PROPOSAL AND QUALIFICATIONS

TOWN OF FALMOUTH, ME

Community-wide
Public Water System
Analysis

January 2016

WRIGHT-PIERCE
Engineering a Better Environment

WRIGHT-PIERCE
Engineering a Better Environment

Water
Wastewater
Infrastructure

January 18, 2016
W-P Project No. T10859

Mr. Theo Holtwijk
Director of Long Range Planning
Town of Falmouth
271 Falmouth Road
Falmouth, Maine 04105

Subject: PROPOSAL:
Planning Services to Prepare a Community-wide Public Water System Analysis

Dear Mr. Holtwijk:

Wright-Pierce is pleased to submit our qualifications and preliminary work plan to develop a public water system plan for designated growth areas in the Town of Falmouth. We are excited about the prospects of supporting the Town on this very interesting and important project.

You know our firm and capabilities from our ongoing wastewater planning study, Route 100 corridor plan, and other work over the years. Let me take a brief moment to introduce our drinking water team and capabilities and our plan to help you succeed on this project.

- **Planning Experience in Falmouth –** Our approach will be to integrate and leverage existing wastewater and civil planning work completed by Wright-Pierce in the Town of Falmouth. In particular, our estimates of wastewater flows and mapping will also be of value on this planning project. Our team includes Chris Dwinal as a technical liaison to assure that this prior work is captured, incorporated and consistent on this study.

- **Leadership** – Our team will be managed by Jeff Musich. Jeff is a principal in the firm and our Drinking Water Practice Group Leader. He will help facilitate the process and guide the stakeholder group towards a plan that will meet the interests of the Town of Falmouth and be supported by the Portland Water District.

- **Relationship with Portland Water District –** Our firm and project team have an excellent working relationship with the Portland Water District. We have used their current distribution system hydraulic model to analyze improvements to their system, similar to what will be required on your project. We know and understand their distribution system and have credibility with their technical staff. We can deliver a service plan in Falmouth that will be technically sound, affordable and supported by the Portland Water District.

75 Washington Avenue, Suite 202
Portland, ME 04101 USA
Phone 207.761.2991 | Fax 207.761.2978

- **Maine Water Utility Planning Experience –** Our team has developed water system master plans for most of the mid-sized and large water systems in the state of Maine including the Greater Augusta Utility District, Bangor Water District, Yarmouth Water District, Bath Water District, Kennebec Water District, Kittery Water District and many others. We have the local expertise to address all of your questions and the requested services in your RFP.

- **Financing and Partnerships** – Our firm can offer some creative ideas on financing extension of water infrastructure in Falmouth. Extension of water mains is driven by the Maine Public Utilities Commission Guidelines under Chapter 65 of the regulations. We understand these requirements and can offer ideas that leverage private or other public funds to make projects more affordable for the Town of Falmouth.

Wright-Pierce understands that great service and technical excellence only happens if you have an excellent team. We recruit the best and the brightest. We offer a work culture that fosters and rewards professional growth, industry leadership, client focus, and balance to personal and professional life. We provide mentoring and company-wide development programs, and encourage our employees to participate with industry trade groups. We are proud to be a local, Maine firm.

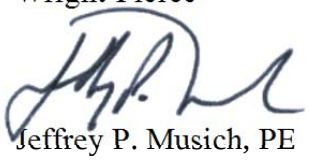
Wright-Pierce is an employee-owned company, with all of our owners being hands-on practitioners that are connected to the "heart of our business" – serving clients. We are organized around client service groups. We minimize bureaucracy and emphasize responsiveness and excellence.

At Wright-Pierce, we are all about people – our clients, our employees and the communities in which we live and work; about integrity and honoring our commitments; and about doing the absolute best we can do for our clients by bringing our commitment to value and our technical expertise to bear for our clients each and every day.

We would greatly appreciate the opportunity to continue serving the Town of Falmouth. Thank you again for the opportunity to propose on this project.

Sincerely,

Wright-Pierce



Jeffrey P. Musich, PE
Project Manager and Senior Vice President
jeff.musich@wright-pierce.com

JPM/jla
Attachments

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Section 1

WRIGHT-PIERCE
Engineering a Better Environment

Maine

Topsham Office

99 Main Street
Topsham, ME 04086
Phone 207.725.8721
Fax 207.729.8414

Portland Office

75 Washington Avenue, Suite 202
Portland, ME 04101
Phone 207.761.2991
Fax 207.761.2978

Connecting all offices
888.621.8156

New Hampshire

The Ammon Center, Suite 208
175 Ammon Drive
Manchester, NH 03103

230 Commerce Way, Suite 302
Portsmouth, NH 03801

Massachusetts

40 Shattuck Road, Suite 305
Andover, MA 01810

Connecticut

169 Main Street
700 Plaza Middlesex
Middletown, CT 06457

Rhode Island

The Westminster Square Building
10 Dorrance Street, Suite 840
Providence, RI 02903

Wright-Pierce is an award-winning engineering firm providing water, wastewater, and infrastructure services to public and private clients throughout the Northeast for more than 65 years.

Employee-owned and customer focused, Wright Pierce has a staff of more than 200 engineers and support professionals located in seven offices. While our prime area of operation is the Northeast, we selectively provide services elsewhere in the United States and globally.

Innovative, Reliable, Sustainable Solutions Tailored to Your Needs

As a respected, quality-driven firm, we are proud of our verifiable track record for delivering technical excellence and innovation. We do not subscribe to a "one-size-fits-all" philosophy; rather, we identify the best solution for your specific needs.

Value Driven

We understand the value of a dollar and the fiscal constraints facing our clients. We take pride in our track record developing solutions that represent the best life cycle cost value. Our understanding of value and the delivery of reliable solutions has been the cornerstone to our success in New England.

Responsive Service Focused on Your Success

As a valued client, the success of your project is our foremost concern, and the only measure of our success.

What sets us apart is expertise in developing creative, sustainable, efficient solutions tailored to meet your needs — today and tomorrow.

- We listen, investigate and understand the requirements.
- We stress practical operator-friendly solutions.
- We understand fiscal constraints and emphasize value-based solutions.
- We involve and collaborate with our clients every step of the way.

We are about building long-standing relationships and delivering on our promise to help you succeed and improve our communities for the future.

Wright-Pierce — innovative, reliable, sustainable solutions for your success today and tomorrow!

WATER ENGINEERING SERVICES

Safe drinking water is essential for life. Wright-Pierce has extensive expertise in the treatment, storage and conveyance of clean, pure drinking water from ground and surface water to the tap.

Water Supply Location, Evaluation and Development

- Source identification and mapping
- Source development studies
- Water quality studies
- Recharge area mapping
- "Safe yield" analysis
- Well and well field evaluation
- Well rehabilitation
- Aquifer management
- Planning

System Master Planning

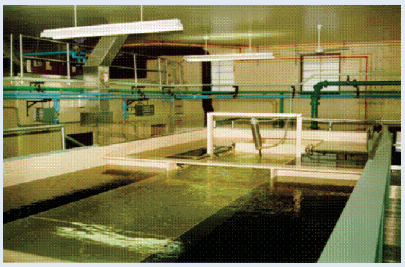
- Regional Water Planning
- Water Supply Plans
- Water system evaluations and studies
- Projections of future needs
- Computer modeling
- Prioritized plans for system improvements
- Asset management systems/ GASB 34 Compliance/GIS
- Mutual Aid and Emergency Planning

Water System Pumping, Storage and Distribution

- Distribution systems
- Hydraulic analysis
- Pumping and booster stations
- Transmission/distribution
- Systems design
- Storage facilities

Water Treatment Facilities

- Pre-design and pilot studies
- Filtration
- Iron and manganese removal
- Softening
- Disinfection
- Corrosion Control
- Taste and odor control
- Arsenic removal
- Radon removal
- SCADA systems
- Process Optimization/Operation Assistance
- Membranes
- Disinfection By-product Reduction



WRIGHT-PIERCE
Engineering a Better Environment

Serving Clients Throughout the Northeast
888.621.8156 | www.wright-pierce.com

Section 2

WRIGHT-PIERCE
Engineering a Better Environment

STAFF QUALIFICATIONS

Wright-Pierce provides a full-range of water engineering services, and has extensive experience in all significant elements of master planning, storage analysis, water treatment, conservation, lost water analysis, rates studies, feasibility studies, and storage and distribution projects. Our staff has complete in-house capability to perform studies, prepare designs and provide construction administration and start-up services for all the systems needed to plan, model, produce, treat, transport and store a water supply. Our project team has been involved with the planning, design and construction of all types of water supply facilities for many years.

Our proven hands-on approach, responsiveness and sensitivity to local issues have proven successful in the past for providing cost effective and practical solutions to our clients. Our experience, means we can "hit the ground running" on your project.

System Master Planning and Capital Improvement Plans

Wright-Pierce has assisted a number of municipal water systems with the development of comprehensive improvement plans. These plans serve as a guide for planning, budgeting and constructing new water system facilities and insure that the improvements are appropriate and cost-effective.

Many of the projects include development of a computer-based hydraulic model to evaluate the performance of the respective water distribution system. Computer modeling simulations are typically conducted for both present and expected future demand conditions or to simulate extension of water mains. We carefully analyze water use trends, population, industrial and commercial growth to make the best possible predictions of future water demands. The computer models are calibrated with hydrant flow and pressure tests. Wright-Pierce owns and maintains all equipment necessary to conduct flow tests including pitometers, pressure gauges and 24-hour pressure chart recorders. For many of the projects, storage tank options and water main upgrades are also examined to determine how to optimize system operations and available funds. The results are typically presented in a written report as part of a 10-year or 20-year capital improvement plan.

We maintain a highly skilled staff trained in the latest software for computer-based hydraulic modeling of water systems.

In support of our master planning work, we maintain a highly skilled staff that is trained in the latest software for computer-based hydraulic modeling of water systems. We have the ability to conduct hydraulic modeling on a variety of different software packages such as WaterGems by Bentley, EPANET by the U.S. Environmental Protection Agency, InfoWater by Innovyze, or KYPipe. For each project, the software we use is determined by the needs or requests of the client.

In several water systems our hydraulic modeling work has led to the discovery of fully or partially closed gate valves. We have also worked with multiple zone pressure systems to help improve fire flows. Additionally, we have conducted time-lapse model simulations to examine how storage tank levels react to changes in demand throughout the day, or even over the period of a week. We have used the time-lapse feature to address stagnation of water in storage and to evaluate whether adequate capacity is provided. Our experience in conducting hydraulic analyses will help us recommended optimal improvements to your system.

The Portland Water District model uses Innovyze software. We have obtained a copy of the model, have tested the model, and are prepared to use it to study water main extensions in Falmouth.

Regulatory Knowledge

Our Wright-Pierce project team brings extensive regulatory experience to the table. We routinely assist our clients with obtaining a wide range of regulatory approvals from federal, state, and local agencies. Our building services team is well versed with NFPA and Life Safety Code, National Electric Code, and the various building codes, including the Energy Code adopted by the State of Maine.

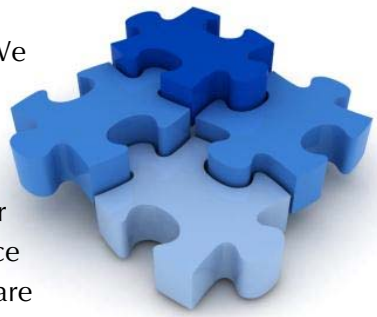
Our project team will be led by Jeff Musich, who has wide-ranging experience with regulatory issues, water system planning and understands issues important to Portland Water District. He is very familiar with the details of Safe Drinking Water Act regulations, DEP, and State Revolving Fund requirements including:

- Stage 2 Disinfection Byproduct Rule
- Long Term 2 Enhanced Surface Water Treatment Rule
- Total Coliform Rule and new revisions
- Maine DEP
  - NRPA and Permit By Rule Requirements
  - Water Withdrawal Regulations
  - Stormwater treatment (NPDES)
- Maine DOT
  - Highway Opening Permit
  - Utility Location Permit
- SRF and Capacity Development Grant requirements
- CDBG and Rural Development requirements
- Environmental Reviews
- Drinking Water Program New Well Approval Process

Our staff is also familiar with the local permits and reviews that are required in the Town of Falmouth. Understanding how these regulations impact distribution system water quality is of utmost importance to the Portland Water District.

ORGANIZATIONAL CHART

Resources and Availability



Wright-Pierce has a staff of over 200 engineers and support personnel. We complete well over a hundred projects per year, with fees ranging from less than $5,000 to more than $20-million. Our principal-in-charge and project manager, Jeff Musich, will play the largest project role for the Town of Falmouth and will also be responsible for maintaining the availability of other key personnel. Additionally, as a stockholder and member of the Wright-Pierce Board of Directors, Jeff has the authority to make certain that projects are adequately staffed. He will commit the project team members to ensure that the project is completed in accordance with scheduling objectives.

PROJECT TEAM

Wright-Pierce is a practice-based organization that focuses on the technical aspects of our work. As a result, all of our staff, from our principals to our administrative staff, are experienced and involved in the technical execution of all phases of projects.

From our full-service staff of engineers, operators, technicians and support personnel, we have assembled a project team with the technical capabilities and experience needed for your project. We believe that the professional background of each team member offers the highest level of experience and expertise for the project that Town is undertaking. At Wright-Pierce, when a project team is assembled, the same team members typically participate throughout all phases of a project to ensure continuity, effective implementation of the original concepts, and the overall success of the project.

Our approach is simple — we assemble the right team for your project and we listen to your needs and goals.

A brief introduction to our key team members and their responsibilities are included below. Where appropriate, we have listed the role they played in similar projects and referenced projects listed in Section 6 of this submittal. For these team members, similar-project specific, abbreviated resumes (two-pages, except for Jeff's) are included at the end of this section. More complete and detailed resumes are available upon request.

INTRODUCTION TO KEY PERSONNEL

Jeffrey P. Musich, PE: Jeff is a senior vice president and will serve as the project's principal-in-charge and project manager. His interest and passion is water system master planning. He has managed and provided oversight for more than 30 water system master plans, including most of the water systems in Maine. As the prime client contact and principal-in-charge, he will oversee the project activities including participation and direction to ensure that the project team provides exceptional client service and fulfills all of our obligations to the Town. Because he is well-known to the Portland Water District, Jeff will also lead any public presentations / meetings and will serve as the Portland Water District liaison for the Town in order to ensure that the Town of Falmouth is provided the most experienced, professional support.

Area of Specialty:	Water Engineering
Office Location:	Topsham, Maine
Total Years' Experience:	32 years
Years with Firm:	15 years

Role in Reference Projects

Yarmouth Water District:	Principal-in-Charge / Project Manager
Bath Water District:	Principal-in-Charge / Project Manager
Kittery, ME:	Principal-in-Charge / Project Manager
Gardiner Water District:	Principal-in-Charge / Project Manager
South Berwick, ME:	Principal-in-Charge / Project Manager
Greater Augusta Utility District:	Principal-in-Charge / Project Manager

Christopher A. Dwinal, PE: Chris has served as project manager or project engineer on numerous wastewater projects for the Town of Falmouth and is very familiar with many of the Town's staff and its wastewater system. He will serve as wastewater plan coordinator, giving direction at key internal and external meetings to help ensure that the project team captures prior mapping and utility information for this study. Chris sits on Wright-Pierce's Quality Management team and is committed to quality projects. An owner and a hands-on leader, he will work with Jeff to coordinate any wastewater-related planning issues with this water system analysis.

Area of Specialty:	Wastewater Engineering
Office Location:	Topsham, Maine
Total Years' Experience:	24 years
Years with Firm:	23 years

Role in Previous Projects for the Town of Falmouth

Mill Creek PS Upgrade:	Project Manager
Comprehensive PS Evaluation:	Project Manager
Mill Creek Force Main Evaluation:	Project Manager
WWTF Capacity Evaluation:	Project Manager

Christopher D. Berg, PE: Chris is a project manager in the Water Practice Group in Wright-Pierce's Portsmouth, New Hampshire office and will serve as hydraulic modeling and report preparation lead. He is Wright-Pierce's senior modeling engineer and he has developed more than ten hydraulic models of water systems within the past 5 years. In addition, he has worked on numerous asset management plans and studies for a number of communities. He has more than 11 years of experience with all phases of water system engineering, hydraulic analysis and modeling and GIS support. He also has extensive experience with hydraulic modeling software (WaterGEMS™, InfoWater™ [Inovyze], and EPAnet) and engineering computer applications (AutoCAD and ArcGIS).

Area of Specialty:	Water Engineering
Office Location:	Portsmouth, New Hampshire
Total Years' Experience:	11
Years with Firm:	11

Role in Similar Projects

Concord, NH:	Hydraulic Modeling Engineer
Rye Water District:	Hydraulic Modeling Engineer
Plymouth Village Water & Sewer	Hydraulic Modeling Lead
Rochester, NH:	Hydraulic Modeling Lead

Jackie A. Cobb, PE: Jackie is an engineer in the Water Practice Group in Wright-Pierce's Topsham, office, and will serve as modeling engineer. She will provide modeling support and supply/demand analysis. She will support Chris and Jeff in this aspect of the study, and other related project tasks. Jackie has extensive experience with several engineering computer applications such as AutoCAD, ArcView, and hydraulic modeling software.

Area of Specialty:	Water Engineering
Office Location:	Topsham, Maine
Total Years' Experience:	5
Years with Firm:	5

Role in Reference Projects

Bath Water District:	Project Engineer / Modeling
Gardiner Water District:	Project Engineer / Modeling
Greater Augusta Utility District	Project Engineer / Modeling

Linwood "Woody" Bailey: Woody has been a technician for the Water Practice Group in Wright-Pierce's Topsham, office, and will serve the project in GIS / mapping development. Woody understands GIS systems in many communities and will support the project with integration of information between the databases and to develop mapping. He is an expert in integrating different databases and migrating data between various data platforms. He will also support Jeff to develop mapping for the study.

Area of Specialty:	Water Group Technical Support
Office Location:	Topsham, Maine
Total Years' Experience:	27
Years with Firm:	27

Role in Reference Projects

Yarmouth Water District:	GIS / mapping specialist / AutoCAD
Bath Water District:	GIS / mapping specialist / AutoCAD
Kittery, ME:	GIS / mapping specialist / AutoCAD
Gardiner Water District:	GIS / mapping specialist / AutoCAD
South Berwick, ME:	GIS / mapping specialist / AutoCAD
Greater Augusta Utility District	GIS / mapping specialist / AutoCAD

LIST OF SIMILAR PROJECTS

In the following table we strive to demonstrate, relevant project work performed by members our team to demonstrate the broad range of experience Wright-Pierce can bring to the Town of Falmouth's community-wide public water system analysis.

Location/Client	Master Plan with CIP	Asset Management Planning / Software	System Optimization Status	Water Distribution System Assessments	Benchmarking	Conditional Assessments	Hydraulic Modeling	CMMS Development
MAINE								
Augusta (GAUD)	✓				✓	✓	✓	
Bangor Utility District							✓	
Bath Water District	✓			✓	✓	✓	✓	
Belfast Water District	✓							
Boothbay (BRWD)	✓			✓		✓	✓	
Bowdoinham Water District	✓							
Eagle Lake (Water/Sewer)	✓			✓	✓	✓	✓	
East Pittston	✓						✓	
Fort Kent Utility	✓			✓		✓	✓	
Hallowell Water District	✓		✓	✓	✓	✓	✓	
Gardiner Water District	✓		✓	✓	✓	✓	✓	
Livermore Falls	✓					✓	✓	
Kingfield	✓					✓	✓	
Kittery Water District	✓			✓		✓	✓	
Lisbon	✓			✓		✓	✓	
Madawaska Water District	✓			✓		✓	✓	
North Haven			✓	✓		✓	✓	
North Waterboro / Lake Arrowhead	✓			✓		✓	✓	
Paris Utility District	✓			✓		✓	✓	
Presque Isle	✓			✓		✓	✓	
Sanford Water District	✓		✓				✓	
South Berwick Water District	✓	✓		✓	✓	✓	✓	
Southport	✓			✓		✓	✓	
Waterville (KWD)	✓			✓	✓	✓	✓	
Winthrop Utility District	✓			✓		✓	✓	
Yarmouth Water District	✓			✓		✓	✓	
York Water District	✓			✓	✓		✓	

Location/Client	Master Plan with CIP	Asset Management Planning / Software	System Optimization Status	Water Distribution System Assessments	Benchmarking	Conditional Assessments	Hydraulic Modeling	CMMS Development
NEW HAMPSHIRE								
NHDES	✓			✓		✓	✓	
Bow	✓					✓	✓	
Concord	✓					✓	✓	
Dover	✓					✓	✓	
Hanover	✓					✓	✓	
Jackson						✓	✓	
Jaffrey						✓	✓	
Lebanon	✓			✓		✓	✓	
Plymouth Village WSD	✓	✓	✓	✓	✓	✓	✓	
Portsmouth	✓			✓		✓	✓	
Rochester	✓	✓	✓	✓	✓	✓	✓	
Rye	✓	✓	✓	✓	✓	✓	✓	
Somersworth	✓	✓	✓	✓	✓	✓	✓	
MASSACHUSETTS								
Adams (MassDevelopment)							✓	
Acton	✓		✓	✓	✓	✓	✓	✓
Bellingham	✓						✓	✓
Devens (MassDevelopment)	✓			✓		✓	✓	
Hadley	✓						✓	✓
Haverhill	✓		✓	✓		✓	✓	
Hull	✓		✓	✓		✓	✓	
North Reading	✓		✓	✓		✓	✓	
Plymouth	✓			✓		✓	✓	
Somerset	✓		✓	✓	✓	✓	✓	
Weston	✓					✓	✓	
RHODE ISLAND								
Kent County	✓			✓	✓	✓		
Newport	✓			✓		✓	✓	

JEFFREY P. MUSICH, PE
Senior Vice President

PROJECT ASSIGNMENT: **Principal-in-Charge / Project Manager**

Education
B.S., Civil Engineering
University of Maine

Professional Registration
Maine
New Hampshire
Vermont
Connecticut
Rhode Island
Massachusetts
Florida
Colorado
Texas

Experience
32 Years

Joined Firm
2001

Professional Affiliations
Maine Water Utilities Association (MWUA)

Association of State Dam Safety Officials (ASDSO)

American Water Works Association (AWWA)

American Society of Civil Engineers (ASCE)

New England Water Works Association (NEWWA)

Publications
Standards Committee on Power Actuating Devices for Valves and Sluice Gates. AWWA Standards Committee Co-Author of New AWWA C540-93 Standard. 1993

Presentations
J. P. Musich, P.E., R. N. MacKinnon, and H. Tozer, P.E., "Sanitation and the Public Health System in Northern Haiti – Lessons Learned for Successful Development and Sanitation in Haiti" New England Water Works Association (NEWWA), December 2015

EXPERIENCE SUMMARY

Mr. Musich is the leader of the Water Practice Group and a senior project manager. He is responsible for the oversight of all Wright-Pierce's water projects and the supervision and direction of technical staff. Mr. Musich has over 28 years of water engineering experience.

Mr. Musich is a member of Wright-Pierce's board of directors. In his current position, he oversees all technical and managerial aspects of all water projects within the company. His responsibilities include directing staff training, implementing regional and strategic marketing and planning objectives, and business development in the water supply field. His design and construction experience includes many large, complex water projects, including dam rehabilitation, master planning studies, distribution system studies, water treatment facilities, and pumping stations. He has also completed a variety of studies including corrosion control studies, water quality evaluations, water system master plans, disinfection studies and dam evaluations. Responsibilities have included oversight of environmental permitting and coordination of project approval with state and federal regulators. Knowledge of all components of project development and project financing are an important aspect of his current position. Prior to joining Wright-Pierce, Mr. Musich worked for a major national engineering firm.

RELEVANT PROJECT EXPERIENCE

Master Plans and Regionalization Studies

- Comprehensive Master Plan - Kennebec Water District, Waterville, ME
- Water System Master Plan, Somerset, MA
- Comprehensive Master Plan, South Berwick, ME
- Comprehensive Master Plan, Gardiner, ME
- Master Plan, Castine, ME
- Water System Study and Master Plan, Newburyport, MA
- Water System Master Plan, Yarmouth Water District, Yarmouth, ME
- Water System Master Plan, Kittery Water District, Kittery, ME
- Southern Maine Regional Planning Council Regional Water Master Plan, Hallowell and Gardiner Water District – Regionalization Study, ME
- Water System Asset Management Plan, Orleans, MA
- Water System Master Plan, Plymouth, MA
- Disinfection By-Product ACO Compliance Study, Somerset, MA
- Water System Master Plan, Gardiner Water District, ME
- Regionalization Study Upper Kennebec River Valley, ME
- Water System Master Plan, Madawaska Water District, ME
- Water System Master Plan, York Water District, ME
- Former Otis Air Base Water System Privatization Study, Cape Cod, MA
- Former Brunswick Naval Air Station Water System Privatization Study, Brunswick, ME
- Water System Asset Management Plan, Bangor Water District, Bangor, ME

J. P. Musich, P.E. and C. W. Douglas, "How to Engineer a Dry Hole" New England Water Works Association (NEWWA), September 2015

J. P. Musich, P.E., "Responding to Treatment Plant Challenges from Algal Blooms", Maine Water Utilities Association (MWUA), February 2013

J. P. Musich, P.E., "Developing Simple Databases and Use of Scanning Techniques to Manage Small Water System Assets", Maine Water Utilities Association (MWUA), 2013

J. P. Musich, P.E., "Water Main Sizing and Hydraulic Modeling Applications", Maine Water Utilities Association (MWUA), December 2013

J. P. Musich, P.E., and L.A. Bailey, "Developing Simple Databases to Manage Water System Assets", New England Water Works Association (NEWWA) Spring 2012

J. P. Musich, P.E., "Biofilms and the Prevalence of Microbiological Contaminants in Water Distribution Systems", Maine Water Utilities Association (MWUA), 2011

J. P. Musich, P.E., Distribution System Water Quality and Unidirectional Flusing, Maine JETCC, December, 2010

J. P. Musich, P.E., Water Quality Biology in Distribution Systems, Maine Water Utility Association (MWUA), 2010

- Comprehensive Master Plan, Yarmouth Water District, Yarmouth, ME
- Comprehensive Master Plan, Kittery Water District, Kittery, ME
- Water System Study - Sugarloaf Mountain Corp., Carrabassett Valley, ME
- Water Supply Plan - Southern Maine Regional Council, ME
- Cooperation Study - Hallowell-Gardiner Water Districts, ME
- Regionalization Study - Augusta and Kennebec Water Districts, ME
- Hydraulic Model and Water Age Study - Sanford Water District, Sanford, ME
- Water Treatment and Supply Evaluation, Pleasant Point, ME
- Water System Master Plan, Fort Kent, ME
- Water System Master Plan, Madawaska Water District, ME
- Water System Master Plan, Plymouth, MA
- Supply, Treatment and Distribution System Master Plan, Concord, NH
- Water System and Treatment Evaluation, Haverhill, MA
- Hydraulic Model and GIS Development, Newport, RI
- Water System Master Plan, York Water District, York, ME

Water Distribution

- Water Mains and Water Main Bridge Crossing Design, Bath, ME
- Water Main and Pumping Station Design, Monmouth, ME
- New Water Transmission Main, Oxford, ME
- Water 12-inch Transmission Main - Madawaska, ME
- New Water Transmission Main and Railroad Crossing, Eagle Lake, ME
- New 12-inch Water Main, Mount Blue Standard Water District
- 40 Miles of Distribution and Transmission Main Renewals, Chatham, MA
- New Water Main - State Road, Kittery Water District, Kittery, ME
- New Water Supply Transmission Main, Wiscasset, ME
- Water Main Bridge Crossing Hallowell Water District, ME
- Gerrish Island Bridge Crossing, Kittery, ME
- River Crossing, Kittery, ME
- Cousins Island Ocean Crossing, Yarmouth, ME
- Little Androscoggin River and Railroad Crossing, Auburn, ME
- Highway Bridge Crossing, Brunswick-Topsham WD, Topsham, ME
- New 12-inch Water Main on High Street, Sanford Water District, Sanford, ME
- Various New Water Mains, Hallowell Water District, ME
- New Water Main on Main Avenue, Gardiner Water District, Gardiner, ME

Water Treatment

- Water Treatment Facility Evaluation and Supply Alternatives Study,
- Augusta, ME
- New Slow Sand Filtration with Pre-Ozonation and Roughing Filtration, North Haven, ME
- New Water Treatment Facility at Mirror Lake for Aqua Maine, Rockport, ME
- Iron, Manganese and Color Treatability Study, Acton, ME
- Iron, Manganese and Color Treatability Study, Hadley, MA
- Iron and Manganese Treatability Evaluation, Devens, MA

J. P. Musich, P.E. "Chloramination and Precursor Reduction: How Do You Measure UP?", New England Water Works Association (NEWWA) 12th Annual Water Quality Symposium, Milford, MA, May 12, 2010

J. P. Musich, P.E. "The Ground Water Rule - Do You Have Enough CT" Maine Water Utilities Association, Portland, ME. February 2010

J. P. Musich, P.E. "Use of Ballasted Flocculation in Somersworth, NH to Treat the Salmon Falls River" New England Water Works Association (NEWWA), Worcester, MA. April 2009

J.P. Musich, P.E., and L.A. Bailey, "Techniques to Scan and Maintain Paper Maps and Records" Maine Water Utilities Association, Portland, ME. February 2009

J. P. Musich, P.E., and N. A. Mayberry, P.E., "Compliance with Stage 2 Four Slow Sand Filtration Case Studies Using Low-tech Approaches", New England Water Works Association (NEWWA), April 2008

J. P. Musich, P.E., "Occurrence and Treatment of Dissolved Nitrogen Gas in a Southern Maine Bedrock Well", NEWWA and NHWWA, Portsmouth, NH, January 2008

J. P. Musich, P.E., "Drinking Water and Disinfection: Regulatory and Horizon Issues", Joint NEWWA and MWWCA Meeting and Trade Show, February 2005

J. P. Musich, P.E. "ABC's of Corrosion Control for Water Systems", Paper Presentation, Maine Rural Water Association Annual Technical Conference, Freeport, ME, December 2004

- Iron and Manganese Removal, Bellingham, MA
- Iron and Manganese Removal, Littleton, MA
- Iron and Manganese Removal, Sturbridge, MA
- Iron and Manganese Removal, Dedham-Westwood, MA
- Water Treatment Facility, Orono, ME
- New Water Treatment Facility, Tenants Harbor, ME
- Membrane Filtration Facility Design, Hanover, NH
- Sodium Hypochlorite Conversion Study, Portland, ME
- Chloramine Conversion Project, Auburn, ME
- Treatment Optimization Study, Orono Veazie Water District, ME
- Water Treatment Facility, Filter Rehabilitation and Chemical Feed System Upgrades, York, ME
- High-rate Arsenic, Iron and Manganese Pressure Filtration, South Berwick, ME
- Fluoridation and Chloramine Study and Water Treatment Facility Improvements, Kennebunk-Kennebunkport-Wells (KKW) Water District, ME
- New 6-MGD Water Treatment Facility, Somerset, MA
- New 1.2-MGD Greensand Filtration Facility, Dartmouth, MA
- Water Quality Evaluation and Treatment Evaluation, Dighton, MA
- Water Quality Evaluation and Corrosion Control Study, Hallowell, ME
- New 1.0-MGD Slow Sand Water Treatment Facility, Livermore Falls, ME
- Corrosion Control/Water Quality Study, Norway, ME
- Corrosion Control Study and Pumping Station Evaluation, Rumford, ME
- Water System Study - Sugarloaf Mountain Corporation, Carrabassett Valley, ME
- New 2,800-GPM Greensand Pressure Filtration System, Brunswick-Topsham Water District, ME
- Ballasted Flocculation and DAF Pilot Testing and Preliminary WTF Design, University of New Hampshire, Durham, NH
- WTF Chlorine Gas Conversion, Somerset, MA
- Auxiliary Power and Well Improvement Project, Orleans, MA
- Lagoon Residuals Handling Design Project, Brunswick-Topsham Water District, Topsham, ME
- Ballasted Flocculation and DAF Pilot Testing and Preliminary WTF Design, Kittery Water District, NH
- Comprehensive Improvement Program, Wiscasset, ME
- New Lime Handling and Feed System, Cotuit, MA
- Desalination Study, Hull, MA
- Groundwater Rule Compliance Study, Dartmouth, MA
- Membrane Filtration Facility, Kent County Water Authority, Coventry, RI
- Membrane Treatment Evaluation, Orleans, MA
- Water Treatment Optimization Study, Kittery Water District, Kittery, Maine
- Sodium Hypochlorite Conversion, Portland Water District, Portland, ME
- Treatability and Supply Evaluation, Concord, MA
- Treatment Plant Upgrade with Ballasted Flocculation, Somersworth, NH
- Treatability Study and Slow Sand Filter Upgrade using MIEX, Newport, ME
- Slow Sand Filter Evaluation and Upgrade, Canaan, NH
- Arsenic Removal Facility at Willow Drive, South Berwick, ME

- SCADA and Treatment Plant Upgrades, York Water District
- SCADA Evaluation, Bangor Water District, Bangor, ME
- Design-Build SCADA System - Yarmouth Water District

J. P. Musich, P.E. "The Hows and Whys of Valves", Maine Rural Water Association Annual Technical Conference, December 2003

Water Supply, Storage Tanks, Wells, Pumping Stations

D. C. Michniewicz and J. P. Musich, P.E. "Drought Management Experience for the York Water District," New England Water Works Association (NEWWA), Hyannis, MA. September 2002

- Safe Yield and Source Evaluation, Newport, RI
- Water Supply and Treatment Study, Topsfield, MA
- Safe Yield and Source Evaluation Kittery Water District, ME
- Renovation of Wellesley Street P.S., Weston, MA
- Renovation of MWRA P.S., Wellesley, MA
- New Gravel-Packed Well, Yarmouth Water District, Yarmouth, ME
- Two Gravel-Packed Wells, Greater Augusta Utility District, Augusta, ME
- Two Gravel-Packed Wells, Sanford Water District, Sanford, ME
- Gravel-Packed Replacement Well, Gardiner Water District, Gardiner, ME
- New Municipal Water Supply and Pumping Station, Sanford, ME
- Test Well Exploration and Groundwater Exploration Program, Waldoboro, ME
- New 8.0 MG Welded Steel Water Tank, Portsmouth, NH
- New Gravel-Developed Well and Pumping Station, Eagle Lake, ME
- Martin Brook Bedrock Well and Pumping Station, Madawaska, ME
- St. David Gravel-Packed Well and Pumping Station, Madawaska, ME
- Storage Analysis and Study, Greater Augusta Utility District, Augusta, ME
- New Pre-Stressed Concrete Storage Tank, Greater Augusta Utility District, Augusta, ME
- New Pre-stressed Concrete Storage Tank, Bangor Water District, Bangor, ME
- New Pre-stressed Concrete Storage Tank, Paris Utility District, S. Paris, ME
- New Pre-stressed Concrete Storage Tank, Bath Water District, Bath, ME
- New Glass-lined Bolted Steel Tank, Wiscasset, MA
- New Welded-Steel Tank, Chatham, MA
- New Well Supply and Pumping Station, Caribou Utilities District, Caribou, ME
- Safe Yield and Source Evaluation, Newport, RI
- New Replacement Well, Bowdoinham Water District, Bowdoinham, ME
- New Replacement Well, Richmond Utilities District, Richmond, ME
- Renovation of Wellesley Street P.S., Weston, MA
- Renovation of MWRA P.S., Wellesley, MA
- Replacement Well, Bowdoinham Water District, Bowdoinham, ME
- Replacement Well, Richmond Utilities District, Richmond, ME
- Booster Pumping Station Design York Water District, York, ME
- Water and Sewer District Two New Pre-stressed Concrete Tanks, Eagle Lake, ME
- Water Main Replacement Project, Yarmouth Water District, Yarmouth, ME
- Cleaning and Lining West Elm Street Main, Yarmouth Water District, Yarmouth, ME
- New Pre-stressed Concrete Storage Tank, Gardiner Water District, Yarmouth, ME

CHRISTOPHER A. DWINAL, PE
Senior Project Manager

PROJECT ASSIGNMENT: Wastewater Plan Coordinator

Education
B.S., Civil Engineering, University of New Hampshire

Graduate Study, Groundwater Hydrology, Tufts University

Graduate Study, Water Chemistry, University of New Hampshire

Professional Registration
Maine
New Hampshire
Massachusetts

Experience
24 Years

Joined Firm
1993

Professional Affiliations
Maine Water Environment Association

New England Water Environment Association

New Hampshire Water Pollution Control Association

Tau Beta Pi
Water Environment Federation

Publications
Dwinal, C.A., Hazelton, S. and G. Hill, "Commercial and Residential Organics Pilot," BioCycle, October 1996

Giggey, M.D., Pinnette, J.R. and C.A. Dwinal, "Odor Control Factors in Compost Site Selection," BioCycle, February 1995

Dwinal, C.A., Grotton, E.J. and R.A. Behr, "Revised Method of Approximate Structural Analysis," Journal of Structural Engineering Div., ASCE, November 1990

EXPERIENCE SUMMARY

Mr. Dwinal is a senior project manager at Wright-Pierce and is the Maine Wastewater Group Leader for Wright-Pierce. He is currently serving several Maine and New Hampshire clients as a project manager. He has extensive experience in the planning, design and construction administration of wastewater treatment facilities, odor control systems, residuals management facilities, septage treatment facilities, pump stations and collection systems. Ongoing projects include construction administration for a $14 million Phase 2 upgrade at the Berlin, NH, wastewater treatment facility; construction administration of a $6 million Phase 2 upgrade at the Merrimack, NH, wastewater treatment facility and composting facility; and the construction administration of an 18.4-MGD pump station in Portland, Maine.

RELEVANT PROJECT EXPERIENCE

Pump Stations

- Comprehensive Pump Station Evaluation, Falmouth, ME
- Mill Creek Pump Station Upgrade, Falmouth, ME
- Fore River Pump Station Upgrade, Portland, ME
- Pump Stations Upgrade, Westbrook, ME
- Wastewater Pump Station, Force Main and Gravity Sewer, Raynham, MA
- Pump Station Evaluations, Portland, ME
- Pump Station Upgrade, Cape Elizabeth, ME
- Pump Station and Terminus Manhole Replacement, Cape Elizabeth, ME
- Long Creek Pump Station Upgrade, South Portland, ME
- Pump Station Preliminary Design, Portland, Maine
- Multiple Pump Station Evaluations, Bath, ME
- Pump Station Evaluation, Auburn, ME
- Comfort Station Grinder Pump Station Design, Bar Harbor, ME
- Harbor Place Pump Station Evaluation, Bar Harbor, ME
- Rodick Street Pump Station Evaluation, Bar Harbor, ME
- “Tin Can” Pump Station Structural Assessment, Bar Harbor, ME
- Pump Station Wet Well Mixing Evaluation, Bar Harbor, ME
- Pump Station Telemetry, Bar Harbor, ME
- Pump Station Preliminary Design, Merrimack, NH
- Watson Street Pump Station Upgrade and Screening Facility, Berlin, NH
- Pump Station and Headworks Evaluation and Upgrade, Dover, NH
- Brown Farm Pump Station, Berlin, NH

Wastewater Collection and Combined Sewer Overflows

- Mill Creek Force Main Evaluation, Falmouth, ME
- Private Infiltration and Inflow Investigation and Remediation Plan, Cape Elizabeth, ME
- Combined Sewer Overflow Master Plan, South Portland, ME
- Combined Sewer Overflow Master Plan, Cape Elizabeth, ME

Presentations

Dwinal, C.A., "Water and Wastewater Infrastructure Energy Usage, Audits & Case Studies" MRWA Conference, December 2014

Dwinal, C.A. and Swett, M.P, "Fast-Paced Project Leads to Slow-Speed Dewatering Solution,"MeWEA Fall Conference, September 2014

Dwinal, C.A. "Sludge Dewatering Short Course," JETCC, October 2013 and December 2014

Dwinal, C.A., "Long Creek Pump Station Case Study, S. Portland, Maine," Maine Wastewater Control Association, September 2013

Dwinal, C.A., "Merrimack, NH First FKC Press in New England Dewatering Municipal Biosolids," NEBRA November 2011 and NEWEA January 2012

Dwinal, C.A. and Taylor, J., "Merrimack, NH - The first FKC screw press dewatering 100% domestic biosolids in New England, NEWEA Annual Conference, January 2012

Dwinal, C.A., "Economic Impact of Loss and Gain of Large Sewer Users – Berlin, NH," Maine Wastewater Control Association, September 2009

Dwinal, C.A., "Economics Impacts of Sewer Use Changes," Maine Wastewater Control Association Fall Conference, September 2009 "

- Combined Sewer Overflow Master Plan, Bar Harbor, ME
- Combined Sewer Overflow Evaluation, Bar Harbor, ME
- Sewer Rehabilitation Projects, Bar Harbor, ME
- Sewer Master Plan, North Stonington, CT
- Collection System Evaluation, Bath, ME
- Phase 2 Collection System Evaluation, Bath, ME
- Sewer and Stormwater Pipe Replacement, Bar Harbor, ME
- Sewer System Master Plan, Merrimack, NH
- Post CSO Master Plan Flow Monitoring, Bar Harbor, ME
- CSO Pipe Replacement, Bar Harbor, ME
- Long-Term CSO Control Plan, Berlin, NH
- Collection System O&M Manual, Berlin, NH
- Infiltration/Inflow Removal Projects, Berlin, NH
- Flow Metering Structure, Berlin, NH
- Siphon Stabilization, Merrimack, NH
- Gravity Sewer and Force Main, Berlin, NH
- Interceptor Replacement, Merrimack, NH
- Middle School Sewer, Merrimack, NH
- Sewer Options, Merrimack, NH

Wastewater Treatment

- WWTF Capacity Evaluation, Falmouth, ME
- Evaluation of Impact of Methadone Clinic, Warren Sanitary District, ME
- Secondary Treatment Operations Assistance, East End WWTF, Portland, ME
- Evaluation of Flows from Seafood Processing Facility, Richmond Sanitary District, ME
- WWTF Facilities Evaluation, Dover, NH
- WWTF Facilities Evaluation, Bath, ME
- Wastewater Treatment Facility Upgrade, Berlin, NH
- Wastewater Treatment Facility Phase 1 Upgrade, Berlin, NH
- Wastewater Treatment Evaluation, Merrimack, NH
- Aeration Controls Evaluation, Bar Harbor, ME
- Wastewater Treatment Facility Evaluation, Berlin, NH
- WWTF Structural Improvements, Concord, NH
- Sludge Thickener Upgrade, Portland, ME
- WWTF Facilities Evaluation, Bar Harbor, ME
- WWTF Facilities Evaluation and Upgrade, Cape Elizabeth, ME
- WWTF Headworks Evaluation, Richmond, ME
- WWTF HVAC Upgrade, Merrimack, NH
- Sludge Pump Upgrade, Westbrook, ME
- Headworks Upgrade, Westbrook, ME
- Septage Treatment Facility Upgrade, Orleans, MA
- Groundwater and Surface Water Protection Program, Brunswick and Freeport, ME
- Water and Wastewater Master Plan, Harpswell, ME
- Packaged Wastewater Treatment Plants Evaluation, Yarmouth, MA

CHRISTOPHER D. BERG, PE
Project Manager

PROJECT ASSIGNMENT: Hydraulic Modeling Leader / Report Preparation

Education
M.S., Civil Engineering, University of New Hampshire

B.S., Civil Engineering Rowan University

Professional Registration
New Hampshire

Experience
11 Years

Joined Firm
2004

Professional Affiliations
American Water Works Association

New England Water Works Association

Professional Development
Grade 2 Water Treatment Operator-In-Training

Awards
Co-Recipient, Engineering Excellence Award, ACEC, Rochester Cocheco Well WTF LEED Certified Building, 2012

Presentations
Berg, C., "Risky Business - Managing Assets Using a Risk Based Approach", Granite State Rural Water Assoc. Sept. 2014

Berg, C., Normandin, J., "GPS and GIS for Asset Management, Granite State Rural Water Assoc. Aug. 2013

Berg, C., "Sustainable Water Treatment Facility Design on the Cocheco River", UNH Engineering Alumni Conference, Durham, NH, May, 2010

EXPERIENCE SUMMARY

Mr. Berg is a project manager in the Water Practice Group in Wright-Pierce's Portsmouth, New Hampshire office. His responsibilities include design of distribution system infrastructure, water storage facilities, water treatment processes and facilities, pump stations, and water supply wells. In addition, his project experience includes the use of hydraulic models for design and analysis of water distribution system infrastructure, master planning and asset management water treatment process pilot studies, construction administration, and construction inspection. He has extensive experience with hydraulic modeling software (WaterGEMS™, InfoWater™, and EPAnet) and engineering computer applications (AutoCAD and ArcGIS).

RELEVANT PROJECT EXPERIENCE

Master Planning / Hydraulic Modeling

- Distribution System Hydraulic Model Development, Burlington, MA
- Asset Management Plan, Orleans, MA
- Distribution System Master Plan, Concord, NH
- Distribution and Storage System Evaluation, Somersworth, NH
- Conceptual Water and Sewer System Design, Stratham, NH
- Water System Master Plan, Rye, NH
- Water System Master Plan, Plymouth, NH
- Water and Sewer System GIS/Asset Management Development, Plymouth, NH
- Distribution System Hydraulic Model, Hadley, MA
- Initial Distribution System Evaluation, Rochester, NH Lebanon, NH, Wolfeboro, NH, Meredith, NH
- On-call Hydraulic Modeling, Rochester, NH, Lebanon, NH, Milford, NH, Meredith, NH
- Hydraulic Model Report Update, Wolfeboro, NH
- New Water Pressure Zone, Rochester, NH
- Water Quality Modeling Analysis, Rochester, NH
- Water Distribution Model, Plymouth, MA
- Hydraulic Model and Water Distribution Map, Wolfeboro, NH

Water Distribution

- Route 25 Water Main Improvements, Cornish, ME
- Salmon Falls Water and Sewer main Extension, Rochester, NH
- Infrastructure Improvements, Rochester, NH
- Stone Arch Bridge TIF Water Main Extension, Jaffrey, NH
- Stone Arch Bridge TIF Water Main Extension, Jaffrey, NH
- Silver St Extension Water Main Improvements, Dover, NH
- Jady Hill Utilities Improvements, Exeter, NH
- Water Main Replacement Projects, Salem, NH
- Upper Albany Sewer Separation Contract #1, Hartford, CT

Berg, C., and Willis, T., "Sustainable Water Treatment Facility Design in Rochester, NH", NEWWA Annual Conference, Dixfield Notch, NH, Sept. 2009

Berg, C., "High Rate Iron and Manganese Removal for Groundwater Using Granular Media Filtration", ATCAVE, Cromwell, CT, February 2007

Berg, C., Carroll, B., "A Systematic Approach to Disinfection By-Product Reduction Without Changing Disinfectant", NEWWA Spring Conference, Worchester, MA, April 2008

Berg, C., Silke, C., and Willis T. "Infrastructure Reduction by Interconnecting High Pressure Zones", NEWWA Annual meeting, Worchester, MA, November 2007

Druschel, S., Haendiges, J., and Berg C., "Wetlands for Wildlife", EnviroExpo, Boston, MA, May 2006
.

- Upper Albany Sewer Separation Contract #2, Hartford, CT
- Water and Sewer Replacement Projects, Wolfeboro, NH
- Little Falls Bridge Water Main Extension, Rochester, NH
- Water and Sewer Relocation Projects, Wolfeboro, NH
- Water Main Extension, Rochester, NH
- Water Main Replacement, Wolfeboro, NH
- Water Main Pipe Lining, Rochester, NH
- Water Line Relocation, Portsmouth, NH
- Western End Piping Modifications, Rochester, NH
- Transmission Main Relocation, Portsmouth, NH
-

Water Storage

- Dram Cup Hill Tank Renovations, Milford, NH
- Bible Hill Storage Tank Modifications, Hillsborough, NH
- Salmon Falls Reservoir Tank Painting, Rochester, NH
- Breakfast Hill Tank Painting, Rye, NH
- Howard St Tank Painting and Mixing System, Salem, NH
- Lawrence Rd Tank Mixing System, Salem, NH
- Tank Mixing and Rechlorination System, Wolfeboro, NH

Water Treatment

- Stream Gage Installation, Rochester, NH
- WTP Upgrades, Rochester, NH
- WTP Instrumentation and Mechanical Upgrade, Hillsborough, NH
- Curtis Well Pump Station Modifications, Milford, NH
- WTP Hydraulic Evaluation, Essex, MA
- Clearwell Improvements, Rochester, NH
- Willow Drive Pump Station Modifications , South Berwick, ME
- Primary Disinfection Tank Upgrade, Wolfeboro, NH
- Water Treatment Facilities Master Plan, Dover, NH
- Cocheco Well Water Treatment Facility, Rochester, NH
- Reach Road UV Disinfection Upgrade, Presque Isle, ME
- French Cross Road Water Treatment Facility, Dover, NH
- New Primary Disinfection Tank, Wolfeboro, NH
- Corrosion Control Plan, Presque Isle, ME
- Corrosion Control Plan, Newport, ME
- WTP Instrumentation and Mechanical Upgrade, Hillsborough, NH
- Central Water Treatment Facility, Rye, NH
- Water Intake Location Study, Wolfeboro, NH

Pump Stations

- Goulds Pond Well Field Station Generator Installation, Orleans, MA
- Well Rehabilitation and Cleaning, Dover, NH
- Carvel Meter Pit Upgrade, Watertown, CT
- Richardson Street Pump Station Improvements, Rochester, NH
- Silver Hill Pump Station Replacement, Haverhill, MA

JACQUELINE A. COBB, PE
Project Engineer

PROJECT ASSIGNMENT: Modeling Engineer

Education
B.S., Civil Engineering, University of Maine

Professional Registration
Maine

Experience
5 years

Joined Firm
2010

Professional Affiliations
American Water Works Association

New England Water Works Association

Professional Development
10 Hour OSHA Construction Site Safety Training

Publications
Undergraduate Thesis
"Arsenic Removal from Water Pollutant Fate and Transfer"
Spring 2011

"Groundwater Hydrology"
Spring 2010

EXPERIENCE SUMMARY

Ms. Cobb is a project engineer in the firm's water practice group. Her responsibilities include the support of project engineers and managers with the design of water treatment processes and facilities, pump stations, water supply wells, water storage facilities, and water main infrastructure. Her experience includes hydraulic modeling, engineering report preparation, master planning, environmental permit preparation, construction administration and construction inspection for various water works projects. She has experience with engineering computer applications such as AutoCAD, WaterGEMS and ArcMap. Prior to joining Wright-Pierce, was in the University of Maine Honor Program. Her honors thesis and related laboratory work focused on arsenic removal from drinking water.

RELEVANT PROJECT EXPERIENCE

Water

- Water System Development, Poland, ME
- Water Demand Projections, Walpole, MA
- Water System Master Plan Update and Consolidation Study, Boothbay Region, ME
- Water System Mapping and GIS, Southport ME
- Emergency Response Plan, Bath, ME

Water Mains

- Pre-stressed Concrete Water Storage Tank, Augusta, ME
- Gerald and Beacon Streets Water Main Replacement, Bath, ME
- North Street Water Main Replacement, Bath, ME
- Water Main River Crossing, York, ME
- Water and Sewer Main Replacements, Portsmouth, NH
- Water System Development, New Gloucester, ME
- Water Main Looping Projects, Boothbay, ME
- Water Treatment Facility Intake, Woolwich, ME
- Water Main Upgrade, Woolwich, ME
- Water Main Replacement, Jay, ME
- Route 4 Water Main Replacement, Jay & Livermore Falls, ME
- Water Main Cleaning and Cement Lining, Yarmouth, ME
- Raw Water Main, Bellingham, MA
- Water Main Replacement, Fitchburg, MA
- Water Main Replacement, Acton, MA

Water Treatment

- Water Facilities Plan, Dover, NH

Water Storage / Tanks

- Pre-stressed Concrete Water Storage Tank, Gardiner, ME
- Water Storage Planning Study, Madawaska ME
- Exterior Tank Painting, Boothbay, ME

Wastewater Collection

- Sewer Installation Inspection, Topsham, ME
- Water and Sewer System, Bow, NH
- Drainage System Mapping and GIS, Rye, NH

LINWOOD A. BAILEY
Water Technology and Design Specialist

PROJECT ASSIGNMENT: GIS / Mapping Development

Education
Mechanical Engineering Technology, University of Maine

Experience
27 Years

Joined Firm
1988

Professional Affiliations
Maine GIS Users Group

EXPERIENCE SUMMARY

Mr. Bailey has been with Wright-Pierce for over 27 years, where he has served in a number of roles in both the office and the field, as a drafter, laboratory technician, designer, field data collection roles and survey and field construction inspector. His primary responsibilities currently are CAD systems coordinator, and senior engineering technician with the Water Practice Group. He is responsible for preparing plans and drawings for various water projects; from water treatment plants and pump stations, to distribution and storage facilities.

Mr. Bailey has developed a number of GIS mapping solutions for several water systems. He has served a lead role in the development of custom programming applications for AutoCAD and GIS applications.

In addition to serving the Water Practice Group, Mr. Bailey also performs similar services for the environmental division taking a lead coordination role developing plans for wastewater treatment plants and wastewater collection systems. His primary responsibilities as CAD systems coordinator are implementing CAD upgrades and improvements through programming, training and maintaining standards. He has received training on the use of, Autodesk's AutoCAD, AutoCAD Map, Land Development Desktop, Civil 3D, AutoCAD MEP, ESRI GIS software, GPS mapping equipment, and Intellution SCADA software.

RELEVANT PROJECT EXPERIENCE

Water System Mapping and GIS

- Yarmouth Water District, Yarmouth, ME
- Kittery, ME
- Aqua Maine, Camden, Rockport, Rockland, Thomaston and others
- Lake Arrowhead Community, ME
- Boothbay Region Water District, ME
- Belfast, ME
- Damariscotta, ME (GSB)
- Kennebec Water District, Waterville, ME
- Kennebunk, Kennebunkport & Wells Water District, Kennebunk, ME
- Kingfield, ME
- Lebanon, NH
- Lisbon, ME
- Madawaska, ME
- Rochester, NH
- Rye, NH
- Southport, ME
- Wolfeboro, NH
- Waldoboro, ME
- Winthrop, ME
- Rye Water District, Rye, NH

Environmental Assessment GIS Studies

- Auburn Water District, ME - Watershed Study
- Harpswell, ME - Water and Wastewater Study
- Islesboro, ME - Groundwater Protection Study
- Route 1, ME - Corridor Study

Bathymetric GPS Survey

- Bath, ME
- Belfast, ME
- Exeter, NH
- Rochester, NH
- Boothbay Harbor, ME
- Wolfeboro, NH
- Hanover, NH

Water Distribution System Improvements

- South Berwick, ME
- Caribou, ME
- Boothbay Harbor, ME
- Dixfield, ME
- Eastport, ME
- Farmington, NH
- Jackson, NH
- Kennebunk, Kennebunkport & Wells Water District, Kennebunk, ME
- Kingfield, ME
- Pittsfield, ME
- Poland Spring Bottling Company, Poland, ME
- Presque Isle, ME
- Rangeley, ME
- Rochester, NH
- Rye, NH
- Tenants Harbor, ME
- Wolfeboro, NH
- York, ME

Water Treatment Plant Designs/Upgrades

- Portland Water District, ME
- Brunswick & Topsham, ME
- Boothbay Harbor, ME
- Concord, NH
- Hadley, MA
- Hanover, NH

Section 3

WRIGHT-PIERCE
Engineering a Better Environment

BACKGROUND

The Town of Falmouth has requested proposals from engineering firms to develop a water system analysis of the public water system in Falmouth. The initial impetus for this project was a request by citizens in the Middle Road area in conjunction with proposed road reconstruction work in the area scheduled for 2016-2017. Middle Road is located in one of the designated residential growth areas in the 2013 Falmouth Comprehensive Plan. The Town of Cumberland is planning to extend public water to the town line on Middle Road in the near future. The expanded RFP work will focus on extending service to presently unserved portions of this area as well as other designated residential and commercial growth areas in Falmouth identified in the plan (discussed below).

The water system assets in Falmouth are owned and operated by the Portland Water District (PWD). The PWD completed a comprehensive water system strategic plan (CWSSP) in 2003, which has guided decision-making, planning and capital improvements at the district and within each of its service communities. The plan included community-specific master plans for each service community in the PWD service area, including one for the Town of Falmouth. As part of the CWSSP development, a hydraulic model of the water distribution system was developed to simulate and predict behavior of the distribution system. Wright-Pierce has obtained the hydraulic model from the PWD and has worked with this valuable tool on other projects. The model will be used for the Falmouth evaluation to predict proper pipe sizes and to predict available fire flows, pressures and water age. Understanding and using this model to create credible outcomes supported by the PWD will be critical to garnering their support for growth of the public water system. We are well-positioned from our prior work with the PWD to deliver credibility with them.

The end result of the study will be an integrated infrastructure plan that guides utility investment in Falmouth.

In 2013, the Town of Falmouth adopted a new comprehensive plan which guided planning objectives in the community, as well as identifying specific, bounded residential and commercial development areas.

The goal and objective of the study is to develop comprehensive strategy to invest in municipal infrastructure that is strategic and proactive within this development zones. The plan will establish priority water needs in the community and incorporate these needs with road and sewer needs. A similar study of the sewer collection system is ongoing and nearing completion. The end result will be an integrated infrastructure plan that guides utility investment in Falmouth.

IMPORTANT DOCUMENTS

Wright-Pierce has read the entire CWSSP and has worked with various aspects of the plan over the years. In addition, we have reviewed the Water System Master Plan for the Town

of Falmouth, appended to this study report (Volume 4.3). More recently, the PWD has identified several planning projects in Falmouth, some of which will be funded by the PWD:

- Connection to Route 100 in Cumberland
- Connection with Harris Road in Cumberland
- Middle Road
- Woodville Road Extension
- Bowdoin-Alpine Drive Connection (Not to be Funded by PWD)

In addition to this document, the PWD has specific guidelines that determine how the distribution system will be expanded, what desired design standards must be met, and other policies and procedures that must be well understood. It will be important to create an outcome that not only meets the Town's development and service objectives, but reflects PWD's design and construction standards, so they will be willing to accept ownership of the assets.

The 2013 Falmouth Comprehensive Plan adopted the following guided principles:

- Increasing the share of new residential growth into new designated growth areas
- Increasing the availability of water and sewer in growth areas
- Allocating much of the new infrastructure investment in the designated growth areas

The 2013 comprehensive plan identified the need to gather technical information related to expansion of the water system in these designated growth areas. Wright-Pierce is familiar with the Falmouth GIS system, from which mapping was developed for the 2013 Comprehensive Plan and for the ongoing sewer collection system evaluation. It is our intent to use the same Wright-Pierce GIS team, who is familiar with the Falmouth mapping.

Regulatory Drivers and Constraints

Expansion of the Portland Water District distribution piping in Falmouth is regulated by the Maine Public Utilities Commission (MPUC). Chapter 65 of the MPUC regulations establish rules and regulations, for extension of water mains to unserved areas. The essence of this regulation is that main extensions are funded by the new users of the system served by a main extension. This principal assures that development entities or municipal partners fund expansion of the system, not current users who do not directly benefit from expansion of infrastructure.

Expansion is regulated by the MPUC, with established rules and regulations for extension of water mains to unserved areas.

The Town of Falmouth wishes to work hand in hand with the PWD to guide how water service can be extended in Falmouth to unserved areas to meet

local planning and growth objectives in Town. In addition to the MPUC regulations, the PWD has well-developed regulations that guide selection of pipe materials, construction methods and protocols for inspection and funding main extensions. A discussion of these issues will be a topic for the initial kick-off meeting.

STAKEHOLDERS AND STUDY PARTICIPANTS

The study will be guided by several municipal stakeholders in the Town of Falmouth including the fire chief, Long-Range Planning Advisory Committee (LPAC), Community Development Committee (CDC), town director of Long Range Planning, town council, town manager and the Portland Water District. The residents and business community within the designated growth areas are also critical stakeholders.

Determining adequate service to the designated commercial and residential growth areas will be an important focus of the study.

The PWD is supportive of partnering with the Town of Falmouth to determine the extent and location of future infrastructure in the town within specific target areas zoned for development. Designated (draft) commercial and residential growth areas have been identified in the 2013 comprehensive plan and subsequent planning efforts by Town staff and committees. These areas include the Middle Road-US Route 1 corridor, including the Pleasant Hill Road area, and the US Route 100 corridor north of the Maine Turnpike spur. Determining adequate service to these areas will be an important focus of the study.

Portland Water District will be an important partner for this study. All piping improvements and other recommendations need to meet the PWD design and performance standards regardless of how they are funded. The PWD will ultimately own any water mains placed in the Town of Falmouth, so each project must be analyzed and studied per the PWD standards. Selecting the size and capacity of water mains to serve developed areas requires several considerations:

Adequate Fire Protection – Water main sizes are primarily driven by required fire flows. We anticipate working closely with both the PWD and the Falmouth fire chief to determine requirements for public fire protection in each key development area. The structure type, size and spacing all impact the required or quantity of fire flow. We will review specific land-use and building requirements in each zone and recommend appropriate pipe sizes using the PWDs hydraulic model.

Water Quality – The PWD is very concerned about distribution system water quality. Large mains with little use can increase detention time in water systems and degrade water quality. Our work plan will include developing local demand projections within each development area to estimate detention time in the system. The PWD has a target of 200 hours of maximum detention time in the distribution system. Our work plan will include an estimate of detention time in the distribution system in areas of concern. We will use some of the data collected in our wastewater planning study to look at undeveloped land

and current occupied lots within each development zone to predict water usage and additional detention time if mains are extended. This analysis will look at near-term and build-out conditions for each area.

Looping and Redundancy – Creating new piping that provides value to the PWD for redundancy and looping may bring them to the table as funding partners. Our work plan will explore this aspect or any proposed piping extensions.

The District strives to maintain aesthetic water quality in the distribution system. High pipe velocities can re-suspend sediments in pipelines and produce colored water. Taste and odor can be produced in dead-ends or when water age increases from disinfectant residual decay.

Private Wells

Some private wells in Falmouth are reported to have high concentrations of arsenic, a contaminant of concern which is regulated and controlled in public water systems. The type of bedrock geology in parts of Falmouth suggests that arsenic is likely present in many wells. The State of Maine, through the Center for Disease Control (CDC), and the Maine Geological Survey have been engaged in a state-wide study to collect arsenic data from private wells to understand the breadth and prevalence of arsenic in private wells in Maine communities. Initial data and mapping collected from the State of Maine is shown in Appendix A of this proposal.

We have contacted both agencies and will collect whatever data is available and we will include the data in our report. We do not know, at this juncture, if the data includes geospatial location (GPS). If available, we will create a GIS map overlay and geocode wells by lot in the Falmouth GIS system.

Financing, Project Phasing and Cost Estimates

The Town has requested a financial plan to fund the project. Water main extensions can be phased in a logical, step-by-step manner to spread the financial commitment over a long time period. The Maine PUC has specific rules for establishing accounts and reimbursing the original funder of the main extension, as new customers are added to the main extension project. We will work with the Town and determine how this is best accomplished.

Traditional sources of municipal borrowing are available for main extensions, such as the Maine Municipal Bond Bank (MMBB). There are other creative ways for capital recovery such as real estate transfer taxes, tax-increment financing (TIF), and property betterment strategies. We do not envision an exhaustive financial analysis, but working with the Towns planning and financial staff to identify opportunities and

present a narrative of options with impacts to project costs. In addition, the Town may wish to explore partnering opportunities with the business community and other private-public partnerships to fund needed water infrastructure.

Wright-Pierce has an extensive database of completed water main projects. We can provide accurate cost estimates once a service plan is developed for each development zone.

Final Report

The final work product will be a water system planning report and capital planning report for expansion of the PWD water system in Falmouth.

Section 4

WRIGHT-PIERCE
Engineering a Better Environment

PROPOSED APPROACH

Wright-Pierce has begun to collect existing records and information from the Portland Water District (PWD). As discussed, we have obtained the hydraulic model from the PWD and have become familiar with the existing conditions within the PWD system in Falmouth. We will be well-prepared to have an informed, initial kick-off meeting with the stakeholder group and the PWD as described below.

Our project understanding describes the key issues to make this project a success. Our implementation plan will include the following steps:

1. **Step 1 - Collect Existing Information and Clarify Roles and Responsibilities** – The primary objective of this first step is to develop a clear understanding of PWD's requirements. The Town of Falmouth will drive where the infrastructure goes and what the needs of the system are to support development in the community but PWD will be the ultimate arbiter on how the expansion of water is designed and constructed.

2. **Step 2 – Analysis and Initial Results** – Analysis of the system will follow after technical requirements are defined. We propose an interim meeting to present findings before the draft report is generated so that the basic outcomes, mapping and service area plans meet the stakeholder group's requirements.

3. **Step 3 – Finalize the Report and Present Findings** – Once the report is complete, we anticipate presenting this findings to the public and town council for final adoption of the recommendations.

The specific tasks to meet these objectives are described below.

PROPOSED WORK PLAN

1. Collection of Existing Records and Information

   a. Meet with the PWD and stakeholder group (The team defined by the Town) and discuss project approach. Clarify how interaction and review of recommendations will occur and how consensus will be reached on the capital plan for the water system in Falmouth.

   b. Identify changes to the distribution system not incorporated into the working water distribution system model. Collect current PWD water distribution system mapping and piping information not incorporated into the model (pipe age, roughness, etc.) Add these improvements to the model before conducting modeling simulations.

c. Review proposed capital improvements in the system by both the PWD and the Town, including proposed system improvements planned locally in Falmouth.

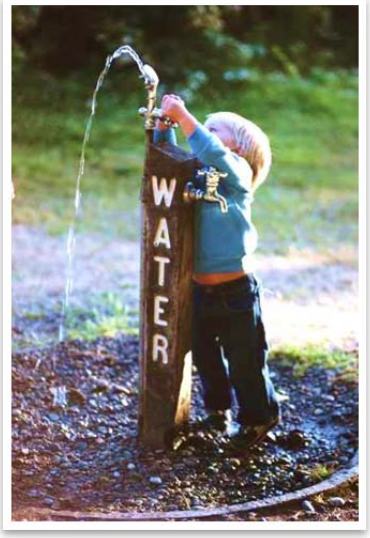
d. Discuss the proposed methodology for assessing water demand and age in Falmouth, related to development of service plans for the designated commercial and residential growth areas within Falmouth.

e. Review proposed methodology for calculating main size in Falmouth with PWD and review the PWD goals for extension, looping, and redundancy in their water system, if service is extended within the designated growth areas. Understand and mesh local planning objectives in Falmouth with PWD's broader objectives to grow and manage the water system in Falmouth.

2. Expansion of Water in Unserved Areas of Designated Growth Zones

a. As necessary, update the existing GIS mapping layers in Falmouth using information started by Wright-Pierce for the wastewater master plan. Confirm geographic boundary of designated growth areas including all properties. Collect any local information that may exist at the town level regarding private well water complaints (quality or quantity); salt water intrusion or road salt contamination; and any other relevant information.

b. Collect private well data on arsenic from the Maine CDC and Maine Geological Survey from an ongoing state-wide study. If this data exists geospatially, than create a map overlay for the report showing well contamination within the growth areas. If available as a data file, add a narrative on this information in the final report.



c. The Maine Drinking Water Program maintains a state database of information provided by private well drillers. We will collect any relevant information from this database and incorporate this information into the report.

d. Identify any non-community or transient public water systems within the designated growth areas that may allow for consolidation of public water systems. These opportunities qualify for a unique grant program managed by the DHHS.

e. Building on prior work completed by Wright-Pierce, re-confirm properties within the designated growth area which are not available for development from either property constraints (steep topography, wetlands) or conservation land, including any recently added parcels. This information will be gleaned from discussions with Town staff and GIS mapping overlays. These excluded develop areas will be factored into the service area planning discussed below in Task 2h.

f. Meet with the Falmouth Fire Chief and determine fire flow requirements in the designated growth areas. Review this information with the PWD and reach a consensus on approach to sizing water mains within the develop zones.

g. Using the hydraulic model, develop conceptual water service plans using existing and proposed piping within the designated commercial and residential growth areas. Service plans will consider main size, fire protection requirements, looping and redundancy and estimated initial and build-out demands in the area. Water age estimates will be made based upon local demands. An extensive water-age model in the PWD system is not envisioned. Determine if adequate service pressures and flow can be achieved without elevating pressure with booster pumping stations.

h. Using the hydraulic model, determine if required service plan and fire flows, trigger improvements within the current PWD distribution system.

i. Develop a list of proposed water mains, locations and mapping overlay, and a phasing plan to extend the water system within the designated growth areas. Mapping will show proposed sewer planning in each area so that projects can be in scheduled in sync and coordinated with other development or road reconstruction (Local or MDOT). We propose to meet at this juncture to review our progress before beginning the report.

3. Develop Capital Improvement Plan for Recommended Service Area Improvements

a. Prepare capital cost estimates for each recommended water main project in the designated service area.

b. Develop a phased implementation plan based on priority, to be established jointly between the Town and PWD. Implementation schedule will consider planned development projects, municipal goals or timing with other sewer or road projects.

c. Review draft plan with the PWD and determine if improvements qualify as MPUC regulated main extensions or improvements to the PWD system for redundancy, looping or existing infrastructure renewal.

4. Develop a Financing Plan for the Improvements

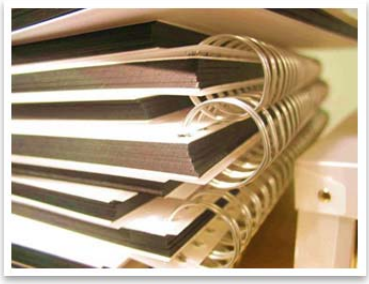
a. Work with the town staff/committee to screen possible funding approaches including the following items:

i. Use of escrow accounts for all main projects subject to MPUC regulation for reimbursement to the Town (If the Town funds initial main extensions).

ii. Other approaches to fund improvements such as TIFs, betterments or other methods.

b. Develop a strategy document that can form the basis for a later municipal policy or ordinance to guide funding/reimbursement for all future water infrastructure in the growth areas.

c. Outline policies and procedures required by the PWD to accept water mains or other infrastructure if funded or constructed in Falmouth by other parties. PWD has well developed policies and procedures in this regard which would be to be folded into local Falmouth policies.



5. Final Report Deliverables

a. Prepare 3 paper copies of the draft final report (90% complete) plus one PDF scan of the entire draft document and submit to the Town for committee review.

b. All report fold-out mapping will be prepared using the Town's GIS layering in Arcview or AutoCAD format for incorporation into the Town's GIS system.

c. Present findings of the evaluation to the stakeholder group/committee and solicit comments and feedback on the document.

d. Incorporate comments into report and issue 3 paper copies and one annotated PDF scan copy of the final report.

6. Public Presentations and Meetings

a. Our work plan includes three meetings as follows:

i. An initial kick-off meeting and workshop to collect records and to engage the PWD and other stakeholders in the process.

ii. One additional interim meeting as discussed.

iii. A final review meeting of the draft report.

iv. We understand that an additional public meeting may be required to present the findings to the public and community leaders. This is not included in the current work plan. We would be happy to add this task in if a meeting is requested. Because we are local and anticipate this to be a night meeting, this additional meeting should not be costly.

SCHEDULE

Wright-Pierce is prepared to meet the schedule milestones proposed in the RFP. The project will be managed by Principal and Drinking Water Practice Group Leader, Jeff Musich, PE. Jeff oversees all of the staff identified for this project and general workload planning for the company. On this basis, we propose the following key schedule milestones for the project.

Task/Deliverable	Date
Submission of Proposals	January 19, 2016
Anticipated Selection of Consultant	February 8, 2016
Initial Kick-off Meeting and Workshop	Early March 2016
Data Collection, Modeling, Analysis	March-April 2016
Interim Meeting to Present Initial Findings	Late April 2016
Submission of Final Draft Report	Mid-May 2016
Final Report Review Meeting	Early June 2016
Incorporate Comments and Issue Final Report	Late June 2016

Section 5

WRIGHT-PIERCE
Engineering a Better Environment

PROPOSED FEE

Wright-Pierce is a strong believer in the selection of engineers on the basis of qualifications, with an equitable fee negotiated between the selected firm and the client, based on a mutually established detailed scope of work. Your primary concern should be that the firm you select is fully qualified, with recent experience in planning and design to address issues similar to yours. You should also be confident that the staff to be assigned to your project is experienced and competent, and that the firm has quality control procedures and qualified senior staff to adequately advise the project team and review their work.

For the proposed scope of services, broken down by the tasks discussed in our project approach section, we propose a not-to-exceed overall project fee of **$23,000**. As requested, a listing of hourly rates is provided on the following page.

Our experience enables us to balance your needs for safety, durability and economy.

We feel that our fee reflects a good understanding of the needs of the Portland Water District. We have provided a work plan and fee that we believe reflects the level of effort required to build a consensus with the town and district. We have also based our fee on leveraging our existing knowledge of the system and the data we have collected from our ongoing wastewater study. Our use of a senior company leader as project manager will actually provide the best and most cost-efficient labor/hours for the project, because he is the person best-suited to garner support from the Portland Water District; to understand the depth of technical issues at hand; and, to guide the project to completion with the most effective use of time.

We are flexible and willing to reconsider any aspect of our proposal if we can provide a more tailored level of service.

HOURLY RATES FOR PROJECT STAFF

ACCOUNTING / BILLING CLASSIFICATION	AVERAGE HOURLY BILLING RATES
Project Manager	$175
Wastewater Plan Coordinator	$160
Hydraulic Modeling Engineer Leader	$110
Modeling Engineer	$ 85
GIS Specialist	$ 105
CADD Technician	$ 95
Administrative Assistant	$ 58

The listed rates are current as of January 2016. Actual billing rates are based on the actual salary costs of individuals assigned to the project.

Section 6

WRIGHT-PIERCE
Engineering a Better Environment

The following references are existing clients who are familiar with Wright-Pierce. They will be able to share candid opinions regarding the quality of service that has been provided by Wright-Pierce on past or ongoing projects for projects similar to yours. Please contact them and specifically ask about our:

- Adherence to scope, project schedule, and budgets
- Technical knowledge and attention to detail
- Ability to work with committees, and stakeholders

Client	Contact
Bath Water District 	Trevor Hunt, PE Superintendent 1 Lambard Street Bath, ME 04530 (207) 443-2391 *thunt@bathwd.org*
Yarmouth Water District 	Robert MacKinnon, Jr. Superintendent 118 East Elm Street - PO Box 419 Yarmouth, ME 04096-0419 (207) 846-5821 *ywdbob@maine.rr.com*
Kittery Water District 	Mike Rogers Superintendent 17 State Road Kittery, ME 03904 (207) 439-8549 *MikeRKWD@comcast.net*

Client	Contact
Gardiner Water District 	Paul Gray Superintendent 246 Water Street PO Box 536 Gardiner, ME 04345-0526 (207) 582-5500 *paul.gray@roadrunner.com*
South Berwick Water District 	John Leach Superintendent 80 Berwick Road South Berwick, ME 04096 (207) 384-2257 *jslsbwd@aol.com*
Greater Augusta Utilities District 	Andy Begin, PE Assistant General Manager 12 Williams Street Augusta, ME 04333 (207) 622-3701 *abegin@augustawater.org*

Appendix A

WRIGHT-PIERCE
Engineering a Better Environment

PAUL R. LEPAGE
GOVERNOR

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0093
www.maine.gov/dacf/

WALTER E. WHITCOMB
COMMISSIONER

1/11/2016

Naleen Mayberry
99 Main Street
Topsham, Maine 04086

Naleen,

Enclosed is the information you requested on bedrock wells in the vicinity of Town of Falmouth, Maine. A brief explanation: We have provided you with well information only on wells close to your project area.

The attached map shows bedrock wells in our database that we have **located**, either through GPS coordinates provided by the well driller, a visit to town offices to match our well ownership information with property tax records or using E911addresses. There is a total of 280 wells in the area you indicated in your letter. The enclosed table lists the well depth, casing length, yield, etc. for these wells.

Maine Geological Survey - Well Database - 01/11/2016

	Last Name	Location	Type	Drill date	Depth	Casing	Yield	Ovrbrdn	Map	Lot
7349	ROY	FALMOUTH	BEDR	02/06/1986	220	20	3	10	U36	10
7465	RAINSFORD	FALMOUTH	BEDR	06/11/1986	140	20	35	2	U36	9
7463	HARRIS	FALMOUTH	BEDR	06/11/1986	120	20	25	10	U36	11
9328	FOSTER	FALMOUTH	BEDR	01/18/1989	260	32	20	10	U36	12
8595	HANSEN	FALMOUTH	BEDR	06/13/1988	277	22	1	8	U36	32
8274	NORTON	FALMOUTH	BEDR	11/11/1987	200	50	3	46	R08	61
9560	HAMILTON, JR.	FALMOUTH	BEDR	07/28/1989	340	112	15	100	R08	62
8033	ALLEN	FALMOUTH	BEDR	10/18/1987	120	62	10	57	R08	61E
7721	CHELLIS	FALMOUTH	BEDR	08/14/1986	220	60	3	55	R08	55A
63185		FALMOUTH	BEDR	01/01/1994	320	40	25	30	R8	85
9562	MARSTON	FALMOUTH	BEDR	09/11/1989	560	32			R06	87B
9154	TITCOMB	FALMOUTH	BEDR	10/31/1988	360	20	1	10	R08	36D
8593	POULIN	FALMOUTH	BEDR	06/10/1988	308	31	10	14	R08	36C
5787	MCLEAN	FALMOUTH	BEDR	01/01/1971	722	18	0	18	R08	36B
55137	WEILAND	FALMOUTH	BEDR	08/05/1991	300	25	0	13	R-8	35-1
6548	SAWYER	FALMOUTH	BEDR	01/01/1973	325	10			R08	44
10081	SAWYER	FALMOUTH	BEDR	07/18/1990	580	20	10	2	R08	44
66315	FOLEY	FALMOUTH	BEDR	07/17/1995	322	20	2	4	R-08	35-2
9968	PIKE	FALMOUTH	BEDR	03/30/1990	502	40	1	31	R08	46-C1
66322	PICKRELL	FALMOUTH	BEDR	09/05/1995	142	21	8		R8	27L
66321	PICKRELL	PORTLAND	BEDR	02/28/1995	502	25	5	17	R8	27K
5765	BOIS	FALMOUTH	BEDR	01/01/1965	534		0	29	R08	19
55106	FITZGERALD	FALMOUTH	BEDR	06/19/1991	630	60	30	55	R-06	84
55107	FITZGERALD	FALMOUTH	BEDR	06/20/1991	460	55	0	54	R-06	84
65155	VANDERMAST	FALMOUTH	BEDR	08/08/1994	280	20	1	10	R6	56
10205	LEGGE	FALMOUTH	BEDR	07/31/1990	690	21	30	5	R06	57B
9729	CYR	FALMOUTH	BEDR	09/30/1989	760	17	0	6	R06	45G
68179	JORDAN	FALMOUTH	BEDR	07/20/1994	500	20	1	15	R6	58C
5766	BRADFORD	FALMOUTH	BEDR	01/01/1965	210		8	15	R09	35A
58168	CHAGNON/SANDBERG	FALMOUTH	BEDR	09/22/1994	300	20	1	5	R6	46C
56084	PERRY	FALMOUTH	BEDR	08/10/1994	305	20	10	13	U66	6
62838	HAWKES	FALMOUTH	BEDR	04/15/1995	162	20	5	2	R-9	39-B
10041	HILFRANK	FALMOUTH	BEDR		500	21			R09	42 & 42A
55817	LEAVITT	FALMOUTH	BEDR	08/22/1991	202	46	15	39	R-9	43D
62156	HEWARD	FALMOUTH	BEDR	05/04/1994	320	20	1	14	HL6	3
8273	MIELE	FALMOUTH	BEDR	12/10/1987	360	40	30	32	R09	22
7971	MIELE	FALMOUTH	BEDR	06/25/1987	620	47	50	40	R09	22
5047	PYLE	FALMOUTH	BEDR	01/01/1965	116	9	6		R06	16A
5764	BASCOM	FALMOUTH	BEDR	01/01/1965	409	54	12	19	R09	4
60011	IRELAND	FALMOUTH	BEDR	02/15/1993	305	20	20	10	R6	34
9561	POIRIER	FALMOUTH	BEDR	08/15/1989	260	42	2	40	R09	9
5789	TERISON	FALMOUTH	BEDR	01/01/1971	248			4	R03	84A
56054	NASH	FALMOUTH	BEDR	08/10/1994	265	20	20	14	HL3	3
9234	COOPER	FALMOUTH	BEDR	11/08/1988	600	54	0	58	R07	20
6546	PUCKETT	FALMOUTH	BEDR	01/01/1976	110	25	25	19	HL5	7
52499	BONNVIE	FALMOUTH	BEDR	04/07/1992	500	20	1	5	R3	60
7445	VINCENT	FALMOUTH	BEDR	07/12/1986	300	15	2	10	R07	38D
56471	WINSLOW	FALMOUTH	BEDR	07/05/1992	720	73	50		R6	33A
5773	REMINGTON	FALMOUTH	BEDR	01/01/1968	158		40	20	HL5	1
60922	SCHWARTZ	FALMOUTH	BEDR	08/25/1993	420	20	6	5	R3	29
8863	THOMPSON	FALMOUTH	BEDR	06/03/1988	205	20	2	5	R7	37-16
56494	NANOS	FALMOUTH	BEDR	08/17/1992	140	20	10	13	HL7	8
54597	WARD	FALMOUTH	BEDR	10/10/1991	560	21	5	6	HL7	1

MAINE GEOLOGICAL SURVEY
ROBERT G. MARVINNEY, DIRECTOR AND STATE GEOLOGIST
17 ELKINS LANE, WILLIAMS PAVILION

www.maine.gov/dacf/mgs/
PHONE: 207-287-2801
FAX: 207-287-2353

5763	PARKER	FALMOUTH	BEDR	08/01/1968	137	11	3	3	R07	131
5788	PREBLE	FALMOUTH	BEDR	01/01/1971	68		20	1	R07	14
9335	MACMASTER	FALMOUTH	BEDR	12/27/1988	400	20	8	3	R03	54E
56442	LIGHT	FALMOUTH	BEDR	04/16/1992	200	20	35	3	R3	54
9507	BARTER	FALMOUTH	BEDR	08/24/1989	500	22	0	5	R09	54A
56218	JELLISON/PETROSKI	FALMOUTH	GRAV	12/11/1991	97	92	20	97	R3	76B
55140	DESIEYES/WARD	FALMOUTH	BEDR	08/07/1991	240	20	30	5	R-3	31
58737	POIRIER	FALMOUTH	BEDR	09/22/1992	222	27	20	8	R-1	42
7722	LAMB	FALMOUTH	BEDR	12/31/1986	300	80	4	70	R03	74B
8815	LAMB	FALMOUTH	BEDR	07/01/1988	185	99	4	95	R03	74B
5046	JACKSON	FALMOUTH	BEDR	01/01/1971	176				R07	28A
52291	MORSE	FALMOUTH	BEDR	12/03/1990	300	20	60	10	R07	4B
51437	MILLICK, III	FALMOUTH	BEDR	12/24/1990	405	20	0	9	R03	63-4
58291	DIGHELLO	FALMOUTH	BEDR	05/05/1993	200	20	4	13	R3	63-1
60946	PARKER	FALMOUTH	BEDR	09/22/1993	120	20	15	2	R3	36
9506	BROWN	FALMOUTH	BEDR	07/21/1989	500	65	0	50	R07	105E
8446	WITKOWSKI	FALMOUTH	BEDR	01/28/1988	180	47	15	40	R07	105D
56449	JOSEPHS	FALMOUTH	BEDR	04/28/1992	200	20	3	1	R3	36A
59189	SULLIVAN	FALMOUTH	BEDR	11/29/1993	440	20	0	10	R7	105-B4
8679	RISBARA	FALMOUTH	BEDR	06/22/1988	500	20		10	R07	105G
7254	BLANCHARD	FALMOUTH	BEDR	10/23/1985	360	31	25	20	R07	105B
8272	BLANCHARD	FALMOUTH	BEDR	12/11/1987	360	32	30	20	R07	105B
68162	MELANSON	FALMOUTH	BEDR	01/13/1994	280	50	20	45	R7	105-B1
7792	GAUDREAU	FALMOUTH	BEDR	06/15/1987	100	14	30		R07	98B
10246	GAUDREAU	FALMOUTH	BEDR	12/31/1986	100	14	30	3	R07	98B
9159	CRAWFORD	FALMOUTH	BEDR	12/05/1988	240	40	2	35	R07	96A
5791	KASERMAN	FALMOUTH	BEDR	01/01/1972	308		0		R07	113C
8271	HIGGINS	FALMOUTH	BEDR	11/15/1987	540	20	1	10	U21	1C
7013	GILBERT	FALMOUTH	BEDR	07/23/1985	220	21	8	20	R07	98A
5785	CRAWFORD	FALMOUTH	BEDR	01/01/1971	146		4	19	R07	97
69575	GORDON	FALMOUTH	BEDR	10/09/1995	280	40	4	35	R7	80A
5043	CREIGHTON	FALMOUTH	BEDR	01/01/1969	167	16	4		R07	89A
9866	ASCANIO	FALMOUTH	BEDR	12/11/1989	440	21	2	8	R07	87A
5767	ELLIS	FALMOUTH	BEDR	01/01/1966	275		100	47	U53	2
68187	NAVIA	FALMOUTH	BEDR	08/09/1994	420	20	3	15	R5	24B
5049	WEBB	FALMOUTH	BEDR	12/01/1961	325	7	2		U30	7
60932	PERRY/SHAW	FALMOUTH	BEDR	09/10/1993	300	20	1	3	R4	82D
52277	PERRY	FALMOUTH	BEDR	11/01/1990	240	27	2	3	R04	82D
7025	PERRY	FALMOUTH	BEDR	06/24/1985	400	12	3	8	R04	82D
64376	GRIMSHAW/SGAMBOTI	FALMOUTH	BEDR	06/27/1994	142	20	5	7	R4	37-1
63167	PERRY	FALMOUTH	BEDR	05/16/1994	180	40	6	30	U4	17
65586	NEUTS	FALMOUTH	BEDR	04/03/1995	185	20	15	6	R4	43B
65461	WELCH	FALMOUTH	BEDR	09/21/1994	145	20	8	8	R4	62-2
77919	THOMPSON	FALMOUTH	BEDR	10/15/1996	200	50	6	40	U66	34
77918	THOMPSON	FALMOUTH	BEDR	10/13/1996	200	50	40	50	U66	35
77971	HARRIMAN	FALMOUTH	BEDR	11/15/1997	300	63	4	50	R-3	76-A
80984	PATTERSON	FALMOUTH	BEDR	03/17/1998	250	67	20	63	R03	77
90085	DYHRBERG	FALMOUTH	BEDR	03/10/2000	320	45	3	40	R03	22
69562	BERLEW	FALMOUTH	BEDR	09/07/1995	660	20	1	15	R6	61
87117	RODGERS	FALMOUTH	BEDR	11/14/1998	603	20	7	3	R6	45L
66388	WAIKENFORO	FALMOUTH	BEDR	07/25/1997	530	30	50	4	R06	58
75424	MACMASTER	FALMOUTH	BEDR	07/29/1996	400	20	20	3	R-6	37-B
75083	CUNNINGHAM	FALMOUTH	BEDR	03/20/1998	485	20	15	3	R6	37-G
78888	LAX	FALMOUTH	BEDR	08/25/1997	405	40	2	23	HL4	19
74239	REED	FALMOUTH	BEDR	05/27/1996	520	20	1	15	R9	12A
78141	ARNOLDO	FALMOUTH	BEDR	05/08/1997	204	62	11	5	R09	043-A
75455	GAUDET	FALMOUTH	BEDR	09/20/1996	500	20	20	14	R-9	7
90013	PICKEL	FALMOUTH	BEDR	09/09/1999	420	60	2	56	R08	10
66365	DURST	FALMOUTH	BEDR	08/10/1996	120	20	100	4	R-08	35-5
88250	LATINI	FALMOUTH	BEDR	11/08/1999	140	20	10	5	R08	046-004
81596	PARKER	FALMOUTH	BEDR	04/15/1998	400	20	3	4	R-8	56
78814	TAIT	FALMOUTH	BEDR	05/01/1997	505	45	4	12	R8	68-2
80935	FINCH	FALMOUTH	BEDR	10/21/1997	140	20	20	15	R8	74
88251	WAITE	FALMOUTH	BEDR	11/10/1999	400	40	5	25	R8	65-A
82521	SPEED	FALMOUTH	BEDR	06/09/1998	100	25	10	20	HL6	14
80906	BRADFORD	FALMOUTH	BEDR	08/21/1997	500	46	2	41	R7	123-A
83926	SANBORN	FALMOUTH	BEDR	06/15/1998	125	20	12	2	U57	35
87067	ILLUMINATI	FALMOUTH	BEDR	06/23/1999	600	20	12	6	R05	24
77945	NAVIA	FALMOUTH	BEDR	07/26/1997	310	20	12	8	R5	24-B
77908	CHAMBERLAIN	FALMOUTH	BEDR	07/18/1996	210	20	20	10	R5	3-B
75446	WAGNER, LOCKHART	FALMOUTH	BEDR	09/02/1996	300	20	3	13	U32	49C
85786	BUCCI	FALMOUTH	BEDR	05/24/1999	320	20	8	15	R3	38A
88482	STANLEY	FALMOUTH	BEDR	11/12/1999	200	20	6	15	R-3	29-A
95100	COOK	FALMOUTH	BEDR	07/20/2000	130	35	12	4	HL1	1A
81930	LABRUZZO	FALMOUTH	BEDR	04/16/1998	525				R7	37-8
93963	LIBBY	FALMOUTH	BEDR	07/06/2000	160	20	20	5	R07	52
93933	STRASENBURGH	FALMOUTH	BEDR	05/08/2000	400	60	3	45	U44	2
93935	SEARLE	FALMOUTH	BEDR	05/15/2000	220	20	10	5	R05	024-F
79545	GRIFFIN	FALMOUTH	BEDR	04/13/2000	290	21	10	10	R04	78
94048	UNNOLD	FALMOUTH	BEDR	08/04/2000	400	20	2	6	R3	36A
131366	THERRIAULT	FALMOUTH	BEDR	11/15/2006	605	20	4	2		
145273	DESIEYES	FALMOUTH	BEDR	06/24/2010	340	25	3	14		
144945	EVERS	FALMOUTH	BEDR	01/20/2010	905	20		5	R08	027-B
142764	COOK	FALMOUTH	BEDR	05/21/2010	475		20			
140086	KIRSH	FALMOUTH	BEDR	10/30/2008	540	80	15	68		
140082		FALMOUTH	BEDR	10/21/2008	380	35	3	7		
140043	MORSE II	FALMOUTH	BEDR	07/24/2008	250	20	2	2	R07	004C
123030	DELOIS	FALMOUTH	BEDR	08/14/2006	464	25	6	10		
127576	BURNES	FALMOUTH	BEDR	10/05/2009	266	24	4	13		
117500	STILLINGS	FALMOUTH	BEDR	03/10/2005	480	40	6	30	R08	18
119911	TANNER	FALMOUTH	BEDR	08/19/2004	225	20	3	5	R3	63-12
119989	NOYES	FALMOUTH	BEDR	01/05/2005	880	20	10	5	R08	43
136842	HOTHAM	FALMOUTH	BEDR	12/14/2007	800	100	3	90		
142617	VERTEFEUILLE	FALMOUTH	BEDR	03/01/2009	420	29	4	13		
83963	BILL	FALMOUTH	BEDR	09/14/1998	220	20	12	12		

87003		FALMOUTH	BEDR	11/03/1998	500	67	3	60				
87005	FABARICO(?)	FALMOUTH	BEDR	11/19/1998	420		3					
87095	LIBBY	FALMOUTH	BEDR	08/09/1999	420	47	5	5				
91432		FALMOUTH	BEDR	09/20/2000	605	48	1	40				
91501	DEROSIER	FALMOUTH	BEDR	03/24/2000	420	40	15	29				
93055	WOOD	FALMOUTH	BEDR	02/08/2002	425	80	1		R 6	73		
95227		FALMOUTH	BEDR	10/02/2000	200	20	5	4				
95228		FALMOUTH	BEDR	10/04/2000	300	20	3	3				
95232	MCCANN	FALMOUTH	BEDR	01/29/2001	1020	20	1	6				
95269	ACETE	FALMOUTH	BEDR	07/10/2001	700	20	8	3				
95413	DRESSER	FALMOUTH	BEDR	05/22/2000	140	20	15	10	U67	7		
95456	COLASANTI	FALMOUTH	BEDR	11/07/2000	100	20	10	10				
95481	DOW	FALMOUTH	BEDR	01/02/2001	460	48	4	35	U44	1-3		
95732	PELIETIER	FALMOUTH	BEDR	10/11/2000	404	20	4	11	H 13	4		
95759		FALMOUTH	BEDR	03/25/2002	464	28	2	20				
97497	HILLFUANCK(?)	FALMOUTH	BEDR	09/21/2000	600	20	3	5				
97761	ALLEN	FALMOUTH	BEDR	04/17/2001	600	70		55				
100667	BRENNAN	FALMOUTH	BEDR	10/25/2001	104	21	20	5	R03-060	2		
100830	COBLEATZ	FALMOUTH	BEDR	08/24/2001	400	30	2	15				
101006	PERRY	FALMOUTH	BEDR	08/23/2001	1000	20	0	5				
101266	BISHOP	FALMOUTH	BEDR	10/20/2001	505	35	0	29	*	*		
101298	NELSON	FALMOUTH	BEDR	11/19/2001	505	35	0	29				
102608	WINSLOW	FALMOUTH	BEDR	12/29/2001	480	20	50	12	R6	32		
103023	SALVAGGIO	FALMOUTH	BEDR	01/22/2002	660	20	4	4				
103068	TOLFORD	FALMOUTH	BEDR	05/20/2002	420	20	1	4	U-19	57		
103327	NELSON	FALMOUTH	BEDR	06/12/2002	530	43	0	38	R07	90-4		
104206	COSTA, JR.	FALMOUTH	BEDR	07/17/2002	790	50	3	38	R8	32-13		
104650	MILLIKEN	FALMOUTH	BEDR	07/10/2002	140	20	20	10	R06	008-001		
105872	TOD, JR.	FALMOUTH	BEDR	07/19/2002	155	21	20	2	R3	34		
106386		FALMOUTH	BEDR	12/03/2002	320	20	15	3				
106387	BIFULCO	FALMOUTH	BEDR	12/05/2002	300	20	20	2				
106515		FALMOUTH	BEDR	07/26/2002	425	20	2	8				
107385	SKAWINSKI	FALMOUTH	BEDR	08/05/2003	495	20	100	1				
107634	NOWAK/FILIPPONE	FALMOUTH	BEDR	10/15/2002	440	48	15	38	R9	043K		
107685	WORMELL	FALMOUTH	BEDR	04/09/2003	240	48	10	38	R08	097-A		
107839	WOOD, JR.	FALMOUTH	BEDR	03/27/2003	900	79			R06	73		
110088	SHAFTO	FALMOUTH	BEDR	07/30/2003	530	50	0	43				
110102	CARON	FALMOUTH	BEDR	02/06/2003	1100	20	1	8				
113995	ANDREWS	FALMOUTH	BEDR	08/28/2003	700	20	15	8	R03	38		
115143	GREARSON	FALMOUTH	BEDR	12/23/2003	350	20	20	10	R 09	6		
115188	REGAN	FALMOUTH	BEDR	07/23/2004	120	79	15	69				
119178	WYMAN/DE LINA	FALMOUTH	BEDR	05/24/2005	810	20	10	3	U-28	5-A		
119196	STOREY	FALMOUTH	BEDR	06/29/2005	680	20	50	14				
119321	BLAND	FALMOUTH	BEDR	08/19/2004	200	30	20	18	340	HL3-030		
119325	GAGNON	FALMOUTH	BEDR	08/28/2004	300	60	20	48	R-03	81		
123554		FALMOUTH	BEDR	08/12/2005	580	20	10	10				
124925	PARIS	FALMOUTH	BEDR	08/24/2005	400	120	5	108				
129906	KARGAR	FALMOUTH	BEDR	12/12/2005	500	31	15	20				
131136	FERRANTE	FALMOUTH	BEDR	12/27/2006	580	60	3	50				
131155	MAGGIO	FALMOUTH	BEDR	05/11/2007	140	20	12	10				
131156	CULVER	FALMOUTH	BEDR	05/15/2007	180	40	20	30				
130291	BLACKBURN	FALMOUTH	BEDR	11/30/2007	700	20	1	4				
140027	DERREY	FALMOUTH	BEDR	07/03/2008	1300	20	30	6				
123579	MARSTON	FALMOUTH	BEDR	10/06/2005	320	48	7	38	R08	064-00B		
125010	FARRAR	FALMOUTH	BEDR	07/01/2005	500	85	5	28	U63	20		
8924	MILLIKEN	CUMBERLAND	BEDR	08/30/1988	600	20	1	10				
9380	TOWNE	FALMOUTH	BEDR	03/04/1989	500	20	0	10	U64	11		
9563	CHASE	FALMOUTH	BEDR	09/08/1989	240	21	2	18				
9564	CHASE	FALMOUTH	BEDR	10/03/1989	270	51	20	48				
52283	POSS	FALMOUTH	BEDR	11/15/1990	700	20	1	8				
55139		FALMOUTH	BEDR	08/06/1991	240	20	50	5				
56414	CHASE	FALMOUTH	BEDR	11/14/1991	680	20	3	7				
58259		FALMOUTH	BEDR	12/14/1992	580	65	1	62				
60005	JOHNSON	FALMOUTH	BEDR	01/22/1993	255	20	4	9	R3	63-6		
60089	TALBOT	FALMOUTH	BEDR	09/14/1993	605	10	1		U64	13		
60580	HANLEY/HERBERT	FALMOUTH	BEDR	11/24/1993	82	20	20	8	U68	31		
60988	NEUTS	FALMOUTH	BEDR	11/04/1993	300	20	2	16	U36	29		
65199	BODMER	FALMOUTH	BEDR	06/29/1994	440	20	0	10				
66362	MAINE WOODLAND	FALMOUTH	BEDR	06/15/1996	122	25	13	15	R8	68-10		
69591	WALLACE	FALMOUTH	BEDR	09/15/1995	300	20	10	15	R3	54N		
75052	SAGE	FALMOUTH	BEDR	09/02/1997	405	20	1	2		12		
75128	SMITH	FALMOUTH	BEDR	05/01/2000	180	40	15	23				
77593		FALMOUTH	BEDR	05/21/1997	280	20	10	15				
77928	DOBKOWSKI	FALMOUTH	BEDR	05/13/1997	240	44	10	34	U68	33		
82539	GORMAN	FALMOUTH	BEDR	07/01/1998	400	20	3	15				
82546	MINERVINO	FALMOUTH	BEDR	07/27/1998	700	140	1	135	R7	37-9		
131110	DONATELLO, JR.	FALMOUTH	BEDR	10/19/2006	240	60	20	50	R07	128-001		
109979	JOYCE	FALMOUTH	BEDR	08/25/2003	540	20	15	10	R06	51		
138618	TOLFORD	FALMOUTH	BEDR	10/09/2007	200	27	27	18	U-19	82		
142346	JENNIFER LITWINOWICH	FALMOUTH	BEDR	09/08/2009	320	86	5	76	R08	55		
123543		FALMOUTH	BEDR	07/05/2005	220	40	15	30	R08	26		
127511	CONROY(?)	FALMOUTH	BEDR	11/03/2005	100	28		12	HL1-	021-00A		
128744		FALMOUTH	BEDR	03/22/2006	240	60	12	50	R08-026	6		
131152		FALMOUTH	BEDR	04/09/2007	380	80	56	70	R08	026-003		
131158		FALMOUTH	BEDR	05/08/2007	880	80	10	70	R08	026-004		
131159		FALMOUTH	BEDR	04/11/2007	580	65	1	55	R08	026-005		
150709	DERICE	FALMOUTH	BEDR	01/30/2012	900	20	10	10				
147886	WHITE	FALMOUTH	BEDR	05/23/2012	245	20	7	8				
147903	HALEY	FALMOUTH	BEDR	11/16/2010	380	40	3	30				
147463	MILLEY	FALMOUTH	BEDR	05/27/2011	200	30	5	5				
148037	BRACKETT	FALMOUTH	BEDR	06/15/2012	145	31	50	10				
149898	GRAFFAM	FALMOUTH	BEDR	09/21/2011	420	60	0	49	R08	061-000		
146071		FALMOUTH	BEDR	07/26/2012	520	20	8	2				
146940	VAMVAKIAS	FALMOUTH	BEDR	09/29/2010	500	55	15	45	R04-028	2		
147904	FARM DEV. INC.	FALMOUTH	BEDR	11/03/2010	840	60	50	50	R08-026	10		

147905	FARM DEV. INC.	FALMOUTH	BEDR	11/04/2010	380	57	6	47	R08-26		9
151330	VANLOENEN	FALMOUTH	BEDR	01/24/2013	557	29	100	17			
151331	VANLOENEN	FALMOUTH	BEDR	01/16/2013	548	20	100	10			
152213		FALMOUTH	BEDR	02/19/2013	820	40		30	R08-026		8
152730	WALKER	FALMOUTH	BEDR	07/14/2013	720	20	2	4			
153715	CROK	FALMOUTH	BEDR	11/07/2013	720		1				
152275	SOMMA	FALMOUTH	BEDR	06/28/2013	1000	34	5	24			
153545		FALMOUTH	BEDR	10/15/2013	180	20	15	14			
152731		FALMOUTH	BEDR	08/10/2013	500	20	2	10			
154089		FALMOUTH	BEDR	09/19/2014	728	20	75	2	5		D-3
154098		FALMOUTH	BEDR	10/20/2014	760	20	45	5	5		D-3
5044	CYR	FALMOUTH	BEDR	01/01/1966	204	7	1				
5768	FEENEY	FALMOUTH	BEDR	01/01/1965	101		30	56			
5771	PETERS	FALMOUTH	BEDR	01/01/1967	372		2	6			
5774	SOWLES	FALMOUTH	BEDR	01/01/1965	402		2	39			
5775	SWITZER	FALMOUTH	BEDR	01/01/1960	549		0	38			
5786	LALUMIERE	FALMOUTH	BEDR	01/01/1971	204		4	2			
6547	REGINALD	FALMOUTH	BEDR	01/01/1974	160	56	6	50			
8086	DENNIS	FALMOUTH	BEDR	09/25/1987	277	17	3	2			
68154	BOUDREAU	FALMOUTH	BEDR	03/14/1995	630	20	30	16			
143256	MCDERMOTT SR.	FALMOUTH	BEDR	05/10/2010	620	20	1	3	R0944		C
156408	AMATO	FALMOUTH	BEDR	11/03/2014	300	45	25				
156436		FALMOUTH	BEDR	02/17/2015	380	80	10	70			
156808	CHASE	FALMOUTH	BEDR	05/29/2015	160	44	7	30			
156628		FALMOUTH	BEDR	06/06/2015	500	20	20	7			
5450		FALMOUTH	BEDR	12/05/1968	1205	38	1	1			
157151		FALMOUTH	BEDR	06/23/2015	130	23	30	2			
157150		FALMOUTH	BEDR	06/19/2015	505	28	2	1			
157039		FALMOUTH	BEDR	07/22/2015	220	40	20	30			
157038		FALMOUTH	BEDR	07/22/2015	260	40	30	30			
143412		FALMOUTH	BEDR	08/20/2015	660	20	15	2			
143420		FALMOUTH	BEDR	08/31/2015	745	20	60	3			
157246		FALMOUTH	BEDR	09/21/2015	1005	20	0	14			
157245		FALMOUTH	BEDR	09/17/2015	630	100	0				
157062		FALMOUTH	BEDR	09/17/2015	240	40	20	30			
157054		FALMOUTH	BEDR	07/23/2015	300	40	10	30			
143477	ANDERSON	FALMOUTH	BEDR	11/26/2015	1300	23	0	3			

This listing is not comprehensive; there are certainly other wells in the area for which we have no information.

The hydrologic information on the wells listed is as provided by the drillers - it has not been field checked. Also, our database is ***not*** comprehensive; ***there are certainly other wells in the area for which we have no information***. For a complete listing of all wells in the database please visit the MGS Water Well Database web page at: http://www.maine.gov/dacf/mgs/pubs/digital/well.htm. There you will find an interactive web map and a downloadable file that can be imported to your database and/or GIS/CAD mapping program.

If you have any questions feel free to contact me.

Sincerely,

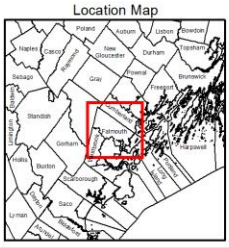
Robert Johnston
Senior Geologist

Maine Geological Survey
93 State House Station, Augusta, ME, 04333

Water Wells Database Locations:
Vicinity Of: Town of Falmouth, Maine

Data from the Maine Geological Survey Wells Database
Map prepared by the Maine Geological Survey

Location Map



NORTH

0 1.25 2.5
Miles

Appendix B

WRIGHT-PIERCE
Engineering a Better Environment

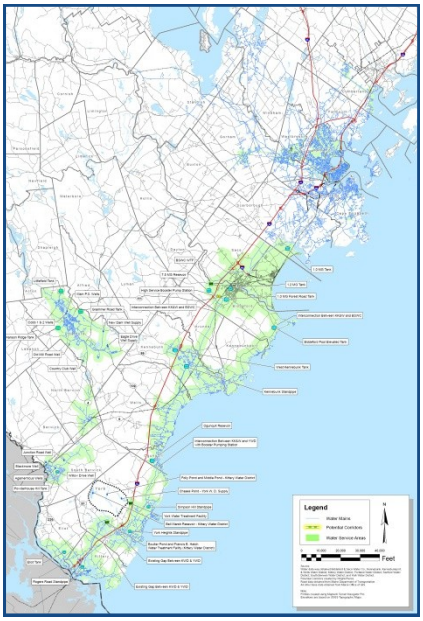
Regional Water System Master Plan, Hydraulic Modeling, and GIS

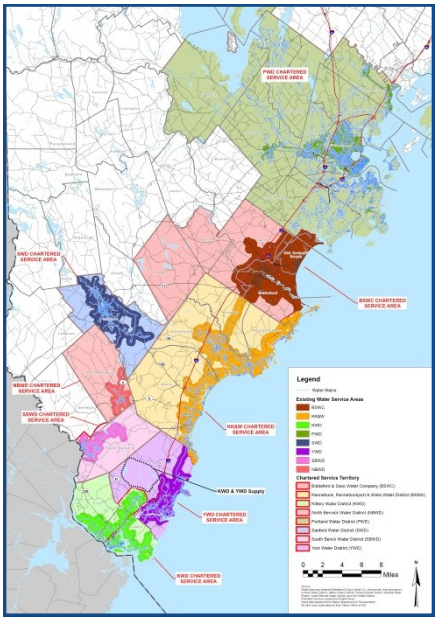
Southern Maine Regional Water Council

Wright-Pierce was selected to develop a regional water system master plan for the Southern Maine Regional Water Council (SMRWC)). The SMRWC includes seven of the largest utilities in the southern Maine coastal region, serving the most densely populated region of the state. The combined service territory extends nearly 60 miles, from the Maine-New Hampshire border, north beyond Portland. The purpose of the study was to evaluate the feasibility of interconnecting the systems to create a regional water system.

Wright-Pierce developed a regional hydraulic model that integrated individual models from each water system (which includes 1,500 miles of distribution and transmission piping), conducted a safe yield analyses, a regional supply plan, population and demand projections, and GIS mapping. The model was used to study interconnections between the systems for regionalized, mutual aid and emergency service.

The regional water system plan was completed and presented to the public in 2008. The plan will address transmission, treatment, pumping and storage needs, opportunities for sharing resources, and a model for the future formulation of a regional supply authority.





Client

Kittery Water District

Project at a Glance

Background

Wright-Pierce was selected to develop a regional water system plan for seven of the largest utilities that service the densely populated southern Maine coastal region.

Challenge

The goal of the study was to evaluate opportunities to create a regional water system plan among diverse water utilities.

Solutions

Wright-Pierce GIS and hydraulic specialists developed the following:

- integration of seven separate water system hydraulic models into a single regional hydraulic model
- safe yield analysis
- supply plan
- mapping of the seven systems' infrastructure for creation of a utility data base

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Water System Master Plan

Boothbay, Maine

Wright-Pierce was retained in 2008 to complete a water system master plan for the Boothbay Region Water District. The study addressed all components of the water system including the distribution system, supply, pump stations, storage system, and treatment facilities.

Some of the key recommendations included tank mixing systems to improve water quality; piping upgrades to improve system hydraulics; plant control system upgrades; radio telemetry upgrades; and a water treatment optimization study. Prioritization of recommended capital improvements and a financial analysis were integral components of the master plan study. A 10-year financial plan was developed for the system which analyzed projected expenses, rate structure, break even analysis, and included an annual revenue forecast to fund improvements and projected expenses.

The final document provided the District with a comprehensive understanding of the water system, a prioritized list of upgrades for the planning period, and a single source of information and referenced documentation of the entire water system.

Client

Boothbay Region Water District

Project at a Glance

Background

- The Boothbay Region Water District proactively develops master plans for the water system every 10 years to guide capital investments
- Wright-Pierce was retained to complete a master plan for a 20-year period extending through the year 2028

Challenges

- The primary objective of the planning effort was to evaluate all system components and develop a prioritized list of upgrades with realistic capital budget projections for funding the capital improvement plan

Solutions

- Reviewed history of the water system
- Identified critical needs for highest priority upgrades
- Sought recommendations from client on proposed upgrades
- Developed a financial plan to fund improvements

Water System Capital Improvement Plan

Skowhegan, Maine

Wright-Pierce was retained by Maine Water Company, Inc., to develop a capital improvement plan (CIP) for the Skowhegan water system. The CIP included a detailed water system infrastructure evaluation, including surface water supply sources, treatment works, distribution piping, water storage requirements, and administrative facilities. A computerized hydraulic model was developed to evaluate the distribution system and simulate future water demands.

The plan recommended that improvements be made to the existing river intake, filter backwash waste tanks, distribution system and the administrative facilities. A phased implementation plan was developed to coordinate with proposed sewer and roadway infrastructure improvement projects, to maximize the distribution system improvements for the capital expenditure, and to manage water rates.

The Wright-Pierce team worked closely with town officials to develop a CIP that would address both the identified short-term system improvements, and plan for the projected long-term storage and distribution needs for areas of town that are considered to be future growth areas.

Client

Maine Water Company, Inc.

Project at a Glance

- Maine Water Co., Inc. - Skowhegan Division (AMSD) is a private water company that serves the town of Skowhegan.
- The system consists of a conventional filtration surface water treatment facility, river intake, primarily unlined CI distribution piping, and two welded steel water storage standpipes.
- A hydraulic model was developed to determine existing fire flow capacities. The model indicated a closed valve in the system that was then corrected by AMSD, improving flow conditions.
- New storage tank sites were identified.
- Phased implementation of distribution system improvements to coordinate with other town infrastructure improvements projects.
- A detailed review of existing and proposed regulations was performed.

Supply Feasibility and Planning Study

Augusta, Maine

Wright-Pierce was retained by the Augusta Water District in 2003 to evaluate the feasibility of various water supply options and develop a comprehensive water supply strategy for the District. The supply options included regionalizing with the Kennebec Water District (KWD); retaining its current supply at Carleton Pond; or switching to a groundwater supply at Bond Brook. The scope of work included a technical and financial analysis of the three supply options, a comparative analysis of options and cost analysis, and recommendations for both a short-term and a long-term supply strategy.

The work also included development of a hydraulic model of the water distribution system. The model was used to test and simulate the impacts of the interconnection option as well as future opportunities to regionalize the water system with surrounding water utilities.

This work dovetailed with a parallel study in which Wright-Pierce evaluated opportunities to regionalize the major water systems in the lower Kennebec Valley. This parallel study outlined the engineering feasibility and constraints involved in constructing an interconnection between the Augusta and Kennebec Water Districts. The findings of both the KWD and Augusta feasibility study were then compared to the District's internal supply options at Carlton Pond and Bond Brook. Recommendations, based on this comparative analysis, were made for both a short-term (8 years) and long-term (20 years plus) supply strategy.

Client

Augusta Water District

Project at a Glance

Background

Wright-Pierce was retained by the Augusta Water District to evaluate the feasibility of various water supply options and to develop a comprehensive water supply strategy for the District.

Challenges

- A trend of decreasing demand caused by a loss of major industrial customers and a declining population in the service area.
- A fixed capital and debt structure from construction of the G.F. Laurin Water Treatment Facility in East Winthrop and other infrastructure improvements in the early 1990s.
- A complex distribution system with multiple pressure zones, storage facilities and operational requirements to maintain and operate.

Solutions

The District elected to reactivate its former well supply and temporarily decommission its water treatment facility at Carelton Pond.

Water System Master Plan

Bath, Maine

Wright-Pierce was retained in 2008 to complete a water system master plan for the Bath Water District. The study addressed all components of the water system, including the distribution system, supply, storage system, and treatment facilities.

Some of the key recommendations included raw water intake and pumping redundancy, dam improvements, piping upgrades to improve system hydraulics, utility interconnection, and a safe yield evaluation. Prioritization of recommended capital improvements and a financial analysis were integral components of the master plan study.

The final document provided the District with a comprehensive understanding of the water system, a prioritized list of upgrades for the planning period, and provided a single source of information and referenced documentation for the entire water system.

Client

Bath Water District

Project at a Glance

Background

The Bath Water District proactively develops master plans for the water system every 10 years to guide capital investments. Wright-Pierce was retained to complete a master plan for a 20-year period extending through the year 2028.

Challenges

The primary objective of the planning effort was to evaluate all system components and develop a prioritized list of improvements to achieve the most critical system upgrades with realistic capital budget projections for funding.

Solutions

- Reviewed history of the water system
- Identified critical needs for highest priority upgrades
- Sought recommendations from client on proposed upgrades
- Developed a financial plan to fund improvements

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Water System Master Plan

Gardiner, Maine

Wright-Pierce was retained to complete a master plan of the Gardiner Water District water system. The study encompassed all aspects of the water system including the distribution system, groundwater supply, storage system, and booster pumping stations. The study included development of a hydraulic model of the water distribution system using WaterCAD software. The complexity of the Gardiner water system requires careful planning and scheduling of capital improvements to maintain affordability and reliability.

The primary work product from the master plan was a capital improvement program (CIP), which scheduled the tasks identified in the study over a 10-year planning period. The improvement program was directed toward the supply and distribution system to augment the relatively new water treatment facility constructed by the District in the 1990's. The study was funded in part by a grant through the Maine Department of Health and Human Services (DHHS) Drinking Water Program through a Capacity Development Grant.

Client

Gardiner Water District

Project at a Glance

Background

Wright-Pierce was retained to complete a master plan for a 10-year period extending through the year 2017.

Challenges

The complexity and age of the Gardiner water system presented many challenges in developing an affordable capital improvement program.

Solutions

The master planning effort culminated in development of a capital improvement program focusing on distribution and supply enhancements. The plan recommended a new source of groundwater supply, pipe renewal projects, tank maintenance projects and improvements to the Brunswick Avenue booster pumping station.

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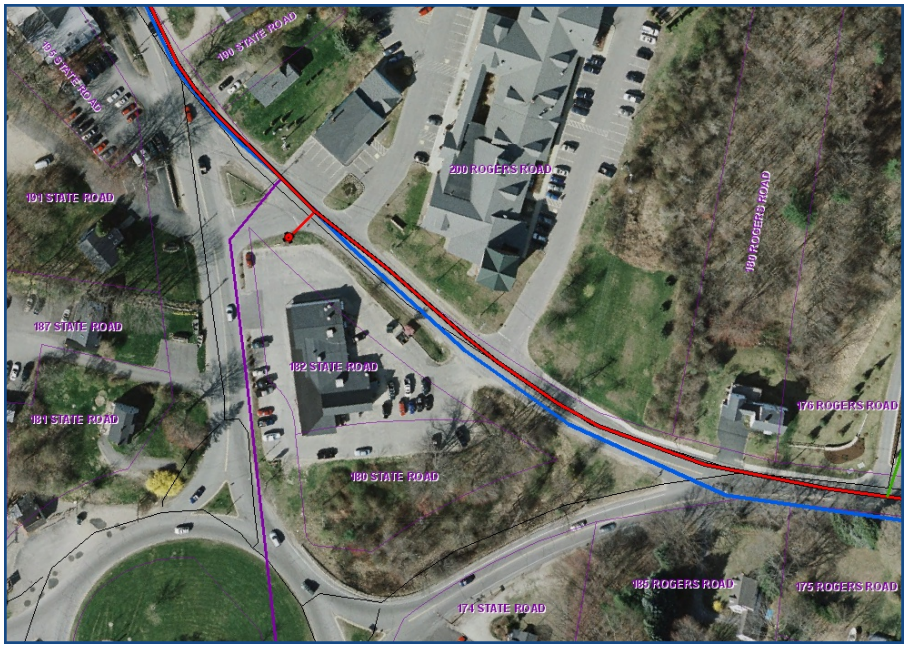
Hydraulic Model Development and GIS

Kittery, Maine

Wright-Pierce has been advising and providing professional engineering services for the Kittery Water District on a variety of water treatment and water distribution problems since 2002. In 2006, the District selected Wright-Pierce to design and implement a Geographic Information System (GIS).

The Wright-Pierce team initially developed a hydraulic model of the Kittery Water system using Bentley software products. Based on the hydraulic modeling work, the decision was made to develop a GIS for the district.

The GIS developed by Wright-Pierce integrated the data collected during the modeling stage as well as other piping and infrastructure data, such as hydrant location and service records, that was subsequently gathered. The work plan also included a comprehensive training program to teach District staff how to populate the GIS. The program is ongoing.



Client

Kittery Water District

Project at a Glance

Wright-Pierce was retained by Kittery Water District to design and implement a comprehensive GIS.

Based on hydraulic modeling completed by Wright-Pierce, a GIS was then developed to include asset data including:

- piping infrastructure
- hydrant location
- service records

The GIS work plan also included a training program for district staff. Training involved onsite and off site solutions. Remote applications were used to manage client support.

Water System Master Plan

Yarmouth, Maine

Wright-Pierce was retained to develop a master plan for the Yarmouth Water District. The plan included a comprehensive evaluation of the entire water system including storage, supply, distribution system, and administrative functions. The master plan also included development of a hydraulic model of the distribution system to test and simulate future demand conditions.

The study culminated with a capital improvement plan (CIP) with a phased implementation plan for a 10-year period. Recommended improvements included a new SCADA system for system operations; renewal of distribution mains; and additional storage to improve fire protection and flows in the distribution system.

One important aspect of the study was to consult various development and planning documents in both Yarmouth and North Yarmouth, to dovetail the goals and objectives of the two communities with those of the water system master plan.

Client

Yarmouth Water District

Project at a Glance

- The Yarmouth Water District serves the community of Yarmouth and portions of North Yarmouth, Maine
- The system is in excellent shape as a result of periodic master plan updates
- A new plan was initiated to guide system improvements through 2015
- The distribution system has a large amount of unlined cast iron mains of diminished capacity
- Storage tanks do not operate together as intended
- Staffing is limited
- A phased implementation plan for all capital improvements was developed
- Preservation of water rates was given top priority
- Additional staffing resources were recommended from a benchmarking analysis
- New storage tank sites identified

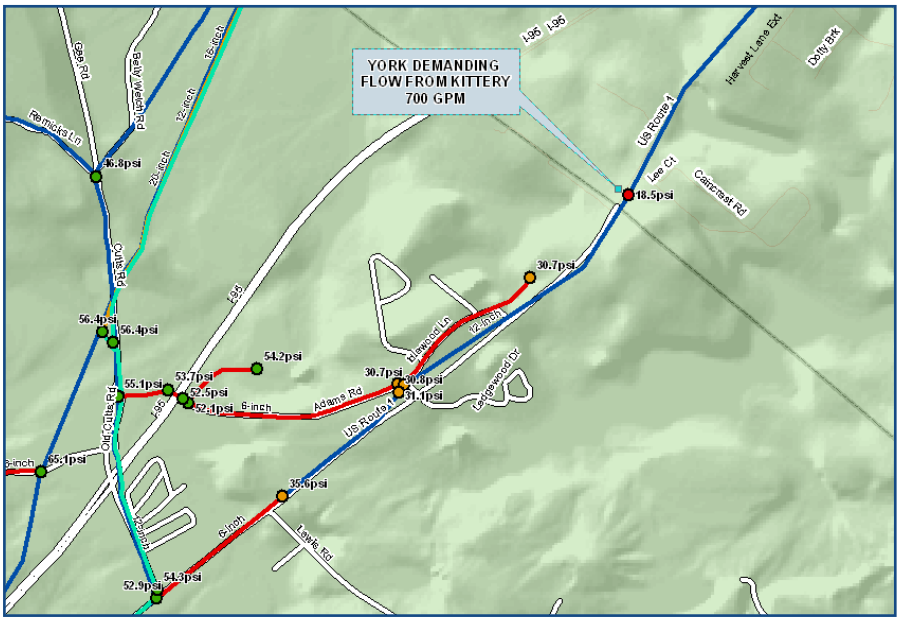
Water System Master Plan and Hydraulic Model Development

York, Maine

Wright-Pierce has been advising the York Water District on a variety of waterworks issues since 1987. The projects have included design and construction administration of a new 4.0 water treatment facility, a new SCADA system, new booster pumping stations, dam rehabilitation, reservoir studies, and development of a comprehensive water system master plan in 2002. The master plan included detailed studies of all aspects of the water system to provide a guiding document for transition of the utility to a new management team.

The centerpiece of the master plan was development of a hydraulic model of the water distribution system using WaterCAD software from Haestad/Bentley. The model was used to simulate improvements in the distribution system, to study fire flow capacity, storage capacity and needs, and to develop emergency interconnections to adjacent water systems.

The final water system master plan has been a useful tool for the York Water District which routinely uses the document to define water supply requirements for new developments in the service territory, as well as for general annual capital planning.



Client

York Water District

Project at a Glance

Background

Wright-Pierce was selected to develop a new hydraulic model of the York Water District distribution system as part of a comprehensive water system master plan.

Challenges

The purpose of the plan was to guide transition of a new management team and to consolidate records and data into a single, comprehensive document.

The water system master plan included:

- an administrative and staff review
- facility and office space needs assessment
- water system model
- distribution system evaluation
- treatment and regulatory review

Water Main Improvements

Bath, Maine

Wright-Pierce was retained to provide engineering services for the design and construction of approximately 4,500 feet of 12-inch and 8-inch water mains on Oak Grove Avenue, Whiskeag Road, and Garden Street. The project was designed to enhance water quality, flow hydraulics, and to replace a section of 100-year old pipe. The project was financed by the 2009 American Recovery & Reinvestment Act (ARRA, and required an aggressive design schedule to achieve the milestones established as conditions for financing. Wright-Pierce assisted the client with understanding ARRA requirements and administered all ARRA construction requirements, which included wage rate and certified payroll standards, "Buy American" provisions, and environmental review requirements.

The key technical issues in the project included ledge removal near historic homes and temporary water provisions. The project was designed to minimize the use of temporary water service, and a sequence of construction was developed to guide the contractor and the owner as they completed pressure tests and temporary service provisions. The ledge removal requirements were detailed to minimize the likelihood of damage to historic structures. The project was completed below budget, as well as without any reported damage caused by ledge removal activities.

Client

Bath Water District

Project at a Glance

Background

- Project financed by the ARRA of 2009
- Project improved system fire flow capacity and water quality
- Project replaced an aging water main susceptible to breaks

Challenges

- Aggressive project schedule to meet ARRA requirements
- Detailed temporary water provisions were required
- Ledge removal work adjacent to historic homes

Solutions

- Adjusted company staff resources to meet aggressive design schedule
- Developed a detailed temporary water plan and
- construction sequence
- Developed particle velocity limits for ledge blasting

Water Main Design - Maine Avenue

Gardiner and Farmingdale, Maine

The Maine Avenue water main dated back to the 1880s and was one of the oldest water mains in the Gardiner Water District system. The main provided service to Farmingdale along the busy US Route 27 (Maine Avenue).

In a regional water supply plan completed by Wright-Pierce, the water main was identified as a critical interconnection point to wheel water between the Gardiner, Hallowell and Augusta area for mutual aid purposes and eventual consolidation of the water distribution systems.

The water main was replaced in two sections, each about 1.5 miles in length. Both projects were constructed as part of a highway reconstruction project by the Maine Department of Transportation. The first reconstructed segment was bid within the MaineDOT construction bid documents. The second segment was incorporated into a design-build procurement through MaineDOT, one of the first projects completed by MaineDOT using this project delivery method.

The water mains were successfully installed and commissioned in 2010. The final construction process was lower than the bid price for each project.

Client

Gardiner Water District

Project at a Glance

Background

- The critical water main was over 120 years old and in very poor condition.
- The main required replacement to meet regional mutual aid goals and to restore hydraulic capacity to an outdated water main.

Challenges

- Construction completed within a very busy road corridor.
- Constructed using the alternative delivery method of design-build.
- Sequencing of work required commissioning and testing small segments of pipe.

Solutions

- This water main project provided a critical link for future regionalization of water systems in the greater Augusta area.

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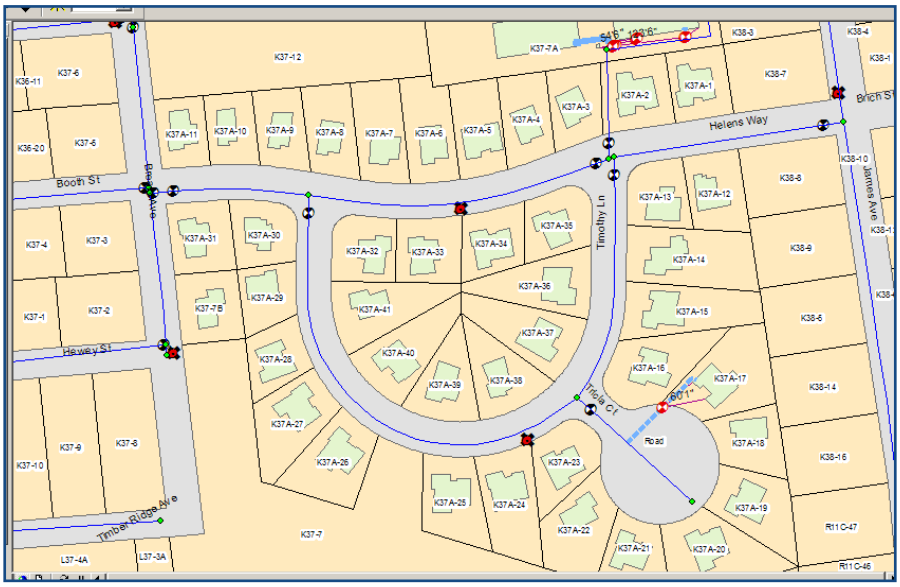
Hydraulic Model Development and Water Quality Analysis

Sanford, Maine

The Sanford Water District is an unchlorinated groundwater system in southern Maine serving a population of about 25,000 customers. The water system is supplied from a series of gravel-packed wells dispersed around the service territory. The system has struggled with maintaining a strong chlorine residual in the distribution system. To identify and solve this problem, the District selected Wright-Pierce to develop an integrated hydraulic model of the water system to study water aging, water mixing and system hydraulics.

The Wright-Pierce team developed a hydraulic model of the District's water system using the MWHSoft Infowater software suite. This program used piping information developed by the District's GIS advisor and created the modeling simulations within the GIS module of Infowater. The work program required a customized training program facilitated by Wright-Pierce staff and supplemented by vendor support.

The final GIS product included integration of the modeling work with ESRI's GIS software provided by the District's GIS advisor. Using the hydraulic model developed in the study, Wright-Pierce was able to use extended period simulations to study water age and chlorine decay in the distribution system, and help develop system-wide strategies to improve mixing and chlorine residual.



Client

Sanford Water District

Project at a Glance

- Wright-Pierce was retained by the Sanford Water District to develop a hydraulic model of the water system to study water aging, mixing and system hydraulics
- Utilizing the hydraulic model, Wright-Pierce was able to conduct extended period simulations to study water age and chlorine decay in the distribution system and help develop strategies to improve mixing and chlorine residual in the system
- The final GIS product included integration of the modeling work with ESRI's GIS software provided by the District's GIS advisor
- Wright-Pierce, in collaboration with the vendor, provided customized training for district staff

Water System Inspection and Asset Management Plan

Orleans, Massachusetts

Wright-Pierce was retained by the Orleans Water Department to create a comprehensive asset management plan for the water system. The program included an inventory of all distribution, well supply, treatment and storage assets in the system; a condition assessment of each asset; creation of a hydraulic model to identify deficiencies in the distributions system; demand projections; and development of a level of service agreement. A business risk exposure factor was determined for each asset based on consequence and likelihood of failure models developed using databases created in Microsoft Excel and Access programs. The Town opted for use of these software tools over costly third-party software packages.

The asset register, condition assessment and business risk exposure rankings developed as part of the asset management plan are being integrated into the town's Utility Cloud asset management software module. Wright-Pierce facilitated a series of workshops with the Board of Water and Sewer Commissioners, Board of Selectmen and Finance Committee to adopt the results of the asset management plan.

Asset inventory of water distribution, treatment, and storage systems, and subsequent asset management plan will guide improvements to infrastructure.

Client

Orleans Water Department

Project at a Glance

Background

The Orleans Water Department needed an integrated asset management plan to build support in the community for necessary infrastructure improvements.

Challenges

- The water department had many infrastructure needs.
- Balancing water system needs with other capital needs in the community was a challenge.
- Traditional capital planning was not viewed as a viable way to invest limited financial resources.

Solutions

- The asset management plan identified need based on criticality and risk exposure.
- The final plan created a future vision for the water system.
- The final plan identified a multi-year financial plan to implement recommendations.

Asset Management Plan and Hydraulic Model

KY Pipe 2012 Hydraulic Model

Bangor, Maine

Wright-Pierce was retained by the Bangor Water District to create a comprehensive asset management plan for the water system. The program centered on advancement of the District's KY Pipe 2012 hydraulic model, a software package selected by the District and familiar to the internal staff.

The project included integration an inventory of all assets in the water system and incorporation of a GIS system developed earlier and jointly by Wright-Pierce and District staff. The inventory of all distribution and transmission system piping, the UV/Ozone disinfection facility and storage assets in the system, a conditional assessment of each asset, demand projections, and creation of a hydraulic model to identify needs in the distributions system. For each asset, a level of service was developed. A business risk exposure factor was determined for each asset based on consequence and likelihood of failure. Models developed using databases created using Microsoft Excel and Access.

Simplification of a complicated distribution system with fewer service areas is one objective of the study.

Client

Bangor Water District

Project at a Glance

Background

The Bangor Water District needed an integrated asset management plan to build support in the community for needed infrastructure improvements.

Challenges

- Water department needed a comprehensive capital improvement plan based on sound asset management principles.
- The plan needed to demonstrate need based on business risk because of the large amount of old unlined cast iron piping in the system.
- Traditional capital planning was not viewed as a viable way to invest limited financial resources.

Solutions

- Asset management plan identified need based on criticality and risk exposure.
- The final plan will create a future vision for the water system.
- The final plan will identify a multi-year financial plan to implement recommendations.

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