



County of Carroll
Office of the Commissioners
Ossipee, New Hampshire

PROPOSAL FOR

Carroll County
Water System Improvement Study

June 10, 2021





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June 10, 2021
File No. P100192.000

Ms. Mellisa Seamans
Executive Coordinator
Carroll County, Office of the Commissioners
95 Water Village Road
Ossipee, NH 03864

Re: **Carroll County Water System Improvement Study**
Carroll County, NH

Dear Ms. Seamans:

Nobis Engineering, Inc., d.b.a. Nobis Group® (Nobis) and CSA Environmental Consultants, LLC (CSA) are pleased to present our qualifications and proposed scope of work and fees to provide Water System Improvement Study services to Carroll County, as described in the County's Request for Proposals (RFP) of May 2021 and as discussed during a site visit on June 7, 2021. We thank Will DeWitte for meeting with us and showing us the water system.

PROJECT TEAM INTRODUCTION

Our project team includes experienced water supply professionals who will work closely together with the County to provide services that are focused and coordinated to address the County's needs and objectives as described within the RFP. Our team also has the breadth and depth of qualifications to provide continuing services, should the County decide to proceed to subsequent phases of work based on the study results.

Nobis Group®

Nobis is a multi-disciplinary consulting firm headquartered in Concord, New Hampshire that provides diversified services to clients throughout the United States with proven experience and a collaborative approach to building successful, long-lasting client relationships. Founded in 1988, Nobis delivers a full range of expertise including environmental, civil, geotechnical, and water supply services to Federal, State, municipal, and commercial clients. Strategically organized to offer the multi-disciplinary benefits of a large company while maintaining a high level of

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Concord, NH 03301
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service generally available through smaller firms, every member of the Nobis team personally supports the company's commitment to efficiently provide unparalleled value to every client and teaming partner. Nobis offers a highly trained staff of 75+, which includes geologists, hydrogeologists, scientists, civil engineers, water supply specialists, geotechnical engineers, environmental engineers, remedial experts, chemists, operations and maintenance (O&M) technicians, inspectors, site superintendents, construction managers, GIS professionals, and contracts specialists. Nobis is an employee-owned company with a 30-year legacy of collaboration, responsiveness, efficiency, effectiveness, and community involvement.

Key Personnel

Nobis' project lead will be Dr. Jim Vernon, Senior Hydrogeologist and Director of Water Supply Services. Jim has more than 30 years' experience locating, installing, testing, and permitting new drinking water wells in New Hampshire and seven other states. He is experienced with bedrock wells, gravel-packed wells, dug wells, and springs. He is a Licensed Geologist in New Hampshire and Maine. Jim served for 13 years as Chair of the New England Water Works Association Groundwater Committee and has taught numerous seminars on bedrock wells, wellhead protection, and related topics.

Nobis Group roles for this project include:

- Co-lead with CSA
- Existing wells assessment and hydrogeology
- Recommend whether new wells are needed
- Report (with CSA)
- Project administration

CSA Environmental Consultants, LLC

After nearly 30 years working as a Lead Design Engineer and Project Manager in municipal design, permitting, and construction management in the wastewater and drinking water fields, Christopher Albert started his own firm - CSA Environmental Consultants, LLC - based in Nottingham, New Hampshire.

Key Personnel

Mr. Christopher Albert is a licensed wetland scientist, septic system designer, and evaluator with over 30 years of experience in the private sector. He is the Chairman of the Licensure Board for Septic System Evaluators and Vice Chairman of the Licensure Board for Natural Resource



Scientists. Chris also serves on the Board of Directors for the Granite State Designers and Installers (GSDI) chairing the non-point source advisory committee, is past President for the New Hampshire Association of Natural Scientist (NHANRS), the Town of Epping's representative, board member for the Southeast Watershed Alliance (SWA), and serves on the Board of Directors for the New Hampshire Water Works Association.

CSA's roles for this project include:

- Co-lead with Nobis
- Existing tank assessment and recommendations (maintain/upgrade vs replace)
- Existing infrastructure assessment and water model
- Rate assessment
- Report (with Nobis)

OTHER TEAM MEMBERS

Scott Kelley, SUEZ Utility Service Co.

Scott Kelley is well known in the New Hampshire water industry, having worked for many years for water-testing laboratories and for SUEZ Utility Service Co., Inc. which focuses on providing sustainable asset management, water quality and conservation services, and specialized solutions to the US water industry.

Key Personnel

Mr. Scott Kelley is experienced with water storage tank assessments and will review the previous assessment by Underwater Solutions and will conduct an updated inspection using a Remotely Operated Vehicle (ROV).

Suez's roles for this project include:

- Review the previous tank inspection and cleaning
- Conduct a new tank inspection using a Remotely Operated Vehicle (ROV)
- Consult with CSA and Nobis regarding tank recommendations

Lee F. Carroll, P.E., Consulting Electrical Engineers

Lee F. Carroll, P.E., is a small proprietorship consisting of two full-time engineers. This firm serves various architects, engineers, and/or industrial, institutional, commercial and



governmental clients with electrical design work and studies. Facilities projects have included potable water and wastewater treatment facilities and many other public and private facilities and institutions. The firm is presently registered in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Connecticut and several other states. Detailed resumes of personnel are available if requested.

Key Personnel

Mr. Lee F. Carroll, PE will assist CSA and Nobis by assessing the existing electrical controls for the system and recommending improvements, with cost estimates.

Lee F. Carroll Electrical Consultant's roles for this project include:

- Assess existing electrical controls
- Recommend modifications with costs

REFERENCES

Nobis

Mr. Donald Drew, Water and Maintenance Superintendent - Mountain Lakes District
75 White Mountain Drive, Woodsville, NH 03785 - (603) 787-6180 | mtnlakeswater@yahoo.com

Daniel Crosby - AquaTech Compliance Services
27 Brook Street, Keene, NH 03431 - (603) 209-4875 | dcrosby@aquatechcompliance.com

CSA

Peter Billings, President - North Country Village Coop
100 Willow Avenue, Center Tuftonboro, NH 03816 - (940) 399-0146

Dennis Koch, Public Works Coordinator - Town of Epping, New Hampshire
157 Main Street, Epping, NH 03042 - (603) 608-9492

Jim Knapp, Selectman - Town of Middleton, New Hampshire
182 Kings Highway, Middleton, NH 03887 - (603) 300-2090



PROJECT UNDERSTANDING

Nobis and CSA understand that Carroll County seeks a full engineering evaluation of its existing water system and that the last such evaluation was performed in 1999. Since that time, an additional bedrock well has been installed, the distribution system has been upgraded, and new County facilities have connected to the system. As described in the RFP, the water system serves 40 or more homes in Ossipee village and a few additional connections are possible; also, the County nursing home may add an assisted living wing, thereby increasing water demand. Also, the water system provides fire protection, which means that system modifications that may take place in future phases will likely be subject to New Hampshire Department of Environmental Services (NHDES) Large Community Water System rules.

While the County requests a full engineering evaluation of the water system, Nobis and CSA understand that the well sources and the storage tank are two areas where assessment and recommendations are particularly sought. As stated in the RFP, overall project objectives include:

- Evaluate existing supply capacity;
- Project demands and ability of existing sources to meet the future demands;
- Evaluate fire flow capability throughout the system; and
- Provide recommendations on:
 - Rehabilitating or improving existing supply sources;
 - Adding a supply source or sources to meet demands;
 - Improving the existing distribution system to ensure adequate fire flow; and
 - Rate adjustments to help support recommended improvements.

The present proposal is intended to constitute the first step in assessing and improving the County's water system. We propose both a desktop study and some field work in order to assess the wells, storage tank, and other system components. However, full pumping tests or other work with a NH-licensed well driller might be recommended now, but not conducted until a later phase. Our current proposal includes on-site investigations by our team and working closely with Will DeWitte, including some options shown below.

Our team has already assisted the County in completing a Preliminary Application for State Revolving Fund (SRF) funding.



SCOPE OF WORK

Task 100: Review Existing Reports *(RFP Scope of Work Bullet #1)*

We have started the review on the 1999 study by Provan & Lorber, and the 2001 water system plans for the new distribution system. We will research additional information on the water system from NHDES One Stop and the County. This information may include (but not be limited to) logs for some or all of the existing well sources, water quantity records submitted to the Water Registration Program, and water quality results. If the County agrees, we will inform NHDES Drinking Water and Groundwater Bureau staff of our work on the project and solicit any information and knowledge of the system that they may have. We will also schedule a file review appointment at the NHDES office (if allowed by COVID 19 protocols) to seek information that may be available in paper format that is not available on One Stop or at the County DPW office.

Task 200: Existing Well Infrastructure Assessment *(RFP Scope of Work Bullets #2 & #3)*

We will make the best estimate of the sustainable yield of the current dug well and bedrock well sources based on a combination of interpretation of existing data (e.g. pumping test data if available on One Stop or obtained from an NHDES file review under Task 100) and short-term on-site tests. If full pumping tests are needed, these will be recommended in our report and proposed for a future phase of work.

We understand that infrastructure to measure and record water levels (presumably pressure transducers) was installed (or at least planned) in 2001, perhaps at the time of installing Bedrock Well #2. We will assess whether or not this equipment was actually installed and if so, whether it is functional and can be connected to existing control and communication systems. If the equipment is present and functional or repairable, we will conduct short-term (1-4 hours each) “tests” of Bedrock Well 1 and Bedrock Well 2 with the wells pumping into the existing system and with manual starts and stops for the well pumps. Using the existing transducers (if made functional) and flow meters, we will track flow rates and drawdowns for the wells under current pumping conditions. While it will likely not be possible to maintain a constant pumping rate with existing pumps and pressures, these tests will give us preliminary information on water levels relative to the pump settings and will allow us to estimate Specific Capacity (SC; gallons per minute per foot of drawdown). These results can then be compared to any previous pumping test data that may have been found for Task 100.



If the water level infrastructure is not present or cannot readily be made operational, we will provide specific recommendations for purchasing, installing, and connecting this equipment to the communications system in the next phase of work. These recommendations will be provided in our report (Task 800). We also offer Optional Task 210, below, in which we will conduct preliminary step tests with rented transducers or with a sonic water level device.

Task 210: Preliminary Yield Tests on Existing Wells (OPTIONAL)
(RFP Scope of Work Bullet #2 - Additional)

If water level measurement infrastructure is not present in the wells or is not functional, we will perform preliminary step pumping tests on the bedrock wells and one-hour tests with a centrifugal pump on the dug wells. Details of these tests will depend on the accessibility of the wells for monitoring equipment (bedrock wells) and centrifugal pumps (dug wells). For example, if transducers can be safely installed in the bedrock wells, we will rent transducers and conduct step tests on each well, while monitoring water levels in the pumping well and the other well. (If the pumps must be pulled from the bedrock wells in order to install monitoring equipment, this will have to wait for a later phase.) We will proceed with a series of 30-60-minute steps with increasing pumping rate though it may not be possible to maintain a constant rate within each step. If transducers cannot be safely installed without the help of a licensed well driller, we will rent a sonic water level device for the tests. If the dug wells can be safely accessed, we will pump each one for one hour with a centrifugal pump and measure water levels manually. We will disinfect the wells following testing. *We will only perform this optional task upon request and written agreement by the County.*

Task 300: Evaluate Source Water Quality and Treatment
(RFP Scope of Work Bullet #4)

We will review the raw water quality analysis for the two bedrock and three dug wells. It is our understanding that current test results may not be available. An additional scope of services has been included for updated samples to be collected. It is important to review the arsenic and manganese levels in the system. The MCL for arsenic is being reduced to 5 ppb and an MCL for manganese is being initiated by NHDES.

Task 310: Additional Raw Water Quality Testing (OPTIONAL)
(RFP Scope of Work Bullet #4)

If recent raw water quality test results from the individual well sources are not available or if, in consulting with the County, we determine that testing for additional parameters is advised, we



will collect samples from some or all of the wells. We will have the samples analyzed by the State Laboratory, Eastern Analytical, or other lab as may be needed. The cost estimated below (\$1500) is intended as a placeholder; the wells, analytes, and laboratories will be determined by mutual agreement if this task is selected. *We will only perform this optional task upon request and written agreement by the County.*

Task 400: Water Demand and Fire Flow
(RFP Scope of Work Bullets #5 & #7)

We will review the fire flow demands for the existing and future structures in the Complex. The 1999 study reported a required fire flow demand of 345,000 gallons. Since then, the 90,000-gallon storage tank has been removed from the system and the 170,000-gallon fire pond is offline. We assume that the County will provide the internal sprinkler system demand to be used in our calculations.

Task 500: Inspect Water Supply and Storage Infrastructure
(RFP Scope of Work Bullet #6)

We will evaluate the existing 200,000-gallon storage tank. The previous inspection and cleaning report by Underwater Solutions will be reviewed. A new Remotely Operated Vehicle (ROV) interior inspection will be conducted to access changes in the tank. Recommended upgrades with costs will be provided. An alternate cost for a replacement storage tank to meet Fire Flow demands will be included. The existing electrical, heat, and HVAC systems in the well house will be inspected. Deficiencies and replacement costs will be provided.

Task 600: Develop Computerized Water Model
(RFP Scope of Work Bullet #8)

We will create a hydraulic model for the water distribution system using EPANET. With EPANET, we can perform extended-period simulation of the hydraulic and water quality behavior within pressurized pipe networks. The system can be tracked from the storage tank reservoir through the distribution system. Fire flow demands and placement of hydrants can be analyzed. One night of fire flow testing is budgeted. The proposed cost estimate is based on the County and Granite State Rural Water providing GIS mapping for the system in CADD format.



Task 700: Evaluate Rate Structure
(RFP Scope of Work Bullet #9)

We will review the current rate schedule. A rate analysis model will be conducted to project the utility's expenses, revenues from rates, and fund balance for the year. The rate analysis model will account for projected future growth.

Task 800: Report
(RFP Scope of Work Bullet #10)

We will prepare a report presenting the findings of the above tasks. The report will emphasize the information gained on the sustainable yield and Specific Capacities of the existing wells, the ability of these wells to meet present and projected needs, fire flow capability, the existing storage tank, the distribution system, and other existing infrastructure components. We will include recommendations on:

- The need (or not) for new wells;
- Additional required well investigations (pump inspections; pumping tests; new well site exploration);
- Required infrastructure upgrades (supply, treatment, and storage);
- Distribution system upgrades for modernization and fire flow;
- Changes in rate structure; and
- Possible funding sources.

If a new source is needed or a likely option, we will not only evaluate new well sites identified in the 1999 study, but also provide a preliminary assessment of aquifers in the area and potential favorable zones for new well sites. We are experienced with funding options, having obtained one of the first Drinking Water and Groundwater Trust Fund awards for one of our clients, and ***our team has already assisted the County in completing a Preliminary Application for SRF funding.***

Our team has the capability to conduct many of the investigations that are likely to be recommended for a second phase of work. Should a licensed well driller be needed for a pumping test, removing a pump to install water level infrastructure, or drilling a new well, we can assist the County in selecting the best driller for the work needed. Our team has worked with most of the drillers in central and eastern New Hampshire.

We assume that we will submit the report electronically and also provide four bound paper copies.



Task 900: Project Coordination and Meeting

In addition to project coordination, our team leads (Jim Vernon and Chris Albert) will provide informal email or telephone updates to Will DeWitte (or other County personnel) on at least a weekly basis. If agreeable to the County, we will also communicate with NHDES regarding the project, funding opportunities, and permitting requirements for the recommended steps for subsequent phases of work.

We will also attend one virtual or in-person meeting at County offices to present our results and discuss our recommendations with Will DeWitte and other County officials.

COST PROPOSAL

Task	RFP Scope of Work Bullet	Task Description	Estimated Budget	Estimated Budget for Optional Tasks
Task 100	1	Review Existing Reports	\$ 2,300.00	
Task 200	2 & 3	Existing Well Infrastructure Assessment	\$5,900.00	
<i>Task 210 (Optional)</i>	2	<i>Preliminary Yield Tests on Existing Wells</i>		\$4,100.00
Task 300	4	Evaluate Source Water Quality and Treatment	\$ 700.00	
<i>Task 310 (Optional)</i>	4	<i>Additional Raw Water Quality Testing</i>		\$ 1,500.00
Task 400	5 & 7	Water Demand and Fire Flow	\$ 2,900.00	
Task 500	6	Inspect Water Supply and Storage Infrastructure	\$ 8,600.00	
Task 600	8	Develop Computerized Water Model	\$ 5,800.00	
Task 700	9	Evaluate Rate Structure	\$ 2,300.00	
Task 800	10	Report	\$ 6,000.00	
Task 900		Project Coordination and Meeting	\$ 3,700.00	
TOTAL			\$38,200.00	

Additional work will be performed, upon request, according to Nobis Group’s applicable Schedule of Fees to be provided at time of contract.

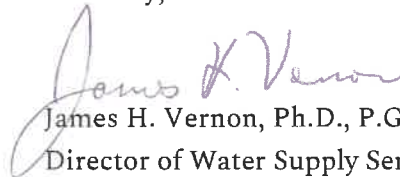


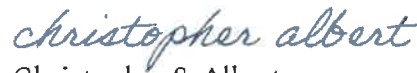
PROJECT SCHEDULE

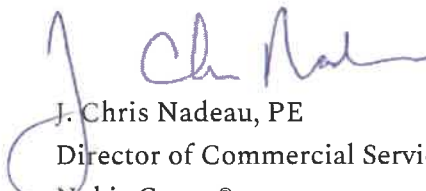
Our team is prepared to begin work immediately upon contract execution. Depending on whether the optional tasks are selected, we estimate that 3 – 4 months will be required to complete the work. For example, if the contract is executed in July 2021, we anticipate submitting our report in late October or in November 2021.

Thank you for this opportunity to present our proposal and qualifications. We would be pleased to answer any questions that the County may have.

Sincerely,


James H. Vernon, Ph.D., P.G.
Director of Water Supply Services
Nobis Group®


Christopher S. Albert
Principal Engineer, Owner
CSA Environmental Consultants, LLC


J. Chris Nadeau, PE
Director of Commercial Services
Nobis Group®

Attachments: Project Team Qualifications



water supply services

Nobis Group offers water supply services that include broad planning and assessment services from a water resources perspective and technical “bread and butter” services focusing on locating, developing, and permitting groundwater sources for water supply (wells) for Public Water Systems, private water supplies, and water bottlers. Nobis is highly experienced with wells tapping both overburden and bedrock aquifers.

Our projects include new gravel-packed wells for large community water systems, including permitting under New Hampshire’s Large Groundwater Withdrawal program and corresponding programs in other states. Nobis has located, installed, tested, and permitted bedrock wells for Small Community Water Systems and non-Community Water Systems. Nobis also offers a range of complementary engineering services for water system design and upgrade, through both in-house resources and collaboration with other engineering firms. Additional services include assessing existing water supply sources, troubleshooting water supply problems (e.g. increasing demand or declining yield), PFAS testing and assessment, grant/loan application, preparation of water conservation plans, and groundwater/wellhead protection.

Nobis’ current, recent, and prospective water supply clients include several New Hampshire and Massachusetts municipalities (towns, districts, and precincts), private water suppliers, homeowner associations, and partner engineering firms.

our capabilities

- New Groundwater Supply Exploration & Permitting*
- Test Drilling & Production Well Installation*
- Pumping Test Design, Implementation, & Interpretation*
- Water Supply Assessment & Planning*
- Water Well Sustainable Yield Assessment*
- Hydrogeologic & Aquifer Mapping*
- Surface & Borehole Geophysical Surveys*
- Water Distribution System Design & Construction Oversight*
- Water Conservation Plans & Wellhead Protection Plans*
- Bottled Water Source Assessments*
- Financial Planning & Analysis*
- Drought Contingency Services*



our offices

New Hampshire (603) 224-4182	Massachusetts (978) 683-0891	Connecticut (203) 409-1292	New Jersey (908) 320-7999
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meet our water supply experts



James Vernon, PhD, PG **Director of Water Supply Services | Senior Hydrogeologist**

James Vernon coordinates Nobis Group’s Water Supply Team and has been a consulting hydrogeologist/geologist since 1990, managing numerous new water supply well projects, water resource assessments, and aquifer protection projects. Dr. Vernon served as Chair of the New England Water Works Association (NEWWA) Groundwater Committee for 13 years and serves as an instructor for technical seminars offered by the Committee. He also works on contaminated groundwater projects, especially in complex geologic settings. Dr. Vernon is a licensed Professional Geologist in Maine, New Hampshire, and Pennsylvania.



Dr. Vernon has located, developed, permitted, and protected groundwater supplies (wells and springs) for federal, state, municipal, and private clients in all of the New England states, New York, and Georgia. He has conducted groundwater studies in a variety of settings including glacial deposits, weathered rock/saprolite, crystalline bedrock, karst, and other sedimentary bedrock. He has worked with regulators in all of the above states to permit new wells for Public Water Systems or bottled water operations. Dr. Vernon is also experienced in speaking at public hearings, teaching professional seminars, and professional committee service.

Jeffrey Kadegis, PG, MBA **Assistant Director of Water Supply Services**

Jeff Kadegis has over 8 years of experience in hydrogeologic and geophysical investigations in 15 states and is a licensed Professional Geologist in New Hampshire and Pennsylvania. Jeff’s groundwater investigation experience includes siting and mapping potable groundwater sources (wells and springs); exploration and development; impact assessments of natural and anthropogenic contamination; groundwater pumping testing and analysis; zone of influence assessments; permitting; and watershed and catchment sustainability analyses for both private and municipal water supplies. Jeff’s experience conducting groundwater studies includes a variety of settings including sedimentary, igneous, and metamorphic bedrock, karst, saprolitic, glacial, alluvial, and paleofluvial environments.



In addition to the water supply work, Jeff has also performed mining impact assessments on local and regional water supplies; karst investigations; geophysical investigations, including: electrical resistivity, seismic, borehole geophysical, ground-penetrating radar (GPR), and electromagnetic surveys; as well as mining operational assessments (e.g. slope stability geotechnical assessments, groundwater inflow and deepening assessments, economic reserves analysis, and financial modeling). Jeff couples his technical hydrogeophysical knowledge with his financial and business acumen to ensure all work is designed to develop and deliver long-term water resource solutions for his clients.

let us solve your water supply needs

nobis-group.com/services/water-supply

A detailed annual condition assessment report—including photographs and condition assessments for the asset—will be provided to the CDPW after the completion of each assessment to ensure all operational awareness and continued success. Reports also provide the necessary documentation to meet state and regulatory compliance for assessments and water storage asset conditions and can be provided to the CDPW via electronic copy, hard copy, or both. The process for each type of annual assessment performed on the SUEZ Tank Asset Maintenance Program is explained in the following subsections.

VISUAL ASSESSMENTS

Visual assessments ensure potential issues are detected early on in order to immediately complete any preventative maintenance work. A standard visual assessment determines:

- Need for any repairs, coating touchups, and/or asset maintenance
- Conditions of the exterior/interior coating
- Verification of compliance with any and all safety and sanitary regulations
- Condition of tank structure/components
- Functionality of all security measures that are in place to protect the tank

The SUEZ visual condition assessment report includes all the documentation of any services completed during the assessment, as well as photographs of the exterior coatings, logo(s), screens, access points, and all visible areas of the foundation to provide clients with a full understanding of the tank asset's condition. Visual assessment reports also identify needs for immediate repairs, exterior coating touch-ups, or other preventative maintenance work.



WASHOUT ASSESSMENTS

The SUEZ washout assessments include the cleaning and disinfecting of tanks to improve both water quality and operational efficiency. Our standard washout assessment includes all elements of the visual assessment, with the addition of the following:

- The tank is both isolated and completely drained, allowing for the interior condition to be fully evaluated.
- SUEZ provides multiple solutions to our clients to minimize service disruption and maintain minimum flows during washout assessments—as well as other scheduled maintenance—with pressure relief valves, variable frequency drive (VFD) controls, and temporary water storage units.
- The interior floor and walls of the tank are washed to remove mud, sediment, biofilm, silt, and inorganic deposits on the interior of the water storage tank.
 - More aggressive chemical cleaning options can be added on a case-by-case basis.
- The assessment and evaluation of both the interior and exterior of the tank include the safety, sanitary, security, and coatings condition assessments.
- The interior tank coating is evaluated for appearance, adhesion, coating condition, dry film thickness, protective qualities, and percentage of deterioration.
- After the interior assessment of the water tank is complete, the tank is disinfected in accordance with AWWA C652; the tank is then sealed and made ready for service.

The washout condition assessment report includes:

- Documentation of the work completed
- Photos of the interior before/after the washout
- Interior and exterior coatings
- Logo(s), screens, access points, etc.
- Visible areas of the foundation

These condition assessment reports provide clients with a full understanding of the asset's condition. They also identify any need for immediate repairs and coating touch-ups, as well as other preventative maintenance work.



An inspection of the tank appurtenances—such as vents, overflows, hatches, ladders, railings, and manholes along both the exterior and interior surfaces—will be performed to determine if the item complies with all of the latest OSHA, AWWA, NACE, SSPC, and NSF regulations and standards. Where deficiencies exist, SUEZ will provide recommendations to return the item to compliance.

REMOTELY OPERATED VEHICLE (ROV) INTERIOR INSPECTION

During ROV inspection, the tank is inspected for visible signs of failure or deterioration of the metal surfaces, paint, coatings, linings, welds, bolted connections, hatches, ladders, railings, manholes, and other appurtenances along both the exterior and interior surfaces. This also includes—but is not limited to—the list of evaluation items provided by the CDPW.

The tank interior is inspected by ROV method supplemented by a visual assessment from the roof hatch to ensure thorough coverage. Both the tank assessments and inspections are completed in accordance with the latest revision of both AWWA D101 and AWWA D110 guidelines.

All equipment and personnel used in the interior of the tank shall be clean and free from loose dirt, rust, lubricant, or other foreign matter. All equipment used in a ROV inspection is strictly for utilization in potable water applications and shall be disinfected with a 200ppm chlorine solution in accordance with AWWA C652 Method 2 prior to use in the tank. A remote monitor will also be available during ROV inspection to provide live feed to personnel during the operation.



EXTERIOR & INTERIOR RENOVATIONS

SUEZ representatives will work closely with the CDPW to plan any upfront services to bring the asset into baseline condition under terms that are agreeable to both parties involved. These services will be conducted per applicable OSHA and AWWA standards. Dependent on the overall condition of the water storage tank asset, this may include the installation of updated safety and security features, chemical cleaning, interior and exterior coating repairs, structural repairs, and disinfection—as well as the installation of active mixing systems. Undergoing upfront renovations will bring assets into their optimum condition and—simultaneously—extend the useful life of assets. As part of the SUEZ Tank Asset Maintenance Program, clients can spread the costs of major upfront renovations over an extended period of time—ultimately assisting the client with long-term financial stability, predictable costs, and budget planning. We work with our clients to evaluate the unique needs of their budget and provide sustainable, advanced solutions—both operationally and financially.

EMERGENCY SERVICES

SUEZ completes tank emergency repairs and maintenance services at any time to address, remedy, and correct any unforeseen or unsafe asset conditions. Emergency repairs are maintenance services beyond any of the initial tank repairs that were identified during annual condition assessments. The repairs are covered at no additional cost to the owner under the SUEZ Tank Asset Maintenance Program. Emergency services are typically commenced within 24 hours of notice and include:

- Leaks in the water storage vessel (excluding the tank fill line)
- Offensive graffiti (non-offensive graffiti will be scheduled for repair as soon as possible)

SECURITY MEASURES

Preventing access by intruders and pests is critical to the protection, condition, and water quality of assets. The installation and maintenance of ladder anti-climb devices, roof hatch locks, and the security of all other access points to the water tank interior is fully included in our asset maintenance program. Our program also covers regular maintenance and replacement of screens on both vents and overflow valves to prevent unwanted intrusion by insects, bugs, birds, and other pests.

WASTE MANAGEMENT PLAN

SUEZ has an environmental policy and procedure that covers our commitment to environmental compliance—including waste generated on the job sites. These procedures explain how we treat both hazardous and nonhazardous waste types to ultimately ensure compliance and reduce risk. Each individual project has a Project Manager that both reviews the scope and creates a plan for execution that includes a plan for managing and handling hazardous and nonhazardous waste.

In regard to the handling, transportation, and disposal of hazardous waste materials, all empty cans, containers, waste material, and rubbish are removed from the immediate worksite area and placed in the appropriate, visibly-marked waste containers while the work progresses. All solvent waste, oily rags, and flammable liquids are kept in covered, fire-resistant containers until they are removed from the worksite. All hazardous waste created will be transported by certified hazardous-waste haulers to approved hazardous-waste disposal sites. While blasting tank interiors or exteriors that contain—or may contain—lead paint or primers, we use a blasting compound to encapsulate the lead, enabling it to be handled as a non-hazardous material for both transportation and disposal.

ACTIVE MIXING SYSTEMS

This section details our active mixing system capabilities—if included in the services agreement.

Water quality is a critical factor in the operational performance of water systems and water tanks. Without the proper solution, water systems can experience a variety of unfavorable outcomes. For example, when water stratification occurs, it allows old, stale water to enter the water distribution system—resulting in taste and odor complaints from customers. As quality regulations increase—and operational resources decrease—utilities need a cost-effective solution that offers maximum performance for water distribution systems.

The PAX Water Technologies active mixing systems are exclusive to SUEZ clients. Typically—within 24 hours of installing the active mixer—the water distribution system will reach its equilibrium and ultimately improve the overall water quality with rapid efficiency and effectiveness.

Other issues affecting the water quality in water storage tanks include disinfection byproducts (DBPs), ice damage, nitrification, increased water age, and residual loss. EPA regulations for permissible levels of DBPs and THMs in water distribution systems and water storage tank assets continue to increase—adding pressure on water system managers to regulate and control standards within their system. The PAX submersible mixers' powerful vortex flow pattern inside the tank creates water circulation from top to bottom—reducing thermal stratification and water age. The consistent water age may reduce old, stale water from entering water distribution systems and—in some cases—may reduce any associated taste and odor issues.

Mixing also allows for the even distribution of chlorine and disinfectant chemicals—which can result in a reduction of chemical usage. In colder climates, the active mixers will reduce ice formation to prevent both tank expansion and contraction—as well as the loss of any water storage tank resources. Our active mixing solutions are customized to the water storage tank size, capacity, and type—specific to the climate and geographic variables of the system—to ensure optimum performance.

Active mixing systems are not just a product; they are a comprehensive solution that is built to the specifications of a water system to provide optimal support. Mixers can be installed while some tanks are in service; others may need to be drained—depending on the tank specifications.

Lastly, the installation, servicing, and ongoing maintenance of the PAX active mixing systems can be fully covered as an additional service under SUEZ's maintenance program.



LEE F. CARROLL, P.E.
Consulting Electrical Engineers

Lee F. Carroll, P.E., is a small proprietorship consisting of two full-time engineers. The firm obtains CAD services by subcontract with a local firm that provides that service to many national clients. This firm serves various architects, engineers, and/or industrial, institutional, commercial and governmental clients with electrical design work and studies.

The firm's projects include machinery controls design, various electrical designs for facilities (including communication, alarm systems, power and lighting), energy conservation studies and reports, power system studies, reports, and design, power generation controls design, utility rate studies, and expert witness on electrical accidents and/or losses.

Facilities projects have included potable water and waste water treatment facilities, airports (electrical vaults, R/W & T/W lighting and signage, approach lighting), solid waste incineration and recycle plants, sports field lighting, high-rise office facilities, schools, churches, libraries, hospitals and nursing homes, paper mills, machining operations, multiple unit housing, motels, etc.

The firm is presently registered in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Connecticut and several other states.



James Vernon, PhD, PG, CPG
Director of Water Supply Services | Senior Hydrogeologist

registrations / certifications

Professional Geologist, (ME #GE374; NH #00674)
Certified Professional Geologist

credentials

Ph.D., Geology – University of Oklahoma (1987)
M.A., Liberal Studies – Wesleyan University (1982)
B.A., Geology and Mathematics – Bucknell University (1974)

key projects

Pine Grove Mobile Home Park, West Swanzey, NH

Assisted Pine Grove in obtaining two new water supply sources following loss of one of the existing gravel-packed wells during the drought of 2016. This followed the prior loss of four bedrock wells due to MtBE contamination. Nobis performed this project under our contract with NHDES, with funding provided by the MtBE Bureau. Nobis considered both stratified drift and fractured bedrock aquifers and identified potential drilling sites on land owned by Pine Grove. Two new bedrock wells successfully provide water needed to make up for the shortfall in the 2016 drought and to allow for future water supply needed at “build-out”. Nobis conducted the pumping tests and permit applications to obtain approval for the new water supply sources. Nobis also assisted Pine Grove in modifying its Wellhead Protection Plan, preparing a Water Conservation Plan, and obtaining funding under the Drinking Water State Revolving Fund and the new Drinking Water and Groundwater Trust Fund. Nobis won a project award from the New Hampshire chapter of ACEC for this project in 2020.

qualifications summary

- Provides water supply services, including water yield assessment, groundwater exploration, and well testing and permitting in both fractured bedrock and stratified drift settings.
- Develops and permits new water supply wells.
- Expertise in hydrogeology, structural geology, geophysics, source water protection, hydrology, and field geology.
- Develops conceptual site models for contaminated groundwater sites in complex hydrogeologic settings, especially fractured bedrock.
- Assesses potential groundwater flow directions and contaminant transport pathways in fractured rock settings.
- Experience with well tapping both overburden and bedrock aquifers.



James Vernon, PhD, PG, CPG

Municipal Well Installation, Marlborough, NH

As Project Manager and Technical Lead, assisted the Town with installing, testing, and permitting two new gravel-packed production wells to serve the Town water system. Provided overall project coordination; drilling and well construction supervision; prepared successful permit applications to NHDES for a Large Groundwater Withdrawal Permit and a New Large Community Well permit; designed and conducted extensive pumping tests; monitored groundwater, wetlands, and stream flow; assisted the Town with Water Conservation Plan and a Wellhead Protection Plan; and provided support at Public Hearings. The two new, gravel-packed wells were drilled in summer 2011 by Nobis' subcontracted well drilling firm and tested in 2012 to meet permitting requirements. Large Groundwater Withdrawal Permit and New Large Community Well Permits were granted by NHDES in August 2013. Assisted the Town in obtaining a federal grant/loan funding package for the project. This project won project of the year award in its category from the New Hampshire Chapter of the ACEC in 2014.

Rollinsford Water and Sewer District, Rollinsford, NH

Worked closely with the District and the District's engineering consultant to assess options for the General Sullivan Well, a gravel-packed well installed in the 1950s that experienced declining yield and the frequent need for re-development. Selected a favorable location outside the existing pumphouse and installed, tested, and permitted a replacement well for the District.

Pillsbury Lake District, Webster, NH

Assisted the District in improving its Community Water System, following water supply shortfalls in 2010 and 2011. Worked closely with the District and the New Hampshire Department of Environmental Services (NHDES), assisted the District in obtaining accurate yield estimates for three of its four existing bedrock wells, deepening and hydrofracturing two of its wells, and testing and permitting the deepened wells. The District worked to locate and repair water main leaks. The District was then notified by NHDES that its water supply shortfalls were corrected. This was done without the expense of drilling, testing, and permitting a new well.

Waterville Estates Village District, Campton and Thornton, NH

Assisted the Waterville Estates Village District with the current and future water supply for their Community Water System. Worked closely with the District and NHDES to evaluate several options for new water supply in addition to protecting the existing wells. Services have included assisting the District in applying for a Flood Mitigation Grant from FEMA, following the close approach of Mad River flood waters to the existing wells during Hurricane Irene.



James Vernon, PhD, PG, CPG

Public Spring Assessment, Plymouth, NH

Assessed and made recommendations for improvements of the Town's roadside spring. Examined the spring's construction and the upgradient contributing area to the spring and submitted a report with recommendations for improving and protecting the spring. Assisted the Town with procuring specialized services to improve the spring.



Jeffrey Kadegis, PG, MBA
Assistant Director of Water Supply | Project Hydrogeologist

registrations / certifications

Professional Geologist, (NH #00906; PA #005366)

credentials

M.B.A., Finance – Delaware Valley University (2016)

B.S., Geology – Kutztown University (2012)

key projects

Milan Water Supply Well, Milan, NH

Serving as hydrogeologic lead in this ongoing project to address contamination of local homeowner wells due to a fuel spill. Investigating contaminant transport and groundwater flow and considering using an innovative overburden well design to avoid drilling a replacement well into the contaminated bedrock aquifer.

Oak Hall Borough, Centre County, PA

Developed hydrogeologic conceptual models pursuant to permitting municipal water supply wells through State and Federal agencies for municipalities. Calculated all hydrogeologic parameters required to permit public water supply (PWS) well. Developed hydrogeologic conceptual models pursuant to permitting municipal water supply wells through State and Federal agencies for municipalities. Calculated all hydrogeologic parameters required to permit public water supply (PWS) well.

Industrial Pet Food Property, Lehigh County, PA

Planned, managed, and performed hydrogeophysical investigation to site, develop, and permit a high-capacity public water supply well in confined carbonate geology at

qualifications summary

- Experience in geologic and environmental engineering.
- Geology experience includes hydrogeophysical investigations; karst investigations; structural geologic mapping; slope stability investigations; geotechnical investigations; natural resource management; sustainability analysis; water supply development, testing, and permitting; and naturally-occurring asbestos (NOA) exposure assessments.
- Environmental experience includes Phase I and Phase II Environmental Site Assessments (ESAs); Brownfields; remediation, and closure; regulatory compliance; stormwater infiltration investigation; wetlands mapping and impact assessments; water supply permitting; Title V permitting; and NPDES permitting.

www.nobis-group.com



Jeffrey Kadegis, PG, MBA

risk to surface water inflow and facilitate stormwater management plans. Refined regional geologic mapping based on site-specific structural mapping using a Brunton compass, directed the installation of test pits and logged soils, performed infiltration assessments of unconsolidated glacial till using double-ring infiltrometers in accordance with ASTM standards, conducted and interpreted 2D and 3D electrical resistivity surveys to identify preferential flow pathways within unconsolidated overburden and competent bedrock, directed installation of boreholes using an Ingersoll Rand T-4 to assess structural hydrogeologic framework, developed a conceptual groundwater flow model using Surfer and refining in AutoCAD Civil 3D, performed numerous hydrogeologic tests (stepped-rate, constant-rate, rising/falling head) to quantify aquifer characteristics, assessed surface water impacts during borehole production, and calculated hydrogeologic aquifer properties. Submitted hydrogeologic report for regulatory approval with Delaware River Basin Commission (DRBC).

Commercial and Industrial Properties, Monroe and Luzerne Counties, PA

Planned, managed, and performed a natural resource investigation pursuant to sustainable development of spring source(s) for bulk water hauling. The investigation included wetland delineation support for professional wetland scientists, manually installing and logging nested piezometers to measure vertical flow gradients of surficial water sources, sizing and installing Parshall flumes to gauge High Quality streams, developing a stage-discharge Hydraflow models for streamflow, performing an electrical resistivity geophysical survey using a SuperSting R8 earth resistivity meter to site boreholes in conjunction with structural geologic mapping, directed installation of boreholes using an Ingersoll Rand T-3 to assess structural hydrogeologic framework, developed a conceptual groundwater flow model, refined regional geologic mapping based on site-specific mapping collected with a Brunton compass, performed numerous hydrogeologic tests (i.e. stepped-rate, constant-rate, falling head, rising head, constant-head) to quantify aquifer characteristics, assessed surface water impacts of springs during borehole testing, and calculated hydrogeologic aquifer properties. Generated comprehensive hydrogeological report that was submitted to local Township Board of Supervisors, Susquehanna River Basin Commission (SRBC), and PADEP regarding proposed development.

KH Springs, LLC, Schuylkill County, PA

Planned, managed, and performed natural resource investigation pursuant to sustainable development of spring source(s) for bulk water hauling. Investigation included manually installing nested piezometers and logging soils, sizing and installing Parshall flumes and V-notch weirs to gauge High Quality streams, developing a stage-discharge Hydraflow model for streamflow, developed a conceptual groundwater flow model using Surfer and refining in



Jeffrey Kadegis, PG, MBA

AutoCAD Civil 3D, refined regional geologic mapping based on site-specific mapping using a Bruton Compass, performed numerous hydrogeologic tests (blown yield, stepped-rate, constant-rate, rising/falling head) to quantify aquifer characteristics, assessed surface water impacts during borehole testing, and calculated hydrogeologic aquifer properties.

Industrial Pet Food Property, Lehigh County, PA

Planned, developed scope of work, and managed MPA sampling assessments for non-community, transient water supply wells in compliance with PADEP requirements at an industrial facility with wells intercepting high-yield karst aquifers that are under the influence of surface water.



CHRISTOPHER S. ALBERT
OWNER – CSA ENVIRONMENTAL

Mr. Albert recently created CSA Environmental Consultants LLS, bringing over 30 years of experience in municipal design, permitting, and construction management in the Wastewater and Drinking Water fields. He is sitting to take the Professional Engineers exam in October 2021. We welcome Rowen Prescott, PE to the CSA team for Professional assistance.

PROJECT HIGHLIGHTS

Madison, NH-Village District of Eidelweiss: Lead project Engineer and Manager on the design of the 120,000-gallon DN cast in place water storage tank; the upper Reinach pressure zone with 4,000 linear feet of 4” HPDE watermain with a booster pump station. Instrumental in obtaining a \$295,000 grant through the Groundwater Trust Fund. Work entailed evaluating current pressure gradients in the District and designing new pressure zones.

Epping Water and Sewer Commission, Epping, NH: Pilot Plant: Lead Design Engineer for the Pilot plant for the Town of Epping’s new water supply. The 100 GPM plant was construed to removed arsenic and manganese. The interim plant was operational for over 4 years until a permanent plan could be constructed. *Water Storage Tank:* Project Manager for the construction of a 300,000-gallon elevated steel storage tank. QC/QA for friction pile and concrete base placement, installation of 3,000 LF 12” DI waterline, steel tank erection and welding inspections.

Newfield Water and Sewer Commission, Newfield, NH – Route 85 Water and Sewer Extension: Lead Designer for a 1700 linear foot water extension on NH Route 85. The work entailed a hydraulic analysis of the current water system and placement of fire hydrants for fire suppression and blow offs.

Town of Winchester: Ashuelot Covered Bridge: Design, permitting, and construction of 245 LF 8” snap-lok D1 water line across the Ashuelot River. Work involved a river diversion and structural repairs to the Ashuelot Covered Bridge. *Well House upgrades:* The work entailed upgrades to the above ground storage tank and installing a telemetry system between the tank and well houses. *Snow Road infrastructure improvements.* CDBG funded grant project. Worked with SWRPC on grant administration. Reconstructed approximately 1200 linear feet of roadway with new municipal wastewater and water.

Rollinsford Water and Sewer District, Rollinsford, NH: Construction of 3000 LF of 12” DI water line, and a 750,000-gallon Natgun prestressed concrete water storage tank.

PROFESSIONAL EXPERIENCE

2020 to Present: CSA Environmental Consultants LLC. Owner, Nottingham, NH. Project Manager for the design, permitting, and construction management for Drinking Water, Wastewater, Stormwater and Environmental Projects in New Hampshire

2018 to Present: UNH Technology Transfer Center (T2) Program. Instructor for the Certified Culvert Maintainer (CCM) program for T2. Coordinating with the NHDES Wetlands Bureau, NHDOT and T2 on the training programs. Instructing Road Agents and NHDOT officials on being certified in the best management practices in replacing culverts under 48" in diameter.

2007 to 2020: Jones and Beach Engineers Inc. Stratham, NH. Civil Engineers and Land Surveyors; Senior Project Manager responsible for the design and construction management on environmental and civil engineering projects including municipal drinking water systems; wastewater pump stations; onsite wastewater treatment systems; wetland delineations, evaluation, and mitigation; roadway and highway construction inspector; Town roadway culvert design and stormwater management; Groundwater sampling and studies.

1993 to 2007: Hoyle Tanner and Associates, Manchester, NH. Civil Engineers; Project Manager and Resident Engineer responsible for the design and construction management on environmental and civil engineering projects including FAA airports; water and wastewater treatment plants; landfill closures; Inspector on DOT roadway projects.

1987 to 1993: TF Moran Inc. Manchester, NH. Land Surveyors and Civil Engineers; Senior Survey Chief and Resident Engineer. Resident Engineer for the Jones Ave. Landfill and NHDOT highway improvements.

1991 to 1997: Town of Nottingham Part-time Building Inspector. Responsible for the issuance and inspection on all permits in Town. Town inspector for the construction of the new K-8 middle school.

LICENSES AND CERTIFICATES

State of New Hampshire Certified Grade 1A Water Works Operator (Cert. # 3153)
Start of New Hampshire Licensed Wetland Scientist (CWS #21)
State of New Hampshire Licensed Designer of Subsurface Disposal Systems (#1085)
State of New Hampshire Licensed Septic System Evaluator (#24)
Certified Professional in Erosion and Sediment Control (CPESC #4668)
Certified Professional in Storm Water Quality (CPSWQ #493)
New Hampshire Survey In Training (SIT #300)
OSHA 10-Hour Construction Safety and Health

EDUCATION

University of New Hampshire, B.S. in Forestry, minor in soils
University of New Hampshire, Graduate Courses: Landfill Design, Legal Issues in Engineering, Designing with Geosynthetics

CHRISTOPHER S. ALBERT
OWNER – CSA ENVIRONMANTAL

BOARD AND ASSOCIATIONS

NH Office of Professional Licensure and Certification (OPLC): Governor Appointments

Board of Septic System Evaluators, Chairman.

Board of Natural Resource Scientist, Vice Chairman.

New Hampshire Water Works Association (NHWWA). Board of Directors, vice Chairman

NH Association of Natural Resource Scientist (NHANRS), Board of Directors, past President

Granite State Onsite Wastewater Association (n/f GSDI) Board of Directors, Chairman

Southeast Watershed Alliance (SWA) - Town of Epping Representative, Board of Directors

HB 475 Shoreland Septic Study Commission – Governor Appointment

Past member of the Nottingham Volunteer Fire Department, School Board, and Planning Board, chairman.

CHRISTOPHER S. ALBERT
OWNER – CSA ENVIRONMENTAL



36 Stage Rd, Nottingham NH 03290
 603.679.1866 C: 603.706.2521
 calbert.env@gmail.com

ROWEN E. PRESCOTT, P.E. | *Engineered Products Manager*



Rowen Prescott is a Professional Engineer who specializes in civil engineering for water and wastewater projects. His experience includes water treatment design recommendations, design document review and preparation, as well as field observations and equipment commissioning.

Professional Experience

Water

- *Main Street and Mountain Road Water Main Replacement:* Acted as the project engineer for the replacement of 12,000 feet of water main and pump station improvements in Jaffrey, NH. Duties included preparation of design documents for the replacement water main and pump station upgrades as well as for project approval from NHDOT and NHDES. Additional duties included field investigations, attendance at design meetings and coordination with the Jaffrey DPW, Water Department, and Sewer Department.
- *Rochester Pump Station Design:* Acted as project engineer for the design of a new booster pump station and water mains for the City of Rochester, NH. Duties included preparation of design and construction documents for pump station and water mains, hydraulic calculations, coordination with pump manufacturers and submittal review.
- *MDC Clean Water Project:* Provided full time construction observation services to the Metropolitan District Commission for the installation of 1,500 feet of ductile iron water main as a part of the Granby Street Sewer Separation Project in Hartford, CT. Duties included daily construction observation of subcontractor during water main installation as well as daily reports, construction quantities and as-built drawings.
- *Aquarion Water Company Great Boar's Head Water Main Replacement:* Provided design and construction services for the abandonment of an eight-inch cast iron water main, and installation of new HDPE water mains and service connections in Hampton, NH. Duties included preliminary site visit with client, coordination with owner and contractors throughout design and bidding phase, as well as on-site design and construction services.
- *Portsmouth Naval Shipyard Pump Station:* Acted as the project engineer on a team to provide the design and specifications for a full retrofit of the existing fresh water pump station at the Portsmouth Naval Shipyard. This project included the replacement of existing pumps, controls, and piping within the pump station, installation of OSHA compliant staircase, as well as underground water main replacement in the vicinity of the pump station. Duties included preparation of design and construction documents, weekly design meetings with the NAVY, coordination with contractors and subcontractors, editing NAVY specifications, reviewing shop drawings, and construction services.
- *Aquarion Water Company Booster Station:* Provided field observation and client coordination for the replacement of an eight inch ductile iron water main, and installation of a concrete meter vault in Hampton, NH.

YEARS OF EXPERIENCE

8

SPECIALTIES

Water

Wastewater

EDUCATION

**Master of Science
 Civil Engineering
 University of New Hampshire**

**Bachelor of Science
 Civil Engineering
 University of New Hampshire**

PROFESSIONAL AFFILIATIONS

Water Quality Association

NH Water Works Association

Wastewater

- **Whitla Drive Pump Station Replacement:** Acted as a project engineer for the design of a new sewer pump station located on Whitla Drive in Worcester, MA. Duties included preparation of design plans and specifications for the new pump station as well as the design of a temporary pumping station.
- **Sandwich Wastewater Treatment Facility Upgrades:** Provided design and construction services for the replacement of six (6) existing septic tanks with two new 25,000 gallon septic tanks. Duties included preparation of design and construction plans, specifications, and construction phase services.
- **Webster Leachate Pumping Stations:** Provided field investigation, and design documents for the rehabilitation of two leachate pumping stations located within the sludge residual landfill at the Waste Water Treatment Facility in Webster, MA. Duties included initial site investigation, design plans for the rehabilitation of the stations, pump sizing, hydraulic calculations, and construction phasing plan.
- **Portsmouth Naval Shipyard Sanitary Sewer System:** Provided field observation, maintenance recommendations, and design improvements for the existing sanitary sewer system at the Portsmouth Naval Shipyard in Kittery, ME. Included assessing existing utility components and their condition, studying historical and current flow data, as well as inflow and infiltration rates. Also included preparing contracts for system improvements.

Coastal/Waterfront Engineering

- *Harborwalk Park:* Provided construction observation for a new waterfront park, including repair and replacement of stone seawalls, historical interpretive display and triangular harbor overlook pier, Portsmouth, NH.
- *Harbour Place Wharf & Marina Assessment:* Assessment of a 400 foot long timber wharf and adjacent marina, Portsmouth, NH
- *PNSY Marine Hydrokinetic Energy Implementation Study:* Acted as a project engineer on a team to provide a comprehensive engineering analysis of the hydrokinetic resources in various locations at the Portsmouth Naval Shipyard, Kittery, ME.

Geotechnical

- *Jaffrey, NH Geotechnical Investigation:* Provided geotechnical drilling observation for the replacement of 12,000 feet of water main along Mountain Road and Main Street in Jaffrey, NH.
- *Lindt Sprungli Building Expansion:* Provided geotechnical drilling observation for a 110,000 square foot expansion to the Lindt Sprungli chocolate plant. Duties included observation of subsurface explorations, soil classification, rock classification, and preparation of subsurface exploration location plans.
- *PSNH Substation Improvements:* Provided geotechnical drilling observation at two potential electrical substation sites. Duties included observation of subsurface explorations, soil classification, monitoring well installation, environmental sampling, and preparation of subsurface exploration location plans.
- *Granby Landfill:* Provided field observation for various stages of landfill operations in Granby, MA. Included settlement and slope stability data collection using settlement monitoring equipment and inclinometers on capped and active areas of the landfill.
- *Chicopee Landfill:* Provided field observation for various stages of landfill operations in Chicopee, MA. Duties included leachate head levels and flow data collection using piezometers and pump station instrumentation.
- *Londonderry Subsurface Investigation:* Provided oversight of geotechnical contractors during subsurface investigation in Londonderry, NH. Duties included oversight of test pits, Geoprobe soil sampling, and soil classification.

Additional Experience

- *Aquarion Water Company Kings Highway Water Main Replacement:* Provided design and construction services for the replacement of an eight inch cast iron water main, new crossover connections to two existing six inch cast iron water mains, temporary water services, and all service connections to the new water main. Duties include developing design plans and

ROWEN E. PRESCOTT, PE
ENGINEERED PRODUCTS MANAGER – CSA ENVIRONMENTAL

specifications for new water main and all connections, coordination with client and contractors throughout bidding process, and construction services.

- *Rochester Retail Development*: Provided permitting and design documents for a proposed 300,000 square foot mixed retail development in Rochester, NH. Duties included preparation of Alteration of Terrain Application and all supporting documentation as well as preparation of design plans and stormwater management design.
- *Greenland Multi-Use Development*: Provided permitting, conceptual and design documents for a proposed development located in Greenland, NH. Duties included preparation of conceptual and design plans as well as preparation of Alteration of Terrain Application and all supporting documentation.
- *Durham Town Hall*: Provided design and construction plans for the new town hall in Durham, NH. Duties include development of site, utility, drainage, and landscape plans.
- *Stratham Multiuse Development*: Provided site plans for a multiuse development in Stratham, NH. Duties include preparation of design documents, site layouts, truck turning, grading plans, utility plans and construction details

ROWEN E. PRESCOTT, PE
ENGINEERED PRODUCTS MANAGER – CSA ENVIRONMENTAL

SCOTT KELLEY

WATER SYSTEM CONSULTANT (COMMONWEALTH OF MASSACHUSETTS)



YEARS OF EXPERIENCE

- 33 Years Total
- 28 Years in the Water and Wastewater Industry
- 12 Years in Asset Maintenance

EDUCATION

- Associates Degree, Business Administration, NHTI Community College, 2011.

AREAS OF SPECIALIZATION

- Business Management
- Asset Management
- Account Management
- Business Development
- Customer Service

PROFESSIONAL CERTIFICATIONS

- Small Business Management Certificate, NHTI Community College, 2008

PROFESSIONAL ASSOCIATIONS

- American Water Works Association (AWWA)
- New England Water Works Association (NEWWA)
- New Hampshire Water Works Association (NHWWA)
 - Program Committee
 - Distribution & Storage (D&S) Committee
- New Hampshire Water Pollution Control Association (NHWPCA)
- Granite State Rural Water Association (GSRWA)
- Massachusetts Water Works Association (MWWA)
- Massachusetts Rural Water Association (MRWA)
- Maine Water Utilities Association (MWUA)
- Vermont Rural Water Association (VRWA)
- Green Mountain Water Environment Association (GMWEA)
- Occupational Safety and Health Administration (OSHA)

PROFESSIONAL TRAINING

- OSHA Training | First Aid | CPR
- United States Marine Corps (USMC) Leadership & Financial Management School Training
- Leadership (Dun & Bradstreet)

OFFICE ADDRESS

- 24 Fellows Road, Brentwood, NH 03833

KEY QUALIFICATIONS

Mr. Scott Kelley serves as a dedicated Water System Consultant (WSC) for SUEZ Advanced Solutions | Utility Service Co., Inc. He is readily available to the municipalities he serves for project consultation, to answer any questions, provide information about other services, and assist as a constant resource in all aspects of water systems, asset maintenance, and asset management. Mr. Kelley specializes in supporting both municipal and industrial water system clients with a sense of urgency to accomplish services in a timely manner and meet established deadlines, ultimately providing specialized services in a method that will produce the high-quality results expected from SUEZ's many valued clients. His extensive experience qualifies him to conduct the work associated with the requested services. Mr. Scott Kelley has now been employed with SUEZ Advanced Solutions | Utility Service Co., Inc. for nine (9) years as a WSC within the New England Region, including the:

- Commonwealth of Massachusetts
- State of Maine
- State of New Hampshire
- State of Vermont

PROFESSIONAL EXPERIENCE

SUEZ ADVANCED SOLUTIONS | UTILITY SERVICE CO., INC.

Water System Consultant (Commonwealth of Massachusetts)

2011–Present

- Develops and implements effective strategies to capitalize on opportunities in his territory
- Utilizes all products and services available to create SUEZ separation from the competition
- Lead-generation and creation of opportunities through the established SUEZ Sales Process
- Performs industry-standard condition assessments on all types of potable water assets
- Manages existing customer base utilizing relationships to grow new business accounts
- Creates and implements new marketing promotions and strategies to gain market share
- Works directly between Line of Business (LOB) team(s) for each product line and client to close deals and identify opportunities
- Comprehensive knowledge of asset management and maintenance programs for the potable water, wastewater, and utility industry
- Sales development, project planning, and management for water, wastewater, municipal, industrial, and commercial customers
- Track and manage existing and potential opportunities through Salesforce
- Forecast accuracy through strong business relationships
- Understand the client's needs and time-lines for sales

EASTERN ANALYTICAL, INC.

Sales & Marketing Manager | Customer Development

1997–2011

- Manage and perform all sales (internal and external) and all marketing activities
- Create and implement sales and marketing business plan and budget
- Maintain existing customers, create target lists, and develop new customers
- Monthly revenue, project and customer management, and tracking
- Research new lines of business and stay current with industry needs
- Exhibit at trade shows and attend industry meetings: staff and customer presentations
- Marketing, accounting, and service responsibilities

NEI/GTEL ENVIRONMENTAL LABORATORIES, INC.

Accounting | Customer Service | Supervisor

1992–1997

- Accounting, customer service, and group supervisor responsibilities

Lee F. Carroll, PE
Electrical Consultants
1 Madison Avenue
Gorham, NH 03582
(603) 466-5065(W) (603) 466-3680(H)

Professional Experience

- 1973-Present Self Employed Electrical Engineering Consultant. Electrical Consulting for industrial, commercial, municipal, education and institutional projects. Included are projects on the airfield side of airports including upgrades to power vaults, obstruction beacons, and other ancillary systems/equipment and also potable water and waste water treatment and pumping facilities, electrical utility designs and studies, pulp and paper industry control and power design, low head hydroelectric and coal/wood fired power plants, hospitals, schools, energy audits, and forensic engineering/expert witness testimony, etc.
- 1970-1973 Wright, Pierce, Barnes & Wyman, Topsham, Maine. Chief Electrical Engineer responsible for all electrical design and specifications for engineering projects. Some responsibility for electrical phase of architectural projects of Wright, Pierce & Whitmore. Work included sewage pumping stations, treatment plants, water systems, recreational areas, street and site lighting, schools, hospitals, nursing homes, multi-story office building, etc.
- 1966-1970 Brown Company, Berlin NH Electrical Engineer, Central Engineering, Dept. Responsible for formulating material and construction specifications. Full electric responsibility for \$22 million plant expansion, including consulting firm coordination. Responsible for operation management of power system including budgeting, manpower, etc. Consultant to other company divisions.
- 1965-1966 Georgia-Pacific Corp., Lyons Falls, NY Plant Electrical Engineer. Responsible for initiation, estimating, specification, and follow-up on plant electrical projects. In depth analytical report of plant electrical system economic operations and development of long-range plant generation modifications.
- 1964-1965 American Optical Co., Southbridge MA. - Maintenance Engineer. Responsible for estimating, specification, procurement and follow-up on plant engineering projects.

Resume of Lee F. Carroll, P.E.

- 1960-1964 Fraser Paper, Ltd., Madawaska, Maine Plant Electrical Engineer with overall electrical responsibility after 1962. Electrical systems studies, major expansion liaison with contractors.
- 1957-1960 Fraser Paper, Ltd., Madawaska, Maine (under Northeastern University cooperative education program). In crew work on electrical maintenance and project engineering work in engineering department.
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Education

Graduate of Gould Academy, Bethel, Maine, 1955

Graduate of Northeastern University, BSEE Boston, Mass. 1960

Professional and Civic Activities

Professional Engineer Licensed in Maine, New Hampshire, Commonwealth of Massachusetts, Commonwealth of Virginia, Vermont, New York, Pennsylvania, Rhode Island, New Jersey, North Carolina, South Carolina, Connecticut, and Florida.

Past Professor, Adjunct Staff: NH Community Technical College at Berlin

Master Electrician licensed in State of New Hampshire

Senior Member - Institute of Electrical and Electronics Engineers

Member - Illuminating Engineering Society

Member - New Hampshire Society of Professional Engineers, NSPE

Member - International Association of Electrical Inspectors

Associate Member - National Fire Protection Association

Past Member - N. H. Department of Transportation Appeals Board (1985-2002)

Life Fellow Member – American College of Forensic Examiners International

Resume of Lee F. Carroll, P.E.

Past Member - Board of Trustees - Gould Academy, Bethel Maine (1982-2009)

Past President - New Hampshire Society of Professional Engineers (1999-2000)

Past President - Gorham Development Corporation

Past President - North Country Home Health Agency (1997-2000)

Commissioner - Gorham, NH Water and Sewer Dept.

Past Member - Professional Engineers Board, State of New Hampshire

Emeritus Member - Professional Engineers Board, State of New Hampshire

Past Member – Home Inspectors Board, State of New Hampshire

Member - New Hampshire State Building Code Review Board

Member - PE Electrical and Computer Exam Committee, NCEES

Professional Awards and Recognition

New Hampshire Engineer of the Year, 1990

NCEES Northeast Zone, Distinguished Service Award, 2012



Municipal Well Installation & Permitting Marlborough, NH

Installation, testing, and permitting two new gravel-packed production wells for the Town of Marlborough's water system

Nobis installed two new water supply wells to replace one of the Town of Marlborough's previous wells in a more protected location on Town-owned property. Nobis worked closely with the Town, the Town's general engineering consultant, USDA Rural Development (the funding agency), NHDES, and subcontracted well drillers. The two new, gravel-packed wells were drilled in 2011 by Nobis' subcontracted well drilling firm, tested in 2012 to meet permitting requirements, and permitted in 2013. Nobis assisted the Town in obtaining a federal grant/loan funding package for the project.

Nobis performed the following for the Town of Marlborough:

- Overall project coordination;
- Assistance in obtaining federal grant/loan funding package;
- Well drilling and well construction oversight;
- Preparation of successful permit applications to NHDES for a Large Groundwater Withdrawal Permit and New Large Community Well Permits;
- Extensive pumping tests that monitored groundwater, other supply wells, wetlands, residential wells, potential sources of contamination, and stream flow;
- Preparation of Water Conservation Plan and a Wellhead Protection Plan; and
- Technical support to Board of Selectmen at Public Hearings.

Additionally, Nobis assisted the Town with maintaining and upgrading the one remaining original well, in a different location, to provide operational flexibility for future water supply needs. This upgrade enabled the Town to meet increasing water needs of a commercial customer, who had proposed to drill their own well in the same aquifer as the Town's new wells. This solution maintained the Town's revenue stream and avoided a competing water withdrawal in a limited aquifer. Nobis continues to assist the Town of Marlborough with routine well maintenance and well operations consultation.

services

- New Groundwater Supply Exploration & Permitting
- Test Drilling & Production Well Installation
- Pumping Test Design, Implementation, & Interpretation
- Water Supply Assessment & Planning
- Water Well Sustainable Yield Assessment
- Hydrogeologic & Aquifer Mapping
- Water Conservation Plans & Wellhead Protection Plans

challenges

- The area available for new wells on the Town-owned property was very limited due to accessibility, existing recreational and other land uses, wetlands, and varying geological subsurface conditions. Portions of the required Sanitary Protective Area (SPA) for the new wells were not within Town-owned property. Wetlands, streams, and private domestic drinking water wells were present on or adjacent to the site; assessment of potential impacts, due to pumping the wells, was required.
- The project schedule was concurrent with the construction of a new public school on an adjacent property. This posed not only scheduling and logistical coordination challenges but also concerns that school construction activities could result in fuel releases that could contaminate the aquifer. The presence of gravity sewer main at the site posed a threat that pumping the wells could draw contaminants into the water system should there be a sewer main leak.
- A former fuel leak at a gasoline station south of the site resulted in a small MtBE detection at the Town's former well at the time of the leak and a groundwater plume that could possibly be drawn to the new wells under pumping conditions.

solutions

- Nobis worked closely with the Town, other consultants, and NHDES to overcome the limited suitable well locations, multiple uses of Town-owned properties, concurrent construction schedules, and the presence of a gravity sewer main to successfully install and permit two new water supply wells.
- Nobis worked with NHDES to ensure the proposed new well locations were permissible and would provide a greater degree of protection compared to an existing water supply well.
- With Nobis' assistance, the Town obtained easements from 3 of 4 private property owners within the SPA. Nobis obtained a waiver from NHDES for the 4th property.



Municipal Well Installation & Permitting - Marlborough, NH

- Nobis coordinated directly with the school contractor to make sure best management practices were followed during school construction to protect the aquifer.
- On Nobis' recommendation, the Town double-lined and pressure-tested the sewer line through the property.
- To evaluate potential leakage from the sewer main, Nobis collected groundwater samples from monitoring wells located between the main and the wells during a 5-day pumping test to evaluate potential leakage from the sewer main. These results confirmed there was no sewer leakage threatening the proposed supply well area. Monitoring is ongoing, as a permit condition.
- Extensive monitoring of stream flow, stream stage, groundwater levels on the far side of the stream, wetland water levels, and homeowner wells indicated that pumping the wells caused very minor, non-adverse impacts on stream flow and wetlands and no appreciable impact on the homeowner wells.
- Nobis communicated with the consultant who was monitoring the shrinking groundwater plume associated with the former gasoline leak south of the new well site. Nobis monitored selected monitoring wells associated with the gas station during the pumping test and showed that pumping the new wells did not draw the plume closer to the Town's new wells and that the plume continued to shrink.
- Nobis provided support to the Board of Selectmen during a public hearing and Town Meeting, answering the questions of project critics. The necessary warrant articles for the project passed at Town Meeting.

results

- Two new gravel-packed water supply wells were successfully installed, tested, and permitted, allowing abandonment of one of the old wells that was in a threatened location, thus meeting NHDES requirements and improving the reliability of the Town's water supply.
- Ongoing monitoring, required as a permit condition, provides assurance that the new wells are not impacted by the sewer main.
- The other previous well has been upgraded, providing a supplemental supply at a different location.





Pine Grove Cooperative Bedrock Well Installation & Permitting West Swanzey, NH

Installation, testing, and permitting of two new bedrock water supply wells following the loss of previous wells to drought and MtBE contamination

The Pine Grove Cooperative (Coop) experienced a water supply crisis in 2016 due to drought, resulting in one of two gravel-packed wells going dry, following the prior loss of four bedrock wells due to MtBE contamination. As a response to this urgent need for potable water, Nobis Group assisted the Coop in obtaining two new water supply sources. Nobis performed this work as a Prime Contractor to NHDES with funding provided by the MtBE Bureau and received Project Honors for the Pine Grove project from the New Hampshire chapter of ACEC.

To resolve this water supply crisis, Nobis performed the following roles for the Cooperative and NHDES:

- Identified potential drilling sites using photolineament analysis, geologic mapping, and geophysics, including a consideration of both stratified drift and fractured bedrock aquifers on land owned by the Coop;
- Provided well drilling and well construction oversight for stratified drift test drilling and bedrock well drilling;
- Conducted pumping tests, monitoring, and sampling in support of a permit application to obtain NHDES approval for new bedrock water supply sources;
- Assisted the Coop in modifying its Wellhead Protection Plan and preparing a Water Conservation Plan; and
- Assisted the Coop in obtaining funding for the project under the Drinking Water State Revolving Fund (SRF) and the Drinking Water and Groundwater Trust Fund.

Two new bedrock wells now successfully provide water needed to make up for the shortfall in the 2016 drought and to allow for future water supply needed at “build-out”. Nobis continued to work with NHDES, the Coop, and subcontractors to connect the new wells to the water system and perform other system upgrades.

services

- New Groundwater Supply Exploration & Permitting
- Test Drilling & Production Well Installation
- Pumping Test Design, Implementation, & Interpretation
- Water Supply Assessment & Planning
- Water Well Sustainable Yield Assessment
- Hydrogeologic & Aquifer Mapping
- Surface & Borehole Geophysical Surveys
- Water Conservation Plans & Wellhead Protection Plans
- Drought Contingency Services

challenges

- The Coop experienced a water supply crisis in 2016 due to drought causing one of two gravel-packed wells to run dry, along with prior loss of four bedrock supply wells due to MtBE contamination from an upgradient gas station.
- The overburden aquifer on Coop-owned property was both limited in areal extent and by other features requiring setbacks (e.g. wetlands).
- The new bedrock wells had to be tested and analyzed to ensure that they did not impact the Coop's remaining gravel-packed well or nearby residential water supply wells.
- The Coop was faced with a water supply emergency and lacked the financial resources to establish a new water supply source and perform needed water system upgrades inherited from the previous owner when the Coop formed.

solutions

- Nobis evaluated potential water supply well locations for both bedrock and overburden aquifers. For bedrock, this assessment required consideration of a historical MtBE plume that impacted part of the bedrock aquifer and the limited accessible and suitable locations on Coop-owned property.
- Based on the limited extent and depth of the overburden aquifer, the presence of wetlands, and the need to avoid interference with the existing gravel-packed wells, Nobis used small-diameter test drilling to evaluate potential gravel-packed well sites and rule out the option.
- Nobis subcontracted a bedrock well driller and provided oversight for well installation and construction of three bedrock water wells. Two of these were deemed suitable for new water supply sources for the Coop.



Pine Grove Cooperative Bedrock Well Installation & Permitting - West Swanzey, NH

- Nobis subsequently designed and conducted simultaneous, staggered pumping tests on the bedrock wells that included monitoring of nearby water sources.
- Nobis identified more than a dozen other water wells within 1,000 feet of the Coop's new wells and sent certified letters to the property owners, offering to monitor their wells during the pumping test. Wells whose owners granted permission were monitored, showing no interference effects due to pumping the new wells.

results

- With assistance from Nobis, the Coop successfully obtained funding under the Drinking Water State Revolving Fund (SRF) and obtained one of the first grants under the new Drinking Water and Groundwater Trust Fund.
- Two new productive bedrock water supply wells have been sited, drilled, tested, and permitted for the Cooperative. The new wells have no trace of MtBE and show no interference with neighboring homeowner wells.
- The yield from the new bedrock wells is sufficient to make up for lost yield from one of the gravel-packed wells during the 2016 drought and to provide water for potential additional homes at build-out.
- In 2020, Nobis won Project Honors for the Pine Grove new well project from the New Hampshire Chapter of ACEC.





Municipal Well Replacement Rollinsford, NH

Siting and directing installation and permitting of a filter-packed replacement well near existing pumphouse

Nobis worked closely with the Rollinsford Water and Sewer District and the District's engineering consultant to assess options for the General Sullivan Well, a gravel-packed well installed in the 1950s that experienced declining yield and the frequent need for re-development despite reconstruction. The assessment indicated that further redevelopment would not be fruitful and that well replacement on the same site was the best option for the District.

Nobis oversaw both test drilling near the existing pumphouse to select the most favorable location for a replacement well and replacement well installation at that location. The replacement well is constructed with a filter pack consisting of glass beads, the first known example of this construction for a community well in New Hampshire. Nobis conducted a pumping test and other investigations to satisfy a streamlined permitting process for the replacement well, in close consultation with the New Hampshire Department of Environmental Services (NHDES). During the permitting process, Nobis recommended wellhead and aquifer protection measures to minimize risk to the aquifer at the General Sullivan Well site, which is located in a residential neighborhood.

challenges

- The Rollinsford Water and Sewer District experienced declining yields from the General Sullivan well, requiring well rehabilitation with increasing frequency and decreasing effectiveness.
- Declining yields required the District to rely increasingly on its other wells, which require expensive water treatment.
- Developing a new water supply at another site would be an expensive and time-consuming process.

services

- New Groundwater Supply Exploration & Permitting
- Test Drilling & Production Well Installation
- Pumping Test Design, Implementation, & Interpretation
- Water Supply Assessment & Planning
- Water Well Sustainable Yield Assessment

Municipal Well Replacement - Rollinsford, NH

solutions

- Nobis advised that continuing to redevelop and clean the General Sullivan well would not address insufficient water supply issues. Installing a replacement well on the site and using a submersible pump allows the District to continue using the site and the existing pumphouse at a manageable cost.
- The replacement well solution provided the lowest-cost and quickest permitting pathway.
- The replacement well solution allowed the District to reduce its dependence on the other two wells, which require expensive treatment, and thereby minimize long-term system operating costs.

results

- A replacement filter-packed well was installed on the General Sullivan site, immediately outside the existing pumphouse.
- Nobis conducted a pumping test and activities to address other requirements under the NHDES' replacement well permitting rules and received approval for the District to connect the new well to the system.
- The District installed a submersible pump in the replacement well, abandoned the original well, and connected the replacement well to the system.







nobis