

# QUALIFICATIONS STATEMENT

## TOWN OF WAREHAM: PARKER MILLS POND DAM CONSULTING SERVICES



Submitted August 19, 2021



CELEBRATING **50** YEARS



August 19, 2021

Derek Sullivan, Town Administrator  
Town Hall  
54 Marion Rd  
Wareham, MA 02571

Re: **Parker Mills Dam Consulting Services**  
**Wareham, Massachusetts**  
(Pare Proposal No. GQ336.21)

Dear Mr. Sullivan & Members of the Selection Committee:

Pare Corporation (Pare) and our project partner, VHB, Inc. are pleased to provide this response to your Request for Qualifications (RFQ) for the studies related to the Parker Mills Pond Dam Consulting Services project in Wareham, Massachusetts. Through Pare’s past work for both the Town of Wareham as well as for the MADCR Office of Dam Safety completing a variety of dam safety inspections, preparing preliminary designs for rehabilitation, developing hydrologic and hydraulic models to support Emergency Action Plan development and bridge replacement designs, and supporting the Town in obtaining grant funding to advance previous phases of the project, Pare has a unique and thorough understanding of the issues and concerns for this dam.

Our goal in submitting this proposal is to present our personnel and experience, which will enable us to succeed through all aspects of the project. In developing this response, Pare has reviewed the RFP, documentation provided with the RFP, available documents pertaining to the dam, and other material sources cited in the RFP. We are excited to have the opportunity to help you address the known deficiencies at the dam to provide a site meeting the goals of the Town of Wareham.

**INTRODUCTION**

As with all things built, time has a way of deteriorating once capable facilities. However, if maintained, structures such as dams, roads, bridges and our general infrastructure, can provide useful service for decades. As understood from our review of the Request for Qualifications, the Town of Wareham (Town) is requesting proposals to develop a fundable concept for the Parker Mills Dam to improve fish passage, habitat, and flow in this area, to significantly increase the safety of the downstream properties from catastrophic failure, to preserve the historic properties at the Tremont Nail Factory and associated historic district, and to explore the potential dam removal options for the dam.

Established in 1970, Pare has been a leader in the planning, engineering, and permitting of unique and complex projects for more than 50 years. By working with our clients, and listening to their needs, Pare has become an established leader in the field of dam engineering, and has substantial experience with the inspection and evaluation of public and private dams, inclusive of water supply structures. From our office in Foxborough, Massachusetts, Pare undertakes dam engineering projects throughout the Commonwealth and offers a regional perspective across New England.

**PROJECT TEAM**

With nearly a thousand dam inspections completed, Pare is familiar with the types of dams, methods of construction, and concerns associated with aging dams in New England. Our dam experience does not end with inspections; Pare has worked with public and private dam owners to evaluate options to repair, rehabilitate, decommission, or remove their structures and address the observed deficiencies, following through with final







design, the development of construction documents, and the provision of construction phase services.

Having completed the design of more than 35 rehabilitations in the last 10 years, feasibility studies for 12 removal projects, and completion of 4 dam removals, Pare is familiar with methodologies, constraints, and the necessary work to evaluate and understand the needs to address dam safety deficiencies at a variety of sites. This experience provides Pare with a strong knowledge base and enables us to provide our clients with practical, efficient, and cost-effective solutions for their dam engineering problems.

To supplement our in-house expertise, Pare will partner with VHB of Watertown, Massachusetts. For nearly 10 years, Pare and VHB have been partnering on numerous projects to leverage Pare's dam engineering experience with VHB's environmental, sediment transport, and cultural resources capabilities to assist a variety of communities in their decision-making process for the future of the dam projects. The Team has a long history of working together on dam engineering and water restoration projects in the Commonwealth and throughout New England; we are actively collaborating on a feasibility study for the Mill Pond Dam in Durham, NH. Other projects have included the Aberjona River Flood Mitigation Program in Winchester, MA, the Great Dam Removal in Exeter, NH, and the Mill Pond Dam Rehabilitation effort in Hampton, NH, among others. This Team synergy gives us a head start when it comes to understanding and meeting the community's needs for this project.

For the purposes of this project, the Team will be represented by Mr. Allen R. Orsi, P.E. and Mr. David R. Caouette, P.E., who will be the primary points of contact for the Town. Allen and Dave can be reached at 508.543.1755 or by email at [aorsi@parecorp.com](mailto:aorsi@parecorp.com) and [dcaouette@parecorp.com](mailto:dcaouette@parecorp.com), respectively. Both Allen and Dave work from Pare's Foxboro, Massachusetts office at 10 Lincoln Road, Suite 201, Foxboro, MA 02035.

### **Why choose the Pare Team?**

Within the following pages, we present our company qualifications and resumes for our key engineers and team members. However, our goal here is to demonstrate what sets Pare apart from our competitors by illustrating what we do for our clients, and what we will *continue* to do for you during the progression of this contract.

You have many qualified consultants from which to choose. So what makes Pare unique? We are familiar with dam engineering aspects both in relation to repair/rehabilitation as well as dam removal; We understand the requirements of the Office of Dam Safety and environmental agencies which have jurisdiction over this type of project. Obviously, we will provide the Town with capable, experienced and resourceful civil engineers that will work closely with you to achieve your objectives. However, what makes our clients keep coming back to us for additional services is our approach to projects. We enthusiastically adhere to the following approach:

- Strong interpersonal relationships, trust and dependability promote communication and the sharing of ideas. Effective communication is key to problem definition and solution.
- Old fashioned engineering, applied science, hard work and experience combined with developments in the field, are the keys to creativity and design solutions.
- Listening is an underrated skill – everyone has something to offer.
- A coordinated approach, a thorough understanding, and timely, professional deliverables.

Thank you for the opportunity to submit this Proposal. If you have any questions, please contact us at your convenience. We look forward to working with you on this important project.

Sincerely,  
**PARE CORPORATION**

Allen R. Orsi, P.E.  
Vice President

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**SECTION 1**

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**PROJECT APPROACH**

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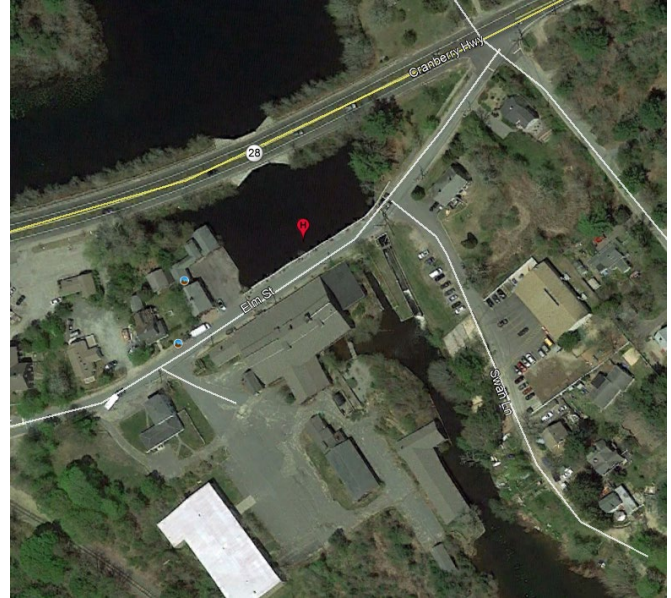
## PROJECT UNDERSTANDING

The Pare Corporation / VHB Team (Team) understands the MA00150 Parker Mills Pond Dam is an integral component of the Tremont Nail Factory and surrounding historic district within the Town of Wareham. The dam was originally constructed to support local industry and has functioned to provide water for both manufacturing processes and agricultural industry scattered around the impoundment perimeter. Despite its important role in the past, the dam does not serve those purposes and is now considered to be in Poor condition by the Office of Dam Safety with requirements for the owner(s) to take action to mitigate the hazard currently posed by the structure.

To this end, the Town of Wareham, having an ownership interest in the dam, is tasked with identifying a plan of action for the dam to address the known dam safety deficiencies while also accounting for historic, cultural, commercial, and aesthetics concerns specific to the site.

The understood scope of this study is to develop a feasible project approach for the Parker Mills Dam to meet the project goals of restoring habitat, natural river processes, fish passage, and water quality in the riverine system; improve the climate change resiliency of the watershed; complement future property improvements envisioned for the Tremont Nail Factory; provide feasible improvements to the visual and historic character, recreation, nature viewing, and boating along the river for visitors; avoid impacts to existing public and private physical infrastructure; and maintain existing levels of flood control and protection for public and private property.

To meet these project goals, the Team proposes to leverage our existing knowledge of the dam based upon previous Emergency Action Planning, detailed evaluations, and hydrologic/hydraulic analyses completed for the site to deliver comprehensive and efficient evaluations to be completed as part of this study. To this end, the Team anticipates the following project approach presented below. This approach is based upon the Team's past experience assisting other communities navigate the process to determine the future of a historic dam site; this process, while impacted by the engineering aspects of the project, is more often steered by non-technical considerations; as such, the project approach includes developing a thorough understanding of not only the science but also the community, cultural, and historic resources that may be impacted by a dam removal program.



## PROJECT TEAM

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## PROJECT APPROACH

The project approach will include the following tasks:

### **Task 100: Data Review & Collection**

Pare is familiar with the history of reports, studies, and other work that has been completed at the





dam. These include our past work on developing conceptual design for a dam rehabilitation program, regular inspection of the dam under contract to the MADCR Office of Dam Safety, and our involvement with ongoing bridge replacement design work for which Pare has completed hydraulic design and dam safety permitting. While significant information exists, additional data collection is required to inform the identification and assessment of project alternatives. To this end, the proposed scope of data review will include the following:

***Document Review:*** The project team will review the body of work previously completed for the dam. In addition to these documents, the Team will review additional information provided by the Town and other project stakeholders, as well as information identified through additional research. Specific areas of interest for which research will seek to identify information includes water quality information for the impoundment and tailwater (including research on any known releases to the impoundment that would affect both its water and sediment quality), data related to fisheries and effectiveness/limitations of current wildlife passage elements (i.e., fish ladder and eel ramp), water supply uses surrounding the impoundment, bridge inspection reports from MassDOT, impoundment bathymetry, historical information on the natural course/alignment of the river, and other factors that may have a driving impact on the current study.

For the purposes of this project, the Team has determined that available survey data combined with LiDAR data will be sufficient to serve as the land side survey data; data needs for underwater areas are discussed below. Property lines will be supplemented to available plans based upon available survey, MassGIS data, and other property line research to be coordinated with the Town. The Team has also determined that geotechnical information collected as part of previous studies at the dam and associated bridges is also sufficient to support the current study.

***Site Conditions Review:*** Early in the study, the Team will coordinate a site meeting with the Town and interested stakeholders (to be invited by the Town). As part of this meeting, a comprehensive site walk will be completed to provide for in person discussion of various project elements including condition of the dam structure, plans for the Tremont Nail Factory redevelopment, considerations for other abutting properties, and general project overview. At the time of the site meeting, the Team will complete an inspection of the dam to review notable changes since the date of the last available report and collect additional field data to support our analyses.

***Pond Bathymetry and Sedimentation:*** Currently there is only bathymetric data available for the portion of the impoundment located between the dam and Cranberry Highway. Therefore, the Team will complete a coarse bathymetric survey of the impoundment north of Cranberry Highway to develop a map depicting the general bathymetric contours; mapping will be utilized to determine stage-storage properties of the impoundment as well as approximate the changes in water surface area under dam removal and partial dam removal scenarios. Bathymetric survey will establish survey control points based on Survey-Grade GPS observations. Ten east-to- west cross-sections will be



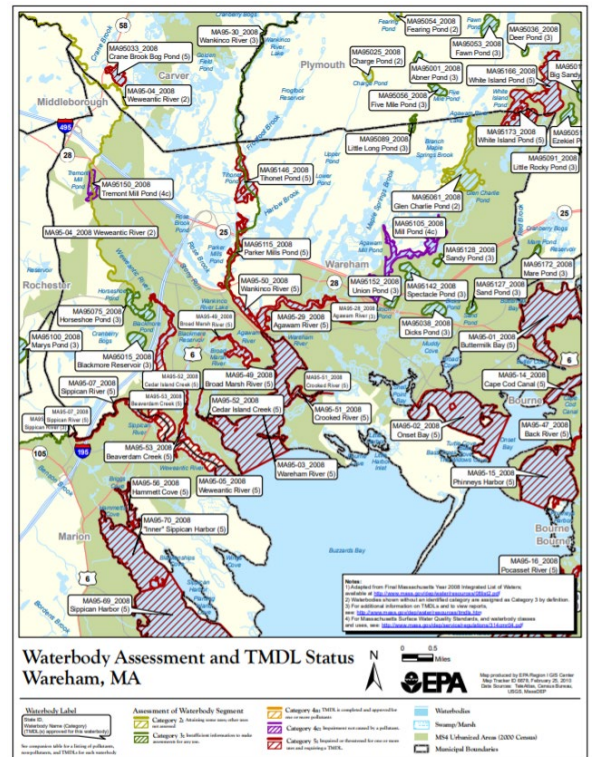
taken across the pond to generate soft bottom (top of sediment) and hard bottom (bottom of sediment) profiles which will be utilized to create a generalized pond bathymetry contour map.

**Sediment Qualification - Desktop Due Diligence:** The team will perform a limited desktop due diligence review to identify current and past land uses, as well as historical releases of petroleum or hazardous materials, that may have impacted sediment behind the dam. Due to the anticipated size of the watershed, the due diligence will be generally limited to an area within 1-mile of the impoundment. As a starting point for our desktop due diligence, the Team will obtain a radius map report from Environmental Data Resources (EDR), which provides a database listing of known hazardous waste sites and oil/hazardous material releases within a pre-defined search radius. Based on the information provided in the EDR report, the Team may select certain files or sites for further review at the Massachusetts Department of Environmental Protection. In addition, the Team will contact the local fire department to identify if they have any knowledge of a specific release in the area that could have impacted sediment behind the dam. Pare will also contact the local planning department to identify current and historic land use patterns in the watershed, with specific emphasis on identifying current and historic industrial and agricultural uses.

From the information obtained during the desktop due diligence, the Team will adjust the sediment characterization program outlined below. The types of modifications that may result from the desktop due diligence may include an increase in the number of sediment samples collected, a modification to the location of the samples, and an expanded suite of analytical parameters. Modifications will be presented through a contract addendum, if required.

**Sediment Qualification - Sediment Characterization:** The Team will collect up to seven (7) core samples of sediment from within the existing impoundment and one (1) core sample from the downstream channel for physical and chemical analysis. For the purposes of this proposal, it has been assumed that laboratory testing will include those tests required for a Dredge Water Quality Certification where >10% of the material passes the #200 sieve.

The samples will be analyzed for toxicity characteristic leaching procedure (TCLP) analysis and chromium speciation. These samples will be placed on hold with the laboratory and only analyzed if the concentrations of metals or organic compounds exceed the theoretical concentration at which TCLP criteria may be exceeded. Additional testing requirements,



if any, which become apparent during the progression of the sediment sampling and evaluation process, will be completed as an additional service if requested by the Owner. Analysis for any TCLP parameter would be considered an additional service. If the sampling program is modified as a result of the desktop due diligence, the Team will modify this scope and corresponding fee accordingly.

Upon receipt of the analytical data, the Team will compare the data to the regulatory limits. The data will be compiled and presented in a table, which will be included in the data summary submission and final project report. Our review of the data relative to these standards will support our evaluation and the cost implications associated with future handling and disposal of dredge material from the impoundment.

***Hydrologic & Hydraulic Analyses:*** The Team will fully utilize and build off of the H&H analyses that were completed in 2018 and 2020 in support of the hydraulic design reports developed for the bridge replacement designs for Elm Street. The existing H&H model (HydroCAD) will be updated to include the bathymetric data that is collected during the current analyses and will be updated to include the latest rainfall data (NOAA Atlas 14; currently the model uses rainfall data specific to MassDOT studies, that although similar, is not the same as the more detailed and NOAA data).

In addition to the HydroCAD model, a more robust hydraulic model specific to modeling riverine systems such as this one will be completed under existing conditions as well as under the potential alternatives. A 2D hydraulic model will be developed utilizing the latest version of HEC-RAS (currently 6.0.0). The model will include the full limits of the upstream impoundment (1.5 miles upstream of the dam) to the tidal waters of the Wareham River (1 mile downstream of the dam).

The model will be used to as guide in the development and evaluation of the proposed alternatives identified for detailed study discussed within Tasks 201 and 202. For each alternative, a variety of storm events will be modeled ranging from an average baseflow sunny day event to the ½ PMF storm event.

The model will be developed to serve as a guide in answering the questions identified within the RFQ, including:

1. What is the geographic extent of change (hydrologic, hydraulic, other) that might result from removal or partial removal of the Dam?
  - *The model will identify and demonstrate both in plan view and section view the predicted hydraulic changes (inundation footprint, water surface elevation, depths, velocities, etc.) that the dam removal alternatives (#2 and #3) would have on the surrounding area, both upstream and downstream of the dam.*
2. What is the current relationship of the Dam to the overall function of the flood control system it is a part of and how would alteration of the dam impact the system's performance?





- *The model will identify the amount of attenuation (if any) provided by the current dam and its impoundment and evaluate the extent to which the dam removal options lower that attenuation and how that will affect the surrounding area (downstream and upstream).*
3. What are the current impacts that the dam has on the hydraulics of the River and flooding patterns in the vicinity?
    - *The model will identify the hydraulic conditions that exist under existing conditions, within the full model limits (1.5 miles upstream of the dam to 1 miles downstream of the dam).*
  4. What are the benefits to hydrology and hydraulics from removing the dam?
    - *The model will show the differences between the hydraulic conditions that occur under existing conditions and the proposed alternatives. Those differences (both beneficial impacts and negative implications) will be identified, evaluated, and incorporated into the conceptual design of the alternative.*
  5. What is the character of the sediment impounded behind the dam, how does that compare to upstream and downstream sediment, and what are the options for managing that sediment in a dam removal?
    - *The model will determine the transport potential of the sediment within the impoundment.*
  6. What will be the impact to public and private infrastructure, such as existing drainage structures and their alignment with the present river shoreline, and what are feasible treatments to address those impacts?
    - *Similar response to #1 and #4 above.*
  7. What are the ramifications for restoring sediment transport through a potential dam removal?
    - *Similar response to #5 above.*
  8. What will be the changes to the shoreline upstream and downstream of the dam, particularly with respect to historic property improvements that have been made, and what are feasible treatments to address those changes?
    - *Similar response to #1 and #4 above.*
  9. What will be the impacts to channel depth, navigation, and recreational access points upstream and downstream of the dam?
    - *Similar response to #1 and #4 above.*
  10. What will be the visual impact to the upstream corridor from the river and abutting public properties?
    - *Similar response to #1 and #4 above.*
  11. What will be the impacts to structural integrity of the historic buildings along the waterway?
    - *Similar response to #1 and #4 above.*
  12. What are the alternatives?
    - *The model will help to develop and evaluate each of the proposed alternatives.*



***Hazard Potential Assessment:*** The current hazard classification of “High” for the dam is a classification for the dam based upon classifications made early in the development of the Massachusetts dam safety program. Past studies have supported this classification based upon inundation mapping prepared in 2007 based upon USGS Topographic mapping that suggested potential impacts to residential and commercial development downstream of the dam, including the day care facility. However, recent reports have suggested the potential to reclassify the dam based upon changes in the downstream area and advancement in the level of accuracy in available GIS data.

As the hazard potential classification is a significant driver in dam design requirements, reclassification could have a significant impact on the scope of a rehabilitation or partial removal project. Therefore, as part of this project, a hazard assessment would be completed through the completion of updated dam break analysis utilizing current state of the practice methodologies to develop a comprehensive understanding of the risk associated with a potential failure of the dam. The base model will be utilized to develop dam break models. Dam break models will be developed for the current SDF (1/2 PMF Storm Event), the SDF if it were to be reclassified to Significant (100-year storm event), as well as the SDF if it were to be reclassified to Low (50-year storm event).

The dam break analyses will also be used to complete a preliminary inflow design flood study. Therefore, if the dam break studies do not demonstrate that a hazard reclassification is warranted, the inflow design flood study may show that the design flood for the dam should be lower than its prescribed ½ PMF based upon incremental damage within the downstream area.

***Wells & Infrastructure Considerations:*** Projects which alter the level of an impoundment, such as dam removals and partial removals, may potentially affect infrastructure in the project vicinity. As part of this project, the Team will review records for wells from Town and MassDEP to identify nearby wells which may be impacted, and catalogue the type of well, depth, and potential need to further assess impacts.

In addition, the causeways which cross the impoundment and support Rt. 28 and Rt. 25 will be reviewed to determine if the changes in the flow regime through those bridges/culverts will impact the integrity of those structures. Mitigation requirements to be included in the final design project will be reviewed.

Reducing impoundment water levels also impacts groundwater around and below existing structures. Reduction in groundwater levels results in reduced pore water pressure and subsequently can reduce the bearing capacity of adjacent foundations, leading to foundation settlement. As such, structures in the vicinity of the dam and impoundment will be catalogued along with foundation information and distance from the impoundment and a screening level determination if additional considerations for foundation impacts is warranted.



***Sediment Transport:*** A sediment transport evaluation will be conducted to identify potential impacts of dam removal on sediment transport processes in the Wankinco River through the former impoundment area. This will include a qualitative evaluation of the overall morphology of the Wankinco River taking into consideration potential upstream sediment sources and downstream sediment deposition areas, upstream cranberry bogs and wetlands, upstream dams and culverts, tidal influences from Buzzard’s Bay, and hydraulic impacts from the downstream confluence with the Wareham River, to estimate the geographic extent of change from dam removal.

The volume and distribution of potentially-mobile sediment within Parker Mills Pond will be estimated based on sediment probe depth and grain size distribution sampling data, along with the longitudinal profile of the Wankinco River and existing and potential streambed grade control structures. In addition, hydrologic and hydraulic analysis results for the channel-forming bankfull discharge will be used to estimate the long-term equilibrium channel geometry and streambed particle size upstream of the dam. This data will be used to estimate potential active (construction) and passive (post-construction) sediment excavation and transport volumes, which may be required to remove the dam and construct a new river channel alignment. Based on the characterization of sediment from sampling data, this will also include a qualitative evaluation of active and passive sediment management required to excavate and construct a new channel, identifying potential reuse of material on site to minimize construction costs.

The sediment transport evaluation will include a qualitative review of impacts to the channel depths and shorelines upstream and downstream of the dam, as well as effects on potential navigation and boat moorings/marinas downstream and on recreational access points upstream of the dam. This evaluation will take into account site-specific sediment data in conjunction with the overall morphology of the Wankinco River.

### ***Cultural Resources:***

VHB cultural resources staff conducted a preliminary review of the Massachusetts Cultural Resource Information System (MACRIS) online database and geographic information systems (GIS) mapping tool, which serves as the repository for the Inventory of the Historic and Archaeological Assets of the Commonwealth (the “Inventory”) and is maintained by the Massachusetts Historical Commission (MHC). The Parker Mills Pond Dam is located adjacent to two historic districts listed in the National Register of Historic Places: the Parker Mills Historic



Postcard Image dating to the early 1900s (obtained from [www.warehamfreelibrary.org](http://www.warehamfreelibrary.org))



District (listed in 1976) and the Tremont Nail Factory Historic District (listed in 1976). Neither district lists the dam as a contributing resource in the existing documentation. The Parker Mills Historic District is also a local historic district, and therefore listed on the State Register of Historic Places. The Dam is identified as a contributing resource to the Wankinco River Area (MHC No. WRH.G), listed in the Inventory of the Historic and Archaeological Assets of the Commonwealth (the “Inventory”); however, the area’s eligibility for National Register listing has not been evaluated at this time.

*Massachusetts Historical Commission Project Notification Form (PNF)*

If the repair or removal of the dam requires a state or federal permit the project would be subject to review under state and federal regulatory requirements. The Massachusetts Historical Commission (MHC) has review authority over projects requiring state funding, licenses, permits, or approvals, to evaluate potential direct or indirect impacts to properties listed in the State Register of Historic Places, in compliance with MEPA and the State Register Review requirements (M.G. L. Chapter 9, Sections 27-27c, as amended by Chapter 254 of the Acts of 1988). This consultation process identifies potential adverse effects to historic properties, and evaluates ways to avoid, minimize, or mitigate these adverse effects.

If the project triggers a federal permit, it will therefore be subject to Section 106 of the National Historic Preservation Act (“Section 106”). Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800) requires federal agencies to take into account the effects their actions may have on historic properties. Any project that requires federal funding, licenses, or permits must be reviewed by MHC in its role as the State Historic Preservation Office (SHPO), in compliance with Section 106. Section 106 is a consultation process among the federal agency, the MHC, project proponents, and other identified consulting parties to consider prudent and feasible measures to avoid, minimize, or mitigate adverse project impacts to historic properties.

VHB will assist with state and/or federal historic regulatory requirements. Compliance with Section 106 is coordinated through the Massachusetts Historical Commission (MHC) as the Massachusetts State Historic Preservation Office. Review by the MHC is initiated by the submission of an MHC Project Notification Form (PNF), which includes basic information about the proposed Project and details regarding any previously recorded historic resources on or in the vicinity of the Project site. VHB’s Cultural Resources Team will prepare and submit the PNF to the MHC.

Upon reviewing the PNF, MHC will determine whether the Project will result in an adverse effect to historic properties. Due to the extent of recent redevelopment in the vicinity of the Project site, VHB anticipates that the MHC will determine there is no adverse effect to historic properties. If MHC requires additional information to make a determination, or if a Memorandum of Agreement is required to resolve adverse effects, VHB will prepare a contract amendment to reflect those additional services, which are not included in this proposal.



**Environmental Resources:** VHB will review existing data to inventory wildlife and plant communities within the impoundment including state and federally-listed threatened and endangered (T&E) species located upstream and downstream of the Pond. Using published data such as the Massachusetts Wildlife Action Plan, the MA Natural Heritage and Endangered Species database and data compiled by the Town of Wareham, the team will assess what species and habitats are currently present, how the dam affects the distribution of those species or other species not present but expected to occur in the watershed, and how the dam removal or rehabilitation might affect those species. This analysis would be developed in consultation with the ecologists at the Massachusetts Division of Fisheries and Wildlife, the US Fish and Wildlife Service, and the National Marine Fisheries Service if applicable. The team will use the results of the hydraulic model developed as part of this study to analyze the influence of backwater conditions on natural communities, including adjacent wetlands, and will attempt to derive a spatial expression of that relationship. GIS analysis would use this relationship to overlay a buffer onto National Wetland Inventory mapped wetlands to identify the extent and type of wetlands potentially affected. The ecological effects on these wetlands would be discussed in terms of the possible changes in community composition and wetland functioning.

## **Task 200: Alternatives Identification and Assessment**

### **201: Alternatives Identification & Screening**

Under this task, the Team will develop a preliminary list of conceptual alternatives, with preliminary conceptual sketch plans and engineering analysis. It is expected that up to eight conceptual alternatives will be developed, within the following general categories:

1. No-Action
2. Dam Removal with River Restoration
3. Partial Dam Removal
4. Repair/Stabilization of the Existing Dam
5. Reconstruction/Rehabilitation of the Dam

A repair/stabilization program would include measures to address areas of noted concerns (i.e., seepage/leakage, wall instability) as well as modifications to the abutments to protect the dam from overtopping. Reconstruction/Rehabilitation would include complete replacement of portions or the entire dam and may include elements such as raising the crest of the dam and extending the dam into the abutments, replacing the spillways with new spillway(s) sufficient to accommodate the spillway design flood, permanent normal pool lowering, or other concepts identified during this phase of the work.

During the early phase of the analysis, alternative designs would be conceptual in nature and intended



to allow for the screening of preliminary alternatives. For each alternative identified, general sketches of the alternatives will be developed to facilitate preliminary screening, feasibility consideration, and evaluation of comparative magnitudes of project costs.

## 202: Alternatives Assessment

The Team will work with the Town to finalize a set of screening criteria to evaluate the alternatives described above to identify a range of reasonable alternatives to be carried forward for modeling and impact assessment. Screening criteria are expected to include:

- Effectiveness (Does the alternative meet project goals?)
- Efficiency (Are the goals met in a cost-effective manner?)
- Completeness (Does the project address the intent?)
- Acceptability (Is the alternative socially and environmentally acceptable?).

It is expected that some of the alternatives described above will be eliminated during the alternatives screening process. Others will be identified as "reasonable" (i.e., feasible and acceptable) and carried forward for detailed analysis. This task will include development of a summary matrix to report the alternatives screening. Once completed, the Team will meet with the Town to confirm the list of reasonable alternatives, and a final summary will be produced that will include brief descriptions of the conceptual alternatives, screening criteria and results, and the basis for eliminating certain alternatives or options.

## 203: Conceptual Sketches & Planning Report

Upon identification of feasible and acceptable alternatives, the Team will advance the sketches developed as part of previous phases to a conceptual sketch level to facilitate a comprehensive comparison of the reasonable alternatives. Conceptual designs for each of the reasonable alternatives will be completed to identify the anticipated scope of the work required to implement the project. For this phase of the project, designs are assumed to be limited to hydraulic designs to confirm geometries (i.e., heights and lengths), cursory stability evaluations, and conceptual evaluations of additional design requirements such as foundations, seepage mitigation, scour/erosion protection, and operations/maintenance requirements.

For the purposes of this proposal, the Team assumes that up to four alternatives will be considered as part of this task including dam removal, dam rehabilitation, dam repair, and partial removal. For each alternative considered as part of this task, conceptual site plans will be generated depicting the plan extent of the required work and typical sections of anticipated structures. Plans will also be developed showing access, staging, and control of water requirements for each alternative considered. The





evaluation will include the development of conceptual sketches depicting potential access routes and identifying implications associated with use of private property, potential easement requirements, temporary construction to allow access to the work area, and traffic control requirements. The alternative development will also include preparation of opinions of probable cost based upon recent project bid values, standardized cost estimating guides, material supplier information and experience. Based upon the level of design development at this submission, a 25% contingency will be included for each alternative as a separate line item to include design and construction contingencies. The opinion of cost will also include initial estimates as to the level of engineering, permitting, and construction administration that will be required through the completion of the project.

The potential schedule for implementing a particular alternative is another important consideration in the public decision-making process. Thus, the Team will prepare preliminary schedules for each alternative for inclusion in the final Planning Report.

In addition to the conceptual plans to be developed as part of this project, renderings of up to 3 alternatives will be generated. The renderings will be developed to depict the post-project conditions at the site and include perspective views of the dam site along with potential views of the impoundment area

Finding of the studies to be completed as part of this project will be presented within a detailed planning report. The report will present details of the completed studies, formulation and screening of alternatives, and conceptual designs. The report will be provided to the Town in PDF format for review and discussions. Upon concurrence by the Town, the report will be finalized and issued in PDF format.

### **Task 300: Outreach & Coordination Meeting**

Public input plays an important role in any public infrastructure project; however, in the case of Parker Mills Pond Dam, given the historic resource supported by the dam as well as wide ranging impacts to surrounding areas in the event of dam removal or partial removal, public involvement will play a key role in project success. As such, the Team will coordinate with the Town to participate in two public information sessions.

- 1) The initial session would be conducted early in the study process. The intent of the meeting will be to introduce the site and project to interested members of the public, present the general scope of the work and anticipated alternatives to be considered, establish general project timelines, and solicit feedback from attendees regarding concerns, support, and other input which they feel should be considered as part of the planning effort.



- 2) The second session will be held towards the completion of the project. The intent of the meeting will be to review findings of the completed studies, present conceptual designs formulated as part of the design process, and, if approved by the Town, discuss a preferred approach for the project.

For each meeting, the Team will prepare presentation materials anticipated to include a PowerPoint or similar format to present the meeting materials. The Team will assist the Town by drafting notices to be posted by the Town advertising the meeting.

The Team also anticipate attending meetings with the Advisory Group to be organized by the Town. The Team anticipates up to 3 meetings with the advisory group during the project progression, to be conducted during regularly scheduled progress meetings

In addition to public participations, the Team anticipates regular progress meeting to be held with Town; Advisory Group members and other project partners will be invited to attend at the Town's discretion. Meetings will be conducted virtually and scheduled monthly to enable the Team to keep the Town informed of project status, update the Town regarding findings of studies, and promote open and regular communications between the project parties.

## LEVEL OF EFFORT

The project approach presented in the proceeding paragraphs has been developed to provide data to inform the Town of implications of a dam removal program, to assist the Town in determining the appropriate course of action to meet their ultimate project goals, and to develop information to support subsequent phases of the project. This project approach is based on the Team's experience supporting other local communities in their efforts to determine the appropriate course of action for their project; however, the Team acknowledges that all projects are different, and the level of effort can be adapted to meet the specific needs of the community. As such, if selected, the Team will be available to review the project approach with the Town to refine the level of effort as appropriate to align with the project intent and available resources.

Based upon the project approach presented herein, the Team anticipates that the level of effort to complete this project includes the following:

	<b>Task</b>	<b>Level of Effort</b>
100	Data Review & Collection	\$ 109,300.00
200	Alternatives Identification and Assessment	\$ 117,100.00
300	Meetings	\$ 23,600.00
<b>Anticipated Project Total</b>		<b>\$ 250,000.00</b>

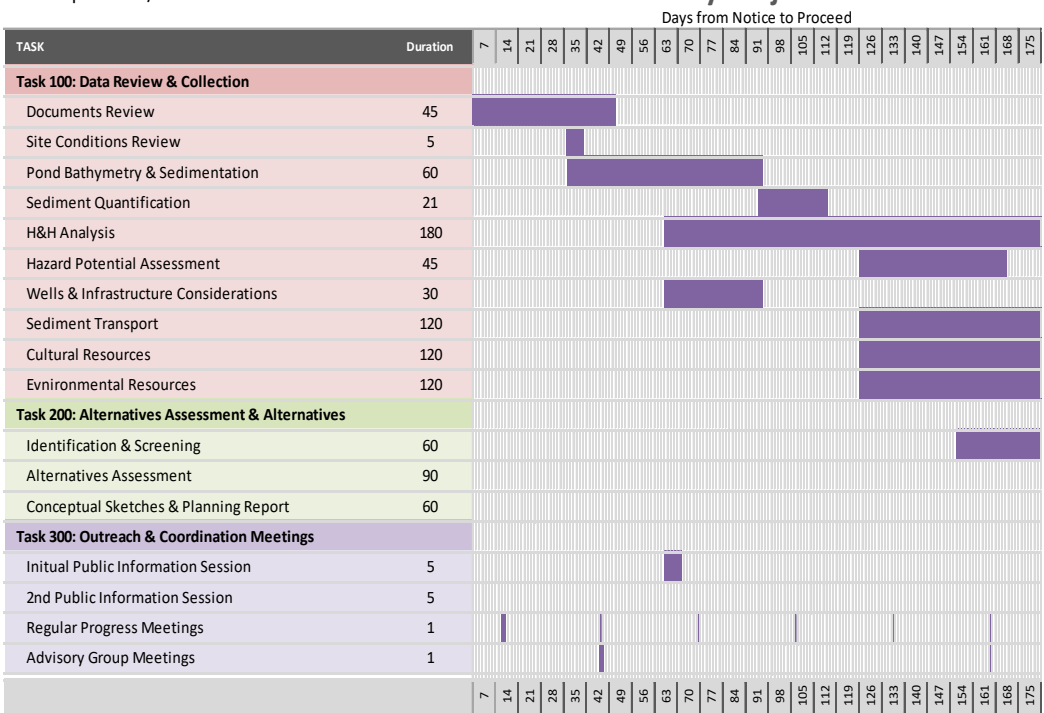


# PROJECT SCHEDULE

## PARKER MILLS POND DAM CONSULTING SERVICES

Pare Coporation / VHB

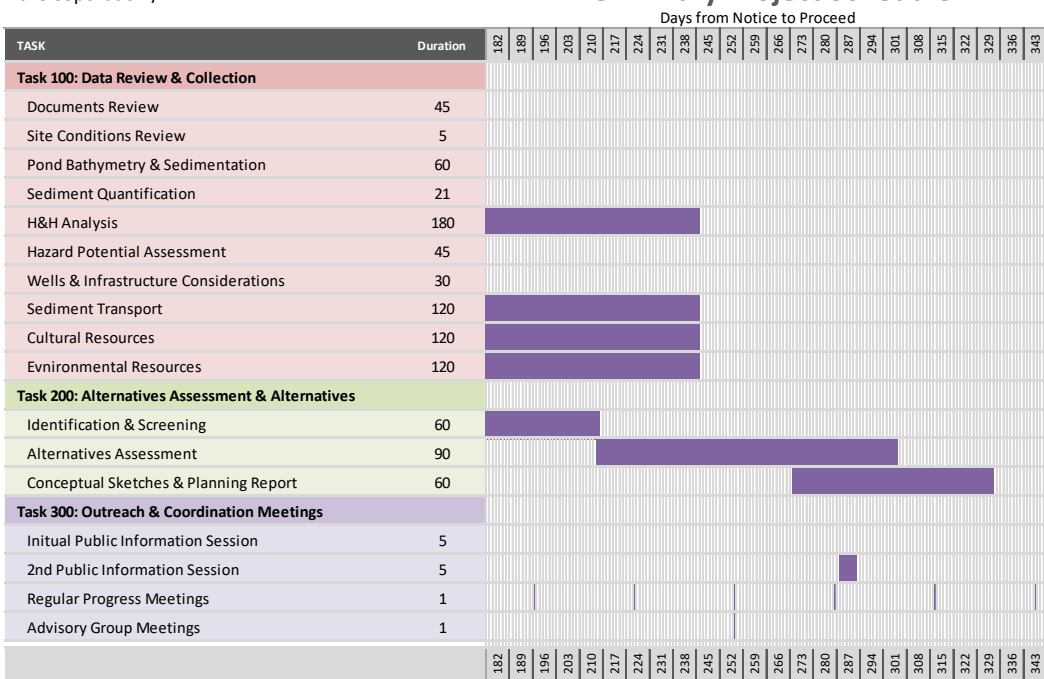
### Preliminary Project Schedule



CONTINUED BELOW

Pare Coporation / VHB

### Preliminary Project Schedule



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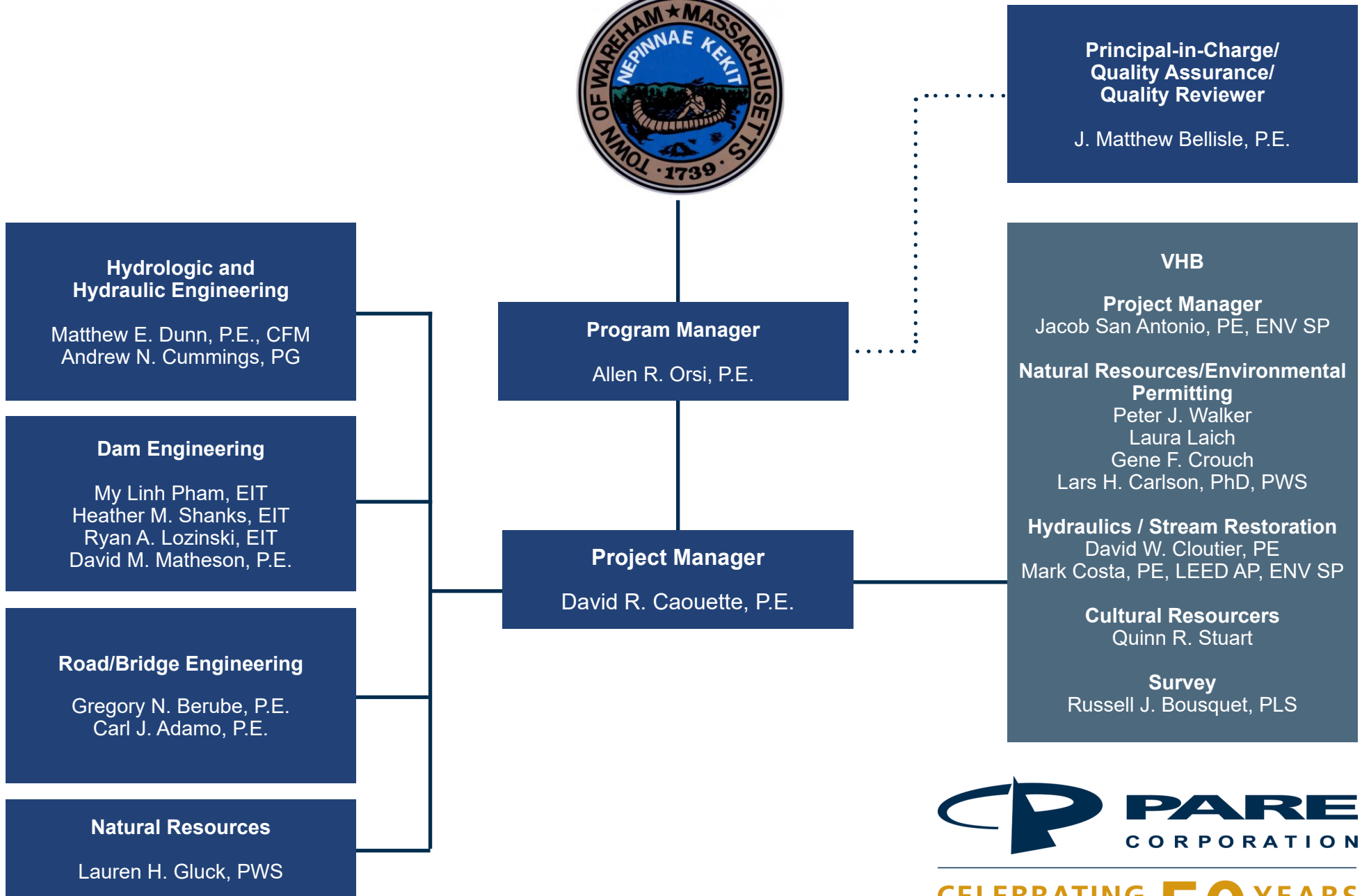
**SECTION 2**

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**PROJECT TEAM & EXPERIENCE**

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# PARKER MILLS DAM CONSULTING SERVICES



CELEBRATING **50** YEARS



## **SECTION 2: PARE QUALIFICATIONS**



#### **REGISTRATIONS AND CERTIFICATIONS**

Professional Engineer –  
Massachusetts,  
Rhode Island,  
New Hampshire, New York

Municipal Vulnerability  
Preparedness (MVP)  
Provider

#### **PROFESSIONAL AFFILIATIONS**

American Society of Civil  
Engineers

Association of State Dam  
Safety Officials

ACEC – Leadership and  
Education Committee

EBC Dam Management  
Committee – Co-Chair

#### **EDUCATION**

University of Rhode Island:  
M.S., Civil Engineering 2001  
B.S., Civil & Environmental  
Engineering, 1992

#### **RELEVANT EXPERIENCE**

Mr. Bellisle possesses more than 29 years of experience working on a variety of geotechnical, foundation, civil, waterfront and dam engineering projects. He has acted as Principal-in-Charge, Project Manager, and Project Engineer for assignments involving geotechnical design, site investigations, testing, instrumentation, and construction monitoring. His experience also includes over 500 Phase I inspections and Phase II design services for earthen and concrete dams as well as value engineering of alternate foundation systems, ground improvement methodologies, and temporary construction support. Mr. Bellisle has also developed environmental permit applications and presented at public hearings in support of public and private projects. Relevant project experience includes:

- **DelCarte Conservation Area:** Principal-in-Charge/Project Manager for the evaluation of a water system that includes seven dams. The study evaluated potential dam removals, wetland restorations, and dam repairs to provide a healthy resource area that meets the Town's needs. Franklin, MA.
- **Fall River Water Supply Dams:** Principal-in-Charge for the inspection of several City-owned dams in accordance with the state regulations. This project included the visual inspection of the structures, development of emergency action plans (EAPs), recommendations for maintenance and repairs, and coordination with the City to establish a maintenance and repair program. Currently the scope of our services has expanded to include the design and permitting of repairs for six of the dams within the City's system. Fall River, MA.
- **Emergency Repairs, Copicut Reservoir Dam:** Project Engineer for the design of emergency repairs to a large size, high hazard dam within the water supply system for the city of Fall River. The project included evaluation of severe upstream erosion, design of repairs, the preparation of construction documents, and the evaluation of downstream seepage. Fall River, MA.
- **MADCR Phase I Dam Inspections 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2003, 1999, 1998, 1995:** Principal-in-Charge/Project Manager for the implementation of Phase I dam inspections for various significant and high hazard potential state, municipal, and privately owned dams. The project included detailed hydrologic/ hydraulic (H+H) analyses, dam break analyses and the development of formal Emergency Action Plans. Statewide, MA.
- **Haskell Pond Dam:** Principal-in-Charge for the design of a subsurface exploration program, completed stability analyses and design improvements to address static/dynamic deficiencies utilizing an internal secant pile wall to support the embankment. Designed spillway and embankment improvements to pass design flows. Prepared phased construction plans and specifications. Gloucester, MA.
- **Sandra Pond Dam:** Principal-in-Charge of an initial Phase I dam inspection and design of repairs to remove trees and restore the embankment for this dam, Pare prepared contract documents for the Town to solicit competitive bids to address deficiencies at the dam. In an effort to work within available budgets, Pare designed a phased construction approach which allowed the work to be spread over two years. Westborough, MA.

- **Dam Rehabilitation Projects:** Principal-in-Charge for the design of remedial repairs to address various structural deficiencies inclusive of stability, seepage, hydraulic capacity, and structural deterioration:
  - Stearns Pond Dam, Sudbury, MA
  - Woonsocket Res 1 Dam, North Smithfield, RI
  - Harris Pond Dam, Woonsocket, RI
  - Hawkins Pond Dam, Gloucester, RI
  - Oyster River Dam Feasibility Study - NH
  - Old Mill Dam, Hampton, NH
  - Silver Spring Lake Dam, North Kingstown, RI
  - Wyoming Pond Dam, Hope Valley, RI
  - Wiswall Dam Repairs - NH
  - Great Dam Removal Geotechnical Eval/Design, Exeter, NH
  - Warwick Levee Repairs, Warwick, RI
  - Haskell Pond Dam, Gloucester, MA
  - Stiles Lake Dam, Leicester, MA
  - Irish Dam Gate Replacement, Grafton, MA
  - Upper and Lower Highland Lake Dam, Goshen, MA
  - Robin Hollow Pond Dam, Cumberland, RI
  - Barney Pond Dam, Lincoln, RI
  - Nagog Pond Dam, Concord, MA
  - Center Pond Dam, Beckett, MA
  - Iron Hill Dam, Weymouth, MA
  - Paradise Pond Dam, Northampton, MA
  - Townsend Harbor Dam, Townsend, MA
  - Terry Brook Reservoir Dam, Freetown, MA
- **NRCS - Arm Brook Multipurpose Dam Supplemental Watershed Plan/EA:** Principal-in-charge for the development of a Supplemental Watershed Plan/Environmental Assessment under a multi-year MATOC with the NRCS. The EA included geologic/geotechnical evaluations, H&H evaluations, as well NEPA evaluations and the development of alternatives to meet current design and regulatory criteria. Westfield, MA.
- **Hobbs Pond Dam:** Principal-in-Charge/Project Manager for the design and development of construction documents of a new armored auxiliary spillway and new primary spillway to repair a failed embankment and increase discharge capacity. Weston, MA.
- **Curtis Pond Dam Removal:** Principal-in-Charge for the design and execution of this dam removal project to restore natural stream flow. Middleton, MA.
- **Bellingham Dam Removal:** Principal-in-Charge for the evaluation and design of this small dam removal to address regulatory and maintenance concerns. Bellingham, MA.
- **Massachusetts Water Resources Authority:** Principal-in-Charge for the seepage and stability analysis, as well as physical inspection of the Authority's water supply dams inclusive of the Quabbin Reservoir and Wachusett Reservoir Dam. Statewide, Massachusetts.
- **Ben Smith Dam:** Principal-in-Charge/Project Manager for the design of modification to the canal and to the powerhouse in accordance with FERC procedures. Maynard, MA.
- **SuAsCo Dam Evaluations:** Principal-in-Charge/Project Manager responsible for visual inspection and collection of survey data for this evaluation of the dams and control structures within the SuAsCo Watershed. Prepared inspection and recommendations for the report utilizing current NRCS format and assisted in the completion of prioritization analysis. Advanced the evaluations to detailed Phase II analysis for 2 of the structures which are currently in conceptual design phases. Marlborough, Northborough, and Berlin, MA.



### REGISTRATIONS AND CERTIFICATIONS

Professional Engineer –  
Massachusetts,  
Rhode Island, New York,  
Connecticut, Vermont, Ohio,  
Pennsylvania

OSHA 40-Hour Hazardous  
Waste Operations Health  
and Safety Training

Nuclear Gauge Operator  
Safety Training

### PROFESSIONAL AFFILIATIONS

Association of State Dam  
Safety Officials

### EDUCATION

Lafayette College:  
B.S., Civil Engineering, 2000

### RELEVANT EXPERIENCE

Mr. Orsi is a Geotechnical Engineer specializing in the field of dam engineering. With more than 23 years of experience, Allen has participated in a wide variety of dam engineering and geotechnical engineering projects. Building upon a career base of completing visual dam inspections and providing construction observation services, Allen has expanded his experience to include all phases of project implementation including scope development, evaluation, design, and project management for a diverse project portfolio under various dam safety programs throughout the Northeast. Representative project experience includes:

- **Parker Mills Pond Dam Consulting:** Project manager for a variety of assignments associated with evaluations the high hazard potential dam historically found to be in Poor condition. Associated services have included completion of a Phase II Inspection / Evaluation of the dam inclusive of evaluation of spillway design flood compliance, geotechnical site investigations and detailed stability analyses; development of conceptual rehabilitation plans; preparation of an Emergency Action Plan; completion of regulatory Phase I Inspection and Poor Condition Follow Up Dam Inspections; and preparation of Hydraulic Design Report for bridge replacement. Wareham, MA

- **Emergency Action Plans and Inundation Mapping Projects:** Managing Engineer for numerous studies and evaluations to assist dam owners and regulators evaluate hazard potential classification as well as prepare for response in the event of a dam safety emergency.

Nagog Pond Dam, Acton, MA	Houghton Pond Dam, Holliston, MA
Framingham Reservoir No. 1 Dam, Framingham, MA	Lake Maspenock Dam, Hopkinton, MA
Framingham Reservoir No. 2 Dam, Framingham, MA	Sugden Reservoir Dam, Spencer, MA
Unionville Pond Dam, Holden, MA	Old Grist Mill Dam, Seekonk, MA
Clarks Mills Lower Dam, Greenwich, NY	Neponset Reservoir Dam (Inundation Mapping), Foxboro, MA
Center Falls Dam, Greenwich, NY	Lake Cochituate Dam, Framingham, MA
Clarks Mills Upper Dam, Greenwich, NY	Otis Reservoir Dam, Otis, MA
Tremont Dam, Wareham, MA	Ashmere Lake Dam, Hinsdale, MA
<b>Parker Mills Pond Dam, Wareham, MA</b>	Rice City Pond Dam, Uxbridge, MA
Muzzy Meadow Pond Dam, Spencer, MA	Falls Pond Dam, N. Attleboro, MA
North Watuppa Pond Dam, Fall River, MA	Whitings Pond Dam, N. Attleboro, MA
Rivulet Village Pond Dam, Uxbridge, MA	Lake Gardner Dam, Amesbury, MA
Smelt Brook Dam, Braintree, MA	Chartley Pond Dam, Norton, MA
Hebronville Pond Dam, Attleboro, MA	Norton Reservoir Dam, Norton, MA
Copicut Reservoir Dam, Fall River/Dartmouth, MA	Ashland Reservoir Dam, Hopkinton, MA
Noquochoke Lake Dam, Westport/Dartmouth, MA	Hopkinton Reservoir Dam, Hopkinton, MA
Mill Pond Dam, Ashland, MA	Fulton Pond Dam, Mansfield, MA
Terry Brook Reservoir Dam, Freetown, MA	

- **Swansea Dam Rehabilitation:** Project Manager for the evaluation, design, and construction administration to stabilize scour apron loss and undermining of the spillway at the Swansea Dam. Project tasks included low level outlet gate replacement, plunge pool and energy dissipation at the downstream toe fo the spillway, and stabilization of the spillway in a manner to preserve the pre-construction landscape at this popular local destination. Appurtenant elements included parking lot efficiency and flow improvements. Assisted the Town in securing grant funding through the Massachusetts Dams and Seawall Repair or Removal program to cover the cost of construction and construction administration tasks. Swansea, MA.

- **Fall River Dam Consulting Services (2006-2021):** Program manager responsible for assisting the City of Fall River Department of Community Utilities and Water Supply Board in implementing their dam maintenance program. Tasks include annual review and completion of regulatory inspections and updating emergency action plans. Services have also

include evaluation and design of repairs/rehabilitation for five of the City's twelve dams, evaluation and conceptual designs for three additional dams, consulting during consideration and implementation of removal programs for two dams, and development of grant applications to assist the City with funding planned repair work. Greater Fall River Area, MA.

- **Bartlett Pond Dam Removal:** Project Manager for the evaluation, design, and construction administration of a dam removal to restore natural flow and address dam safety deficiencies. The area of the dam was designed as a passive public recreation area. Lancaster, MA.
- **Old Mill Pond Dam Restoration:** Project Manager/Lead Designer for the rehabilitation of a historic mill dam that incorporated the design of a "new dam" upstream of the historic structure to return the impoundment and limit impact to the historic resource. The project included preparation of construction documents, permitting, and construction phase services. Hampton, NH.
- **Old Mill Dam Removal & Charles River Restoration:** Guided the dam owner through alternatives analysis and evaluations eventually reaching the determination for dam removal. Prepared applications to receive grant funding and technical assistance from the state for completion of the project. Responsible for preliminary site evaluations, feasibility studies, sediment analysis, hydrologic/hydraulic evaluation, final design, permitting, and construction administration. Bellingham, MA.
- **West Pond Outlet Dam Investigation:** As Senior/Field Engineer, responsibilities included collection, interpretation, and analyses of site information. Performed a visual inspection of the dam, a subsurface investigation, and prepared an inspection report containing analysis results and repair recommendations. Gloucester, MA.
- **North Watuppa Pond Dam Gatehouse Repair:** As part of a program to restore operability to the gates at this High hazard potential, large sized structure which serves as the primary drinking water supply for the City of Fall River, Mr. Orsi provided project management and engineering services throughout the evaluation, design, permitting, and construction phases of the work. Work included incorporating level monitoring into existing remote data collection systems, replacement of inoperable gates, and gatehouse renovations. Fall River/Westport, MA.
- **Copicut Reservoir Dam Rehabilitation:** Project Manager for the design of repairs to a 3,700-foot long, 40-foot-high earthen embankment utilized for water supply purposes. Design components included stabilization of the downstream toe to provide for vehicular access for maintenance across the wetland in the downstream area, installation of a pre-engineered access bridge, installation of seepage monitoring devices, and restoration of failed upstream slope protection. Fall River/Dartmouth, MA.
- **Phase I Dam Inspections (2006):** Project Engineer/Lead Engineer for the inspections and evaluation of various municipal, state and privately-owned dams in response to orders by the MADCR Office of Dam Safety. Statewide, MA.
- **MADCR Dam Inspections (2020 – 2017):** Project Managing Engineer for the inspection and evaluation of state-owned dams throughout MADCR. Statewide, MA.





#### **REGISTRATIONS AND CERTIFICATIONS**

Professional Engineer –  
Massachusetts,  
Rhode Island

#### **PROFESSIONAL AFFILIATIONS**

Association of State Dam  
Safety Officials

American Society of Civil  
Engineers

#### **EDUCATION**

University of Rhode Island:  
B.S., Civil Engineering, 2011  
B.A., German Language,  
2011

#### **TRAINING**

Troxler Nuclear Density  
Gauge License

OSHA 10 Hour Construction  
Safety Training

#### **RELEVANT EXPERIENCE**

Mr. Caouette is a Geotechnical Engineer with 12 years of experience specializing in the fields of dam and foundation engineering. Mr. Caouette has completed numerous dam inspections, embankment designs, deep and shallow foundation designs, alternatives analyses, and a variety of other dam and geotechnical related projects throughout the New England region. While currently serving as a Project Manager, his experience to date includes analytical analysis, field observations, permit development, grant writing data gathering/reduction/analysis, and contract administration through all project stages, resulting in a diverse project portfolio and a well-rounded approach to project completion. Relevant project experience includes:

- **Haskell Pond Dam:** Completed site investigations, alternatives design, final design, and contract administration for this multi-phase project to improve the condition of a large size, high hazard water supply reservoir to address static/dynamic deficiencies utilizing an internal secant pile wall to support the embankment. Designed spillway and embankment improvements to pass design flows. Developed numerous grant applications to the State of MA and FEMA to aid with project funding. Completed Phases I and II and currently pursuing/awaiting funding for Phase III. Gloucester, MA.
- **Sunset Lake Dam Improvements:** Completed subsurface investigations and geophysical survey, analysis to assess this significant hazard potential dam with a history of seepage and spillway clogging. Mr. Caouette developed a variety of dam alternatives from reconstruction to an upstream cutoff wall for evaluation by the dam owner. The project is currently entering design phase to install an upstream cutoff wall and complete additional repairs to the earthen embankment. Foxboro, MA.
- **Stearns Millpond Dam:** Completed designs to demolish and replace the low-level outlet, demolish and replace the primary spillway discharge apron, and install a toe drain to address leakage and scour issues at the existing dam. Provided bid phase, construction administration and field observation services. Sudbury, MA.
- **Chartley Pond Dam:** Designed repairs to address advanced cracking and scouring of the concrete for an existing high hazard potential dam. Prepared construction and bid documents to secure bids and provided construction administration throughout construction and project closeout. Norton, MA.
- **Aaron River Dam:** Designed concrete repairs and vegetation management for this large water supply structure. Prepared construction and bid documents to support competitive bidding. Cohasset, MA.
- **Reading High School Retaining Wall:** Completed a subsurface investigation and existing conditions analysis to supplement the design, repair, and reconstruction of a failing MSE wall. Prepared construction drawings and specifications and provided on-site observation and construction administration services. Reading, MA.
- **Various Phase I Dam Inspections:** Completed visual field inspections as part of the Phase I evaluation of a variety of dams with appurtenant structures ranging from concrete and stone masonry spillways, to gated sluice structures and by-pass channels.

- Aaron River Dam – Cohasset, MA
  - Central Street Dam – Framingham, MA
  - Hollingsworth & Vose Company Dam – Groton, MA
  - Ellis Pond Dam – Norwood, MA
  - Rivulet Village Dam – Uxbridge, MA
  - Whitin Reservoir Dam – Douglas, MA
  - Upper Westborough Reservoir Dam – Westborough, MA
  - Sandra Pond Dam – Westborough, MA
- **Salisbury Tide Gate:** Provided submittal review, construction observation, led client-contractor weekly performance meetings, and provided client consultation during the construction phase of the project to replace an existing tide gate and embankment with a new double gate system. Salisbury, MA.
  - **Bound Brook Dam:** Designed temporary water diversion cofferdams and siphons to facilitate construction. Prepared emergency response plans for storms in excess of the specified design event. Prepared emergency modifications to address elevated pond level. Duxbury, MA.
  - **Dam Stability Analyses:** Completed gravity dam stability analyses of masonry and concrete dam structures founded on bedrock:
    - Revere Street Dam (Concrete) – in support of ownership transfer between a Contractor and Municipality. Canton, MA
    - Natick Pond Dam (100-year-old stone masonry) - in support of permit application submission to FERC. West Warwick, RI.
    - Echo Lake Dam (100-year-old arch stone masonry) – to confirm dam meets current stability criteria. Hopkinton, MA.
  - **Silver Spring Dam Rehabilitation:** Completed investigations, analyses and design to replace the low-level outlet, improve the downstream channel characteristics, remove unwanted vegetation, address upstream slope instability, restore access across the spillway, while preparing to accommodate future spillway improvements at this high hazard potential dam. Mr. Caouette prepared construction drawings, specifications and permit applications to facilitate award by competitive quals based bid. The project is entering bid phase. North Kingstown, RI.
  - **RIDEM Dam Inspections (2017-2020):** Project engineer for the completion of visual inspections of dams in Rhode Island for the RIDEM Dam Safety Program. Statewide, RI.
  - **Wyoming Pond Dam Rehabilitation:** Completed designs to replace the low-level outlet, restore operability to the sluiceway, replace the concrete cap at the overflow spillway and improve the condition of the masonry components of the dam. Based upon the detection of sever internal erosion the design expanded to include the replacement of the right embankment with a new earthen and concrete dam with a bedrock foundation. Mr. Caouette prepared construction drawings, specifications, and permit applications to facilitate award by competitive quals based bid. The project is entering construction phase. Hope Valley, RI.
  - **Natick Pond Dam:** Completed gravity dam stability analysis of 100-year-old masonry dam in support of permit application submission to FERC. West Warwick, RI.
-



**REGISTRATIONS AND  
CERTIFICATIONS**

Professional Engineer –  
Massachusetts, Rhode Island,  
Connecticut, New Hampshire,  
New York

Certified Floodplain Manager

Municipal Vulnerability  
Preparedness (MVP) Provider

OSHA Hazardous Waste  
Operations 40-Hour Health and  
Safety Training

Troxler Nuclear Density Gauge  
Training

**PROFESSIONAL  
AFFILIATIONS**

Association of State Dam Safety  
Officials

Association of State Floodplain  
Managers

Massachusetts Association for  
Floodplain Managers

American Society of Civil  
Engineers

**EDUCATION**

University of Rhode Island  
M.S., Civil Engineering, 2012

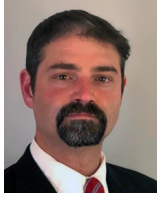
University of Rhode Island  
B.S., Civil Engineering, 2011

**RELEVANT EXPERIENCE**

Mr. Dunn has nine years of consulting experience in H&H, dam, and geotechnical engineering. His H&H experience includes hydrologic and hydraulic modeling for a variety of riverine-based project types including dam assessments, dam removals, as well as bridge and culvert assessments/replacements. His dam experience spans across New England and includes inspecting and evaluating both embankment and run-of-the river dams, development of EAP's and O&M Manuals, and completing all phases of dam rehabilitation, repair, and removal projects from schematic design through completed construction. Project management experience includes staff management, proposal development, budget tracking, project scheduling, subcontractor coordination, invoicing, client coordination (progress updates, meetings, RTC), and Updates to Procedures and Programs. Representative projects include:

- **Parker Mills Pond Dam Hydraulic Design Report:** Developed hydrologic and hydraulic models for two crossings of Elm Street over the Wankinco River / Parker Mills Pond to support the design of bridge replacement programs at the bridges over the two spillways at the Parker Mills Pond Dam. Prepared and issued Hydraulic Design Reports meeting MassDOT design requirements. Wareham, MA.
- **Hydraulic Capacity Assessment for Dams:** Lead engineer for H&H modeling to determine the hydraulic capacity of existing dams as well as to develop alternatives for increasing the hydraulic capacity of dams that do not meet state mandated design flood requirements. Recently completed for:
  - Harold Parker State Forest Dams (Five each) in Andover, MA for MADCR
  - Noquochoke Lake Dam in Dartmouth, MA for the City of Fall River
  - Lake Aldersgate Dam located in North Scituate, RI for the Aldersgate Camp and Retreat Center,
  - Hawkins Pond Dam located in Glocester, RI for the Town of Glocester.
  - Harrisville Pond Dam located in Burrillville, RI for the Town of Burrillville,
  - Sloccum Reservoir Dam in Exeter, RI for the American Baptist Churches of Rhode Island,
  - Sunset Lake Dam in Foxboro, MA for MADCR
- **Dam Removal Evaluations:** Lead engineer for H&H modeling to identify and assess the changed hydraulic conditions that may occur within a river post dam removal. Recently completed for:
  - Upper Lake Noquochoke Dam in Dartmouth, MA for the City of Fall River
  - Whitney Pond Dam in Ashburnham, MA for the Town of Ashburnham
  - Temple Street Dam in Duxbury, MA for MADER
  - Upper and Lower Kickemuit Reservoir Dams in Warren, RI for BCWA
- **Inflow Design Flood / Incremental Damage Assessments for Dams:** Lead engineer for the completion of incremental damage assessments in support of inflow design flood studies for specific dams. Specific work includes detailed hydrological modeling, detailed two-dimensional hydraulic modelling, dam break analyses, inundation area development, incremental damage assessment pre- and post-failure, and inflow design flood determination. Recently completed for:
  - Hebronville Pond Dam in Attleboro, MA for the Preservation of Affordable Housing (POAH) Inc.

- **Bridge and Culvert Replacement Projects:** Lead engineer for H&H modeling of bridge and culvert replacement projects throughout MA. Recent projects include:
    - US-20 Bridge Replacement over the Quabog River in Monson/Palmer, MA for MassDOT
    - Peckham Street Culvert Replacement in Attleboro, MA for the City of Attleboro
    - Elm Street Bridge Replacement in Wareham, MA as a subconsultant to Nitsch Engineering for the Town of Wareham.
    - Leonard Street Culvert Replacement in Norton, MA for the Town of Norton
  - **Old Mill Pond Dam Restoration:** Project engineer for all design, permitting, bid, and construction stages of the rehabilitation of a historic mill dam that incorporated the design of a “new dam” upstream of the historic structure to return the impoundment and limit impact to the historic resource. Hampton, NH.
  - **MADCR Office of Dam Safety – Phase I Dam Inspection/Evaluations:** Lead engineer for completion and project management of Phase I Dam Inspection/Evaluation Reports including 70+ inspections of significant and high hazard dams. Statewide, MA.
  - **Emergency Action Plans (EAP’s):** Project Manager for the development of 50+ EAP’s throughout MA inclusive of H&H analyses, 2D dam break modeling, inundation mapping, impacted infrastructure assessment and documentation, EAP report development, as well as implementation assistance. Statewide, MA.
  - **Dam Removal Feasibility Studies:** Completed dam removal feasibility studies for several different dams. Studies included H&H analyses, sediment analyses, identification of benefits and potential risks/challenges associated with dam removal, as well as a conceptual design of a dam removal program with an associated opinion of probable costs. Statewide, MA.
  - **Conceptual Design of Fall River Dams:** Completed the conceptual design of two dams (Lake Noquochoke Dam and Upper Lake Noquochoke Dam) owned by the City of Fall River. Conceptual design tasks included detailed H&H analyses of the entire drainage area and the development of a conceptual design report for each dam that considered three alternatives (Rehabilitation, Repair, and Removal). Fall River, MA.
  - **Old Mill Dam Removal and Charles River Restoration:** Project engineer for the final design, bid, and construction stages of the removal of the Old Mill Dam along the Charles River. Scope of project included the removal of the existing concrete run-of-the-river dam and restoring the site to natural stream channel, installation of riprap scour protection along the banks of the restored channel, mechanically dredging the river upstream of the former dam, construction of an onsite containment berm to store the dredged material, and improvements to the existing storm water drainage systems along the roadway near the former dam location. Bellingham, MA.
  - **Swansea Dam Repairs:** Project engineer for the bid and construction stages of the repairs to the Swansea Dam, a 16-foot high, 150-foot-long significant hazard run-of-the-river stone masonry dam. Swansea, MA.
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**REGISTRATIONS AND  
CERTIFICATIONS**

Professional Geologist –  
Mississippi

OSHA 40 Hour Training

OSHA 8 Hour Training

Nuclear Moisture/Density  
Gage Operations &  
Radiation Safety Training

Confined Space Entry  
Training

**PROFESSIONAL  
AFFILIATIONS**

Association of State Dam  
Safety Officials

United States Society of  
Dams

Association of State  
Floodplain Managers

**EDUCATION**

Salem State University:  
B.S., Geology, 2007

**RELEVANT EXPERIENCE**

Mr. Cummings is a Professional Geologist with 14 years of experience in many geological disciplines throughout the U.S. and internationally, in both the public and private sectors. Mr. Cummings is an active participant in multiple geologic and geoenvironmental organizations. Relevant project experience includes:

- **Emergency Action Plan (EAP) Development:** Collected hydrologic and meteorological data to model the resulting inundation area from a potential dam break using computer software including HydroCAD, Esri ArcGIS, and HEC-RAS programs. Presented this information in detailed plans for dam owners and local first responders to assist in a dam emergency. EAP's have been developed for the following dams: Three Mile River Dam (MA03082), Nemasket Park Dam (MA00015), Stony Brook Pond Dam (MA03390), Swansea Dam (MA01084), Hollingsworth & Vose Dam (MA03136), Northborough Reservoir Dam (MA01234), Red Dam (MA00170), Jacobs Pond Dam (MA00365), Danielson Pond Dam (MA03351) and Kingsbury Dam (MA01154).
- **Massachusetts Dam Inspections:** Performed or assisted with the inspection of several dams across the State. Dams inspected included Low, Medium, and High hazard dams as determined by the Office of Dam Safety, as well as non-jurisdictional dams. Dam inspections typically consisted of visual inspection, site surveys, photographing features, and reporting deficiencies. Dams inspected include: Cochituate Dam (MA00740), Cold Harbor Dam (MA00996), Hop Brook Dam (MA00998), Paradise Pond Dam (MA00754), Upper Highland Lake Dike (MA00059), Lower Highland Lake Dam (MA00598), Parker Mills Pond Dam (MA00150), Red Brook Road Dam (MA01037), Stateline Dam (MA03192), Tuxbury Pond Dam (MA00151), Lake Gardner Dam (MA00152), Reed Mill Pond Dam (MA00431), Irish Pond Dam (MA00580), and George H. Nichols Multipurpose Dam (MA01000). Statewide, MA.
- **Whitney Pond Dam Removal:** Constructed hydrologic models and analyzed the downstream effects of the proposed removal of Whitney Pond Dam using the HEC-RAS program. Modified the LiDAR-based digital elevation model to design the proposed condition terrain using Esri ArcGIS and AutoCAD. Ashburnham, MA.
- **Elm Street Bridge Culvert Replacement:** Using information gathered from field inspections and surveys, developed HydroCAD models to evaluate the efficiency of a proposed culvert replacement project. Wareham, MA.
- **Leonard Street Culvert Replacement:** Evaluated the storm runoff potential and tailwater considerations for a proposed culvert replacement. HEC-RAS, HydroCAD, and ArcGIS were utilized to determine the hydrologic requirements at the culvert location to properly size and design the replacement culvert. Norton, MA.
- **Kickamuit River Restoration:** Analyzed the effects of a multi-phase project involving two dam removals and a culvert replacement on a tidally influenced riverine system using HEC-RAS. Proposed dam removals included the Upper and Lower Kickamuit Reservoir dams. Warren, RI.



- **Narragansett Bay Commission – Bucklin Point Dam Removal:** Constructed hydrologic & hydraulic models and analyzed the downstream effects of the proposed removal of a non-jurisdictional dam at the Narragansett Bay Commission Wastewater Treatment Facility. The model was developed using HydroCAD software. Modified the LiDAR-based digital elevation model to design the proposed condition terrain using Esri ArcGIS and AutoCAD. Some terrain data was analyzed using HEC-RAS. East Providence, RI.
  - **School Street Culvert Replacement:** Evaluated the storm runoff potential and tailwater considerations following the proposed addition of an emergency sewage overflow outfall to Beverage Brook. The project included a proposed culvert replacement at the School Street crossing of Beverage Brook. HEC-RAS, HydroCAD, and ArcGIS were utilized to determine the hydrologic requirements at the culvert location to properly size and design the replacement culvert and the emergency outfall. East Providence, RI.
  - **NRCS – Margaret Creek Site 1 & 6 Supplemental Watershed Plan/EA:** Completed field data collection/boring logging, evaluations and assessment to support a Supplemental Watershed Plan and Environmental Assessment for the Fox and Meeks Flood Control projects. Scope of work included comprehensive geotechnical explorations of the existing dam and auxiliary spillway, hydrologic and hydraulic analyses, seepage and slope stability analyses, spillway integrity analysis, and alternatives analysis. Work was completed in accordance with NRCS policies and procedures for the evaluation and planning for PL-566 flood control projects. OH.
  - **NRCS – Bentley Creek Watershed Evaluation:** Completed field data collection to support a Supplemental Watershed Plan and Environmental Assessment for the Bentley Creek Watershed. Scope of work included comprehensive geotechnical explorations of the existing dam and auxiliary spillway, hydrologic and hydraulic analyses, seepage and slope stability analyses, spillway integrity analysis, and alternatives analysis. Work was completed in accordance with NRCS policies and procedures. PA/NY.
  - **City of Springfield – Levee Assessment:** Supervised a subsurface investigation for a levee accreditation program. Responsibilities included logging soil borings, monitoring and logging well installation and development, and logging piezometer installation. Laboratory analysis included grain size and Atterberg limit analysis. Springfield, MA.
  - **Dam Safety Compliance Manager:** Inspected publicly- and privately-owned water impoundment structures across the State to assess their overall condition and ensure compliance with State dam safety regulations. Initiated and processed legal actions against non-compliant dam owners. Reviewed and maintained correspondence with dam owners to address operations, maintenance, and any structural deficiencies observed during inspections. Analyzed map data to determine if new or existing dams posed a threat to downstream inhabitants or infrastructure.
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#### **REGISTRATIONS AND CERTIFICATIONS**

Engineer in Training  
Certification #25269

OSHA 40-Hour Hazardous  
Waste Operations Health  
and Safety Training

OSHA 10-Hour Construction  
Safety Training

Nuclear Gauge Operator  
Safety Training

#### **EDUCATION**

University of Massachusetts  
Dartmouth:  
B.S., Civil and Environmental  
Engineering, 2016

#### **RELEVANT EXPERIENCE**

Ms. Pham brings six years of engineering experience to Pare. She has served as an engineer providing engineering analysis, data collection, field surveys, preparation of inspection finding reports, and field observation in traditional geotechnical projects and dam projects. Relevant project experience includes:

- **Phase I Dam Inspections:** Engineer during the field inspection and preparation of the Phase I Dam Inspection/Evaluation Report including 20+ inspections of high hazard and significant hazard potential dams. Statewide, MA.
- **Dam Operation and Maintenance Manual (O&M):** Staff engineer, assisted in the preparation of the manual to ensure that the dam is operated and maintained properly. The work includes the following dams:
  - Field Pond Dam, Andover MA
  - Collins Pond Dam, Andover MA
  - Brackett Pond Dam, Andover MA
  - Deleano Pond Dam, Andover MA
  - Little River Dam, Haverhill MA
  - Weymouth Great Pond Dam, Weymouth MA.
- **Stability Analysis and Slope Analysis:** Engineer for the evaluations of slope stability and seepage stability utilizing Slope/W and Seep/W; performed stability analyses utilizing gravity dam method for 10+ dams throughout Massachusetts, New Hampshire, and New York.
- **NRCS – Arm Brook Dam:** Staff engineer, assisted in the preparation of the geotechnical evaluations and assessment to support a Supplement Watershed Plan and Environmental Assessment for the Arm Brook Flood Control project. Responsibilities included calculated borehole permeability test, spillway integrity analysis, and seepage and slope stability analyses of the structures. Westfield, MA.
- **Collins Pond Dam Improvements:** Staff engineer during the design phase of improvements. Responsibility included observing a subsurface investigation, performed embankment stability analysis, reviewed hydrology & hydraulic model, liquefaction potential evaluation, slope protection design, prepared design reports, construction drawings, and cost estimation. Andover, MA.
- **Hebronville Pond Dam Improvements:** Staff engineer prepared construction drawings, Ch 253 permit application, and cost analysis for the proposed improvements at the dam. Attleboro, MA.
- **Sunset Lake Dam:** Staff engineer assisted in the preparation of the alternatives design report for this significant hazard potential dam with a history of seepage and spillway clogging. Responsibility included observed a subsurface investigation, perform embankment stability analysis, and assisted in the preparation of the alternatives design report. Foxboro, MA.
- **Margaret Creek Structure 1 and 6 Environmental Assessment:** Staff engineer for completing evaluations and assessment on behalf of the USDA-NRCS to support a Supplemental Watershed Plan and Environmental Assessment for the Meeks Lake Dam (Structure 1) and Fox Lake Dam (Structure 6). Athens County, OH.



**REGISTRATIONS AND  
CERTIFICATIONS**

Engineer in Training  
Certification

Nuclear Gauge Operator  
Safety Training

OSHA 10-Hour Construction  
Safety & Health

**EDUCATION**

University of Massachusetts  
Dartmouth,  
B.S., Civil and Environmental  
Engineering, 2017

**RELEVANT EXPERIENCE**

Ms. Shanks has five years of experience in various aspects of geotechnical and dam engineering. Since graduating and joining Pare, Ms. Shanks has served as an engineer providing engineering analysis, data collection, and field observation in both traditional geotechnical projects and dam projects. Heather has also assisted in writing and developing geotechnical reports. Relevant project experience includes:

- **Massachusetts DCR and Municipal Dam Inspections:** Engineer during the inspection and prepared inspection reports for more than 30 dams in the last three years.
- **Old Mill Pond Dam Rehabilitation:** Staff engineer during the construction stage of dam rehabilitation. Responsibilities included evaluations of bearing stratum, reviewing reinforcing steel and concrete placement, monitoring backfilling and compaction operations, interpretation of the design drawings, and reviewing contractor compliance with the drawings and specifications. Hampton, NH.
- **Pratt Farm Pond Dam Evaluation:** Staff responsible for the evaluation of the spillway culvert to determine options for addressing the collapsed pipe section. Responsibilities included inspection of the general condition of the dam, detailed inspection of the spillway culvert, opinions of probable cost, and development of the report. Middleborough, MA.
- **Sugden Reservoir Dam Maintenance Repairs:** Staff engineer for the design phase of the maintenance repairs and construction phase of the grouted riprap apron and crack repairs. Responsibilities included design of the maintenance repairs, preparation of 100% construction drawings, specifications, opinions of probable cost, and construction observation during the crack repair and grouting of the riprap apron. Spencer, MA.
- **Chartley Pond Dam Wall Repairs:** Staff engineer for crack, spall, and scour repairs of the upstream wall. Responsibilities included construction observation, determining field quantities, field coordination of new repair method, observing shotcrete installation, and daily field reporting. Norton, MA.
- **Stearns Mill Pond Dam Reconstruction:** Staff engineer during the construction stage of a new concrete and riprap spillway scour apron. Field responsibilities included evaluations of bearing stratum, reviewing reinforcing steel and concrete placement, reviewing contractor compliance with the drawings and specifications, and developing an Operations and Maintenance Manual. Sudbury, MA.
- **Stafford Pond Dam Spillway Replacement:** Staff engineer during the construction stage of the spillway replacement. Responsibilities included monitoring demolition of the previous spillway structure, evaluations of bearing stratum, monitoring backfilling and compaction operations, reviewing reinforcing steel and concrete placement, reviewing contractor compliance with the drawings and specifications, reviewing submittals, and attending progress meetings. Tiverton, RI.
- **Connecticut Water Company Capital Improvements Plan:** Staff engineer responsible for the development of the Capital Improvements Plan for the 27 Connecticut Water Company owned dams. Various, CT.



## RELEVANT EXPERIENCE

Mr. Lozinski has four years of experience in various aspects of geotechnical and dam engineering. Since graduating and joining Pare, Ryan has served as an engineer providing engineering analysis, data collection, and field observation in both traditional geotechnical projects and dam projects. Ryan has also assisted in writing and developing geotechnical reports. Relevant project experience includes:

## REGISTRATIONS AND CERTIFICATIONS

Engineer-in-Training

Nuclear Gauge Training  
Operator Safety Training

OSHA 10-Hour Construction  
Safety & Health

## PROFESSIONAL AFFILIATIONS

Associate Member ASCE

Association of State Dam  
Safety Officials

## EDUCATION

Merrimack College,  
B.S., Civil Engineering, 2017

University of Rhode Island,  
M.S., Civil Engineering, 2018

- **MADCR - Field Pond Dam and Dike Rehabilitation:** Engineer responsible for construction stages of the rehabilitation of the Field Pond Dam and Dike; both classified as significant hazard. Field Pond Dam, a 16-foot high, 600-foot-long embankment dam and Dike, a 10-foot-high, 150-foot-long earthen dike. Rehabilitation of the dam and dike include the installation of a sheet pile cutoff wall along the entire length of the embankment at the dam and dike, demolition and replacement of existing low-level outlet and primary spillway systems, installation of upstream riprap slope protection, installation of toe drain systems at the dam and dike, and installation of a 60-foot-long prefabricated pedestrian bridge spanning the primary spillway channel. Andover, MA.
- **NRCS – Arm Brook Dam Rehabilitation Planning:** Engineer assisted in geotechnical evaluations and assessments to support a Supplement Watershed Plan and Environmental Assessment for the Arm Brook Flood Control Project. Responsibilities included downstream culvert crossing survey, HECRAS dam break modeling, alternate design analysis, and seepage and slope stability analyses of existing and proposed conditions. Westfield, MA.
- **MADCR Office of Dam Safety – Phase I Dam Inspection/Evaluations:** Engineer responsible for completion of Phase I Dam Inspection/Evaluations and reports for 20+ inspections of high, significant, and low hazard dams. Statewide, MA.
- **NRCS - Margaret Creek Structures 1 and 6 Environmental Assessment:** Completing evaluations and assessments to support an Environmental Assessment for Meeks Lake Dam (Structure 1) and Fox Lake Dam (Structure 6). Scope of work included comprehensive geotechnical explorations of the existing dam and auxiliary spillway, hydrologic and hydraulic analyses, seepage and slope stability analyses, spillway integrity analysis, and alternatives analysis. Work was completed in accordance with NRCS policies and procedures for the evaluation and planning for PL-566 flood control projects. Athens County, OH.
- **Emergency Action Plans (EAP's):** Engineer responsible for assisting and development of 10+ EAP's throughout MA inclusive of downstream culvert crossing survey, H&H analyses, HECRAS 2D dam break modeling, inundation mapping, impacted infrastructure and assessment, and EAP report development. Statewide, MA.



**REGISTRATIONS AND  
CERTIFICATIONS**

Professional Engineer –  
Massachusetts,  
Rhode Island

Nuclear Testing Equipment  
Training

Providence and Worcester  
Railroad Safety Training

OSHA Construction Safety  
10-Hour Training

OSHA Hazardous Waste  
Operations 40-Hour Health  
and Safety Training

OSHA Hazardous Waste  
Operations 8-Hour Refresher  
Training

**PROFESSIONAL  
AFFILIATIONS**

Association of State Dam  
Safety Officials

Chi Epsilon

**EDUCATION**

Northeastern University:  
M.S., Civil Engineering, 2000

University of Rhode Island:  
B.S., Civil Engineering, 1993

Troxler Electronics, Inc.:  
Troxler Density Gauge  
Training, 1993

**RELEVANT EXPERIENCE**

Mr. Matheson is a Senior Project Engineer with 28 years of diverse experience on geotechnical, waterfront, dam, bridge, and construction engineering projects. This includes geotechnical site investigation, geotechnical analysis, dam inspection and repair design, and construction monitoring. Due to his tenure with a pile-driving contractor, Mr. Matheson also has construction experience including estimating, supervision, and shop drawing submittal development. Relevant project experience includes:

- **MADCR Dam Safety - Phase I Dam Inspections (1999 – 2017):** Conducted Phase I dam inspections consisting of visual on-site inspections, interviews with owners, a review of existing construction and past inspection documents, and development of inspection reports containing findings, repair alternatives and recommendations, photos, and opinions of probable construction costs.
- **Norton Reservoir Dam Repairs:** Project Engineer for the design of overtopping protection and the development of Construction Documents for this high hazard potential earthen embankment dam. The project was undertaken in 2 phases, a spillway improvements phase and an embankment repair phase to facilitate funding and pond level management. Norton, MA.
- **Wakefield Pond Dam Evaluation:** Project Engineer for the evaluation of seepage and the development of alternatives to remediate an earthen embankment dam. Wakefield, MA.
- **Wachusett Reservoir Dam:** Provided field observations and a summary report for underwater inspections of a stone masonry dam that is approximately 900 feet long and up to 129 feet in height. Clinton, MA.
- **Sunset Lake Dam:** Performed slope stability analyses of the dam embankment using the computer program XSTABL as part of a Phase II dam inspection. Foxboro, MA.
- **Woonsocket Reservoir No. 3 Spillway Repairs:** Project Engineer for the design of concrete repairs and the development of Construction Documents for the high hazard potential water supply dam. Woonsocket, RI.
- **Barney Pond Dam Repairs:** Project Engineer for the evaluation and design of repairs to address spillway and embankment stability concerns. The project included the development of full construction plans and specifications. Lincoln, RI.
- **Robin Hollow Pond Dam:** Developed construction plans and specifications to improve hydraulic capacity, improve stability and provide overtopping protection for this water supply project. Cumberland, RI.
- **Regulating Reservoir Dam:** Developed construction plans and specifications to repair the embankment dam through earthwork, concrete repairs, and the replacement of inoperable components. Scituate, RI.





**REGISTRATIONS AND  
CERTIFICATIONS**

Professional Engineer:  
Massachusetts,  
Rhode Island, Connecticut

Baystate Roads Scholar

OSHA Construction Safety  
10-Hour Training

**PROFESSIONAL  
AFFILIATIONS**

American Society of Civil  
Engineers

**EDUCATION**

University of Rhode Island -  
M.S., Civil & Environmental  
Engineering, 1996

University of Rhode Island -  
B.S., Civil & Environmental  
Engineering, 1992

**RELEVANT EXPERIENCE**

Mr. Berube has over 28 years of experience on structural engineering projects ranging from buildings to bridges, as well as civil projects such as wastewater and marine structures. His professional experience includes the analysis, inspection, design, detailing, and construction administration for both new structures and rehabilitation of existing facilities. Representative projects include:

- **Bound Brook Dam Construction-Phase Services:** On behalf of the contractor, Project Manager responsible for preparation of construction documents for the implementation of temporary dewatering controls, maintenance of stream flow, and construction permits for the rehabilitation of the Bound Brook Dam. Cohasset, MA.
- **MassDOT Rehabilitation of Parker Mill Pond (Route 28) Dam:** Senior Project Engineer for rehabilitation of a 285-foot long historic earthen high hazard dam carrying Route 28 and 6 over the Agawam River. The dam, located at the site of a former nail factory, contains the oldest functioning herring run in the United States. Project scope includes replacement of the existing undersized primary and secondary spillways with a sharp-crested arch weir spillway, construction of a new steel stringer with concrete deck slab bridge over the outlet channel, replacement of the existing fish passage system with a new Denil fish ladder, construction of temporary bypasses to accommodate marine migration patterns, and stone armament and erosion protection structures. Due to the environmental and historical significance, the project includes significant public and interagency involvement Wareham, MA.
- **MassDOT Repairs to Route 25 Dam #1:** Senior Project Engineer for repairs to a 650-foot long earthen dam carrying Interstate Route 495 over an unnamed reservoir constructed to support cranberry growing operations. Project scope includes reconstruction of the upstream embankment to incorporate rip rap slope protection, concrete repairs to the existing primary and secondary spillways and outlet culverts, repairs and reinforcement of eroded areas throughout the dam. Wareham, MA.
- **MassDOT Rehabilitation of Studleys Pond Dam:** Senior Project Engineer for repairs to a 470-foot long earthen dam carrying Route 123 over the French Stream. Project scope includes replacement of the existing spillway and outlet culvert with a sharp-crested U-shaped weir, installation of precast concrete outlet culverts, replacement of the existing closed drainage system to comply with the Massachusetts stormwater regulations, construction of retaining walls, and construction of an armor stone buttress system to stabilize existing stone retaining walls. Rockland, MA.
- **MassDOT Removal of Indian Brook Pond Dam:** Senior Project Engineer for removal of a 200-foot long earthen dam carrying Route 3A over Indian Brook. The dam, originally constructed to support now-abandoned agricultural operations, is no longer necessary. Removal of the high hazard dam will restore natural riparian movement and provide nearly 8 acres of naturally vegetated wetland wildlife habitat. Project scope includes removal of the existing spillway and outlet culverts, installation of precast concrete natural bottom crossing structures, installation of concrete retaining walls, and construction of new sidewalks to comply with MassDOT Complete Streets requirements. Plymouth, MA.





## RELEVANT EXPERIENCE

Mr. Adamo is a Professional Engineer with over 45 years' experience in the field of civil engineering including transportation, public works and site development. He has been responsible for the administration, design, and reviews of site, transportation, and public-sector infrastructure projects, including geometric highway design, drainage studies, water and wastewater collection systems, utility design, environmental permitting and design study reports. Relevant experience includes:

## REGISTRATIONS AND CERTIFICATIONS

Professional Engineer –  
Massachusetts,  
Rhode Island, Connecticut

Onsite Wastewater Treatment  
Systems,  
Class III Designer #3058,  
Rhode Island

Title V System Inspector  
Massachusetts - #SI 2548

OSHA 10-Hour Construction  
Safety Training

## PROFESSIONAL AFFILIATIONS

American Society of Civil  
Engineers – Life Member

National Society of  
Professional Engineers

ACEC Rhode Island

Providence Engineering  
Society

Institute of Transportation  
Engineers – RI Chapter

## EDUCATION

Roger Williams University:  
B.S., Civil Engineering, 1975

- **Town of Jamestown – Multi Use Path:** Project Manager for the design of a multi-use path along the Jamestown Reservoir, including the design of a vehicular/pedestrian bridge intended to cross the dam spillway. The project intent was to provide for bicycle and pedestrian access from North Street to Eldred Avenue and to provide for maintenance access to the reservoir for the Town Public Works Department. The project also included the coordination of wetland delineation and preparation of a Rhode Island Department of Environmental Management freshwater wetland permit. Jamestown, RI.
- **Providence Neighborhood Street & Sidewalk Improvement Program:** Project Manager for design and construction management services for rehabilitation of various streets and sidewalks over a period of 6 years that was funded under a \$24 million City Bond and partial funding through Community Development Block Grants. The primary goal of this program was to develop abbreviated design plans and contract specifications with close supervision of construction the construction work. This process saved the City both time and money under this program. Providence, RI.
- **Town of Middletown – West Main Road Sidewalk Improvements:** Project Manager for the design and construction of 3,000 lf of new sidewalk along S.R. 114 to improve pedestrian safety and ADA accessibility in a high-traffic urban environment. Middletown, RI.
- **Fall River Chapter 90 Street Improvement Program:** Project Manager for design and construction management services for the City's on-going street and water improvements over a 10-year program, which included full-depth pavement reclamation; mill and overlay; various of drainage improvements, coordination with the City's consultant for water main replacement; resetting/replacing of granite curbing and numerous concrete sidewalk improvements, including providing ADA-compliant facilities. Fall River, MA.
- **Town of Bourne – Clubhouse Drive Drainage and Roadway Improvements:** Project Manager for study, design and construction services for the replacement of the entire roadway drainage system. Work for this project entailed the providing seven stormwater leaching systems within a high groundwater area including pavement repairs. Bourne, MA.
- **Town of Bourne – Roadway Improvements to Sanderling Drive, Whimbrel Drive & Pintail Circle:** Project Manager responsible for preparation of plans, specifications and cost estimate for the resurfacing and drainage improvements to 0.75-mile-long project. This project also included assisting the town with bid review, shop drawing review and construction observation services. Bourne, MA.



**REGISTRATIONS AND  
CERTIFICATIONS**

Professional Wetland  
Scientist #2496

OSHA Construction Safety  
10-Hour Training

OSHA HAZWOPER  
40-hour Training

**PROFESSIONAL  
AFFILIATIONS**

Society of Wetland Scientists

Association of Massachusetts  
Wetland Scientists

National Society of  
Collegiate Scholars

**EDUCATION**

University of Rhode Island:  
B.S. in Wildlife and  
Conservation Biology, 2006

Wetlands-related courses  
include the following:  
Intro to Soil Science,  
Field Botany/Taxonomy,  
Wetland Wildlife, Wetland  
Ecology, Wetlands and Land  
Use, Wetlands Field  
Investigation, Marine Ecology

Introduction to ArcGIS I  
March 2007

**RELEVANT EXPERIENCE**

Ms. Gluck is responsible for performing wetland delineations in accordance with the guidelines and criteria of the Massachusetts Department of Environmental Protection (MADEP), Rhode Island Department of Environmental Management (RIDEM), Rhode Island Coastal Resources Management Council (RICRMC), and the US Army Corps of Engineers (USACE). Additional responsibilities include environmental studies, wildlife habitat investigations, impact mitigation design, reports and permit applications for a variety of coastal and inland projects, including utility, highway, bridge, dam, and private development projects. Ms. Gluck is adept at aerial photo interpretation, and the use of GPS, GIS, and AutoCAD in the collection and display of field data to assist in the development of permit submissions and other documentation. Representative projects include:

- **Haskell Pond Dam Rehabilitation:** Responsible for wetland delineations and environmental permitting for a water supply dam in Gloucester. Responsibilities included wetland delineations, assessment of potential mitigation sites, preparation of a Notice of Intent, MEPA Environmental Notification Form, Water Quality Certification. Submitted documentation to the US Army Corps of Engineers for coverage under the General Permit for Massachusetts. Gloucester, MA.
- **Paradise Pond Dam:** For the design of repairs to an existing dam and dike on the campus of Smith College. Responsible for wetland delineations and a detailed Wildlife Habitat Evaluation. Prepared a Notice of Intent, Environmental Notification Form, Chapter 91 Waterways License application, and Water Quality Certification. Submitted documentation to the US Army Corps of Engineers for coverage under the General Permit for Massachusetts. Northampton, MA.
- **Center Pond Dam:** Performed and documented wetland delineations and prepared a detailed Wildlife Habitat Evaluation for repairs to Center Pond Dam. Prepared a Notice of Intent, Environmental Notification Form, Chapter 91 Waterways License application, and Water Quality Certification. Submitted documentation to the US Army Corps of Engineers for coverage under the General Permit for Massachusetts. Contributed to the design of a Wetland Replication plan and is currently responsible for assisting with on-site environmental compliance monitoring. Becket, MA.
- **Multiple Dam Sites:** Responsible for the delineation of wetlands and resource areas at the dam sites to assist in determining impacts and impact minimization approaches. Prepared wetland data forms and assisted in the preparation of the Notice of Intent. These included, but are not limited to, the following projects:
  - Anawan Dam, Rehoboth, MA
  - Hobbs Pond Dam, Weston, MA
  - Terry Brook Reservoir Dam, Fall River, MA
  - Pearl Hill Dam, Townsend, MA
  - Crow Hills Dam, Westminster, MA
  - Brigham Pond Dam, Hubbardston, MA
  - Lake Maspenock Dam, Upton/Milford, MA
  - Paradise Pond Dam, Princeton, MA
  - Erikson Dam, Acton, MA
- **Neponset Reservoir Dam Repairs:** Responsible for wetland delineation, wetland data collection, and assistance in the preparation of a Notice of Intent

and Environmental Notification Form for the repairs and improvements to the dam impounding the Neponset Reservoir. Foxboro, MA.

- **MADCR Dam Maintenance Program - Eastern Central Region Dam Repairs:** Responsible for wetland delineation, GPS location, and Notice of Intent submission for repairs projects on three dams in the central region of Massachusetts. Worcester County, MA.
- **Blue Pond Dam Permitting:** Assisted in preparation of a RIDEM Application to Alter a Freshwater Wetland for the breach of the Blue Pond Dam in Hopkinton. Responsibilities included classification of wetland resource areas surrounding the impoundment, assessment of wildlife habitat functions, and assistance in the preparation of supporting documentation. Hopkinton, RI.
- **Limerock Reservoir Dam Removal:** Performed wetland investigations on the property and assessed the functions and values of the reservoir and surrounding wetlands. Prepared a report on wetland characterization and assessment of existing wetland functions and values. Lincoln, RI.
- **Willowdale Subdivision Wetlands Consulting:** Provided wetland delineation and permitting support for a residential subdivision project on a former golf course site heavily constrained by wetlands. Responsibilities included delineation of wetlands, preparation of a wetland delineation report for inclusion in permitting documentation; seasonal monitoring of a potential vernal pool and submission of a potential vernal pool monitoring study for review by the Conservation Commission; and providing support at public hearings throughout the permitting process. Mansfield, MA.
- **Panas Road Wetland Delineation:** Delineated approximately 2 miles of wetland within a 55-acre site that included open areas, natural woodlands, and abandoned gravel pits. Prepared a Wetland Delineation Report and appeared at a Public Hearing for an Abbreviated Notice of Resource Area Delineation. Currently monitoring two possible vernal pools on the site. Foxborough, MA.
- **242-244 Main Street Flagging:** Delineated extensive wetlands within an 80 acre site that included maintained horse pasture, shrub wetlands, natural woodlands, and stream channels, to assist with land use planning. Monitored flow conditions within two stream channels in order to determine whether either qualifies as an intermittent stream under 310 CMR 10.58 (2). Evaluated a potential vernal pool on the site. Foxborough, MA.
- **Cedar Swamp Brook Wetland Flagging:** Delineated a previously relocated stretch of Cedar Swamp Brook and associated wetland areas on the Central Landfill property, located in the vicinity of several construction activities being proposed part of the Phase VI Central Landfill expansion project. Johnston, RI.
- **Viridian Development - Wetland Consulting:** Responsible for wetland delineations, delineation data collection, and preparation of an Abbreviated Notice of Resource Area Delineation (ANRAD) for review and verification of approximately 17,000 feet of wetland edge on a 100± acre site. Attleboro, MA.



ENGINEERS SCIENTISTS PLANNERS

CELEBRATING 50 YEARS

Pare Corporation was founded in 1970 with one goal in mind — providing consistently superior service to our clients. Over the years, we have expanded both our capabilities and our staff to address the ever-changing complexities and challenges of projects in both the public and private sectors.

Today, we provide a diverse array of in-house services. By combining the resources of our experienced professional staff, and staying at the forefront of emerging technologies, we maintain a track record of solid accomplishment and are able to handle projects of any size with efficient, responsive service.

As a multidisciplinary firm of engineers, planners, environmental and wetland scientists, GIS specialists, and regulatory permitting specialists, our clients depend on us to help them work through the anxieties of the design and permitting process while sharing their sense of urgency.

Pare at a Glance

- 50 Years in Business
• 110+ Employees
• 49 Professional Engineers (Licenses in RI, MA, CT, ME, NH, VT, NY, PA, OH, NJ, DE, MD, VA, WV, NC, SC, GA, FL, AL, MI, CO, NV, UT, CA, and ON)
• USGBC LEED-Accredited Professionals
• ISI Envision Sustainability Professionals
• Licensed Site Professional (LSP)
• Professional Geologists
• Professional Wetland Scientists
• NICET Resident Construction Observers

Primary Markets

- State, Municipal, and Site Infrastructure — Transportation, Water, Wastewater, Solid Waste
• K-12 and Higher Education
• Pharmaceutical and Biotechnology
• Dam Owners and Marine Facilities
• Industrial, Corporate, Institutional, and Commercial

8 Blackstone Valley Place
Lincoln, RI 02865
(401) 334-4100

10 Lincoln Rd., Suite 210
Foxboro, MA 02035
(508) 543-1755

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TRANSPORTATION

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Highways and Roadways
Parking / Traffic Studies and ITS
Bicycle and Multi-Use Facilities
Streetscape Design
Railroads and Airports



GEOTECHNICAL / DAM

- Subsurface Investigations
Foundations and Retaining Walls
Slope Stability and Ground Stabilization
Dam Inspections, Design, Rehabilitation, and Removal
Emergency Action Plans / O&M Manuals



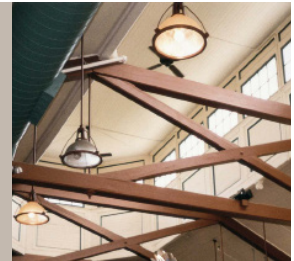
ENVIRONMENTAL

- Water Supply / Wastewater
Stormwater BMPs
Environmental Site Assessments
Site Remediation, Hazardous Waste
Hydrology and Hydraulics
Solid Waste / Resource Recovery



STRUCTURAL

- Building Design and Rehabilitation
Condition Surveys / Inspection
Parking Decks, Towers, and Specialty Structures
Foundation Design
Pre- and Post-Construction Inspections



PLANNING AND SITE / CIVIL

- Feasibility Studies and Master Planning
Land Development and Site Design
Sustainable Design / LEED Assistance
Municipal Planning Services
Park and Recreation Planning
Sustainable Energy Development
Grading / Drainage / Utility Layout



WATERFRONT / MARINE

- Piers / Docks / Wharves
Seawalls / Bulkheads
Ferry Docks & Terminals
Structural Analyses & Underwater Inspections
Port Planning / Marinas
Dredging / Coastal Studies



PERMITTING & SUPPORT SERVICES

- Coastal & Inland Wetlands
Delineations / Mitigation / Restoration
Water / Groundwater
Regulatory Agency Coordination
CAD / Drafting
Geographic Information Systems (GIS)
Construction-Phase Services





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## DAM-RELATED ENGINEERING

Pare Corporation is experienced in performing engineering evaluations and design associated with the rehabilitation and repair of dams and related structures. Pare's expertise includes both Phase I evaluations of structural, hydraulic and geotechnical conditions, as well as Phase II investigations and design of remedial measures. Pare's work in this area has involved earthen, masonry and concrete dams for various clients, including state, municipal, and private concerns. Pare's corporate experience encompasses more than 400 dams in Rhode Island, Massachusetts, Connecticut, and throughout New England.



### ***REPRESENTATIVE SERVICES:***

- **Condition Surveys & Reports**
- **Determine Structural & Geotechnical Adequacy**
- **Develop Emergency Action Plans**
- **Analyze Slope Stability**
- **Review Hydrologic & Hydraulic Conditions**
- **Inspect Downstream Routing Conditions**
- **Evaluate Potential for Dam Failure**
- **Recommend Remedial Measures**
- **Design Rehabilitation & Repairs**
- **Design Spillway Improvements**
- **Prepare Operations and Maintenance Manuals**



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## DAM SAFETY ENGINEERING

Pare Corporation has been inspecting and designing dam construction projects for over 50 years. Our main focus is helping dam owners and regulators mitigate risks by developing practical and cost-effective solutions that recognize the uncertainty associated with the condition of an aging dam.

Pare has a special expertise in dam engineering and has completed over 400 dam safety evaluations, site inspections and reports, repair and replacement designs, and construction inspections. Pare maintains a staff of geotechnical engineers, hydrologists, structural engineers, and construction engineers with extensive knowledge and hands-on experience in dam safety engineering. Our expertise and experience allows us to address the full range of a dam owners' inspection and rehabilitation needs including: dam safety inspections and reports (Phase I, II and III), stability analyses, seismic evaluations, hydraulic and hydrologic analyses, dam break analyses and inundation mapping, emergency action plans, spillway replacement designs, dam repair designs, instrumentation monitoring, construction inspection and testing, and operations and maintenance manuals.



Pare has provided dam engineering services to private, municipal and state government clients. Projects range from small millpond dams to large high-hazard water supply dams. Pare provides dam engineering services out of our Foxboro, Massachusetts office.





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## DAM INSPECTION / EVALUATION

Pare is experienced in performing Phase I and Phase II inspections and evaluations of dams. We have performed over 400 dam inspections of earth, stone masonry, and concrete gravity structures. Our work has been performed throughout New England for private, municipal, and government owners.



Pare has a team of experienced engineers ready to perform Phase I Dam Safety Inspections. These Phase I inspections typically include a thorough visual inspection of the dam's outlet works, spillway, pond area, and downstream areas. Extensive photographic documentation and critical survey information are gathered during this portion of the work. The issues critical to dam stability, such as seepage, overgrown vegetation, and non-functioning outlet works, are noted during the inspection. Based on the information gathered and the analyses performed, a report is prepared outlining the condition of the dam and providing recommendations for repairs and maintenance. The report also includes order-of-magnitude cost estimates to be used by the owner for budgeting.



A Phase II Dam Investigation is usually required when a Phase I Inspection reveals fair or poor conditions in an existing dam. The Phase II Investigation typically includes a comprehensive field exploration program, such as the performance of soil borings to determine soil conditions and the installation of specialized instrumentation. Piezometers, groundwater wells, and inclinometers are some of the instruments used to determine critical internal design parameters such as pore pressures, uplift pressures, phreatic surface, and internal stresses and strains. Embankment soil samples are often collected and analyzed in the laboratory to determine parameters for design. Slope stability, global stability, seepage analyses, seismic analyses, and liquefaction analyses are often undertaken to determine if the dam meets the minimum requirements of the governing authority. In addition, a comprehensive hydrologic and hydraulic evaluation is often required to determine the adequacy of the spillway and outlet works.



## DAM REMOVALS



Through assisting dam owners with their inspection and maintenance requirements, dam removal is often identified as an alternative to implementing repairs at a dam. Over the past 10 years, Pare Corporation has assisted municipal and private dam owners navigate the process to determine if dam removal is the preferred alternative, identifying physical and regulatory constraints that affect the scope of the dam removal program, complete necessary studies and evaluations to support the design and permitting of a dam removal project, develop construction plans and specifications, and implement construction-phase activities and post-construction site monitoring.

### ***REPRESENTATIVE SERVICES:***

- **Site Reconnaissance / Constraints Identification**
- **Hydrologic/Hydraulic**
- **Historic / Cultural Significant Review**
- **Rare or Endangered Species Review**
- **Sediment Qualification Studies**
- **Sediment Quantity Evaluation**
- **Sediment Mobility**
- **Grant/Funding Assistance**
- **Dam Removal Design**
- **Stream / Site Restoration Design**
- **Permitting**
- **Construction Phase Services**





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## GEOTECHNICAL ENGINEERING



Pare Corporation has provided geotechnical engineering services for over 50 years. The firm offers a broad range of services applicable to both small and large, simple and complex projects alike. Past clients have included the United States government, municipalities, private industrial and commercial clients, and marine/foundation contractors.

Pare engineers utilize state-of-the-art investigation, testing and analysis to address a broad range of geotechnical issues. Our experience allows us to provide the client with cost-effective, timely solutions to a variety of geotechnical and foundation issues. The firm's specific experience with geotechnical engineering projects exceeds a total construction cost of \$100 million. In addition, Pare has extensive experience with bridge and waterfront structures, which is reflected in over \$80 million of construction in place.

Pare has successfully completed a variety of geotechnical engineering projects, ranging in size and complexity from the assessment of boring information for simple foundations to the design of a 1,500,000-cubic yard earth containment structure to create a new port facility. Geotechnical investigations and design services have been provided for multi-story buildings and parking structures, bridge piers and abutments, retaining walls, braced excavations, underground pump stations and tanks, and specialty structures such as dams. Pare also provides expert testimony and investigation of foundation failures, as well as construction-phase geotechnical consultation. We can effectively address the troublesome and unknown conditions encountered in construction once the excavation has started.

### ***REPRESENTATIVE SERVICES:***

- **Subsurface Investigations**
- **Geotechnical Reports**
- **Deep & Shallow Foundation Design**
- **Earth Support System Design**
- **Pavement Design**
- **Dewatering System Design**
- **Instrumentation Installation and Monitoring**
- **Ground Improvement (DDC, Vibraprobe, Cement Stabilization)**



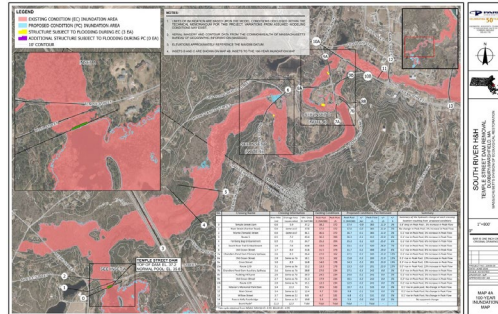
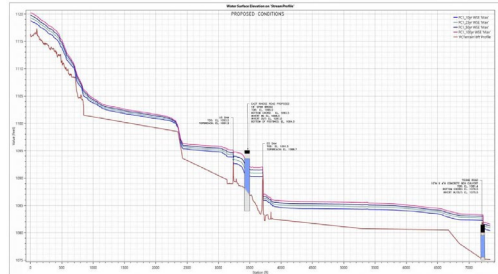
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## HYDROLOGY AND HYDRAULICS – RIVERINE SYSTEMS

Pare's team of engineers has extensive experience in the hydrological and hydraulic (H&H) analyses of rivers and streams throughout New England. Our team excels in meeting the needs of our clients with projects located along these valuable resources. Whether the project is dam rehabilitation or removal, a bridge replacement, or a floodplain restoration project, Pare utilizes the latest modeling software along with evolving internal workflows and procedures to meet the needs of the project, the resource, and the surrounding community. Pare is proud to offer a wide range of technical services related to the H&H analyses of riverine systems, including:

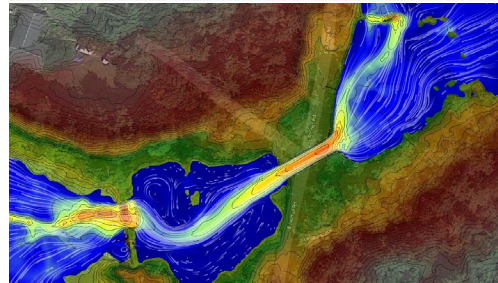
### HYDROLOGIC MODELING

- Programs Utilized: *HydroCAD, HEC-HMS, ArcPro, AutoCAD, PeakFQ, USGS Stream Stats*
- Use Existing or Create Rainfall Data Sets
  - *Recurrent Storms Events (NOAA Atlas 14)*
  - *Probable Maximum Precipitation (PMP)*
  - *Recreation of Past Storm Events*
- Watershed and Sub-Watershed Delineation
- Hydrological Parameter Development
  - *Curve No. (Existing & Future Land Use)*
  - *Time of Concentration*
- Model Calibration & Accuracy Checks
  - *Utilize gauge data, regression, FEMA data, past H&H, & historic flooding data to verify and calibrate model accuracy*



### HYDRAULIC MODELING

- Programs Utilized: *HEC-RAS, SMS-SRH*
- 2D & 1D Models; Unsteady & Steady Flow
- FEMA Special Flood Hazard Area (SFHA) Coordination & Compliance
- Applications:



### ***Dams & Dikes/Levees***

- Assessments: *Assess SDF compliance, design and develop improvements for SDF compliance, assess impacts (US&DS)*
- Breaks: *Inundation maps, impact determination/assessment, hazard class review, IDF Studies, BCA's*
- Removals: *Assess impacts (US&DS), breach design (size, geometry, composition), impounded sediment considerations*

### ***Road Crossings (Bridges and Culverts)***

- Hydraulic & Scour Design: *Existing and New Crossings in accordance with federal, state, and local regulations*

### ***Riverine And Floodplain Studies***

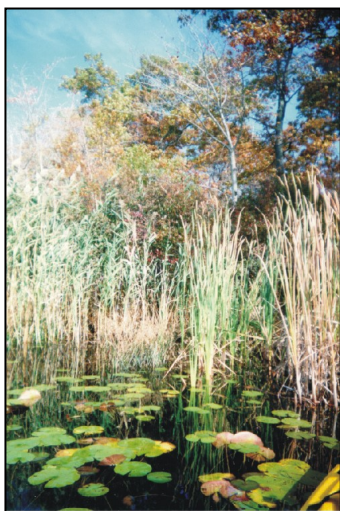
- Existing Conditions: *Determination of inundation area, impact assessment (quantity and severity), identify current/future vulnerable areas*
- Mitigative Actions: *Development, evaluation, and design of potential mitigative measures (structural, non-structural, floodplain restoration)*



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## ENVIRONMENTAL STUDIES AND PERMITTING

Project implementation requires the filing of necessary environmental documentation and the securing of required local, state, and federal permits. Pare Corporation approaches the regulatory approval process not as the last milestone task to be completed before construction, but as a key planning task that is investigated and integrated into the engineering design process. Pare assists clients in several ways: first and foremost, we



believe it is imperative to incorporate pre-design planning into every engineering project. The firm's extensive knowledge of the permitting process allows the early assessment of potential site constraints and regulatory requirements that may affect project design and construction costs.

Second, for projects potentially affecting environmentally sensitive areas, Pare's performance of feasibility studies and the evaluation of alternate designs—which achieve project goals and yet avoid or minimize environmental impacts—provide clients with information vital to the success of their project. Pare continues to assist our clients through the life of the project with the completion and filing of environmental documentation and permit applications according to established regulatory requirements. Pare personnel also conduct project presentations and provide expert testimony to reviewing state

regulatory agencies, local conservation commissions and boards, and the public.

Throughout the firm's history, Pare has assisted clients with permitting requirements at the local, state, and federal levels. Representative application filings include the US Army Corps of Engineers, Federal Emergency Management Agency (FEMA), US Coast Guard, state environmental protection agencies, conservation commissions, coastal resources agencies, and local zoning and planning boards. Pare's staff keeps current with the ever-changing regulatory field through continuing education, seminars, and professional associations.

### REPRESENTATIVE SERVICES:

- **Impact Assessments, Alternatives, and Preliminary Engineering Design**
- **Site Constraints Identification and Mapping**
- **Impact Avoidance, Minimization and Mitigation**
- **Feasibility Studies and Identification of Required Permits**
- **Permit Application Preparation and Regulatory Agency Coordination**
- **Public Presentations and Expert Testimony**
- **Freshwater and Coastal Wetlands Delineation & Identification of Coastal Features**
- **Wetlands Restoration and Replication Plans**
- **Dune and Beach Restoration Plans and Shoreline Protection Design**
- **Floodplain Determinations and Compensatory Flood Storage Design**
- **Hydrologic and Hydraulic Studies**
- **Erosion and Sedimentation Controls and Dewatering Systems Design**
- **Project Incorporation of Best Management Practices (BMP's)**
- **NEPA and MEPA Environmental Documentation, Section 106 and Section 4(f)**





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## BRIDGE AND CULVERT ENGINEERING



Pare Corporation has extensive experience in the area of bridge and culvert inspections and design. The history of the firm's key personnel is linked to the development of the interstate highway system and the design and rehabilitation of our nation's bridges. Highly professional and experienced teams of structural and geotechnical engineers are devoted to the firm's structural projects. Our bridge design work has involved projects throughout the Northeast and continues to enhance our reputation of quality engineering and client satisfaction.

Pare has successfully worked on all levels of structural transportation design projects. We have performed numerous condition surveys, load ratings, prepared in-depth alternative design and rehabilitation studies, prepared environmental impact assessments, permit applications, and Section 106 and Section 4(f) documents, conducted workshops, performed associated hydraulic studies, and worked with all levels of federal, state, and local governments and agencies. Designs by Pare have ranged from minor restoration efforts and small pedestrian structures and culverts to the design and construction of complex multi-span steel and concrete bridges. We have received national recognition from the Federal Highway Administration for the restoration of a historic, one-of-a-kind masonry structure. We provide the proper interaction and dedication to address all elements of a structural project to provide an efficient, on-budget facility.

### ***REPRESENTATIVE SERVICES:***

- **Highway and Railroad Bridges**
- **New Construction and Bridge Rehabilitation**
- **Single and Multi-Span Structures**
- **Inspections and Condition Surveys**
- **Structural Analyses and Load Rating**
- **Geotechnical and Foundation Investigations**
- **Bikeway and Pedestrian Facility Structures**
- **Computer Modeling**
- **Hydraulic Analyses**
- **Alternative Design Studies**
- **Feasibility and Design Studies**
- **Design Development**
- **Plans, Specifications and Cost Estimates**
- **Contract Administration and Construction Services**
- **Environmental Permitting**
- **Section 106 and Section 4(f) Documents**







### Dam Engineering Projects Summary

	Town	State	Dam Removal/ Studies	Water Supply Dam	Emergency Action Plans	Dam Inspections	Phase II Evaluations (Stability/Seepage Analyses)	Hydraulic/Hydrologic Studies	Final Design, Dam Rehabilitation	Construction-Phase Services	O&M Manuals	Telephone No.
Ferwood Dam	Gloucester	MA	•	•	•	•	•					978-325-5600
Mill Pond Dam Feasibility Study	Durham	NH	•		•	•	•					603-868-5578
Silver Lake Dam	North Kingstown	RI			•	•	•		•			401.222.2776 x7235
Upper Kickamuit Dam Removal	Warren	RI	•	•								401.793.0454
Stafford Reservoir No. 3	Union	CT		•	•	•			•	•		860.669.8636
Stafford Reservoir No. 4	Union	CT		•	•	•			•	•		860.669.8636
Harris Pond Dam	Woonsocket	RI		•	•				•			401.767.2619
Woonsocket Reservoir No. 1	Woonsocket	RI		•	•				•			401.767.2619
Field Pond Dam	Andover	MA			•	•	•	•	•	•		508.792.7423 x218
Brackett Pond Dam	Andover	MA	•		•	•	•	•	•	•		508.792.7423 x218
Collins Pond Dam	Andover	MA	•		•	•	•	•	•	•		508.792.7423 x218
Mill Pond Dam	Hampton	NH				•	•	•	•	•		603.926.3202
Haskell Pond Dam (Phase 1 & 2)	Gloucester	MA		•	•	•	•	•	•	•		978.325.5600
Stiles Reservoir Dam	Leicester	MA			•	•	•	•	•	•		508.832.5657
Wyoming Upper Dam	Hopkinton	RI			•	•			•			401.222.4700 x7702
Copicut Reservoir Dam	Dartmouth	MA		•	•	•	•	•	•	•		508.324.2321
Ramshorn Pond Dam	Millbury	MA			•	•	•	•	•	•		508.865.9143
Lower Highland Lake Dam	Goshen	MA			•	•	•	•	•	•		508.792.7423 x218
South Pond Dam	Jamestown	RI		•			•	•	•			401.423.7225
Duck Pond Dam	Belmont	MA	•				•	•				617.626.1410
Woonsocket Reservoir No. 3	Woonsocket	RI		•	•	•	•	•	•	•		401.767.2619
Swansea Dam	Swansea	MA			•	•	•	•	•	•		508.674.5730
Old Mill Pond Dam	Bellingham	MA	•		•	•	•	•	•	•		508.966.5816
St. Marks Pond Dam	N.Attleboro	MA			•				•	•		508.699.0125
Upper Highland Lake Dam	Goshen	MA			•	•	•	•	•	•		508.792.7423 x218
Butterfly Pond Dam	Lincoln	RI				•			•	•		401.333.8415
Exeter Dam	Exeter	NH	•						•			617.607.2710
Arnold Pond Dam	Coventry	RI				•			•			401.397.5785
Bartlett Pond Dam	Lancaster	MA	•		•	•	•	•	•	•		978.365.3326
Torrey Pond Dam	Norwell	MA			•				•	•	•	781.258.5224
Yawgoog Pond Dam	Rockville	RI			•	•	•	•	•	•		401.351.8700 x11
Anawan Dam	Rehoboth	MA		•		•	•	•	•	•		401.793.0454
Howland Dam	Howland	ME	•						•			603.918.4255
Warren Reservoir Dam	Swansea	MA	•	•	•							401.793.0454
Lower Clarks Mill Dam	Greenwich	NY			•	•	•	•	•	•	•	518.695.8128
Upper Clarks Mill Dam	Greenwich	NY			•	•	•	•	•	•	•	518.695.8128
Butterfly Pond Dam	Lincoln	RI			•	•	•		•			401.333.8423
Warren Reservoir Dam	Swansea	MA		•	•	•	•	•	•	•		401.793.0454
Tremont Pond Dam	Wareham	MA			•		•					508.295.5300
Crackrock Pond Dam	Foxboro	MA			•		•		•			508.850.2160
Hobbs Pond Dam	Weston	MA			•	•	•	•	•	•		781.786.5068
Foss Dam	Framingham	MA		•	•	•						508.424.3608
MADCR DWSP (Multiple Dams)	Statewide	MA		•	•	•	•					508.792.7806 x311
MWRA Dams (7)		MA		•	•	•						508.424.3608
Norton Reservoir Dam Ph 2	Norton	MA							•	•		508.285.0275
Wachusett Reservoir Dam	Clinton	MA		•	•	•						508.424.3608
Nagog Pond Dam	Concord	MA		•	•	•	•	•	•	•	•	978.318.3210
Barney Pond Dam	Lincoln	RI			•	•	•	•	•	•		401.333.8423
Curtis Pond Dam	Middleton	MA	•		•				•	•		978.777.0001
Lost Wilderness Dams	Tolland	MA			•		•		•			508.792.7423 x218
Paradise Pond Dam	Northampton	MA			•	•	•	•	•	•		413.585.2441
Whitins Reservoir Dam	Douglas	MA		•	•						•	508.476.7867
Hollingsworth and Vose Dam	Walpole	MA			•		•					508.850.2160
Norton Reservoir Dam	Norton	MA			•	•	•	•	•	•	•	508.285.0275
Terry Brook Reservoir Dam	Freetown	MA			•	•	•	•	•	•		508.324.2321
Center Pond Dam	Beckett	MA			•		•		•	•		617.951.1400
Hope Valley Dam	Hope Valley	RI			•				•	•		401.222.4700 x7702
North Watuppa Pond Dam	Fall River	MA		•	•				•	•		508.324.2321
Robin Hollow Pond Dam	Cumberland	RI		•	•		•	•	•	•		401.729.5011



# Old Mill Dam Removal & Charles River Restoration

**Bellingham,  
Massachusetts**

**Project Owner: Town of  
Bellingham**

In 2008, Pare Corporation (Pare) was retained by the Town of Bellingham to complete a Phase II Evaluation of the Old Mill Pond Dam in Bellingham, Massachusetts. The evaluation identified a number of remedial measures required to bring the dam into compliance with current dam safety regulations. Given the extent of required repairs, Pare also included dam removal as an alternative to implementing a repair program.

Based upon the findings of the Phase II Evaluation, the Town selected pursuing dam removal to address the concerns with the dam. As such, Pare was retained to completed a preliminary feasibility study to assess hydraulic impacts associated with dam removal and potential implications of the volume and character of sediment within the impoundment. The feasibility study identified varying degrees of containment concentrations across the impoundment, will low levels of impacts in sediment along the anticipated stream channel and an area of increased contaminants in a cove of the former impoundment.

Working closely with the Town and the Massachusetts Division of Ecological

Restoration, Pare developed a sediment management plan that selectively removed and relocated areas of moderate contamination from the river channel, and re-used those sediments to encapsulate the very elevated contaminants in the cove. Ultimately the entire cove area was encapsulated with clean fill above the river's normal flood level, creating a stable, vegetated upland area.

Pare completed the design and permitting for the complete removal of the dam, relocation of sediments, and restoration of the former stream channel.

During the course of the evaluation program, Pare worked with the Town to apply for and receive assistance through the DER Priority Project Program as well as the EEA Dam and Seawall Repair or Removal fund.

The Town retained Pare to provide construction administration services including submittal and shop drawing review, construction observation, payment requisition processing, and grant administration.

## Relevant Project Features:

- *Phase II Dam Evaluation*
- *Alternatives Analysis*
- *Feasibility Studies*
- *Sediment Evaluation & Management*
- *Dam Removal Permitting*
- *Dam Removal Design*
- *Construction Administration*





The Town of Lancaster retained Pare to complete a regulatory Phase I Inspection of the Bartlett Pond Dam. The inspection identified extensive structural issues with the concrete dam structure including displacement, missing concrete sections, holes, and other indications of instability.

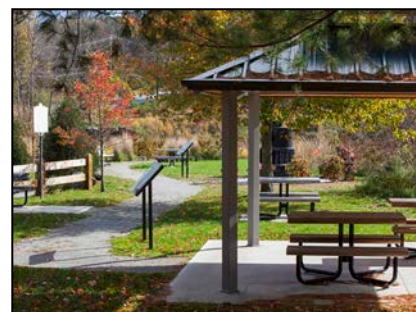
As a result of the observed poor conditions, the Town had Pare complete a Phase II Evaluation of the dam to determine the required repairs through more detailed analyses, develop alternative repair approaches, and provide opinions of probable cost for implementing the repair alternatives. The Phase II Evaluation provided conceptual approaches to restore the dam to a safe operating condition but also considered dam removal and stream restoration as an option for addressing dam safety deficiencies.

In response to the findings of the Phase II Evaluation, the Town identified dam removal and stream restoration as the preferred approach to be implemented at the site. Pare then completed preliminary feasibility studies to evaluate the sediment quality and quantity behind the dam; model potential impacts of dam removal upon the hydraulics of the



stream channel upstream and downstream of the dam; and further review potential costs associated with implementing the stream restoration project. Pare also attended public hearings to present the project, answer questions from residents, and provide technical support.

Working with a project team that included the MA Department of Ecological Restoration and a landscape architect (to design improvements to the adjacent park), Pare completed the design and permitting of the removal in less than 1 year. Construction commenced in May 2014 with the dam fully removed by the end of the month. Pare completed and submitted documentation to the MA Office of Dam Safety documenting the dam removal and requesting the delisting of the site as a dam.



## Bartlett Pond Dam Removal (Wekepeke Brook Restoration)

### Lancaster, Massachusetts

Project Owner: Town of Lancaster

#### Relevant Project Features:

- Phase I visual dam inspection.
- Phase II dam inspection/evaluation.
- Dam seepage & stability evaluation.
- Hydrologic/hydraulic modeling & evaluation.
- Wetland delineations.
- Dam removal evaluations.
- Dam removal feasibility study.
- Dam removal design and permitting.
- Opinions of probable costs.
- Dam removal construction-phase services.







## Del Carte Open Space Conservation Area Restoration

### Franklin, Massachusetts

**Project Owner: Town of Franklin  
Conservation Commission**

Pare Corporation was retained by the Town of Franklin Conservation Commission to evaluate the series of ponds that form the focal point of the Del Carte Conservation Area. As part of this project, Pare was to determine if the dams and impoundments are currently serving any purpose that will necessitate replacement, repair or other means to protect the surrounding resources and downstream area, through an assessment of the condition of each structure. In addition, Pare evaluated the potential short-term or long-term effects to the existing infrastructure that could manifest as a result of dam removal or failure.

A preliminary assessment of the potential for contaminants trapped behind the dams was also undertaken through the collection and analysis of available published data on the dams, the river, and the surrounding landscape, as well as limited sampling.

This preliminary study was then summarized in a technical memo-

randum that discussed the items presented above and provided data obtained during the completion of each task, as well as a brief discussion of the practical alternatives available for the site, inclusive of dam removal and repair.

A hydrologic/hydraulic assessment of the Miller River study area was completed to assess existing and restoration alternative conditions relative to flow, velocity and stages over a range of design storm flows, including mean annual, 2-year, 10-year, 25-year, 100-year, and 500-year return period storms.

Pare evaluated associated impacts due to access, site limitations, and environmental concerns, which were summarized in the final report included recommendation for the removal of some of the dams and repair of others to maintain a variety of habitats and address safety concerns. This report was submitted to the Conservation Commission and presented at a public informational meeting.

#### **Relevant Project Features:**

- *Dam inspections.*
- *Infrastructure evaluation.*
- *Sediment evaluation.*
- *Environmental impact evaluation.*
- *Hydrologic/hydraulic evaluation.*
- *Alternatives review.*
- *Dam removal consideration.*
- *Channel restoration.*
- *Public participation.*



In 2006, Pare Corporation was selected by the City of Fall River through a qualifications process to conduct Phase I Visual Dam Safety Inspections for the City's dam inventory (11 dams) to comply with regulatory requirements. The dams range from low hazard potential dams to large-sized high hazard potential dams.

Based upon the findings of the inspections, Pare worked with the City to commence a dam safety improvements program for select dams. Through discrete tasks orders over the course of the last 12 years, Pare has completed a number of additional dam evaluations, design of remedial repairs, and construction phase services. Projects include:

**Terry Brook Reservoir Dam:** Detailed evaluation of the dam including structural and hydraulic evaluations; Evaluations resulted in the design and implementation of a dam rehabilitation program to stabilize the embankment slopes and modification of the spillway structure to provide required discharge capacity.

**Copicut Reservoir Dam:** Completed detailed seepage and stability analysis of the embankment. Developed designs for and provided construction phase services during installation of a prefabricated access bridge, clearing

of the 3,400-foot-long 39.5-foot-high embankment, and installation of a reinforced access roadway through the wetland along the downstream toe of the dam.

**North Watuppa Pond Dam:** Underwater inspection and evaluation of existing infrastructure; development, permitting, and implementation of repairs to the gatehouse and gate replacement.

**4<sup>th</sup> Street Gatehouse Emergency Response:** Responded to a partial failure of a 10-foot wide by 16-foot high roller gate in the existing gatehouse. Provided engineering consulting during emergency response and stabilization.

**Quequechan Control Structure Improvements:** Designed, permitted, and provided construction-phase services for the replacement of spillway control gates, trash racks, and appurtenances.

**Upper Noquochoke Lake Dam Hazard Evaluation:** Completed a hazard potential evaluation of the dam which was listed in poor condition and under order by the Office of Dam Safety to complete repairs. Successfully demonstrated low hazard potential, resulting in reclassification of the dam and rescinding of the dam safety order.

**Stafford Pond Dam Conceptual Design:** Evaluated potential design approaches to address the deteriorated condition of the structure including repair, replacement, and decommissioning. Prepared a conceptual design report inclusive of opinions of cost and conceptual design drawings of the feasible alternatives.

## Fall River Dam Engineering Consultation Services

Ongoing since 2006

Fall River, Dartmouth, Freetown, & Westport, Massachusetts

Project Owner: City of Fall River

### Relevant Project Features:

- Visual dam safety inspections.
- Detailed Stability Evaluations.
- Hydrologic and hydraulic analyses.
- Dam break analyses and inundation mapping.
- Hazard potential evaluation.
- Repair design.
- Construction plans and specifications.
- Environmental permitting
- Construction-phase services.

**Sawdy Pond Dam Conceptual Design:** Prepared conceptual designs to address dam safety deficiencies and public access concerns.

**Regulatory Inspections:** Through the course of Pare's relationship with the City, the City has retained Pare to complete regulatory inspections of the dams in compliance with state mandated frequency.



## Department of Conservation & Recreation Dam Engineering Services – 1987, 1993, 1998, 1999, 2003, 2005, 2006, 2007, 2008, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021

### Statewide, Massachusetts

**Project Owner: MA Department of Conservation and Recreation**

#### Relevant Project Features:

- *Dam inspections (Phase I and II).*
- *Downstream hazard evaluation.*
- *Seepage and Stability analyses.*
- *Hazard classification recommendations.*
- *Hydrologic/Hydraulic analyses.*
- *Develop repair/rehabilitation alternatives, including concrete structures.*
- *Prepare estimates of construction cost.*
- *Construction documents.*
- *Permitting.*
- *Construction-phase services.*

Pare Corporation has been retained by the Massachusetts Department of Conservation and Recreation (DCR) under multiple master service agreements to provide dam inspection and evaluation services for dams throughout the state. The primary objectives of the dam inspections have been to assess the potential need for immediate remedial action, identify existing problems including condition of concrete, and recommend specific actions to be implemented by the Department, including a recommended implementation schedule. These objectives have been met by undertaking a thorough review of existing plans, historical data, etc.; studying the existing condition of each dam and its structural, hydraulic, and geotechnical adequacy; and inspecting down-stream routing conditions for potential hazards associated with dam failures. The

final reports catalog each dam with photos, detailed conditions, and priority recommendations with cost estimates.

Following through with sub-surface investigations, hydrologic/hydraulic (H&H) evaluations, and stability analyses, Pare has completed numerous Phase II evaluations. These evaluations have culminated in the design of spillway and embankment improvements as well as the replacement of low-level outlets, the addition of drain systems, and improvements of slope protection.

Pare has also provided emergency response as well as completed pre- and post-storm inspections.





# Old Mill Pond Dam Restoration

## Hampton, New Hampshire

**Project Owner: Town of Hampton,  
New Hampshire**

Pare Corporation was retained by the Town of Hampton to complete final design of repairs to the 17-century Old Mill Pond Dam. Repairs were required to address a variety of dam safety concerns including a partially failed spillway section, apparently unstable downstream retaining walls, irregular embankment sections, and inadequate hydraulic discharge capacity. Given the historic and culturally sensitive nature of the site, particularly the downstream wall and adjacent Deacon Tuck Grist Mill, the decision was reached to replace the existing dam with a new structure located shortly upstream of the existing embankment.

To support the design, Pare coordinated the completion of a subsurface exploration program to assess foundation conditions along the alignment of the anticipated dam structure. Alternatives including an earthen embankment section as well as a concrete dam were developed to assist the Town in selecting their

preferred design approach. Upon selection of the earthen embankment by the Town, Pare designed foundation and embankment details for the proposed structure to provide a minimum embankment section compliant with NHDES dam safety standards.

To provide discharge capacity to meet NHDES spillway design flood and freeboard requirements, Pare designed a single cycle labyrinth spillway structure. A valve-controlled outlet was incorporated into the spillway weir to provide low level discharge capacity. Additional accommodations were incorporated to facilitate potential future modifications in the event restoration activities are implemented at the grist mill to restore historic operations.

Pare coordinated the completion of archeological site assessments to evaluate the impacts of the work upon the cultural resources at the site.

Upon completion of the design and preparation of construction docu-

### Relevant Project Features:

- *Conceptual designs*
  - *Earthen embankment*
  - *Concrete dam*
- *Hydrologic & hydraulic evaluation.*
- *Stability evaluations.*
- *Permitting.*
- *Final design and contract document preparation.*
- *Contract bidding assistance.*
- *Construction-phase services.*



ments, Pare provided bid-phase and construction-phase services.

Pare Corporation has been providing the City of Amesbury with engineering consulting for a variety of projects since 1997. Our projects range from evaluations, inspections and studies to design and permitting for full scale infrastructure rehabilitation and new construction. These projects include assignments from the Planning Department, the Conservation Commission, the DPW, and the Engineering Department as well as presentations to the Conservation Commission, Planning Board, and Economic Development Board. Notable projects include:

**Lake Gardner Dam Rehabilitation and Periodic Phase I Inspections** – Pare designed and permitted the full scale rehabilitation of this high hazard potential dam which included embankment stability improvements, spillway improvements, and replacement of the sluiceway to improve operations. Pare continues to provide visual Phase I inspections to meet current dam safety regulations and has prepared an *Emergency Action Plan* for the dam in accordance with the current Dam Safety Regulations 302 CMR 10.00

**Tuxbury Pond Dam Rehabilitation and Periodic Phase I Inspections** - Pare designed and permitted the full scale rehabilitation which included a new multi-gate spillway to comply with state discharge requirements and improve water supply control. Pare continues to provide visual Phase I inspections to meet current dam safety regulations and has prepared an *Emergency Action Plan* for the dam in accordance with the current Dam Safety Regulations 302 CMR 10.00.

**Safe Yield Analysis** – Pare provided engineering services for a Safe Yield Analysis for the City's drinking water supply. The supply consists of multiple surface water bodies, acting in parallel, which were evaluated to improve water level management to balance recreation,

wildlife and drinking water supply needs.

**City- Owned Dam Inspections** – in addition to the inspections of Lake Gardner and Tuxbury Pond Dams, Pare has completed the visual inspection of Clarks Pond Dam, Lake Attitash Dam, and Stateline Dam in accordance with state dam safety regulations.

**Hazard Mitigation Plan** – Pare worked with the City Engineer to prepare a Hazard Mitigation Plan to maintain eligibility under the Federal Emergency Management Agency (FEMA) grant program.

**Emergency Response** – Pare provided emergency dam assessments during severe weather events in 2005 and 2010. The response included onsite engineering assessment, coordination with City emergency personnel, and follow-up inspections with the City personnel to assess damage and develop restoration plans.

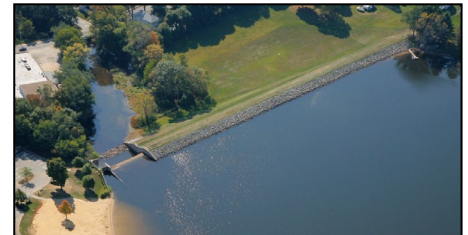
**Timber Crib Dam and Millyard Repairs**– Pare designed repairs to the Timber Crib Dam and the stone masonry channel walls within the Millyard to address storm damage and historic seepage.

**Planning Board Reviews** – Pare provide engineering reviews for various subdivisions and developments within the City under a direct contract with the Planning Board.

**Department of Public Works Building** – Pare assisted the City in evaluating various locations for the placement of a new Department of Public Works facility and yard. Upon selection of the site, Pare designed a new facility and yard inclusive of site design, structural design, geotechnical design, utilities, and wetland permitting. During construction Pare provide construction administration and observation during critical phases of the work.

## City of Amesbury – Engineering Consulting Services (Dam Engineering, Civil Engineering, Structural Engineering, Permitting)

### Amesbury, Massachusetts







# Haskell Pond Dam – Design and Phase I, II Construction

## Gloucester, Massachusetts

**Project Owner:** City of Gloucester

The City of Gloucester retained Pare Corporation to undertake inspections, evaluations, schematic designs, and construction phase services for the implementation of a rehabilitation project at the Haskell Pond Dam, a 480-foot long, 35-foot-tall High hazard potential dam.

As part of the Schematic Design, Pare completed visual assessments, subsurface investigations, laboratory testing, underwater inspection, seepage and slope stability evaluations, hydrologic and hydraulic studies, and a detailed review of repair alternatives. Working with the City, Pare developed a recommended design approach specific to the dam safety needs at the site as well as incorporating the City’s design goals. The recommended design approach not only addressed dam safety concerns, but also incorporated improvements to existing water supply infrastructure to increase the day-to-day control the City has on the reservoir elevation, water quality, and emergency discharge capacity.

In response to the findings and recommendations in the Schematic Design Report, the City retained Pare to continue with the final design and permitting of the proposed improve-

ment program. Due to cost constraints, the City requested that Pare split the project scope into three phases.

**Phase I:** Spillway modification and channel improvements (pictured), inclusive of underdrainage and low-level blow-off capacity.

**Phase II (In Progress):** Gatehouse improvements and water supply piping improvements, inclusive of new gates, access improvements and new water supply valves and piping.

**Phase III (Pending):** Replace the core wall, parapet wall, and embankment grading, inclusive of upstream armoring and raising of the embankment.

Pare assisted the City with the preparation and submission of a grant application to the Massachusetts Executive Office of Energy and Environmental Affairs as part of their Dam and Seawall Repair and Removal Fund, securing \$1 million in grants and low interest loans for Phase I, and \$1 million in grants for Phase II.

Pare provided bid-phase services and is providing Construction Phase Services throughout the project, inclusive of Resident Engineering and Project Administration.

### Relevant Project Features:

- *Visual dam inspection.*
- *Subsurface investigations.*
- *Underwater inspection.*
- *Seepage & slope stability evaluations.*
- *Hydrologic & hydraulic evaluation.*
- *Design of the concrete chute spillway, secant core wall, the blanket, and toe drain.*
- *Water supply infrastructure.*
- *Alternatives analysis.*
- *Schematic design.*
- *Wetland delineation & permitting.*
- *Phased construction.*
- *Final design and contract document preparation.*
- *Grant application.*
- *Contract bidding assistance.*
- *Construction-phase services.*

## **SECTION 2: VHB QUALIFICATIONS**



## Firm Overview

### Your Dedicated Team



Founded in  
**1979**



**1,600 passionate professionals**

including engineers, scientists, planners, and designers

**30+ locations**

throughout the east coast



**56<sup>th</sup> on ENR**

Top 500 Design Firms List

The Parker Mills Dam Project is the type of project that we at VHB get excited about. It represents a great opportunity to restore the natural ecological functions of the river while making way for future development, improving safety, and creating a community amenity. To strategically deliver the myriad services required, we have teamed with Pare Corporation, which specializes in dam removal and repair. Together, we have successfully completed similar projects throughout New England. We are used to working under tight timelines, in challenging urban environments, and in sensitive aquatic habitats.

VHB's differentiator is its integrated services—by combining environmental permitting, civil and structural engineering, hydraulic and hydrogeological services, ecological restoration, and survey with public outreach and visualization skills, we deliver complex projects efficiently. By understanding how all the pieces of a project fit together and how each element influences the next, we can streamline the process and keep you on schedule and on budget. The following pages highlight our work and relevant services.





## Environmental Services

With more than 300 environmental staff companywide—including an experienced team of 70 specialists in our local Watertown office—VHB is fully staffed to take on this important assignment. Our water resources scientists and engineers, stream specialists, contamination assessment and remedial design professionals, wildlife biologists, geologists, wetland and soil scientists, and environmental planners deliver a wide range of services that include:

- » Watershed management planning
- » Water quality modeling and monitoring
- » Stormwater management
- » Pollutant loading analysis
- » Groundwater protection measures
- » Land preservation stewardship plans and monitoring
- » Natural resource inventories
- » Hydrology and hydraulics
- » Hazardous waste management
- » Hydrogeology
- » Invasive species management
- » Threatened and endangered species
- » Fluvial geomorphology

### A Skilled Stream Team

Among VHB's resources is a group of specialists in stream and river restorations—our “stream team.” This group has completed or is currently working on dozens of projects involving streams and rivers of varying complexity throughout the East Coast. These have included numerous dam and stream habitat restorations, floodplain management projects, and the successful correction of adverse impacts to stream ecology associated with sub-standard culverts, channelization, and bank erosion.

Our stream team's experience has included diverse projects. Highlights include the recent removal of the Great Dam and restoration of the Exeter River in downtown Exeter—one of the largest and most successful dam removal projects in New England in the last decade. Our reputation in this area is further exemplified by the fact that NHDES retained VHB to analyze the options for responding to the avulsion of the Suncook River, one of the most complicated and significant river projects in the state. Through projects like these, VHB professionals have gained a great depth of experience in stream geomorphic assessments, survey, and mapping; development of HEC-RAS hydraulic models to evaluate proposed engineering designs and floodplain benefits; and application of natural channel design principles to prepare conceptual and final design plans through construction drawings, including grading and planting plans and specifications. Following design and permitting work, we've also been there to help make sure these projects were built correctly.



## Civil Engineering



VHB's civil engineers specialize in complex, multidisciplinary projects such as this, providing comprehensive site planning and engineering design services to assist clients with a diverse mix of projects. They have a strong understanding of how to get the most out of water quality improvements. Our Team also provides a range of construction management-related services, from assistance with the construction estimates and the bid process to daily construction observation—and from the review of work for conformity with final plans and specifications to the documentation and implementation of any change orders.

## Environmental Permitting



To keep this project on track and moving forward, we will rely on our environmental permitting professionals to obtain the necessary permits and approvals. VHB is well known for its capabilities in environmental permitting, which are founded upon the strong, cooperative working relationships we have built with agency personnel at local, state, and federal regulating authorities. Our success in environmental permitting is gained through clear communication and through submittals that are technically sound from a scientific and procedural standpoint. Often, successful permitting is a matter of clear presentation of design considerations and constraints, then documenting how the proposed or preferred alternative has been developed to address these project/site limitations. VHB prides itself on high-quality documentation that anticipates the agency's needs and, therefore, reduces the lengthy delays associated with additional information requests. This will be the key to keeping this project on schedule.

## Ecological Restoration and Fluvial Geomorphology



From improved habitat to better water quality to flood prevention, the benefits of river restoration efforts are numerous—and VHB's team of environmental scientists, hydraulic engineers, and hydrologists are ready to get started. We have completed ecological restoration projects across New England. Our work has included successfully correcting adverse impacts to stream ecology associated with channelization and bank erosion, as well as restoring stream and tidal fishery habitat and streambank riparian areas. Along the way, we have provided related services such as:

- » Coastal and riverine restoration design
- » Flood analysis and mitigation design
- » Geomorphic assessments
- » Climate change impacts analysis
- » Stream crossing analysis
- » Dam assessment/removal design and permitting
- » Coastal storm surge analysis
- » Construction support



## Hydrology and Hydraulic Studies

VHB will leverage its experience providing hydrologic and hydraulic modeling for a wide array of applications, including dam safety analysis, flood studies, culvert analyses, stormwater runoff calculations, backwater analyses and instream flow studies. Finite element modeling has included analyzing velocity and constituent transport using HEC-RAS and other platforms. We have also performed backwater studies to analyze the effects of varying water levels on wetland vegetation and infrastructure. Our Team performs all aspects of hydrologic and hydraulic analyses, including data collection, model setup, and calibration.



## Structural and Dam Engineering

To design the vehicular bridge and pedestrian boardwalk, we will rely on our internal team of more than 60 structural engineers experienced in all phases of bridge, culvert, and structural engineering. Projects range from design of small roadway culverts to design and construction management of major multi-span bridges, including several projects in sensitive environments, such as rare species habitat and coastal environments. VHB structural engineers are experienced with the design of bridge stabilization, hydraulic analysis, scour analysis, and preparation of final construction plans, specifications, and estimates (PS&Es).



## Topographic and Bathymetric Survey

VHB has been providing surveying services to the public and private sectors in the northeast for more than two decades. This includes hydrologic, topographic, property, right-of-way, construction, bathymetric, geodetic, and ALTA/ACSM surveys. Field surveys are conducted through a combined effort of aerial photogrammetric mapping and ground surveys performed through instrument methods. Our Team is ready to support you with property title research, preparation of construction documents, and legal descriptions for closing documents. VHB uses Total Station and Data Collector instruments, as well as Global Positioning Systems (GPS).



## Site Investigation and Remediation

VHB's Site Investigation and Remediation (SI&R) team has developed a reputation for providing timely and cost-effective services to our clients who benefit from our ability to focus on key environmental issues. Issues such as asbestos, lead paint, hazardous/solid waste management as well as subsurface and sediment contamination by oil and/or hazardous materials can all be addressed as part of our environmental assessment process. **VHB recently developed a sediment management plan to support the removal of the Sawyer Mill Dam in Dover, NH, and allow for proper management, reuse, and disposal of the impounded sediments.** Our SI&R team provides for the protection of resources during the investigation, remediation, and redevelopment of contaminated sites through erosion and sedimentation control plans, stormwater and tidal best management practices, and construction monitoring. VHB also recently developed a sediment management plan for the removal of the Great Dam on the Exeter River in New Hampshire, which was located adjacent to the tidal portions of the river.

### Early Agency Engagement

VHB professionals understand the importance of soliciting agency and public input early in the process. This input will help to define the project goals and constraints, which are essential to finalizing cost estimates for the restoration project.



### Construction Management and Oversight

VHB's construction administration and inspection services, which include bidding assistance, inspection, and measurement of quantities for payment, help deliver a high-quality finished project. As part of these services, we provide the owner quality control and administration of the construction contract. By serving as the owner's representative, we can help confirm that workmanship, physical properties, plant production, equipment, and materials supplied by contractors are in compliance with plans and specifications.



### Cultural Resources and Historic Preservation

VHB's engineers and scientists work closely with our in-house team that delivers a full complement of historic preservation services, including National Register nominations; cultural resources surveys; local, state, and federal review processes; interpretive planning and research and design for panels and other exhibits, and historical research. Staff include professionals in the disciplines of architectural history and archaeology. Having these services in-house means that our products are thoughtful and well-written and comply with relevant standards for documentation. VHB recently provided cultural resources and historic preservation services for dam removal projects on the Nashua River in Leominster, MA, and on the Exeter River in Exeter, NH.



### Public Engagement and Education

Public involvement—including the local communities, landowners, and administrative bodies—will be key to building consensus and reaching a successful and useful plan. The most impactful outreach plans do more than inform; they engage and educate, as well as solicit and incorporate feedback. Our Team is also skilled in working with a variety of stakeholders, including facilitating design charrettes and public meetings. Throughout New England, we have a strong track record of working effectively with regional planning commissions, town boards, stakeholder groups, and universities.

## Visualizations and Graphic Design



Advanced modeling and rendering techniques are powerful ways to convey conceptual and final design alternatives, construction techniques, construction staging, and more. VHB's extensive visualization capabilities help greatly to this end. Using tools like InfraWorks, LumenRT, and AutoDesk Revit, we have quickly and efficiently created 3D and 4D simulations to help educate and inform clients, stakeholders, and the public—as well as “ground truth” project solutions. This approach allows stakeholders to visually immerse themselves in a scene, helping them to see a design before it is constructed and creating an emotional connection that enhances buy-in.

### VHB & Pare: Partnering for Success

VHB has a long history of working together with Pare on dam engineering and water restoration projects in the Commonwealth and throughout New England; we are actively collaborating on a study of the Mill Pond Dam in Durham, NH. Other projects have included the Aberjona River Flood Mitigation Program in Winchester, MA, the Great Dam Removal in Exeter, NH, and the Mill Pond Dam Rehabilitation effort in Hampton, NH, among others. This Team synergy gives us a head start when it comes to understanding and meeting the community's needs for this project.



## Jacob San Antonio, PE, ENV SP



Jake is VHB's Managing Director of Environmental Resources and specializes in surface water infrastructure design, modeling, and permitting. He manages a team of Massachusetts-based environmental planners, scientists, and engineers who are passionate about delivering quality service and value to our clients. He has a broad range of experience including use of riverine models and GIS to evaluate flood impacts to support his engineering design projects. He recently completed the design, permitting, and construction administration for the removal of the Great Dam in Exeter, NH.

### Education

BS, Environmental Engineering,  
Montana Tech of the University  
of Montana, 2001

*20 years of professional experience*

### Registrations/Certifications

Professional Engineer (Civil)  
MA, 2007

Professional Engineer (Civil)  
NH, 2014

Professional Engineer (Civil) CT,  
2009

Envision™ Sustainability  
Professional, 2013

OSHA 40-Hour Hazwoper  
Certificate (HAZWOPER), 1997

### Affiliations/Memberships

Environmental Business  
Council of New England, Board  
Member

### Great Dam Removal, Exeter, NH

Jake is managing the engineering design for the removal of the Great Dam from the Exeter River. Jake has overall responsibility for the study including geomorphic analysis, hydrological and hydraulic analysis, water supply, fish passage, dam and structural engineering, and impacts to natural resources. He will be responsible for preparation of bid documents and selection of a contractor to complete the dam removal by way of a public bid process and, eventually, to proceed with the removal of the dam and restoration of the river at the dam site. In this current phase of the project, VHB is providing survey and design coordination, engineering design, environmental permitting, consultation and cultural resources studies pursuant to Section 106 of the National Historic Preservation Act, and assistance with bid documents for construction.

### Aberjona River Flood Mitigation Program, Environmental Impact Report, Winchester, MA

Jake served as Project Manager for the preparation of a Final Environmental Impact Report (FEIR) for the construction of 15 flood improvement projects on the Aberjona River in Winchester. The project's proposed flood control improvements included channel enlargement and removal/replacement of existing hydraulic structure constrictions. His responsibilities included flood control hydrologic/hydraulic evaluation and mitigation analysis using the unsteady flow option of the HEC-RAS model. Responsibilities also included project management, preparation of the project alternatives, existing conditions, and potential impacts and proposed mitigations sections for the EIR. The Town of Winchester received a certificate from the Secretary of EEA allowing this project to move on to design and permitting.

### Wentworth Farm Conservation Area, Owens Pond Outlet Channel Reconstruction, Amherst, MA

Jake was Project Manager for the design, permitting, and construction of the primary spillway and 170-foot outlet channel from a three-acre impoundment. The project included design and construction of a concrete spillway, cutoff wall, and primary outlet channel including seven rock step-pools to reduce outlet channel velocities and promote aquatic organism passage. He oversaw development of construction drawings, technical specifications, quantifying material and excavation quantities, bid reviews, construction submittal and material reviews, technical assistance for contractor and construction oversight.



**Jacob San Antonio, PE, ENV SP****Leominster Dam Alternatives Analysis/Feasibility Analysis, Leominster, MA**

Jake was Principal-in-Charge for developing an alternatives analysis/feasibility study to identify site constraints, data collection needs, permitting requirements, and key challenges to removing the Leominster Dam and restoring the Nashua River. Data collection efforts were conducted in Fall 2017 to determine whether the project may be eligible for in-stream management of impounded sediment.

**Policy Brook Restoration Final Design, Salem, NH**

Jake assisted with the final design of the restoration of approximately 1,500 feet of Policy Brook, an urban stream in Salem. The project, which was aided by a grant from the Federal Emergency Management Agency (FEMA), allowed relocation of a portion of a neighborhood along Haigh Avenue, which has experienced periodic flood damage. VHB's plans helped to restore Policy Brook, which had been impacted by the original I-93 construction in the early 1960s to create natural habitat and additional flood storage and relocate Policy Brook. VHB provided construction observation services, working with the contractor to make sure that the specialized construction was completed in full compliance with the design plans.

**Hop Brook Restoration/Relocation, Manchester, CT**

Jake was Senior Water Resources Engineer for design of the restoration and relocation of Hop Brook. VHB was tasked with improving the ecological health and long-term stability of a 1,000-foot stretch of the stream which had been degraded and straightened during multiple phases of industrial construction activities within the floodplain. Design included stream bank stabilization through the installation of soft/vegetative treatment protection, floodplain reconnection, and construction of meander bends, pools, and riffles.

**Bass River Coastal Hydraulic Study, Dennis and Yarmouth, MA**

For MassDOT, Jake performed an unsteady-state hydraulic model of the Bass River estuary separating Dennis and Yarmouth as part of the work for a project to extend the Cape Cod Rail Trail (CCRT) westerly. He managed the development of a HEC-RAS model to simulate tidal flushing through the system and identify hydraulically viable abutment alternatives for the new CCRT bridge crossing over Bass River. This work included a detailed scour analysis and design of scour countermeasures.

**Railway Brook Stream Restoration, Newington, NH**

For the New Hampshire Department of Transportation (NHDOT), Jake assisted in the development of final engineering design study for the restoration of Railway Brook, a highly impacted urban stream in the Great Bay coastal watershed. The stream was severely altered, straightened, and diverted during development of the former Pease Air Force Base in Newington, in the 1950s. Historic aerial photographs and United States Geological Survey (USGS) maps show that the stream once discharged to the tidal portion of the Piscataqua River, but it was diverted into Little Bay. The project was successfully constructed in 2014.

## Peter J. Walker



**Pete has directed and led a number dam removal and ecological restoration feasibility studies and engineering designs. His experience includes NEPA analysis, natural resource and planning investigations, and watershed studies. Previously, he was an administrator with the NH Department of Environmental Services Water Division, where he oversaw the technical review of projects affecting streams and rivers throughout the state, including supervising the Department's wetlands and shoreland protection staff.**

### Education

MS, Biology, University of Vermont, 1997

BA, Biology and Environmental Studies, Williams College, 1991

### Affiliations/Memberships

New Hampshire Association of Natural Resource Scientists, Former Vice President

New Hampshire Association of Natural Resource Scientists, Former Education Chair

American Water Resources Association, Member

New Hampshire Association of Natural Resource Scientists, Member

### *30 years of professional experience*

#### **Mill Pond Dam Alternatives Study, Durham, NH**

Pete leads a team working with the Town of Durham to study the potential removal of the Mill Pond Dam on the Oyster River. The study will provide comprehensive review of the possible dam removal along with other alternatives including repair and rehabilitation of the dam. The results of the study will allow the Town to select an alternative for final design and permitting. VHB is the lead consultant for this scope of work with overall responsibility for the study including structural engineering, geomorphic analysis, hydrological and hydraulic analysis, water supply, fish passage, recreation, and impacts to natural resources.

#### **Great Dam Removal Feasibility and Impact Analysis, Exeter, NH**

For the Town of Exeter, Pete was Principal-in-Charge and Project Manager for a feasibility study for the removal of the Great Dam. The study supplemented previous and ongoing studies by others, providing additional information to facilitate the Town's formulation of and consideration of alternatives. VHB was the lead consultant for this scope of work with overall responsibility for the study including geomorphic analysis, hydrological and hydraulic analysis, water supply, fish passage, dam and structural engineering, recreation, and impacts to natural resources. This project was funded through the National Oceanic and Atmospheric Administration (NOAA), US Environmental Protection Agency (EPA), US Fish and Wildlife Service (USFWS), and NH Department of Environmental Services (NHDES).

#### **Ashuelot River (West Street) Dam, Hydrologic Modeling and Wetlands Analysis, Keene, NH**

Pete was Project Manager assisting the City of Keene with the evaluation of the potential removal of the Ashuelot River (West Street) Dam, which had fallen into disrepair. The City and community sought to more fully understand the implications on wetlands and floodplains that would result from the possible dam removal, as well as explore other alternatives such as raising the dam to accommodate hydropower. Pete oversaw a detailed survey of the Ashuelot River and development of a detailed hydraulic model of the river using HEC-RAS. The model was used to evaluate the alternatives and estimate the likely effect of each on wetlands, wildlife, and other natural resources. Pete presented final findings to the City and community at a public meeting.

#### **Homestead Dam Feasibility Study & Final Design, West Swanzey, NH**

On behalf of a state and federal interagency task force and under contract with the New Hampshire Department of Environmental Services (NHDES), Pete directed analysis of options for restoration of the Ashuelot River through removal or modification of the Homestead Woolen Mills Dam. He oversaw a full scope of environmental studies including survey, hydraulic and sediment modeling, hydrogeological studies, historical investigations, and

**Peter J. Walker**

habitat assessment. The project resulted in a decision-making document to help determine the fate of the Homestead Dam and the restoration of anadromous fish to the Ashuelot River basin. The project also involved a significant public coordination effort through the direction of public information meetings and coordination with a project advisory group.

**Railway Brook Stream Restoration, Newington, NH**

For NHDOT, Pete managed the development of a conceptual design study for the restoration of Railway Brook, a highly impacted urban stream in the Great Bay coastal watershed. The stream was severely altered, straightened, and diverted during development of the former Pease Air Force Base in Newington, New Hampshire, in the 1950s. Historic aerial photographs and United States Geological Survey (USGS) maps show that the stream once discharged to the tidal portion of the Piscataqua River, but it was diverted into Little Bay. Pete oversaw the biological assessment of the brook, which found poor water quality and habitat and aquatic life that lacks diversity. He also oversaw the development of a geomorphological assessment that determined that large parts of the former channel and its floodplain and riparian wetlands are still intact. VHB has developed a conceptual plan for restoration of a 3,100-linear-foot reach of the stream that would create a C5 Stream Type (Rosgen, 1996). The restoration of stream morphology included incorporation of a variety of natural rock/boulder structures, adjacent wetlands, and improved water quality, thereby enhancing habitat for aquatic life and diadromous fish. Permanent protection of the riparian corridor was also achieved through a conservation easement for the 3,400-foot length of the restored brook.

**Browns River Restoration, New Hampshire Coastal Program, Seabrook, NH**

For the NHDES, Pete directed restoration designs of the Browns River, under contract to the NH Coastal Program. The 42-acre Browns River marsh is one of the largest remaining tidal restriction projects in coastal New Hampshire. The marsh is located adjacent to Seabrook Station and the restriction to the marsh is an undersized culvert under the old Boston and Maine Railroad embankment, which is now owned by the state.

**Stubbs Pond Restoration Study, Newington, NH**

For the NHDES, Pete directed the assessment of management and restoration opportunities in Stubbs Pond in the Great Bay National Wildlife Refuge, and the impoundment of Peverly Brook. Once one of the largest salt marshes on the Great Bay in coastal New Hampshire, the site was dammed by the US Air Force to serve recreational needs during development of Pease Air Force Base. With closure of the base, the area was turned over to the USFWS for management as a national wildlife refuge. In Phase 1 of the project, Pete directed a sediment analysis program to determine whether contamination from the adjacent former base exists within Stubbs Pond. Sediment cores were collected by use of boat-mounted vibratory drilling apparatus, and sub-samples by depth were taken and analyzed for a variety of contaminants of concern. Phase 2, currently in scoping, will involve a detailed biological survey of the Pond, along with topographic and bathymetric mapping of the Pond and its vicinity. This information will be used to determine if restoration to a salt marsh environment is likely to be successful and, if so, what the ecological consequences of this management decision would be.

## David W. Cloutier, PE



**Dave is a Water Resources Engineer in VHB's Portland, Maine, office specializing in hydraulic and hydrologic modeling and scour analysis. Dave's experience includes extensive bridge scour evaluation analysis, floodplain analysis and mapping including FEMA flood map revisions, and natural stream simulation and restoration design. He is proficient with steady- and unsteady-state hydraulic modeling for dam breach and removal analysis, tidally influenced crossings, and large-scale complex watersheds.**

### Education

BS, Civil and Environmental Engineering, Cornell University, 2004

### Registrations/Certifications

Professional Engineer ME, 2017

Professional Engineer NH, 2018

Professional Engineer MA, 2018

Professional Engineer RI, 2018

Professional Engineer CA, 2008

National Council of Examiners for Engineering and Surveying, 2015

### *14 years of professional experience*

#### **Mill Pond Dam Alternatives Study, Durham, NH**

Dave is part of a team working with the Town of Durham to study the potential removal of the Mill Pond Dam on the Oyster River. The study will provide comprehensive review of the possible dam removal along with other alternatives including repair and rehabilitation of the dam. The results of the study will allow the Town to select an alternative for final design and permitting. VHB is the lead consultant for this scope of work with overall responsibility for the study including structural engineering, geomorphic analysis, hydrological and hydraulic analysis, water supply, fish passage, recreation, and impacts to natural resources.

#### **Sawyer Mill Upper Dam Removal and Bellamy River Restoration, Dover, NH**

Dave led a multidisciplinary team to secure complete redesign and permit amendments for removal of the Sawyer Mill Upper Dam along the Bellamy River, meeting a very aggressive project schedule and maintaining close coordination with all project stakeholders. The project included bathymetric and topographic site survey, subsurface bedrock borings and sediment probes, hydrologic and hydraulic modeling using HEC-RAS 5.0.7 software to provide fish passage and flood impact analysis, full permitting, and final design and preparation of bid documents for dam removal and river restoration. The project incorporated partial removal of a 12-foot high, 80-foot wide cut stone masonry dam; preservation of historic dam features and stabilization of adjacent mill building structures; removal and off-site disposal of over 2,000 yards of contaminated sediment, restoration and fish passage design for 450 feet of new channel upstream of the dam, and the return of an 18-acre, 4,500-foot long reach of the Bellamy River to free-flowing condition.

#### **Great Dam Removal, Letter of Map Revision (LOMR), Exeter, NH**

VHB assisted the Town of Exeter by preparing a full impact and feasibility study in 2013, and full engineering, design, and construction support services through the removal of the dam in 2016. Following removal of the dam, Dave prepared the submission for and secured a Letter of Map Revision (LOMR) for the Exeter River following removal of the Great Dam. He performed a full hydrologic and hydraulic analysis to determine flood flow profiles and floodplain extents for the Exeter River and Little River resulting from the removal of the former Great Dam in Exeter, New Hampshire. Dave developed Duplicate Effective, Corrected Effective, Pre-Project, and Post-Project hydraulic models in HEC-RAS 5.0.3 for 10 river-miles of stream channels, including updated model analysis to incorporate construction of two new bridges by the Town of Exeter along the Little River. From this hydraulic model, Dave delineated the corresponding 100-year, 500-year, and regulatory floodway inundation areas in ArcGIS 10.5

**David W. Cloutier, PE**

implementing HEC-GeoRAS 10.1 to map the HEC-RAS water surface over LiDAR digital terrain data and VHB-surveyed channel bathymetry; and addressed technical review comments the Federal Emergency Management Agency (FEMA).

**Seekonk River Tidal Bridge Replacement, Providence-East Providence, RI**

For RIDOT, VHB is providing engineering and design services to replace the existing 16-span, 2,000-foot long Henderson Expressway bridge over the tidally-influenced Seekonk River and US Coast Guard (USCG) navigation channel. Dave is leading the hydrologic, hydraulic, and scour analysis for the bridge replacement, including dynamic flow modeling using HEC-RAS 5.0.7 software incorporating storm surge hydrographs and tidal prism storage effects. He is developing 2-dimensional hydraulic analysis using SRH-2D to model flow vectors impacting complex multi-column skewed pier structures and impacts from navigation channel fender structures. Using the results of HEC-RAS and SRH-2D analysis, Dave is developing detailed scour analysis for general contraction, local abutment, and complex pier scour based on HEC- 18 guidelines. The project will also include selection and design of scour countermeasures to protect existing pier substructures.

**ME Route 15 over Snow Brook Culvert Replacement Habitat Connectivity Design, Caribou, ME**

Dave provided geomorphic and hydraulic analysis for replacement of an existing perched 8-foot diameter corrugated metal pipe culvert presenting a barrier to fish passage for alewife between the Bagaduce River and prime upstream spawning habitat. The culvert replacement design incorporates natural stream simulation and wildlife passage design consistent with MaineDOT Habitat Connectivity Design (HCD) standards. Dave's responsibilities included field geomorphic assessment, culvert hydraulic and scour analysis using HEC-RAS 5.0.3 software; stream simulation design including channel slope and alignment, bankfull width, and channel bed gradation; and aquatic and terrestrial wildlife passage analysis for culvert replacement alternatives analysis. MaineDOT HCD standards incorporate US Fish and Wildlife Service (USFWS) fish passage analysis and data to preserve the essentials of stream function for waters falling under the Endangered Species Act.

**Silver Street over Twelvemile Brook Bridge Replacement, Monson, MA**

For the Town of Monson, Dave contributed to design of a 24-foot single-span precast concrete replacement bridge over Twelvemile Brook by providing hydrologic and hydraulic design and analysis. Dave authored a project Hydraulic Report for MassDOT Chapter 85 review, including hydraulic analysis of the existing bridge and proposed alternative replacement options, bridge scour analysis and countermeasure design, and wildlife passage design meeting Massachusetts Stream Crossing Standards. Dave's responsibilities included development of Pre- and Post- Project hydraulic models in HEC-RAS Version 5.0.3; No-Rise analysis of the project location within the FEMA jurisdictional floodway in accordance with NFIP 60.3(d)(3); and calculation of design contraction and abutment scour depths and rip-rap countermeasures incorporating HEC-18 and HEC-23 guidelines.



## Laura Laich



**Laura is an Environmental Scientist in VHB's Watertown office whose professional experience includes delineation of wetland boundaries and preparation of environmental permit submittals to obtain regulatory approval from federal and state agencies and local Conservation Commissions. Laura assists in broad collaborative coordination with design and engineering teams to reduce impacts to wetland resources to comply with the regulatory permitting process. Her focus is on transportation, land development, and utility projects extending across the New England region.**

### Education

MS, Applied Environmental Science, University College Dublin, 2006

BS, Wildlife Management, University of New Hampshire, 2002

### *14 years of professional experience*

#### **Crescent Marsh Culvert Replacement & Salt Marsh Restoration, Saugus, MA**

Laura performed an ecological assessment of a tidally restricted area of Crescent Marsh, located within the greater salt marsh system of Rumney Marshes. Laura's responsibilities included vegetative analysis, habitat assessment, wetland delineation, and establishing a baseline for the ecological health of the marsh. VHB assisted the Massachusetts Department of Transportation (MassDOT) with designing and permitting a culvert replacement to restore tidal flows to Crescent Marsh.

#### **Padanaram Causeway, Dartmouth, MA**

For MassDOT, Laura assisted with the federal, state, and local environmental permitting for the rehabilitation of the Padanaram Causeway across Apponagansett Bay in Dartmouth. The project required modifying proposed construction methodologies to reduce impacts to coastal wetland resources and fisheries while reducing overall closure time for the Causeway during reconstruction. Laura prepared permit applications for this project in accordance with Sections 401 and 404 of the Clean Water Act and the MA Wetlands Protection Act.

#### **Lynn Gear Works Redevelopment, Lynn, MA**

Laura assisted with the federal, state, and local environmental permitting for the redevelopment of a former industrial site into a 1.5-million square foot transit-oriented development located in and adjacent to the tidal areas of the Saugus River. The project required protective construction methodologies in the tidal zone to avoid impacts to sensitive coastal resource areas. Laura prepared permit applications for this project in accordance with Section 401 and 404 of the Clean Water Act and the MA Wetlands Protection Act. In this current phase of the project, VHB is providing survey and design coordination, engineering design, and environmental permitting.

#### **Montvale Hill, Woburn, MA**

Laura is assisting with the federal, state, and local environmental permitting for a master-planned mixed-use development of approximately 77 acres of land on a former industrial site adjacent to the Aberjona River. The project requires remediation of contaminated wetland areas and major enhancements to an on-site waterway, Sweetwater Brook, including daylighting and channel naturalization. Laura prepared EIR documentation for the on-site natural resources to assist in the MEPA process and is currently preparing permit applications including wetland mitigation design for this project in accordance with Section 401 and 404 of the Clean Water Act, the MA Wetlands Protection Act, and the local wetland Ordinance.

## Gene F. Crouch



**A Senior Wetland Ecologist and an Associate at VHB, Gene is experienced in fresh and marine wetland ecology, research, permitting, environmental documentation preparation, and reporting. He has a thorough knowledge of federal environmental legislation and regulations, which he gained through previous experience with the U.S. Army Corps of Engineers, the National Marine Fisheries Services, and the U.S. Fish and Wildlife Service and federal Section 10/404 permits.**

### Education

BS, Biology, Northeastern University, 1974

### Affiliations/Memberships

International Erosion Control Association

Association of State Wetland Managers

*45 years of professional experience*

### **Bass River, Dennis and Yarmouth, MA**

VHB performed ecological analysis and an unsteady-state hydraulic model of the Bass River estuary separating Dennis and Yarmouth as part of the work for a project to extend the Cape Cod Rail Trail (CCRT) westerly. VHB managed the development of a HEC-RAS model to simulate tidal flushing through the system and identify hydraulically viable abutment alternatives for the new CCRT bridge crossing over Bass River. This work included a detailed scour analysis and design of scour countermeasures, as well as coastal resource impact assessment in support of permitting efforts.

### **Spy Pond Dredging Plans, Arlington, MA**

VHB has been performing the design and permitting of a dredge project at the MassDOT outfall to Spy Pond in Arlington with associated improvements to the drainage system from Route 2. Accumulated sediment at the outfall has diminished aesthetics and hindered recreational access to the corner of the pond. The Town of Arlington, MassDEP, and abutters had made requests to MassDOT to remove the sediment. The goal of the project is to remove accumulated sediment that was conveyed to the pond by the Route 2 drainage system to restore recreational access to the corner of the pond. The project has completed 100% design documents and all permitting and is now moving to advertisement.

### **Designing and Planning Segment 1 of the Blackstone River Greenway, Blackstone, Millville, and Uxbridge, MA**

For the Massachusetts Department of Conservation and Recreation (DCR), Gene provided environmental planning and permitting in three towns, including field delineation and mitigation efforts for Segment 1 of the Blackstone River Bikeway. The project includes 3.3 miles of greenway and 11 bridges.

### **MassCentral Rail Trail, Berlin to Waltham, MA**

Gene directed the aerial interpolation of wetlands along a 23-mile rail trail corridor for planning and initial environmental impact and permitting assessment for the Massachusetts Department of Conservation and Recreation (DCR). Work included delineation of wetland resources using aerial photographs of the corridor including wetlands, streams and rivers, with selective field review of the delineated resources. Based on the aerial delineation, impacts to wetlands, Riverfront Area and buffer zones were calculated using GIS along with potential impacts to floodplain from available FEMA mapping. This work was conducted to provide a planning level assessment of environmental impacts and list of permits needed for inclusion in an Environmental Notification Form on the project.

## Lars H. Carlson, PhD, PWS



### Education

PhD, Specialization in Coastal Ecology, University of Massachusetts, 1987

BS, Biology, University of Delaware, 1982

### Registrations/Certifications

Professional Wetland Scientist (PWS), 2001

Certified Ecologist (The Ecological Society of America) (Senior Ecologist), 2003

Lars is an accomplished planner, project manager, wetlands scientist, botanist, and published research scientist, as well as a specialist in botany, coastal ecology, environmental permitting and wetlands. He delineates wetland areas, identifies and characterizes natural resources, prepares and manages permit submittals, identifies/manages impacts on environmentally sensitive areas, develops wetland mitigation plans, prepares stormwater pollution prevention plans, and conducts construction-period monitoring for permit compliance. He has extensive experience preparing NEPA and MEPA documents and completing the associated alternatives analysis for major infrastructure projects. He is experienced with the strategy, documentation, and mitigation necessary to obtain a wide variety of regulatory approvals, including: EPA National Pollution Discharge Elimination System Permits (NPDES); U.S. Army Corps of Engineers Section 404 Permits; Massachusetts Wetlands Protection Act Orders and DEP Variances; and Section 401 Water Quality Certificates. Lars has managed projects performed for various federal, state and municipal clients throughout New England and the US. He has led the environmental analysis and permitting activities for complex, high profile projects with MassDOT, MA Water Resources Authority (MWRA), the MBTA, Ohio DOT, Indiana DOT, and Missouri DOT.

*32 years of professional experience*

### **New Bedford Harbor Superfund Site—Post Construction Monitoring and Restoration Design Peer Review**

Lars is serving as project manager and senior wetland scientist for post construction monitoring and design review services for restoration of salt marsh and other coastal habitats as part of the remediation of the New Bedford Harbor Superfund Site for the U.S. Army Corps of Engineers. VHB developed methodology for and is carrying out ecological monitoring to evaluate the success of coastal habitat restoration efforts and make recommendations for adaptive management. VHB is also providing peer review services for design and construction of upland, salt marsh and intertidal habitats impacted by remediation activities.

### **South Coast Commuter Rail Program, Southeastern Massachusetts**

Lars helped prepare the MEPA documentation, including the Draft and Final Supplemental Environmental Impact Report for a project to extend rail service from Boston to Southeastern Massachusetts for MassDOT/MBTA. He was responsible for leading the state and federal environmental permitting effort, developing wetland impact avoidance and minimization measures, and designing wetland mitigation areas. VHB has managed every aspect of planning, permitting, and construction of this project to restore commuter rail service between Boston and the Massachusetts South Coast, connecting 31 communities with 75 miles of new track, 38 bridges, 50 grade crossings, two new layover facilities, and 12 new and rehabilitated stations. Working with the Commonwealth of Massachusetts Division of Marine Fisheries, Lars facilitated a mitigation agreement whereby surplus material from bridge and culvert demolition will be used to create offshore artificial reefs to enhance fisheries habitat.

## Quinn R. Stuart



**Quinn is a Senior Preservation Planner and the Cultural Resources Team leader with knowledge of local, state, and federal regulations. She has more than a decade of experience in archival research, photography (digital and 35 mm), National Register of Historic Places criteria, and has worked with both public agencies and private developers to help them comply with permitting requirements and other project historical needs. Quinn meets the Secretary of the Interior’s Professional Qualifications Standards for an Architectural History (36 CFR 61).**

### Education

MA, Historic Preservation,  
Savannah College of Art and  
Design, 2009

BS, Historic Preservation, Roger  
Williams University, 2006

### Affiliations/Memberships

Vernacular Architecture Forum,  
New England Chapter

Association for Gravestone  
Studies

National Trust for Historic  
Preservation

*15 years of professional experience*

### Mill Pond Oyster River Feasibility Study, Durham, NH

Mill Pond is a focal point for the Town of Durham—one valued for its aesthetic, recreational, and historic value. As a result, reconstructing or removing the Oyster River Dam is a vital issue that will affect the entire community. VHB is working in partnership with Pare Engineering and Weston & Sampson to evaluate the potential engineering, environmental, historic, and financial outcomes associated with potential removal of the dam. Quinn assisted the project team in state and federal historic regulatory review requirements, triggered by the need for an US Army Corps of Engineers permit, by the submission of a NHDHR Request for Project Review. The cultural resources information was also integrated into the feasibility study.

### Main Street Bridge Parapet Evaluation and Design, Winchester, MA

Quinn is the lead preservation planner on VHB’s team working with the Town of Winchester on a study for the rehabilitation or replacement of the parapets on the bridge carrying Main Street over the Aberjona River. The bridge is in Winchester Center Historic District and is a contributing resource to the historic district. The project is not anticipated to need any state or federal permitting; however, the project team is coordinating with the Winchester Historical Commission by presenting compiled drawings, specifications and prepared narratives describing the proposed work and how it meets the Secretary of the Interior’s Standards for Rehabilitation.

### Mill City Park Whitewater Environmental Permitting, Franklin, NH

Quinn is the lead preservation planner providing cultural resource services for a planned whitewater park on the Winnepesaukee River. The continuous 1.25-mile Class III rapids stretch from Cross Mill Road to downtown Franklin, NH with historic structures—including the remains of mill dams and a trestle bridge—within or adjacent to the project area. As a result, close coordination with NHDHR to help make sure Section 106 compliance is required.

### Bruce Freeman Rail Trail, Concord, MA

Prior to joining VHB, Quinn worked with a team of architectural and industrial historians on an evaluation and inventory of extant rail-related features located along the existing Bruce Freeman Rail Trail in Concord, MA. The trail follows the right-of-way of the disused Framingham and Lowell Line of the New York, New Haven and Hartford Railroad. The path is a 10-foot-wide paved multi-use trail, available for walking, running, biking, rollerblading, and other non-motorized uses.



## Mark Costa, PE, LEED AP, ENV SP



Mark is a water resources engineer in VHB's Watertown office. Mark focuses on surface hydrology, stormwater management, riverine hydraulics, climate change, and permitting for a wide range of land development, energy, and transportation improvements projects.

*14 years of professional experience*

### Education

BS, Civil Engineering, University of Massachusetts Dartmouth, 2007

### Registrations/Certifications

Professional Engineer MA, 2011

LEED Accredited Professional, 2008

Envision™ Sustainability Professional, 2013

### The Vale, Sweetwater Brook Restoration, Culvert Design, and No-rise Analysis, Woburn, MA

Mark was the project manager for the Sweetwater brook restoration design, culvert design, and Federal Emergency Management Agency (FEMA) no-rise analysis to support the redevelopment of the 107-acre former Kraft Heinz parcel. The Project proposes to redevelop the site into a mixed-use development consisting of up to 1.6 million square feet. The Project includes the removal of several aging infrastructure elements (culverts, sluice gates, etc.) that formerly served the plant operations within Sweetwater Brook and the restoration of Sweetwater Brook to include a natural substrate material and bridges/culverts that meet Massachusetts Stream Crossing Standards. Sweetwater Brook is located within a FEMA regulatory floodway which requires projects to demonstrate through a hydrologic and hydraulic analysis that there will be no increase in flood levels during the base flood discharge. This no-rise analysis was peer-reviewed by the Town of Winchester and City of Woburn peer review consultants who agreed with the H/H analysis and no-rise findings.

### Suffolk Downs, Hydrologic, Hydraulic, and Resiliency Adaptation Analysis, Boston, MA

Mark served as the Water Resources project manager for preparing the hydrologic, hydraulic, and resiliency adaptation analysis for the 161-acre re-development of Suffolk Downs in Revere and Boston, MA. This analysis presented how the built infrastructure will affect the movement of water on and off-site, by analyzing potential flood events including rainfall, coastal flooding, and a combination of the two. A detailed hydrologic and hydraulic analysis was completed using the Federal Emergency Management Agency (FEMA) Coastal Hazard Analysis Modeling Program (CHAMP) transect model, and a dynamic unsteady United States Army Corps of Engineers (USACE) 1D/2D Hydraulic Engineering Center River Analysis System (HEC-RAS) model. Model runs were completed for rainfall events coupled with various sea level and tidal conditions for current and forecasted climate and sea level conditions (i.e., 2035, 2070, and 2100), in all over 40 rainfall/tide scenarios will be run as part of the analysis. This allowed the Project to analyze calculated water surface elevations and depth & duration of flooding at various points on and off-site from pre to post development conditions for current and future climate conditions. Mark worked closely with state regulators on this analysis including the Massachusetts Office of Coastal Zone Management (CZM), Massachusetts Department of Environmental Protection (MassDEP), Executive Office of Energy and Environmental Affairs (EEA), and Massachusetts Department of Conservation and Recreation (DCR).

### MVP Stormwater Prioritization & Southwick Brook Flood Study, Adams, MA

Mark is the Water Resources project manager for the town-wide stormwater prioritization plan and Southwick Brook Flood Study and that is being completed as part of the Massachusetts Vulnerability Preparedness (MVP) Program. VHB completed a town-wide prioritization plan of flood infrastructure improvements that plans for increased climate and flood resilience by reducing the occurrence and of flooding. Recommendations were based on cost, conditions, and improvements in flood conditions. VHB also evaluated the existing persistent flooding issues along Lime Street due to Southwick Brook by completing a hydrologic and hydraulic analysis which assisted in providing recommendations for improvement to alleviate the flooding.

## Russell J. Bousquet, PLS



Russ is the Survey Manager for VHB's Watertown Survey Department, serves as a Project Manager. He has extensive experience in all types of land surveying in Massachusetts, Connecticut, Rhode Island, New Hampshire, and New Jersey. His responsibilities include boundary calculations for subdivisions and Land Court, developing proposals, coordinating crews, checking field notes and procedures, checking final plans, and performing budget analysis.

### Education

BS, Civil Engineering  
Technology, Wentworth  
Institute of Technology, 1981

### Registrations/Certifications

Professional Land Surveyor MA,  
1990  
Licensed Land Surveyor CT,  
1993

### Affiliations/Memberships

Massachusetts Association  
of Land Surveyors and Civil  
Engineers, Eastern Mass  
Connecticut Association of  
Land Surveyors

*38 years of professional experience*

### Shining Sea Bikeway Extension, Falmouth, MA

Russ was Survey Manager for topographic, right-of-way and utility survey for the design and construction of the proposed six-mile bike path along the former railroad property.

### Wachusett Reservoir, Boylston, MA

Under contract with MassDCR, Russ was Survey Manager for the topographic and drainage survey for the drainage and water quality study of a portion of the Reservoir.

### Blackstone River Greenway, Blackstone and Worcester, MA

Under contract with MassDCR, Russ was Survey Manager for the topographic, ROW and drainage survey for the design of a new Bike Path through both communities.

### Watertown Bike Path, Watertown, MA

Under contract with MassDCR, Russ managed topographic, detail, utility and right-of-way survey through approximately 1.5 miles of abandoned railroad line, for the design and construction of proposed bike path.

### George's Island in Boston Harbor, Boston, MA

Under contract with MassDCR and the National Park Service, Russ was Survey Manager for the topographic and hydrographic survey for the design and construction of a new dock and pier system for the island.

### Morrissey Boulevard Survey, Boston, MA

Under a contract with the Metropolitan District Commission (now MassDCR), Russ was Project Manager for the surveying efforts to develop an existing conditions base plan for the design of roadway improvements for a busy urban commuter boulevard. The 2.5-mile survey included the determination of right-of-way, topography and utilities lines throughout the limits of the roadway.

### Polpis Road Bike Path Design, Nantucket, MA

Russ was Survey Manager for an 8-mile cross section and detail survey along Polpis Road prior to bike path construction. The survey included the determination of property lines throughout the limits of the project for the preparation of easement plans.

### Burlington Bike Path, Burlington, MA

Russ was Project Manager for topographic, right-of-way and utility survey for the design and construction of a proposed one-mile portion of an existing bike path.



## Similar Experience

For members of the VHB Team, ecological restoration projects aren't just another day on the job—they're also our passion. Our related experience—highlights of which follow—illustrates our commitment to making a positive impact on human and natural systems alike. In addition, the following project examples illustrate our experience:

- » Balancing the needs of Massachusetts communities and regulatory agencies
- » Succeeding on some of the largest and most complex dam feasibility and removal projects in the area

We are excited by the opportunity to bring these strengths to the Parker Mills Dam Project.

Below is a table detailing our qualifications and experience on similar projects.

Following the table are several detailed project descriptions of our Team's work.

Relevant Projects	Qualifications											
	RIVER PROCESSES/FLUVIAL GEOMORPHOLOGY & RESTORATION PRINCIPLES	RIVER ECOLOGY/HABITAT RESTORATION	RIVER ENGINEERING	CONCEPTUAL, PRE-CONSTRUCTION & AS-BUILT DESIGNS	FEASIBILITY STUDY	HYDROLOGIC/HYDRAULIC ANALYSIS	SEDIMENT MANAGEMENT ANALYSIS	FEDERAL & STATE PERMIT APPLICATIONS/APPROVALS	PUBLIC OUTREACH, EDUCATION, AND MEETINGS	CONSTRUCTION OVERSIGHT	STRUCTURAL ENGINEERING	HIGHWAY/TRAIL CIVIL ENGINEERING
Owens Pond Outlet Channel Reconstruction   MA	●	●	●	●	●	●	●	●	●	●	●	
Aberjona Flood Mitigation and Bridge Retrofit Program   MA	●	●	●	●	●	●	●	●	●	●	●	●
Bass River Coastal Hydraulic Study and Pedestrian Bridge   MA	●	●	●	●	●	●		●	●		●	●
Leominster Dam on the Nashua River   MA	●		●		●	●	●		●		●	
Mill Pond Dam   NH	●	●	●	●	●	●	●	●	●		●	
Great Dam Removal Project   NH	●	●	●	●	●	●	●	●	●	●		
Buckeye Brook Stream Restoration, T.F. Green Airport   RI	●	●	●	●	●	●		●	●	●		
Sawyer Mill Dam Removal   NH	●	●	●	●		●	●	●	●	●	●	
Ashuelot River Restoration/Homestead Dam Removal   NH	●	●	●	●	●	●	●	●	●	●		
West Street Dam, Hydrologic Modeling, and Wetlands Analysis   NH	●	●				●			●			
Railway Brook Restoration Plan, Design, and Construction   NH	●	●	●	●		●	●	●		●	●	●
Policy Brook Restoration and Floodplain Mitigation, Design, and Construction   NH	●	●	●	●		●	●	●		●	●	●
Hop Brook Restoration/Relocation   CT	●	●	●	●		●		●		●		
Washington Road Stream Restoration at Princeton University   NJ	●	●	●	●		●		●	●			
Meadow Creek Stream Restoration Design-Build   VA	●	●	●	●	●	●	●	●	●	●		
Kingstowne Stream Restoration Phase II   VA	●	●		●		●		●	●	●		
Big Rocky Run Stream Restoration   VA	●	●	●	●	●	●	●	●	●	●		





## Great Dam Removal

### Exeter, New Hampshire

#### Client

Town of Exeter

#### VHB Schedule

Started: June 2011

Completed: Ongoing

In 2013, VHB led a full impact and feasibility study to assist the Town in evaluating the potential environmental, historic, and financial outcomes associated with removal of the Great Dam, located in the Exeter River. The Great Dam serves as an impoundment dam for the Town's water supply.

VHB completed geomorphologic studies of the distribution of sediment stored within the impoundment, which provided important information on the magnitude and duration of potential sediment impacts. We also identified sites of excess sediment deposition, and we determined potential threats to infrastructure and aquatic habitat that could result because of these deposits.

The project also included water supply studies, hydrological and hydraulic modeling; analysis related to fish passage, dam and structural engineering, river ice, and recreation; and geomorphic analyses. VHB also worked closely with the NH Division of Historical Resources (NHDHR) to take into consideration all of the historical implications of removing the dam.



**Recognized with ACEC-NH  
Engineering Excellence  
Awards, Gold Award, 2017**

**VHB collaborated with  
Pare to successfully  
complete the Great Dam  
Removal**

After a thorough and inclusive public process, the Town decided to pursue removal and began developing dam removal engineering plans, obtaining the necessary permits, and selecting a contractor to proceed with the removal and restoration of the river at the dam site. The design incorporated natural channel design principles based on geomorphic analysis, hydrologic and hydraulic analyses, water supply review and modifications, natural fish passage design, and impacts to natural resources. VHB is working with engineers from NOAA and USFWS to finalize the roughened channel design to improve fish passage for multiple target species. VHB provided survey and design coordination, engineering design, environmental permitting, consultation and cultural resources studies pursuant to Section 106 of the National Historic Preservation Act, and assistance with bid documents for construction. The dam was removed in 2016 and since that time, anadromous fish runs have dramatically increased and water quality in the river is no longer impaired.





## Mill Pond Dam Rehabilitation

### Hampton, New Hampshire

#### Client

Pare Corporation

#### VHB Schedule

Started: Aug. 2016

Completed: Jan. 2018

VHB partnered with Pare to help the Town of Hampton to repair the Mill Pond Dam, a historic structure located adjacent to High Street in Hampton, New Hampshire. VHB is assisting Pare with environmental and cultural resource evaluations. The project requires permits from the NHDES and the US Army Corps of Engineers, which results in the need to conduct a review of its effects to historic properties, in compliance with Section 106 of the National Historic Preservation Act of 1966. VHB's architectural historian conducted research and provided historical documentation for final review by the New Hampshire Division of Historical Resources resulting in a determination of "No Adverse Effect."





## Aberjona Flood Mitigation Program

### Winchester, Massachusetts

#### Clients

Town of Winchester  
AECOM

#### VHB Schedule

Started: Sept. 2012  
Completed: Ongoing

VHB is providing design, permitting and construction support services for implementation of the Aberjona River Flood Mitigation Program. These projects include river restoration, dam removal and modifications, and culvert/bridge improvements. Prior to the construction phase, VHB successfully assisted the Town of Winchester in developing the flood mitigation program for the Aberjona River, including:

- » Creating a hydrologic and hydraulic model of the Mystic/Aberjona River Watershed to simulate flooding conditions along the main stem of the Aberjona River and its tributaries
- » Developing and evaluating a series of structural and non-structural alternatives designed to alleviate flooding in downtown Winchester
- » Preparing a Massachusetts Environmental Policy Act (MEPA) Environmental Impact Report (EIR)/Alternatives Analysis for the resulting flood mitigation program

The mitigation program consists of a set of proposed conveyance, storage, operational, regulatory, best management practices, and flood-proofing measures intended to reduce the frequency and intensity of backwater flooding of the Aberjona River.

## Aberjona Flood Mitigation Program *(continued)*

In April 2010, The Town of Winchester received approval for the flood mitigation program's individual projects to move on to design and permitting. Following this approval, VHB has been assisting the Town of Winchester in the design, permitting, and construction support for the individual projects that make up the flood mitigation program. The Aberjona River Flood Mitigation Program consists of the following projects:

- » **Aberjona River Restoration (Completed 2012):** Restored a 2,800-foot stretch of the Aberjona River, including excavation of 26,000 cubic yards of dredge and overbank material; removal of a small run of the river dam, 5,600-feet of bank restoration, and adjacent parkland improvements.
- » **Center Fall Dam Improvements (Completed 2016):** Replaced an existing low-level control structure and 30-inch concrete pipe with a larger precast control structure and 4-foot by 6-foot box culvert and the installation of a steep pass fish ladder for improvement of herring fish passage over the dam.
- » **Skillings Field Culvert Project and Remediation (Completed 2017):** Constructed a parallel 1,250 lineal foot 7-foot by 15-foot box culvert adjacent to the three existing 7-foot diameter culverts under Skilling's Athletic Field adjacent to the High School. Management of soils under the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000 and installation of a 7-acre remedial cap.
- » **Scalley Dam Modification Project (Completed 2017):** Construction of a new spillway bay, slide gate, walkway, and railings. The existing stone spillway was regraded to help improve herring passage.
- » **Mount Vernon Street Bridge Improvements (Completed 2018):** The VHB team inspected the existing bridge, developed and designed the widening concept, and prepared final design plans and specifications, including evaluating construction staging and traffic management options. As part of the Aberjona River Flood Mitigation Program, the bridge expansion plan called for adding a fourth, eight-foot culvert to increase flow capacity to improve the hydraulics of the river. There were three phases of water diversion during construction, including relocating and installing cofferdams and pumps to always leave 50% of the river open to flow. Community feedback called for traffic management options to avoid complete bridge closure during construction in this heavily traveled area and included new railings that maintain the historic character of the bridge. The project also included scour protection measures, and implementation of Best Management Practices (BMPs) adjacent to the river to improve water quality. Through innovative engineering design and solutions, the completed bridge has successfully achieved the desired flood mitigation goals, while also enhancing the historic charm of the bridge.



Scalley Dam



Mount Vernon Street Bridge



Recognized with ACEC of  
Massachusetts' Silver Award  
for Engineering Excellence





## Mill Pond Oyster River Feasibility Study

Durham, New Hampshire

### Client

Town of Durham

### VHB Schedule

Started: Sept. 2019

Completed: Ongoing

Mill Pond is a focal point for the Town of Durham—one valued for its aesthetic, recreational, and historic value. As a result, reconstructing or removing the Oyster River Dam is a vital issue that will affect the entire community. VHB is working in partnership with Pare Engineering and Weston & Sampson to evaluate the potential engineering, environmental, historic, and financial outcomes associated with potential removal of the dam.





## Leominster Dam Alternatives Analysis/Feasibility Analysis Leominster, Massachusetts

### Client

Massachusetts Department  
of Transportation (MassDOT)

### VHB Schedule

Started: November 2015  
Completed: Ongoing

The Leominster Dam is located on the Nashua River within the MassDOT right of way along I-190 in Leominster, Massachusetts. The dam was originally constructed in the early 1900s to provide an impoundment for recreational use and a power source for nearby mills. In the floods of 1936, the dam breached. Rubble from the structure including concrete, stone, steel, and rebar remain untouched in the channel. The MassDOT property is located adjacent to a moderately frequented recreational area owned by MassDCR. In 2015, MassDOT initiated an alternatives analysis/feasibility study analysis to initiate an ecological restoration project and remove the rubble, which is a danger to recreational boaters and an attractive nuisance to site visitors.

In 2016, VHB completed the alternatives analysis/feasibility study that identified data collection needs, permitting requirements, and key challenges to completing the removal and restoration process. After completion of the feasibility study, VHB conducted a sediment probing and sampling effort to quantify and characterize the sediments within the impoundments and to establish background levels within the Nashua River corridor. VHB made recommendations to DCR for potential sediment management options including partial in-stream management.





## Sawyer Mill Dam Removal

### Dover, New Hampshire

#### Client

Sawyer's Mill Associates

#### VHB Schedule

Started: May 2019

Completed: Sept. 2019

Sawyer Mill Apartments is a renovated historic mill building complex on the Bellamy River in Dover, New Hampshire. The mill included two cut granite stone masonry run-of-the-river dams constructed circa 1873 that impound approximately 18 acres of the Bellamy River extending approximately 4,500 feet upstream of the mill. These dams originally provided hydropower to the mill but had since been decommissioned and presented a barrier to migratory fish passage as well as a flood hazard to the adjacent mill buildings. Given the value of the Bellamy River for anadromous migratory fish passage, Sawyer's Mill Associates coordinated with multiple project partners to provide grant funding for removal of both dams. An initial design was completed and permitted in 2017; the lower dam was removed in Summer of 2018, but due to multiple design problems the Upper Dam removal was delayed.

Sawyer's Mill Associates brought in VHB to salvage the second half of a dam removal project that was behind schedule, over budget, and required a complete redesign to address existing design issues and keep construction impacts within the owner's property. VHB provided full engineering, design and permitting services for dam removal and restoration of 450 feet of the Bellamy River on an extremely accelerated schedule: 112 days from project kickoff to issuing complete plans and specifications for bid.

To prepare the design, VHB performed: topographic and bathymetric survey of the dam impoundment area, sediment probes and bedrock borings, hydraulic modeling and analysis, and contaminated soil sampling and pre-characterization for off-site disposal. The final design accommodated fish passage for river herring, NHDES Dam Bureau flood safety standards, stability of adjacent mill buildings, and preservation of historic features, all documented in a basis-of-design technical memorandum. VHB maintained close coordination with multiple regulatory and funding project partners during the entire project period, including NHDES, NOAA, NHFGD, USFWS, USACE, NHDHR, and the City of Dover; submitting and securing amended NHDES Wetlands, NHDES Shoreland, USACE Section 106, and City of Dover Conditional Use permits. VHB completed the project on time and under budget.



## Ashuelot River (West Street) Dam, Hydraulic Modeling and Natural Resource Analysis

Keene, New Hampshire

### Client

Town of Keene

### VHB Schedule

Started: Aug. 2015

Completed: Jan. 2016

The City of Keene is evaluating the repair or removal of the Ashuelot River (West Street) Dam, which has fallen into disrepair and could require costly repair and maintenance. The local Conservation Commission and others in the community wish to more fully understand the implications on wetlands and floodplains that would result from the possible dam removal, as well as explore other

alternatives such as raising the dam to accommodate hydropower. In an effort to further assess the removal versus repair alternatives, the City hired VHB to conduct a survey of the Ashuelot River and to develop a detailed hydraulic model of the river using HEC-RAS. The model was used to evaluate the alternatives and estimate the likely effect of each on wetlands, wildlife, and other natural resources. This analysis will help the community make a decision about whether to pursue removal or repair of the dam. Final findings were presented to the City and community at a public meeting.







## Buckeye Brook Stream Restoration

### Warwick, Rhode Island

#### Client

Rhode Island Airport Corporation

#### VHB Schedule

Started: Oct. 2012

Completed: Aug. 2016

The U.S. Congress required runway safety improvements at airports across the country, including three runway ends at T.F. Green Airport in Warwick, Rhode Island. Many alternatives were analyzed, but the Preferred Alternative at T.F. Green Airport for the Runway 34 End runway safety area impacted floodplains and wetland resource areas, which required a mitigation plan. The Rhode Island Airport Corporation selected VHB to delineate and survey wetlands and construct a HEC-RAS model for the affected area to assess the impacts for options being proposed for the mitigation alternatives and conveyance improvements. VHB incorporated information from on-site airport SWMM modeling and new hydrologic data collected in the field to develop a HEC-RAS model for the main conveyance system, Buckeye Brook.

VHB developed a mitigation plan to offset impacts associated with the improvements which included restoration of 690 feet of Buckeye Brook, 350 feet of an unnamed tributary, and two additional wetland mitigation areas. VHB provided design and engineering services including restoring sinuosity and profile variability to the straightened channel; installing natural grade control and habitat enhancement structures for long-term stability and to improve aquatic species habitat; and reconnecting the channel to its surrounding floodplains. During construction of these mitigation areas in 2015-2016, VHB provided full-time construction support and permit compliance services.

VHB is developing a Letter of Map Revision identifying changes to the floodplain's base flood elevations. VHB is also monitoring the stream restoration and wetland mitigation areas to confirm permit compliance for the U.S. Army Corps of Engineers and the Rhode Island Department of Environmental Management.

## Additional VHB Experience



### Parker Street Bridge Replacement

#### Acton, Massachusetts

VHB was the lead designer for the replacement of Bridge No. A-02-010 carrying Parker Street over Fort Pond Brook in the Town of Acton, MA. The VHB team inspected the existing bridge, developed and designed the replacement concept, and prepared final design plans and specifications. The new bridge structure consisted of a 3-sided buried precast concrete box with a 17-foot square clear span, or about 23 feet along the highly skewed roadway. Portions of the existing stone retaining walls were maintained, and the existing roadway alignment and profile was matched. Precast bridge, railing, and wingwall elements allowed for accelerated bridge construction, which required only a two-week temporary road closure and stream diversion. Additional construction was completed while one lane of traffic was maintained. VHB prepared stated construction and traffic management plans for the project. In addition to the structural design and traffic plans, the VHB team completed the ground survey, geotechnical program, hydraulic analysis, environmental permitting, highway design, and utility coordination for the project. VHB also completed construction phase services for the project, including part-time construction observation and environmental monitoring.



### Shining Sea Bikeway Extension Phase III

#### Falmouth, Massachusetts

The Shining Sea Bikepath extension from Carlson Lane to County Road in North Falmouth extends the current trail an additional 6.5 miles through some of the most environmentally sensitive areas on Cape Cod. This additional section of bikeway provides connectivity between County Road in North Falmouth and the Ferry Terminal in Woods Hole, an overall distance of approximately 10 miles. The bikeway follows the abandoned Old Colony railroad line and traverses the Great Sippewisset and Little Sippewisset Marshes providing views of Buzzards Bay. VHB provided the Town of Falmouth civil engineering support to design the bikeway's vertical and horizontal geometry, modifications to drainage, bikeway intersections with local streets, landscaping, and bikeway amenities. VHB designed structural modifications to a small bridge that traverses an open 4-foot wide waterway connecting cranberry bogs adjacent to each side of the proposed path along with numerous retaining walls along the bikeway alignment. VHB also provided environmental consultation and coordination with the Falmouth Conservation Commission and the Massachusetts Division of Fisheries and Wildlife as the project necessitated the filing of a Notice of Intent and the relocation of a rare plant species and protection for the endangered Eastern Box Turtle. VHB also assisted the Town and MassDOT with community outreach efforts in the form of several meetings with the general public, concerned citizens, the Falmouth bikeway committee, and Town and State officials to help bring this project to a successful completion.





### **Owens Pond Outlet Channel Reconstruction, Wentworth Farm Conservation Area Amherst, Massachusetts**

The Wentworth Farm Conservation Area, which includes Owens Pond, is a popular local destination for walking, fishing, and kayaking. Working with Northeast Utilities as part of a concurrent transmission line upgrade project, VHB was brought on to assist with improvements to a primary pond spillway and adjacent wetland to alleviate flooding concerns and facilitate the flow of migrating fish from the pond to the nearby Fort River. Flooding control techniques included native plantings to absorb overflow and large stones in the spillway to slow down the water at peak times and prevent bank erosion with a series of deep pools and rock cross vanes to facilitate migratory fish passage. Our role included the design, permitting, and construction of the primary concrete spillway, cut-off wall, and outlet channel. We provided construction drawings, technical specifications, quantifying material and excavation quantities, bid reviews, construction submittal and material reviews, and technical assistance for contractor and construction oversight during the three-month construction period.

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**SECTION 3**

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**REFERENCES**

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## PARE CORPORATION – CLIENT REFERENCES

PROJECT	CLIENT CONTACT
<p><b>Town of Durham, NH</b></p> <ul style="list-style-type: none"> <li>• Oyster River Dam Feasibility Study</li> <li>• Dates of Service: 2019-Current</li> </ul>	<p>April Talon, P.E.            Town Engineer – Durham, NH            Durham Public Works            100 Stone Quarry Drive            Durham NH 03824            (603) 868-5578            Email: <a href="mailto:atalon@ci.durham.nh.us">atalon@ci.durham.nh.us</a></p>
<p><b>City of Amesbury</b></p> <ul style="list-style-type: none"> <li>• Regulatory Dam Inspections (Various)</li> <li>• Dam Consultation</li> <li>• Dam Rehabilitation (Lake Gardner Dam, Tuxbury Pond Dam)</li> <li>• Dates of Service: 2017-Current</li> </ul>	<p>Peter A. Manor            Municipal Development Center            Town Engineer            39 South Hunt Road            Amesbury, MA 01913            (978) 388-8116  <a href="mailto:manorp@amesburyma.gov">manorp@amesburyma.gov</a></p>
<p><b>City of Fall River</b></p> <ul style="list-style-type: none"> <li>• Dam Inspections, Evaluations, Rehabilitation Design and Permitting, Construction Phase Services, Emergency Action Planning</li> <li>• Dates Of Service: 2006-Current</li> </ul>	<p>Paul Ferland            Administrator of Community Utilities            One Government Center, 3rd floor            Fall River, MA 02722            (508) 324-2321  <a href="mailto:pferland@fallriverma.org">pferland@fallriverma.org</a></p>
<p><b>Mass Dept. Of Conservation &amp; Recreation</b></p> <ul style="list-style-type: none"> <li>• Dam Inspections, Evaluations, Rehabilitation Design and Permitting, Construction Phase Services, Emergency Action Planning</li> <li>• Dates Of Service: 1998-Current</li> </ul>	<p>William Salomaa, Director            MADCR Office of Dam Safety            251 Causeway Street            Boston, MA 02114-2104            (617) 626-1410  <a href="mailto:William.Salomaa@state.ma.us">William.Salomaa@state.ma.us</a></p>



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**SECTION 4**

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**APPENDIX**

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**DESCRIPTION OF APPLICANT BUSINESS/ORGANIZATION**

Check appropriate box(es):

The named organizational entity submitting this proposal is:

- Corporation     Partnership     Proprietorship  
 Minority Owned     Woman Owned

SIGNATURES:

This page must be signed by a(n) individual(s) with authority to commit the proposing entity to a binding agreement. Corporations must attach required certification:

COMPANY NAME: Pare Corporation

AUTHORIZED SIGNATURE: 

PRINT NAME OF AUTHORIZED OFFICIAL: Allen R. Orsi

ADDRESS: 10 Lincoln Rd. Suite 210 Foxboro, MA 02035

TELEPHONE #: 508-543-1755 FAX NUMBER: 508-543-1881 EMAIL: aorsi@parecorp.com

DATE: 08/19/2021


FEDERAL TAX ID #: 05-0349690

DUNS #: 02-960-4027

*If a corporation, a notarized attestation of the signature(s) is required, or in the case of corporate seal affixed, that the signature is the signature of an officer authorized to bind the corporation to a contractual agreement.*

**STATE TAXES CERTIFICATION CLAUSE**

I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes under law.

PARE CORPORATION By:  VICE PRESIDENT  
\* Signature of individual or Corporate Officer  
Corporate Name (Mandatory) (Mandatory, if applicable)

05-0349690  
Federal Identification Tax ID

\* Approval of a contract or other agreement will not be granted unless the applicant signs this certification clause.

\*\* This request is made under the authority of Mass. G.L. 62C s. 49.A.





**CERTIFICATE OF NON-COLLUSION**

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

FIRM Pare Corporation

SIGNATURE 

ADDRESS 10 Lincoln Rd. Suite 210

NAME (print) Allen R. Orsi

Foxboro, MA 02035

TITLE Vice President

TELEPHONE 508-543-1755

DATE 08/19/2021

Corporate Seal



**END OF PROPOSAL**

