ocean water was determined by salinity measurements in the open ocean and the estuary.

The accuracy of the model for subestuaries of the Great Bay Estuary was validated using a dataset of nitrogen loads and nitrogen concentrations from 2002-2004. Nitrogen loads from WWTFs and watersheds were taken from the State of the Estuaries report (NHEP, 2006). Median salinity and nitrogen concentrations in each subestuary were calculated from samples collected in 2002-2004. The salinity and nitrogen concentration of offshore waters in the Gulf of Maine was determined in DES (2008). Figure 1 shows the modeled nitrogen concentrations in 9 subestuaries compared to measured values. The relative percent difference between the measured and predicted values ranged from -15% to 29% and averaged -2%. The good concurrence between the measured and modeled concentrations shows that the mass balance model can be used to determine loading targets for subestuaries with reasonable accuracy.

Figure 1:



Estimating Nitrogen Loading Targets

To estimate the nitrogen loading target for the Cocheco River subestuary (Figures 2 and 3) the nitrogen concentration in the subestuary was set to the water quality criteria and the model was inverted to predict the associated nitrogen load. No eelgrass has been mapped in this subestuary so the applicable water quality criterion for nitrogen would be 0.45 mg N/L for the prevention of low dissolved oxygen. Had evidence of eelgrass existed, the target water quality criterion would have been 0.32 mg/L N.

In Table 1, the nitrogen loading targets for the Cocheco River subestuary are shown. Typical conditions are represented by stream flows and precipitation in 2007. The table also contains a dry weather condition using data from 2001. There were not enough salinity measurements in this subestuary in 2001 to calculate an accurate median value of the salinity in the assessment zone. Therefore, the ocean flushing (Q from ocean) and salinity in the assessment zone for the 2001 model were back calculated assuming the total flushing rate (Q total) in 2001 to be equal to the value calculated for 2007 and salt mass balance. These assumptions are justified because the water level of the estuary does not drop during dry weather years because more ocean water enters the estuary to maintain the water mass balance.

The loading target for the Cocheco River subestuary was 136 tons N/year for typical conditions and 111 tons N/year for the dry weather condition. These targets include a 10 percent margin of safety. The difference between these estimates is due to the higher concentration of nitrogen in the subestuary that is from the ocean during the dry weather condition. This concentration affects the target loading calculation because the nitrogen contribution from the ocean is subtracted from the water quality criteria before calculating the loading target for the watershed. For the purposes of estimating wasteload allocations, the lower target (111 tons N/year) will be used.

Figure 2:

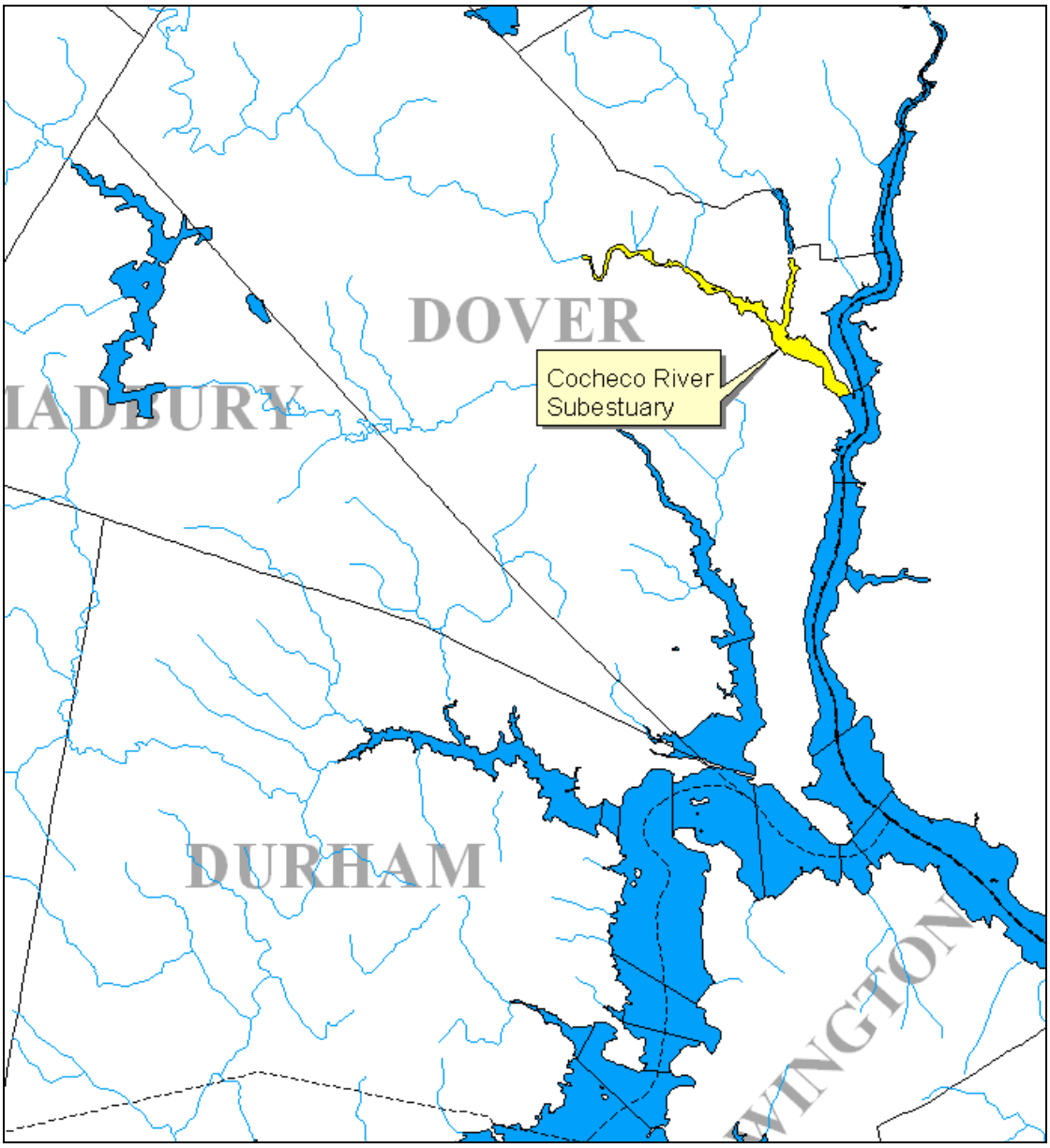

DOVER
Cocheco River
Subestuary
DURHAM

Figure 3:

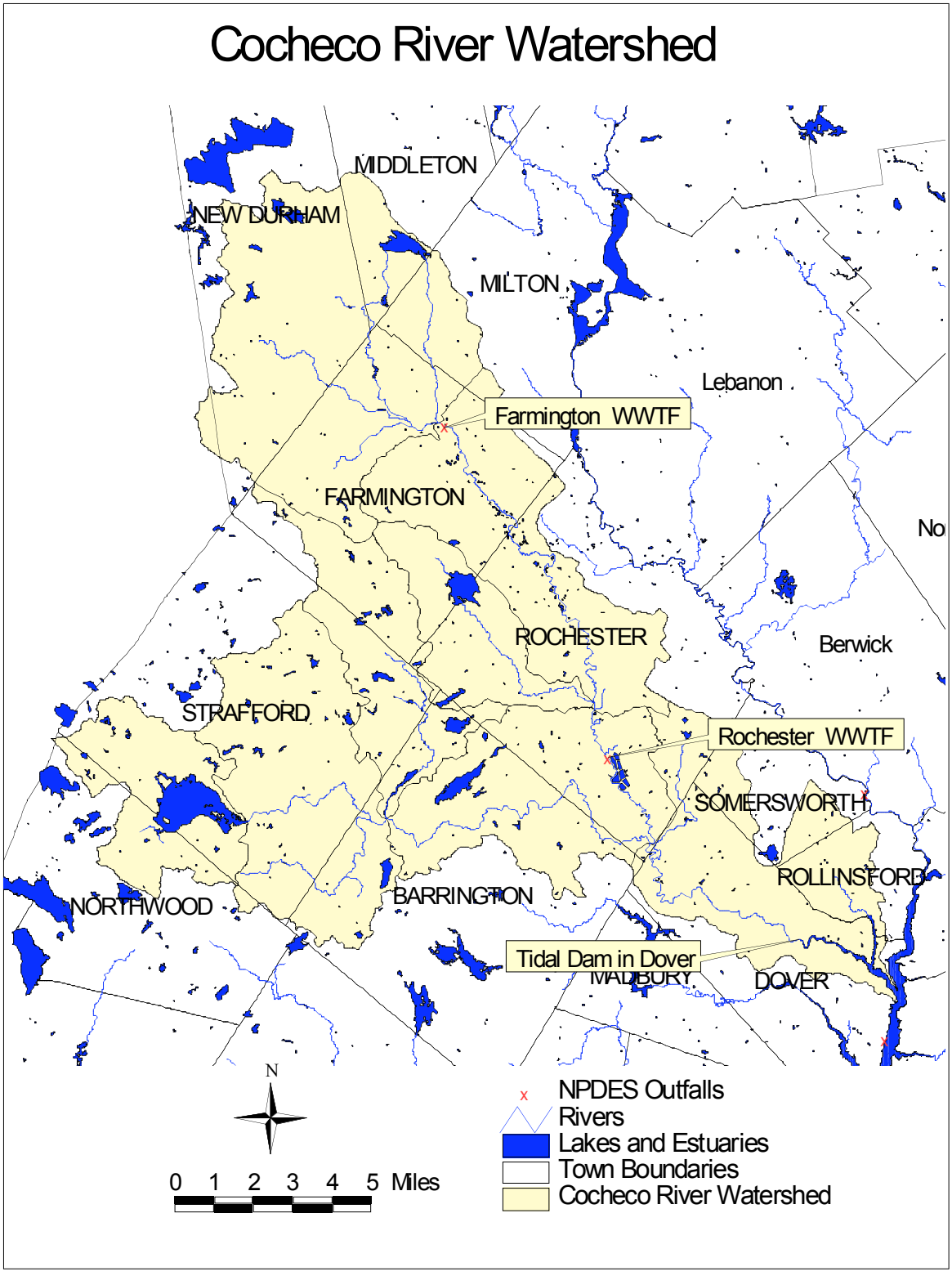

Cocheco River Watershed
MIDDLETON
NEW DURHAM
MILTON
Lebanon
Farmington WWTF
FARMINGTON
No
ROCHESTER
Berwick
STRAFFORD
Rochester WWTF
SOMERSWORTH
ROLLINSFORD
NORTHWOOD
BARRINGTON
Tidal Dam in Dover
MADBURY
DOVER
N
0 1 2 3 4 5 Miles
NPDES Outfalls
Rivers
Lakes and Estuaries
Town Boundaries
Cocheco River Watershed

Table 1:

Nitrogen Loading Targets for the Cocheco River Subestuary

	Units	Typical Conditions (2007)	Dry Conditions (2001)
Drainage Area (DA) Characteristics			
DA for wshed above dam	(sq.mi.)	175.23	175.23
DA for wshed below dam	(sq.mi.)	9.82	9.82
Surface area of estuary below dam	(sq.mi.)	0.28	0.28
DA for wshed land area below dam	(sq.mi.)	9.55	9.55
Hydrologic Parameters			
Streamflow at tidal dam	(cfs)	293.21	186.75
Runoff Coefficient (CFSM)	(cfs/mi2)	1.67	1.07
Precipitation	(in/yr)	44.22	39.37
Effective Precipitation	(cfs/mi2)	2.61	2.32
Salinity and Nitrogen Boundary Conditions			
Salinity at seaward boundary	(ppt)	31.1	31.1
Nitrogen at seaward boundary	(mg N/L)	0.244	0.244
Salinity in assessment zone	(ppt)	5.6	14.83
Flow (Q) of "Clean" Water to Assessment Zone			
Q from wshed above dam	(cfs)	293.21	186.75
Q from wshed below dam	(cfs)	15.98	10.18
Q direct precipitation to estuary surface	(cfs)	0.72	0.64
Q effluent below dam	(cfs)	0.00	0.00
Q from ocean	(cfs)	67.77	180.11
Q total	(L/s)	10,696	10,696
Water Quality Criterion			
TN concentration target	(mg N/L)	0.45	0.45
TN concentration from ocean water	(mg N/L)	0.04	0.12
Nitrogen Loading Target			
Watershed Nitrogen Loading Target	(mg N/s)	4,345	3,569
Margin of Safety - 10%	(mg N/s)	3,910	3,212
	(tons N/yr)	136	111

Attenuation Coefficients

In order to set wasteload allocations for WWTFs, the amount of nitrogen that is lost from the river between the WWTF outfall and the estuary must be estimated. The U.S. Geological Survey has completed a number of studies of nitrogen attenuation for their SPARROW models. The attenuation varies with the size of the stream with the greatest rates occurring in small streams and nearly zero attenuation in large rivers. The Cocheco River between Farmington and Dover has an average velocity of 1.1 ft/s based on SPARROW river reach data. The distance from the Farmington and Rochester WWTFs to the estuary is 26.3 and 11.4 miles respectively. Therefore, the travel time between the Farmington and Rochester WWTFs and the estuary is 1.43 and 0.62 days, respectively. The mean stream flow increases from 70 cfs near Farmington to 280 cfs at the tidal dam in Dover, which is on the high end of the definition of small streams and low end of the definition of medium streams. There are not many large impoundments along this stretch of river (Figure 3). Table 2 contains the range of possible attenuation factors based on average annual stream flow (Smith et al., 1997; Moore et al., 2004; Preston and Brakebill, 1999; Evans, 2008). The average of the attenuation factors for medium streams was chosen as the most appropriate for the Cocheco River. For the Farmington and Rochester WWTFs, these selected attenuation factors predict that 39% and 19%, respectively, of the nitrogen discharged from the WWTFs will be delivered to the estuary. These

estimates compare favorably to the within-HUC12 loss rate (31.7% loss over 0.55 day travel time) assumed for Connecticut River watersheds (Evans, 2008).

Table 2:
In-Stream Nitrogen Attenuation Factors for WWTF Discharges on the Cocheco River

River Reach Characteristics			
Mean Velocity	1.12	ft/s	SPARROW shapefiles for mainstem
Mean Stream Flow	140.47	cfs	SPARROW shapefiles for mainstem
Minimum Stream Flow	72.09	cfs	Near Farmington
Maximum Stream Flow	284.51	cfs	Near Dover at tidal dam
Distance from WWTFs to Estuary			
Farmington	26.30	miles	
Rochester	11.40	miles	
Travel Time from WWTFs to Estuary			
Farmington	1.43	days	
Rochester	0.62	days	
Predicted Losses from Small Streams (q<100 cfs) from the NE SPARROW Model (Moore et al., 2004)			
Attenuation Coefficient	0.77	1/days	
Farmington	67%	% loss	
Rochester	38%	% loss	
Predicted Losses from Small Streams (q<200 cfs) from the Chesapeake SPARROW Model (Preston and Brakebill, 1999)			
Attenuation Coefficient	0.7595	1/days	
Farmington	66%	% loss	
Rochester	38%	% loss	
Predicted Losses from Medium Streams (q<1000 cfs) from the National SPARROW Model (Smith et al., 1997)			
Attenuation Coefficient	0.3842	1/days	
Farmington	42%	% loss	
Rochester	21%	% loss	
Predicted Losses from Medium (q=200-1000 cfs) from the Chesapeake SPARROW Model (Preston and Brakebill, 1999)			
Attenuation Coefficient	0.3021	1/days	
Farmington	35%	% loss	
Rochester	17%	% loss	
Predicted Losses from Large Rivers (q=1000-10000 cfs) from the National SPARROW Model (Smith et al., 1997)			
Attenuation Coefficient	0.1227	1/days	
Farmington	16%	% loss	
Rochester	7%	% loss	
Predicted Losses from Large Rivers (q>1000 cfs) from the Chesapeake SPARROW Model (Preston and Brakebill, 1999)			
Attenuation Coefficient	0.0669	1/days	
Farmington	9%	% loss	
Rochester	4%	% loss	
Predicted Losses from Large Rivers based on Connecticut River Observations (Evans, 2008)			
Attenuation Coefficient	0.091	%/mile	31% loss divided by length of Ct River mainstem
Farmington	2%	% loss	
Rochester	1%	% loss	
Selected Attenuation Factors for WWTFs in the Cocheco River Watershed			
Farmington	**39%**		**Average of values for medium size streams**
Rochester	**19%**		**Average of values for medium size streams**

Existing Nitrogen Load Summary

Existing nitrogen loads from the WWTFs and nonpoint sources in the Cocheco River watershed were quantified based on measurements by the New Hampshire Estuaries Project in 2006-2008. These data will be published in the 2009 State of the Estuaries report. The WWTF loads were calculated from at least monthly measurements of total nitrogen in effluent during 2008. The total nitrogen load from the Cocheco

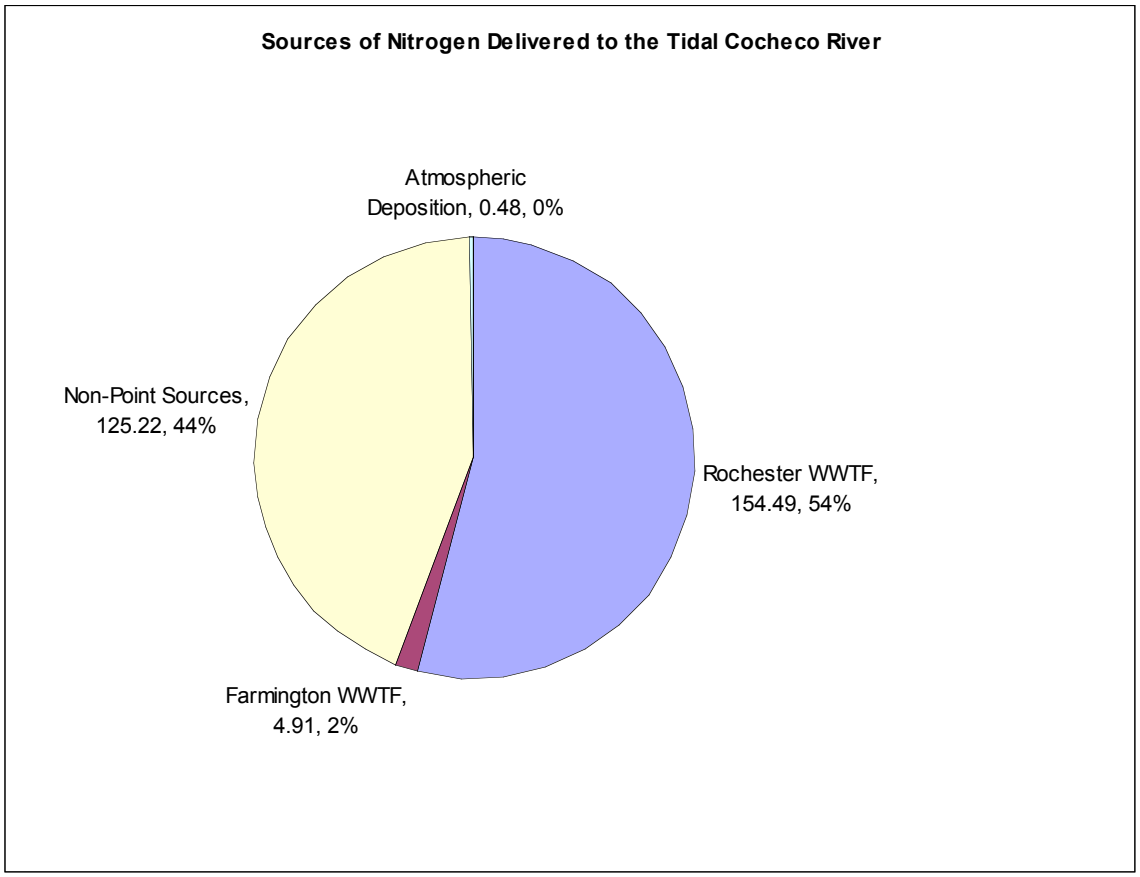
River at that tidal dam was calculated from monthly nitrogen concentration and stream flow measurements at that location between 2006 and 2008 and using the USGS LOADEST model. The delivered load from the upstream WWTFs was subtracted from the total load measured at the tidal dam to estimate the nonpoint source nitrogen load. The nonpoint source nitrogen load from the watershed area downstream of the dam was estimated using average nitrogen yield from watersheds without upstream WWTFs (1.39 tons N/yr/sq.mi.). The nitrogen load from atmospheric deposition to the subestuary was estimated using the surface area of the subestuary and the average nitrogen deposition rate from the National Atmospheric Deposition Program. Table 3 and Figure 4 show the total nitrogen loads to the Cocheco River subestuary in 2006-2008. WWTFs account for 55% of the delivered load, with the Rochester WWTF accounting for most (97%) of the delivered point source loads.

Table 3:

2006-2008 Nitrogen Loads to the Cocheco River Subestuary (tons N/yr)

Source	Discharged	Delivered
Rochester WWTF	191.17	154.49
Farmington WWTF	8.02	4.91
NPS Upstream of Dam		111.97
NPS Downstream of Dam		13.25
Atmospheric Deposition to Tidal River		0.48
Total		285.11
% Point Source		55.91%
% NPS		44.09%

Figure 4:


Sources of Nitrogen Delivered to the Tidal Cocheco River
Atmospheric Deposition, 0.48, 0%
Non-Point Sources, 125.22, 44%
Rochester WWTF, 154.49, 54%
Farmington WWTF, 4.91, 2%

Wasteload Allocations

In Table 4, several scenarios are presented to show the expected nitrogen loading to the subestuary under different permit conditions for the Rochester and Farmington WWTFs. In each scenario, the total loading was set equal to 111 tons N/year (the loading target) and the percent reduction needed from nonpoint sources was calculated. The scenarios present different options to reach the loading target.

As shown, the required reductions in nonpoint source loads is primarily influenced by load reductions at the Rochester WWTF. Even with the Rochester WWTF at 3mg/L, nonpoint sources will need to be reduced by 27 to 29 percent depending on the level of treatment assumed at the Farmington WWTF (3 to 8 mg N/L). If the Rochester WWTF was given a limit of 5 mg N/L, the required nonpoint source reduction to meet the proposed nitrogen standard in the subestuary increases to about 38 percent. Achieving reductions in nonpoint source is very challenging, can be quite expensive, and is much less certain than achieving reductions in point sources. Consequently, to help assure that nitrogen standards in the subestuary will be achieved, it would seem prudent to reduce point source loads as much as possible. This suggests assigning a limit of 3 mg N/L to the Rochester WWTF (i.e., the current limit of technology). Since the Farmington only delivers about 2 percent of the nitrogen load in the estuary, a limit of 5 or 8 mg N/L would seem appropriate for the Farmington WWTF.

Order of magnitude costs for the Rochester and Farmington WWTFs to upgrade to the different permit limits have been approximated in Table 5. Costs for upgrading WWTFs to meet various effluent nitrogen limits were based on regression equations developed for the Chesapeake Bay Basin (Chesapeake Bay Program, 2002) and from the Massachusetts Department of Environmental Protection for WWTFs in the Connecticut River basin (MADEP, 2008). Costs were updated to 2007 using indices from the Engineering News Record. Detailed cost estimates for each community were not conducted. Results indicate that the cost to remove a pound of nitrogen from the estuary is over six times higher in Farmington than it is in Rochester. This further supports reducing nitrogen levels at the Rochester WWTF as much possible.

Table 4:

Wasteload Allocations and Percent Reductions in NPS Needed to Reach Loading Target

Scenario 1 = Existing Loads from WWTFs

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	None	5.03	191.17	154.49	
Farmington WWTF	None	0.5	8.02	4.91	
Nonpoint Sources				-47.99	138% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 2 = TN limits of 8 mg/L for all WWTFs

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	8	5.03	61.23	49.48	
Farmington WWTF	8	0.5	6.09	3.73	
Nonpoint Sources				58.20	54% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 3 = TN limits of 5 mg/L for all WWTFs

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	5	5.03	38.27	30.93	
Farmington WWTF	5	0.5	3.80	2.33	
Nonpoint Sources				78.16	38% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 4 = TN limits of 3 mg/L for all WWTFs

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	3	5.03	22.96	18.56	
Farmington WWTF	3	0.5	2.28	1.40	
Nonpoint Sources				91.46	27% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 5 = TN limits of 5 mg/L for Rochester and 8 mg/L for Farmington

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	5	5.03	38.27	30.93	
Farmington WWTF	8	0.5	6.09	3.73	
Nonpoint Sources				76.76	39% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 6 = TN limits of 3 mg/L for Rochester and 8 mg/L for Farmington

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	3	5.03	22.96	18.56	
Farmington WWTF	8	0.5	6.09	3.73	
Nonpoint Sources				89.13	29% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Scenario 7 = TN limits of 3 mg/L for Rochester and 5 mg/L for Farmington

Source	Limit (mg/L)	Design Flow (MGD)	Nitrogen Loads (tons N/yr) Discharged	Delivered	Comments
Rochester WWTF	3	5.03	22.96	18.56	
Farmington WWTF	5	0.5	3.80	2.33	
Nonpoint Sources				90.53	28% reduction in NPS needed
Total				111.41	
Nitrogen Loading Target (tons N/yr)				111	

Table 5:

Cost of Nitrogen Removal from WWTFs in the Cocheco River Watershed

WWTF	Design Q (mgd)	Effluent Limit (mg N/L)	Capital (Million $)	O &M (Million $/yr)	Annual (Million $/yr)	$/lb removed from Estuary based on Capital Cost	$/lb removed from Estuary based on Annual Cost
Farmington (Existing)			$0.00	$0.000	$0.000		
Farmington	0.5	8	$4.17	$0.068	$0.277	$1,762	$117
Farmington	0.5	5	$5.63	$0.076	$0.378	$1,090	$73
Farmington	0.5	3	$6.48	$0.114	$0.438	$922	$62
Rochester (Existing)			$0.00	$0.000	$0.000		
Rochester	5.03	8	$28.56	$0.687	$2.114	$136	$10
Rochester	5.03	5	$29.78	$0.746	$2.234	$121	$9
Rochester	5.03	3	$39.98	$1.385	$3.384	$147	$12

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