

## EXPRESSION OF INTEREST

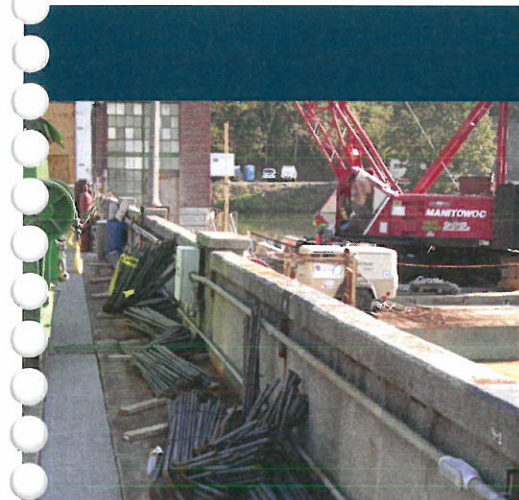
WVARNG Camp Dawson Pierce Lake  
Dam Repair Design Project  
Kingwood, West Virginia

Solicitation No: CEOI 0603 ADJ2000000010

May 14, 2020

Project: R200445.00

05/14/20 09:19:02  
WV Purchasing Division



Prepared for:  
**West Virginia Purchasing Division**  
ATTN: Tara Lyle, Buyer Supervisor  
State of West Virginia  
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**gai consultants**





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May 14, 2020

Project R200445.00

Ms. Tara Lyle  
State of West Virginia  
Department of Administration, Purchasing Division  
2019 Washington Street East  
Charleston, WV 25305

**Expression of Interest (Ref: CEOI ADJ2000000010)**  
**Architect-Engineering Services**  
**West Virginia Army National Guard**  
**Camp Dawson Pierce Lake Dam Repair Design Project**  
**Kingwood, West Virginia**

Dear Ms. Tara Lyle:

GAI Consultants, Inc. (GAI) appreciates the opportunity to provide the West Virginia Army National Guard (WVARNG) with our Expression of Interest for Architect-Engineering (A-E) Services for the Camp Dawson Pierce Lake Dam Repair Design Project (Project), located near Kingwood, West Virginia for your review and consideration. We understand the importance of this Project to the WVARNG and have assembled a proven Project Team with strong capabilities in successfully completing dam rehabilitation and repair engineering services and engineering services for foundation repairs. We believe our Team is exceptionally qualified to meet the needs of this Project based on the following considerations:

- **Our Key Staff:** GAI's Project Manager, Charles F. Straley, is a registered Professional Engineer and Professional Licensed Surveyor in West Virginia (WV) with over 30 years of experience specializing in project management and geotechnical engineering for numerous dam and foundation stabilization projects located throughout West Virginia. Additionally, many of our key personnel have experience working at private and public dams and foundation stabilization projects in WV, including the City of Thomas Dam in Tucker County, WV; Lake Chaweva Dam Replacement Project in Kanawha County, WV; Spruce Island Sand Run Dams in Tucker County, WV; and the Tomlinson Run Dam in Hancock County, WV.
- **Expertise in Dam Rehabilitation, and Foundation Stabilization Projects:** Since 1958, GAI has been providing design, rehabilitation, and inspection services for hundreds of dams and levee projects and geotechnical engineering for foundation stabilization projects. GAI's in-house team of approximately 850 engineers and technical staff has the ability to see projects through all project phases to final completion, including: conceptual design, detailed design, procurement, construction, and close-out.

GAI looks forward to working with the WVARNG on this important Project. Should you have any questions or concerns pursuant to our Qualifications, please contact Mr. Charles F. Straley, PE, at 681.245.8866, or via email at C.Straley@gaiconsultants.com.

Sincerely,

**GAI Consultants, Inc.**

Charles F. Straley

Digitally signed by Charles F. Straley  
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CN=Charles F. Straley  
Date: 2020.05.13 15:47:43-04'00'

Charles F. Straley, PE, PLS  
Senior Engineering Manager

Bruce L. Roth

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Bruce L. Roth, PE  
Engineering Director

CFS:BLR/bfh

Attachment: EOI (A-E Services for WVARNG Camp Dawson Pierce Lake Dam Repair Design Project)

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## Corporate Experience

### GAI Consultants Introduction

GAI Consultants, Inc. (GAI) is pleased to present our Expression of Interest (EOI) to the West Virginia Army National Guard (WVARNG) to provide Engineering Services for the Pierce Lake Dam Repair Design Project (Project), at Camp Dawson, near Kingwood, Preston County, West Virginia (WV).

Established in 1958, GAI is an award-winning, 850-person, full-service engineering consulting firm headquartered out of Pittsburgh, Pennsylvania (PA) with 28 office locations, including offices in Charleston and Bridgeport, WV. **GAI's Charleston office opened in 1986, and we have been providing engineering services to the State of WV, and other local and municipal government agencies, and private clients for over 30 years.**

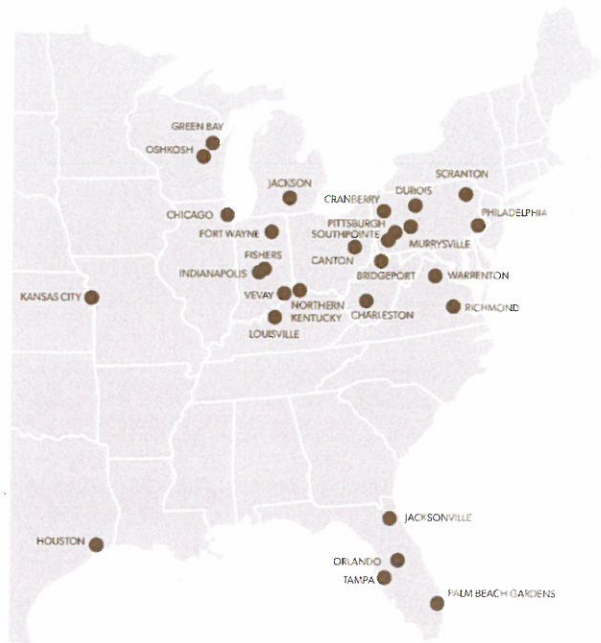
GAI is a highly focused firm specializing in all aspects of dam repair, including design, administration, monitoring, inspection, structural integrity analysis and repair design, rehabilitation and repair engineering, permitting, preparation of bid documents and specifications, bid phase services, contract administration, and construction administration. We are intimately familiar with the geology, topography, water resources, soils, and natural resources of WV.

Additionally, GAI provides engineering services for a wide array of civil and construction monitoring projects. These projects vary from landslide stabilization and restoration, to building foundation design and evaluations, to site development and restoration, including subsurface investigations and design, surveying and related activities, and utility relocation.

GAI is currently ranked 116 out of Engineering News-Record's Top 500 Design Firms. GAI's multi-disciplined staff of engineers, environmental specialists, archaeologists, historians, biologists, soil scientists, geologists, GIS specialists, and planners enable us to complete many projects in-house, from initiation through construction, facilitating communication and the timely completion of projects in a cost-efficient manner. GAI is capable of providing the WVARNG with all of the geotechnical engineering and investigation services, design, permitting, and construction support services required for this Project. Our experience in civil, structural, geotechnical, hydraulic, and water-related engineering services provides the right blend of expertise to successfully perform the engineering services required for this Project.

### Proposed Project Manager and Contact Information

Charles F. Straley, PE, PLS – Project Manager  
GAI Charleston Office, 500 Lee Street, Suite 700, Charleston, WV 25301  
Telephone: 681.245.8866 / Cell: 304.541.0854 / Fax: 304.926.8180





## Dam Engineering Services

Since 1958, GAI has designed and inspected hundreds of dams, levees, and residual waste impoundment dikes for private and government owners – many regulated by the Federal Energy Regulatory Commission, West Virginia Department of Environmental Protection (WVDEP), and other government agencies. **We have a good working relationship with the WVDEP's Dam Safety Section, and have had success dealing with applicable local, state, and federal permitting agencies.**



GAI's services for soil, rock, mine tailings, concrete dam structures, and dam conversions include instrumentation and installation design, and monitoring for pore water pressures and slope movement. Skilled geotechnical engineers conduct mandated inspections and structural integrity evaluations and certify that existing structures meet the regulations of the governing agency.

GAI evaluates dam and reservoir sites by studying hydrologic balance and geotechnical conditions in the area. We assess economic and environmental impacts from facility construction and operation and use advanced computer programs to analyze water quantity and quality, evaluate historical rainfall and streamflow, and determine probable maximum precipitation and runoff. Our subsurface investigations reveal foundation soil and rock characteristics, underlying leakage and aquifer recharge potential, faults, and borrow material.

GAI's dam professionals are a library of knowledge on earth embankment dams, concrete structures, seepage concerns, spillways, Emergency Action Plans (EAPs), inundation studies, and dam foundations in simple, flat-lying strata; complex, fractured and folded strata; and metamorphic rock in cavernous limestone, sandstone, claystone, shale, schist, phyllite, and granite bedrock. Understanding that some sites in karst areas or overlying mines require special treatment, we analyze site-specific seismic risk when designing dams and appurtenances.

The success of a dam project rests on the type of comprehensive quality control testing that GAI provides during construction projects. Using sophisticated testing methods, we evaluate soil, rock, and concrete construction materials on-site while monitoring construction; and design and monitor installation of sophisticated instrumentation systems to evaluate post-construction performance. Our piezometer installations reach depths over 400 feet, establish survey control, and record movement.

GAI's dam structure stability analyses evaluate the behavior of earth, rockfill, and coal waste embankment slopes under varying conditions. Our inspections cover hydrologic, hydraulic, and stability assessments, structural evaluations, geologic reviews, and operation and maintenance program evaluation. GAI is diligent in providing inspection, design, and training services that promote safe operation of the dams, levees, and residual waste impoundments vital to our nation's economy.

### Dam Engineering Services

- Structural and hydraulic analysis and design
- Geotechnical and foundation investigations
- Site, economic, and hydraulic feasibility studies
- Hydraulic and embankment analysis and design
- Spillway hydraulic design and remediation
- Seismic analysis, stability, and seepage analysis
- Spillway and outlet works design
- Instrumentation design, installation, and monitoring
- Maintenance and operation plans
- Failure/flood inundation analysis and mapping
- Emergency warning/action plans
- Inspection and safety training
- Construction monitoring
- Inspection and materials testing



## Geotechnical Engineering Services

GAI's achievements in helping manage the materials and geologic processes that affect their facilities, properties, and project sites, has been exceptional. Since 1958, our geotechnical engineers and geologists are highly experienced in the basic principles of engineering geology, soil and rock mechanics, foundation engineering, subsidence, and mine studies.

GAI has amassed formidable experience in full-scale load testing of foundations, calibrating analytical models, and developing computer programs for designing foundations. Our engineers analyze earth slope stability and retaining wall systems and design solutions for buildings, highways, and deep excavation projects. The uneven rise of expanding subgrades can damage structures built where this danger was not anticipated. GAI investigates these types of movements, determines their causes, and designs repairs that stabilize the structure or eliminates the problem.

Thorough site explorations detect geologic and environmental hazards that can disrupt site or project development. Our geotechnical expertise in site design includes addressing areas subject to expansive materials, sinkholes, and subsidence such as those underlain by karst and underground coal and limestone mines. GAI also has extensive site design experience in areas of potential seismic activity and those with liquefaction potential.

GAI has certified geotechnical, geological, soil science, geoarchaeology, geomorphology, and pedology professionals with years of academic training, research, and field experience. GAI's depth of experience and knowledge in geotechnical engineering, geology, and soil and rock mechanics, represents a viable and valuable solution for unforeseen foundation issues.



### Geotechnical Engineering Services

- Subsurface studies and investigations
- Subsidence studies and remediation
- In-Situ testing
- Slope stability analysis and slope design
- Soil and rock anchor design and testing
- Seepage analysis and filter design
- Pile static and dynamic load testing
- Earth and rock retaining system design
- Foundation recommendations, design, research
- Site characterization, soil sampling, and testing

### Flood Protection Services

- Flood protection and flood damage surveys
- Field reconnaissance
- Potential flood control measure identification
- Hydrologic and hydraulic analyses
- Dredging and sediment removal design
- Rip-rap sizing for erosion protection
- Spillway improvements design
- HEC-HMS/HEC-RAS computer modeling



## Surveying

The survey teams at GAI are a dedicated and experienced group of skilled professionals that provide services ranging from boundary and topographic surveys to specialized surveys for archaeology projects. Our surveys cover any discipline in any market including transportation, development, energy, and industry.

GAI field survey crews, working closely with in-house mapping specialists, have access to an extensive library of computerized mapping software including Terramodel, Arc-Info, GRASS, Microstation and AutoCAD.



**Design Surveys**—Design surveys are the foundation upon which designs are based. GAI records boundary line locations, topography, physical features, onsite buildings and utilities, encroachments, and easements. Quality foundation design plans are produced from these details.

**Topographic Surveys**—GAI uses the latest technology in field equipment, recorders, and computer mapping for accurate topographic surveys that incorporate ground run, aerial, tree, utility location, wetland, floodplain and hydrographic surveying and mapping for CADD.

**Construction Surveys**—Conducted onsite during the initial preparation stage of construction, these surveys provide information critical to establishing location and elevation. GAI saves clients and contractors thousands of dollars in potentially damaging lost time and litigation liability by providing this key information accurately and early.

**Boundary Surveys**—GAI's boundary surveys identify land titles and ownership, and document real estate financing, appraisals and sales, insurance, as-built delineations, encroachment delineation, boundary line disputes, subdivisions, rezoning and variances.

**Control Surveys**—GAI's control surveys establish a series of grid lines and points that pinpoint physical features. The data is used to establish horizontal and vertical control points and independent triangulation measurements to develop reliable control grids.

**Hydrographic Surveys**—Supporting stormwater management and wetland mitigation, these surveys require trained staff, special equipment, and extensive experience. GAI conducts hydrographic surveys for bridges and on wetlands, lakes, rivers, and shorelines.

GAI uses global positioning systems (GPS) for horizontal and vertical control surveys. With GPS technology our surveyors can reference global datum, re-create control points. We conduct utility location surveys, document archaeological/historical data, and support eminent domain work. Combining GPS technology with conventional survey saves time and money. Organized for quick response, GAI's comprehensive surveying services cost effectively meet the needs of public and private landowners, developers, and government agencies.

## Surveying Services

- Floodway and dam surveys
- FEMA flood elevation certificates
- Embankment failure surveys
- Structural monitoring surveys
- Construction layout
- Erosion and Sedimentation Control Drawings
- Borings and piling layout
- Topographic surveys
- Property surveys
- Hydrographic/Bathymetric surveys
- Wetland boundary delineating surveys
- Existing conditions surveys (as-built)
- Post-Construction Stormwater Management Plans
- Forensic surveys



## Project Understanding and Proposed Project Management Plan

### Project Understanding

Pierce Lake is an essential part of the storm water management system at Camp Dawson and is also used to support elements of the required training for the National Guard. Lake Pierce Dam is showing signs of seepage along the downstream slope which may cause potential issues with regard to stability and piping of the embankment. In addition, the control structure for the dam needs to be evaluated for issues.

### Project Goals and Objectives

GAI understands that the WVARNG is trying to meet the following goals and objectives for the Project:

- **Goal/Objective 1:** The primary objective of the project is to evaluate the dam structure with regard to the seepage through the embankment. This evaluation will include survey, subsurface investigation, laboratory testing and analyses. The results of this study will be utilized to develop remediation alternatives for the seepage. These alternatives may include collection of the seepage in an inverted filter to control the the seepage to installing a cutoff wall through the embankment to minimize the seepage. Each of these methods have advantages and disadvantages to compare for selection of the remediation alternative. Once the alternative is selected, design and construction documents will be developed.
- **Goal/Objective 2:** In addition, to the seepage issues through the embankment, the condition of the control structure for the lake will be evaluated both structurally and hydraulically. Any improvements recommended will be provided to the State. If requested, the modifications of the control structure will be included in the construction documents.
- **Goal/Objective 3:** The location of existing utilities, both above ground and underground, is important to the design and construction of the facility. An investigation into the location of the utilities will be performed. The location of the existing and proposed utilities will be included on the construction documents.
- **Goal/Objective 4:** All geotechnical work will be performed for the investigation and design for the remediation. These activities will include, but not limited to, subsurface drilling, monitoring of drilling and site reconnaissance, laboratory testing, analyses and design of the project. All of the results of the geotechnical engineering services will be provided in a report signed and sealed by a West Virginia Professional Engineer.
- **Goal/Objective 5:** Construction documents will be developed for the selected remediation alternative. These documents will include drawings, technical specifications, quality assurance/control documents and engineer's opinion of probable construction cost. In addition, permit applications for the proposed remediation will be prepared and submitted to the appropriate regulatory agency. Submittals will be provided at 35%, 65%, 95% and 100% of the progress for review and discussion.
- **Goal/Objective 6:** Services will be provided to the State through the bidding of the project. These services will include preparing the bid documents, attending a pre-bid meeting, and evaluation of the bids.

### Proposed Project Management Plan

GAI's Proposed Project Management Plan and Project Approach is based upon the WVARNG's EOI, dated April 27, 2020, Solicitation No. CEOI ADJ20\*10, which GAI is using as the basis of our Statement of Qualifications. GAI will perform this Project pursuant to our Project Management System, which is based upon the Project Management Institute's (PMI's) Project Management Body of Knowledge. GAI project managers are trained in PMI principles and use project management tools available to them to initiate, plan, execute, monitor and control, and close out projects. Below is GAI's approach to this important Project for the WVARNG.

GAI's extensive staff of qualified and specialized in-house engineers and technical personnel, enables a quick response and provides flexibility and expertise for complex multi-disciplinary projects. Our staffing approach to working with the WVARNG is to assign a small team with total responsibility for completing the Project to WVARNG's satisfaction and budget.



## Project Team Coordination and Scheduling

### Project Initiation

Upon receipt of the Contract from WVARNG, GAI's Project Manager, Charles Straley, will assign a Task Manager to visit the site, plan the investigation, and respond with a task implementation plan and cost estimate to perform the required work. When the task contract is awarded, the required personnel will be mobilized.

At that point, GAI's Project Manager, Task Manager, and Key Personnel will either meet or teleconference with the WVARNG Project Manager to kick off the Project and establish investigation and design criteria. We will then collect background data from published sources, WVARNG, and knowledgeable individuals. A site reconnaissance will be conducted as part of the data collection process.

GAI will perform the associated field investigations, including sampling and testing. Using the results of the field investigation, GAI will evaluate potential solutions and make recommendations in terms of anticipated construction and operating cost, effectiveness, constructability, maintenance requirements, public acceptability, and ability to be permitted. Once an approach is agreed upon, GAI will proceed systematically through the preliminary and final design processes, will prepare permit applications, and will provide construction support.

### Project Communication

GAI's Project Manager will be the Prime Point-of-Contact with WVARNG. GAI's Project Task Manager will oversee the day-to-day work activities, review technical products and reports, and be responsible for the Project budget and schedule. During Project execution, and particularly as the Project nears completion, meetings with WVARNG will be scheduled to discuss alternatives and discuss past experiences in similar situations.

GAI will participate in routine (typically weekly) conference calls with WVARNG, as required. GAI's Project Manager can lead the calls if requested by WVARNG. GAI will provide a conference call phone number to support the conference calls, typically via Skype. During the calls, GAI will update WVARNG regarding the status of the Project details and deliverables, and any proposed engineering changes that could result in changes to the schedule timelines. GAI will discuss implications of design changes with WVARNG's team to develop strategy adjustments, as necessary.

### Scheduling and Resource Allocation

GAI is well aware of demanding schedules in order to meet permit deadlines and to keep Projects on track for ultimate construction. To coordinate, forecast, and manage the Project schedule, GAI proposes to utilize Microsoft Project or Primavera scheduling and resource allocation software to track Project milestones. The proposed schedule is our initial estimate, which can be adjusted to meet WVARNG expectations. GAI will work with WVARNG to develop the initial baseline schedule, including setting milestone dates, at the initiation of the Project. Weekly Project updates will be provided to WVARNG throughout the life of the Project.

## Program Management Tasks:

### Coordination and Meetings with Regulatory Agencies

GAI will coordinate the dates of meetings with the attendees, invite the participants, and prepare an agenda for distribution to attendees ahead of the meeting. At the meeting, GAI will facilitate the meeting, note the names and contact information of the attendees, and keep notes. After the meeting, GAI will document meeting with written minutes to capture important decisions and direction, action items, open and unresolved items, and identify the potential next meeting date. Minutes will be distributed to all attendees, the project file, and WVARNG within five business days of the meeting. If there are corrections to the minutes, they will be incorporated, and the corrected minutes redistributed.

### Meetings with Summary Presentations to the WVARNG Staff

Similar to above, GAI will schedule, coordinate, and provide an agenda for the meetings. GAI will document the meeting in minutes which will be the official record of the meeting. Minutes will be distributed within five business days of the meeting. Summary presentation slides presented at the meeting will be attached to the meeting minutes for reference.



## Emergency Preparedness

The absence of Project staff associated with this Contract due to illness is a contingency which requires pre-planning and consideration for the potential impact on operations. The information provided in this section provides details regarding how this will be accomplished in light of the requirements of this Contract.

GAI relies on the staff assigned to each Project to be knowledgeable about the Project tasks and activities at a level of detail that enables the Project to be completed as designed. When a key member of the Project Team is unable to perform their tasks due to illness, a potential gap occurs that may impact the ability of the remaining members of the Team to complete the work on time and within the necessary level of technical expertise.

## Health and Safety Plans

Before initiating any field work, all GAI projects require that a site-specific Health and Safety Plan (HASP) be developed by the Project Manager in conjunction with critical Team Members (i.e., Task Managers, Field Supervisors). All HASPs require review and approval by a member of GAI's Health and Safety Department and must be reviewed and signed off by all members of the Project Team prior to the start of field work.

## Employee Training

All of the components of GAI's Health and Safety Program require initial and ongoing training. The organization's onboarding program includes a specific health and safety component, provided to all new staff at the time of hire. This includes important information regarding emergency response for a comprehensive set of scenarios. Revision of any Health and Safety Program or procedure includes a notification process to all affected staff, posting on the company intranet, and training, as needed, by job function. All HASPs address any Project-specific training needs and a plan for provisions to Project staff, as needed. The GAI Health and Safety Department maintains all records related to health and safety training, as dictated by the GAI Records Retention matrix.

## Staffing Issues due to Illness

GAI has over 500 engineering and support staff spread out over nine offices in WV and PA. The depth of this staffing pattern provides the ability to rapidly ramp up and deploy additional Project staff where needed, to assure that the Project tasks can continue with limited interruptions. Staffing depth is available for technical Project staff and support staff in the Project Controls, Accounting, and Business Support functions of the organization.



## Key Project Personnel

The GAI Team has extensive experience in dam and geotechnical engineering projects. This section presents our key staff biographies and their areas of experience, specialization, and responsibilities for this Project. Our experience encompasses evaluation and rehabilitation of existing dams, levees, and associated structures, geotechnical investigations, construction design, permitting, bidding, specification, and construction documents. Many of our key staff have over 20 years of experience in related projects. Additionally, we have the ability to pull from over 500 engineering and technical personnel from our WV and Western PA offices for this Project. A Project Organizational Chart and Key Personnel Resumes are provided in **Appendix A**.

### **Charles F. Straley, PE, PLS – Project Manager and Lead Surveyor**

Mr. Straley will be GAI's Project Manager. He is a registered Professional Engineer (PE) and Professional Land Surveyor (PLS) in WV with over 30 years of experience specializing in geotechnical engineering, including all aspects of subsurface exploration; laboratory testing; foundation and embankment design; slope stability; material and construction specifications; and construction administration, management, and monitoring. In the role of Project Manager, he will serve WVARNG's interest by coordinating and managing all fiscal and personnel aspects of the Project. He will also serve as the Lead Surveyor. He has managed numerous geotechnical investigations and construction support services for impoundment dams and foundation projects located in WV and other states. Additionally, he has performed dam inspections for numerous dams throughout WV, PA, IN, and KY. He was the Project Manager for the WVDEP's Ned's Branch Impoundment Dam Project, which was awarded the National Award for Most Outstanding Abandoned Mine Lands Reclamation Project. Mr. Straley has a working relationship with WVDEP's Dam Safety Section. Mr. Straley received his MS in Geotechnical Engineering, and BS in Civil Engineering, from the University of Akron.



### **Kenneth W. Kinder, PE, CFM – Construction Administration**

Mr. Kinder will provide Construction Administration and Civil Engineering Support for this Project. He is a registered Professional Engineer in WV and is a Certified Floodplain Manager (CFM) with over 15 years of engineering experience. Mr. Kinder specializes in construction oversight and management, site inspections, landfill inspections, levee and dam inspections, hydrology and hydraulics, hydraulic modeling and floodplain permitting, stormwater design, erosion and sedimentation control, and general civil engineering. He has completed inspections and provided civil engineering services for numerous impoundment dams located in WV and VA. Mr. Kinder recently prepared permit modification applications for the altering and/or decommissioning of five impoundment dams in VA. He also has experience with construction administration and construction management. Mr. Kinder received his BS in Civil Engineering from West Virginia University Institute of Technology.



### **Bruce L. Roth, PE – Project Advisor**

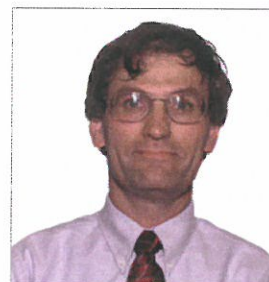
Mr. Roth will be the Project Advisor for this Project. He has more than 30 years of engineering experience and is a registered PE in WV. He specializes in foundation analysis and design, rock and soil mechanics, slope stability analysis and design, subsurface exploration and investigation, geophysical investigations, and geosynthetic engineering and design. He has worked on numerous dam and water-related projects providing Project Management and Geotechnical Engineering services for various dams including Bradford Dams Nos. 2 and 3; Colver Dam; H.B. Norton Dam; and the Warren Ohi Dam. Mr. Roth recently performed the tower inspection for the Colver Dam. Mr. Roth was also the Lead Geotechnical Engineer for a confidential fly ash dam project located in Winfield, WV (dam monitoring and emergency action plan update); and numerous annual inspections for dams located in WV. Additionally, Mr. Roth has experience providing geotechnical engineering for structure foundations, and has investigated and was responsible for the foundation stabilization and reparation for numerous projects located in WV and PA. He received his MS in Civil and Environmental Engineering from Cornell University and his BS in Geological Engineering from the University of Arizona.





**Kerry Frech, PE – Civil Engineering Lead**

Mr. Frech will be GAI's Lead Civil Engineer for this Project. He is a registered Professional Engineer in WV with over 35 years of experience specializing in applying hydrologic and hydraulic principles to the development of water and land-related resources. His project experience ranges from planning and feasibility-level studies to design and the preparation of construction documents. His hydrologic and hydraulic modeling experience includes HEC-RAS, HEC-HMS, HEC 1, HEC 2, DAMBRK, PSRM, SCS TR 20, and TR 55, RIVER2, WSPRO, and the Water Resources Council's Bulletin 17B. He has also provided civil engineering services for numerous impoundment dams for confidential energy clients located in WV. Mr. Frech received his MEng in Environmental Engineering and his BS in Civil Engineering from Cornell University.

**Jason Gandee – Lead Civil Site Engineer**

Mr. Gandee specializes in civil engineering design for GAI's Energy Business Unit. Project responsibilities include civil site design, hydrologic and hydraulic design, grading plans, roadway layout, and stormwater management plans. He develops engineering calculations, prepares project drawings, generates contract documents and specifications, and completes engineering reports. He also has experience with construction oversight and construction management, and site inspections. Mr. Gandee has experience preparing West Virginia Department of Transportation, Division of Highways (WVDOT) MM-109 occupancy permits; and construction stormwater National Pollutant Discharge Elimination System (NPDES) permits and supporting documents. He has prepared Spill Prevention, Control, and Countermeasure (SPCC) Plans, and is knowledgeable of current erosion and sediment control materials and requirements. Additionally, he has performed floodplain studies using HEC-RAS to estimate the changes of the floodplain due to construction; projects include site development adjacent to streams, bridge construction, and culvert installation.

**Samuel G. Mazzella, PE –Geotechnical and Foundation Engineer**

Mr. Mazzella will be the Geotechnical and Foundation Engineer for this Project. He is a registered PE in PA with over 35 years of experience, specializing in dam design and inspections, foundation engineering, subsurface exploration and investigations, slope stability analysis and design, retaining wall systems design, construction monitoring, and soil sampling and testing. His experience includes providing 124 dam inspections, including annual dam inspections for numerous dams in WV. He also provided inspection, stability analysis, and engineering cost estimates for repair options for the City of Thomas Dam, located in Tucker County, WV. Additionally, he received his certification in Landslide Recognition and Investigation by the ASCE. Mr. Mazzella received his BS in Civil Engineering from the University of Pittsburgh.

**Joseph States, MS, PE – Lead Structural Engineer**

Mr. States specializes in structural engineering and design of steel and concrete structures, including reinforced concrete slabs, beams, columns, walls, foundations, and retaining walls as well as steel framing and connections. His experience covers dam and parking garage rehabilitation, transmission line maintenance, concrete structure inspection, concrete foundation design, and steel structure analysis and design. He is proficient in MathCAD, AutoCAD, and RISA and has worked with Microstation, PLS-CADD, STAAD Pro, and GT Strudl.



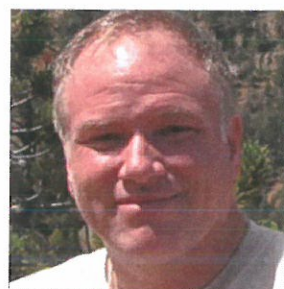


**Richard M. Ruffolo, PG – Lead Geologist**

Mr. Ruffolo will be GAI's Lead Geologist for this Project. He is a registered Professional Geologist in PA, Kentucky, and North Carolina, with over 15 years of experience specializing in site characterization, subsurface investigations for foundations, landslides, and analysis of slope stability, foundation designs, and geotechnical report writing. Mr. Ruffolo has experience in rock strength studies, drilling, and micropile installation monitoring, foundation construction monitoring, and monitoring core logging. He has worked on numerous impoundment dams for confidential energy clients in WV. He has also provided geological engineering services for the Warren Ohi Dam, located in Clinton County, PA; Tamarack Lake Dam A and B in Crawford County; Bradford Dam No. 2 in McKean County; Colver Dam in Cambria County; and Indian Lake Dam in Somerset County. Mr. Ruffolo received his MS in Geology from Kent State University, and his BS in Environmental Geology from the University of Pittsburgh.

**Kevin Bortz, MS, PE – Lead Hydraulic Engineering**

Mr. Bortz specializes in hydrology and hydraulics, natural stream restoration, erosion and sedimentation (E&S) control, and stormwater management, as well as general civil engineering and surveying. He is a registered Professional Engineer in PA and provides hydrologic and hydraulic design and analysis for dams, natural stream restorations, culverts, channels, ponds, stream encroachments, and impoundments in WV, PA, MD, OH, IN, and VA. His experience includes being the project engineer responsible for complete hydrologic and hydraulic design, analysis, and report preparation as part of a successful dam permit application process for expansion of a site sediment pond located in Shinnston, WV. He also provided impoundment dam conceptual design for the Leetown Science Center, located in Kearneysville, WV. Mr. Bortz received his MS and BS in Civil Engineering from the University of Pittsburgh.

**Terry Queen – Lead Construction Technician**

Mr. Queen specializes in construction monitoring for impoundment, site closure, infrastructure, and municipal projects. He provides drafting for site planning, earthwork detailing, and pre-mining and pre-blast surveys. Mr. Queen develops preliminary and final designs for mine reclamation sites and mining permits, and site development, and prepares construction drawings for highway and bridge projects. He compiles engineering data from a variety of sources; processes data using well-defined methods and presents data in prescribed formats. Mr. Queen recently monitored drilling activities, daily boring logs, concrete core, and rock core sampling for a dam located in Gauley Bridge, WV for a Confidential Client. He also provided Construction Monitoring for the Tomlinson Run State Park Dam, located in Hancock County, WV. Mr. Queen received his AA in Drafting and Design from West Virginia Institute of Technology.





## Relevant Project Experience

GAI works on various projects for numerous energy clients, and many of our projects are confidential in nature; therefore, we have reflected this confidentiality in our project descriptions by not giving out project names, locations, and confidential client information. If deemed essential, GAI may be able to discuss with our respective clients with whom there are confidentiality obligations and request written permission to make further disclosure.

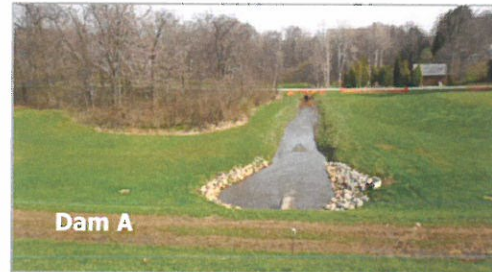
### Dam and Water-Related Engineering Projects

Since 1958, GAI has been providing dam and water-related engineering services. We are experienced with the condition assessment, repair design, and new design for structures that are related to dams. We have worked with numerous owners and agencies to provide the necessary modifications and repairs to bring dams into compliance with Dam Safety Requirements.

#### Tamarack Lake Dam A and Dam B

*Crawford County, PA*

Tamarack Lake is a 1,000-acre flood control lake located near Meadville, PA. There are two high hazard dams associated with this lake. GAI worked with the PA Department of General Services and the PA Fish and Boat Commission to redesign the dams, concrete risers, outfall structures, auxiliary spillways, diversion dam, and saddle dike. Additionally, GAI is completely replacing both of the cast-in-place concrete towers. A significant geotechnical investigation was completed by GAI in 2014, involving a drilling program, lab testing, ground penetrating radar, in-situ testing, stability analyses and settlement calculations. GAI also completed a hydrologic and hydraulic study of the two dams utilizing HEC-RAS and HEC-HMS for a five-square mile drainage area. Multiple permit applications have been submitted, including Pennsylvania Department of Environmental Protection (PaDEP) Dam Safety, National Pollutant Discharge Elimination System, United States Army Corps of Engineers, and township stormwater management.



**Project Status:** Ongoing

#### Work Tasks:

- Engineering Design of Spillway Riser and Pedestrian Bridge
- Geotechnical Investigation
- Laboratory Testing
- Subsurface Investigation
- Drilling Program
- Ground Penetrating Radar
- In-Situ Testing
- Hydrologic and Hydraulic Study
- Land Surveying
- Permitting and Agency Correspondence
- Final Design Plans and Specifications

**Client Contact:** Mr. Bryan Anthony  
 Pennsylvania Department of General Services  
 Bureau of Engineering and Architecture  
 717.787.5616  
 branthony@pa.gov



## Bradford Dam No. 2 Rehabilitation

*McKean County, PA*

GAI was contracted by the Bradford City Water Authority to develop alternatives for achieving compliance and design rehabilitation measures; prepare permit applications; prepare bid and construction documents; and monitor and certify construction for Bradford Dam No. 2. Bradford Dam No. 2 is used as a water supply impoundment by the City of Bradford, PA. The dam's spillway was considered to be inadequate for a Probable Maximum Flood (PMF) event.

GAI conducted a subsurface investigation for the dam, consisting of soil borings, piezometer installation, and Cone Penetrometer and Dilatometer Testing. Selected soil samples were submitted for laboratory analysis. Engineering analyses consisted of stability runs, seepage models, settlement analysis, and bearing capacity. A geotechnical report was prepared which consisted of background information, site descriptions, findings, and recommendations. The report presented the results of engineering and geologic studies conducted by GAI to evaluate the stability of the existing Dam No. 2 and design rehabilitation measures to upgrade the dam to current standards.

The rehabilitation for the dam included the renovation of the dam outfall tower, the pedestrian bridge, and installing roller compacted concrete overtopping protection to provide for dam stability under a PMF event. The energy dissipater for the spillway was extended to achieve compliance with its 100-year design flow, and water supply pipes from the reservoir were slip-lined to prevent leakage. Mitigation wetlands were installed at the downstream toe of the dam, and a public access road was constructed to allow access for fishing.

**Project Status:** Ongoing

### Work Tasks:

- Engineering Design and Renovations of Dam Outfall Tower, Pedestrian Bridge, and Emergency Spillway
- Geotechnical Investigation and Reporting
- Cone Penetrometer and Dilatometer Testing
- Subsurface Investigation
- Laboratory Testing
- Hydrologic and Hydraulic Study
- Land Surveying
- Permitting and Agency Correspondence
- Final Design Plans and Specifications

**Client Contact:** Mr. Kim Benjamin  
Executive Director  
Bradford Water Authority  
814.362.3004  
kim@bradfordwater.com





**Little Blue Run**  
*Beaver County, PA*

Within the last 10 years, GAI has prepared a complete PaDEP Dam Safety Permit Application for Little Blue Run Dam due to changes in its operation procedures. Additional tasks within the 10-year time frame include monthly instrumentation readings, inundation analyses for a hypothetical breach of the Saddle Dam, installation of additional instrumentation on the Saddle Dam, geotechnical assessments of slides in the abutment areas, design and construction consultation for discharge channel repairs, and updating the Emergency Action Plan.

**Project Status:** N/A

**Work Tasks:**

- PaDEP Dam Safety Permit Application
- H&H analyses for Little Blue Run Dam under a PMF event
- Saddle Dam Embankment Stability Analyses
- Inundation Analyses for the Saddle Dam
- Instrumentation Design
- Revisions to the Emergency Action Plan and associated maps
- Geotechnical assessments
- Construction consultation
- Monthly instrumentation readings

**Client Contract:** Confidential



### **Confidential Dam Wave Erosion Protection Design** *Pleasants County, WV*

GAI provided design drawings and specifications for the riprap slope protection at a Confidential Impoundment. Erosion issues were observed on the upstream embankment on the embankment dam at a Confidential Power Station in Pleasants County, WV. **The WVDEP, Division of Dam Safety, recommended the embankment be armored for protection against wave action to help prevent further erosion issues.**

In April 2005, a Draft Slope Protection Alternatives Analysis Report was prepared by GAI. The alternatives provided in this draft report included Riprap Stone; Fabric-form Concrete; Articulating Concrete Block; Permanent Turf Reinforcement Mat; and Geosynthetic Cellular Confinement System. GAI's Client selected Riprap Stone as the preferred method of slope protection for the embankment. GAI reviewed the results of the 2005 Draft Slope Protection Alternative Analysis and provided drawings and specifications for the materials required for the Riprap Slope Protection. Design was based on the assumptions in the Draft Report that the erosion protection is sized for waves resulting from 30 mph winds.

GAI has been providing support to this Confidential Impoundment Dam since 1981, performing Annual Dam Inspections, Surveys, Geotechnical Engineering, Piezometer Replacement, Slope Stability Analysis, Construction Quality Assurance Monitoring, Impoundment Closure, and Landfill Expansion Design

**Project Status:** Completed 2015

#### **Work Tasks:**

- Reviewed Draft Report
- Prepared Impoundment Erosion Drawing and Specifications
- Miscellaneous Fossil Engineering Services

**Client Contract:** Confidential





## Ned's Branch Impoundment Dam

Mingo County, WV

Ned's Branch Impoundment is an approximate five-acre abandoned coal refuse slurry dam near Gilbert, WV, that failed due to heavy rains. The failure sent approximately one million cubic yards of slurry, coal refuse, and debris into the Right Fork of Ned's Branch. The displaced material blocked main Ned's Branch and Ned's Branch Road, stranding numerous families in a nearby hollow. Divided into two phases, the project encompassed removing the debris to clear the roadway and Ned's Branch, and reconstructing the slurry embankment. Work on both phases followed a 24-hour, seven-day week work schedule.

**GAI met with the WVDEP two days after the event to discuss a Work Directive from the Department, issued under their Emergency Guidelines. Within a month, GAI completed the challenging task of developing engineering plans, drawings, and specifications for emergency stabilization of the embankment.** The plans addressed excavating and regading the refuse to establish stable slopes, locating mine portals on the site, and demolishing any remaining structures and foundations. GAI also provided periodic construction monitoring and the project was successfully completed within eight months.

**Awards:** This Project was awarded the National Award for Most Outstanding Abandoned Mine Lands Reclamation.

**Value Added Innovations:** GAI completed the investigation and planning process for the second phase of the project while the first phase of the project was underway. GAI embraced the urgency requested by the WVDEP, providing salutations that reestablished the integrity of the impoundment and restored the natural beauty of the site under an accelerated work schedule.

**Project Status:** Completed 2003

**Key GAI Staff:** Charles F. Straley, PE, PLS, Project Manager

### Work Tasks:

- Reclamation Plan for Impoundment Stabilization
- Survey and Topographic Mapping
- Site Reconnaissance
- Subsurface Investigation Plan
- Slope Stability Analysis
- Stream Relocation Design
- County Road Design
- Construction Monitoring and Testing

**Client Contact:** Mr. Michael Richardson  
Office of Surface Mine Reclamation and Enforcement, Charleston  
*formerly of WVDEP, Division of Land Restoration*  
1027 Virginia Street, East  
Charleston, WV 25301  
Phone: 304.747.7162, ext. 3010





## Confidential Dam Impoundment Design and Inspection

*Pleasants County, WV*

The project is a slurry impoundment with a downstream dry landfill disposal area. The slurry impoundment consists of a 215-foot high zoned earth and ash embankment dam that creates a lake for slurry disposal of Coal Combustion Residuals (CCRs). The embankment (dam) was progressively built over many years to increase storage to its ultimate design capacity. GAI monitored dam construction and permitted, designed, and monitored construction of an emergency spillway and the immediately adjacent downstream CCR landfill. The disposal area provides long-term storage for CCR from the adjacent Power Station.



**Development of the site required significant geotechnical investigations and design modifications due to site geology and the presence of weak, landslide-prone soils. GAI incorporated design features that provide adequate slope stability, including increasing soil strength with augercast grout columns using cement, fly ash, sand, and gravel.** GAI continues to perform annual dam inspections and provide reports, and has designed the slurry pipelines, a temperature blending station, the treatment ponds, and a submerged river discharge diffuser. Disposal area construction began in 1981 and is ongoing.

GAI provided professional geologist and geotechnical engineers who addressed critical site features that threatened the stability of the impoundment. GAI's Quality Assurance/Quality Control (QA/QC) activities during construction documented that the liners were installed properly, resulting in a stable facility that has had minimal impact on the local environment.

**Project Status:** Ongoing

### **Work Tasks:**

- Groundwater Studies
- Geotechnical Evaluations
- Laboratory Testing and Stability Evaluations
- QA/QC Documentation
- Emergency Action Plan Preparation
- Construction Monitoring
- Annual Inspections
- Liner and Leachate System Design
- Slurry Pipeline Design
- Treatment Pond Design

**Client Contract:** Confidential



### **Confidential Dam Inspections, Emergency Action Plans, and Construction Support Services**

*Harrison County, WV*

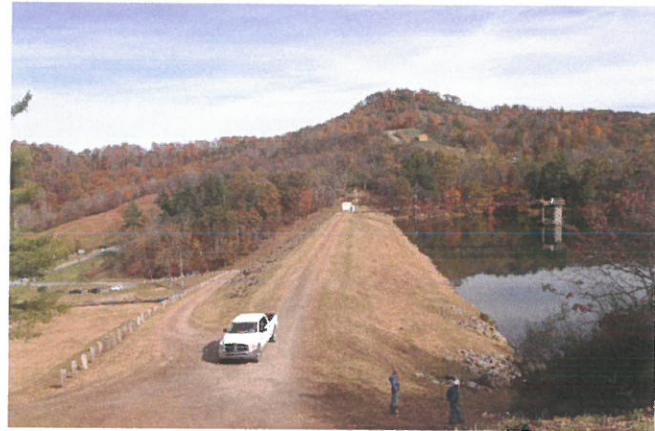
GAI has performed numerous engineering and construction support services for two Embankment Dams located in Harrison County, WV for a Confidential Client. GAI has been working at this Confidential Power Station since 1990 and has performed annual dam inspections since 1996.

**Project Status:** Ongoing

#### **Work Tasks:**

- Annual inspections, including assessing conditions of dams and ancillary facilities; identifying current or potential areas requiring maintenance; review and report piezometer readings; inspect principal spillway pipe; evaluate the survey monitoring data; and provide annual inspection reports for each dam
- Emergency spillway evaluation
- Design and permitting for construction of a pond qualifying as a dam under the WV Dam Safety Regulations, including studies and preparation of an Emergency Action Plan
- Preparation of construction documents, including an Erosion and Sedimentation Control Plan
- Construction monitoring

**Client Contract:** Confidential



### **Confidential Dam Stability Evaluation**

*Fayette County, WV*

GAI is performing a stability evaluation of this Confidential Dam, located in Fayette County, WV. As part of the analysis, a subsurface exploration and testing program is required to define the depth, extent, dip, condition, and strength of the various rock layers within the foundation. GAI is also provided surveying of the horizontal and vertical locations of the two original reference points that established the axis of the dam and is surveying previously established monitoring points within the surge basin and spillway. GAI also performed field surveys with construction activity, foundation exploration, drilling, and instrumenting.

**Project Status:** Ongoing

#### **Work Tasks:**

- Subsurface Exploration
- Foundation Exploration
- Testing Program
- Drilling
- Instrumenting
- Survey

**Client Contract:** Confidential

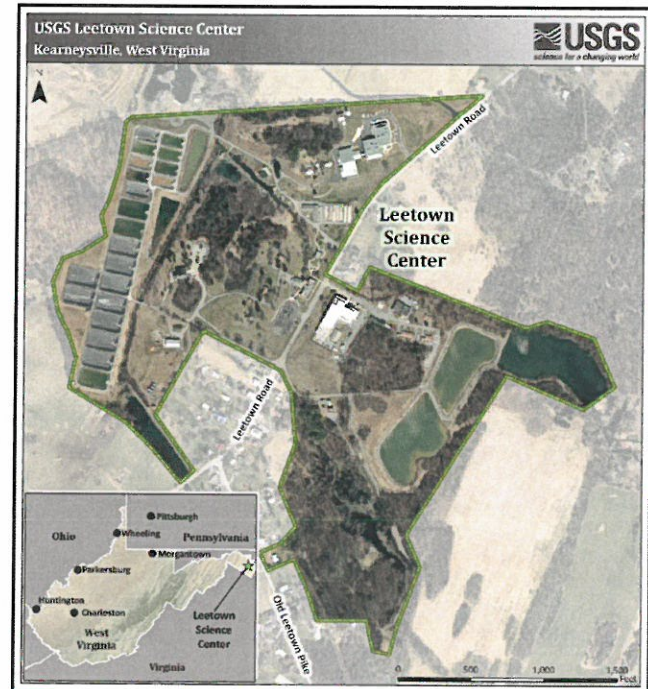


## USGS Leetown Science Center Impoundment Conceptual Design

*Jefferson County, WV*

The Leetown Science Center is a fishery/biological research facility owned and operated by the United States Geological Survey (USGS) and located in Kearneysville, Jefferson County, WV. GAI provided Engineering and Environmental services for a Conceptual Design for Impoundment Construction to Enhance Spring Flow at the facility.

Cold-water fishery research is performed at the facility, and the cold water is supplied to the facility through collection of ground water into infiltration galleries. The cold-water collection system was designed and built to convey the historical cold-water demand of the facility, but the recent construction of a United States Department of Agriculture (USDA) facility upgradient of the Leetown site, and accompanying use of portions of the collected ground water by the USDA facility, has potentially exceeded the ability of the collected ground water to meet all demands.



In the past few years, two beaver dams were established at the Leetown facility. When the beaver dams were present, the Leetown facility reported that ground water levels and associated flow rates were higher than during the periods prior to the presence of the beaver dams. A corresponding reduction in ground water levels and flows was observed after the beaver dams were no longer in service. An evaluation of the hydrogeologic features of the site led the USGS to conclude that the presence of the pools behind the beaver dams acted to inundate naturally occurring seep locations, preventing the surface discharge of ground water, and enabling more efficient capture of the ground water in the infiltration galleries.

The Leetown Science Center was interested in increasing the amount of ground water available for use at the facility. The preferred method selected to increase the water supply was to recreate the hydrogeologic effect of the beaver dams through controlled design and construction of low-level impoundments. Such design would meet state and federal regulations for impoundments, would address inundation of critical areas of the facility, and would account for any off-site flooding. GAI prepared a report to present various alternative methods considered to increase water supply, and conceptual-level design and cost estimate for impoundments replicating the two beaver dams. Two structural alternatives, an earthen embankment and a sheet pile levee, were evaluated for each location. GAI provided conceptual design plans and cost estimates for final design and construction.

GAI also prepared an Environmental Assessment (EA), in compliance with the National Environmental Policy Act, to address the projected impacts from the proposed construction of an impoundment. The EA described the proposed action, the purpose and need for the proposed action, and reasonable alternatives to accomplish the project.

**Project Status:** Completed 2010

### Work Tasks:

- Conceptual Design Report, including: Conceptual Solutions and Design Alternatives, Design Requirements, Permitting Requirements, Structural Alternatives, Cost Estimates, and Hydraulic Calculations
- Environmental Assessment

**Client Contact:** Mr. Alfred E. Benton  
Contract Specialist, Eastern Region Office  
USGS  
abenton@usgs.gov



## Warren Ohi Dam

Clinton County, PA

GAI was contracted by our Client in 1995 to evaluate a sinkhole that was found along the outside of the east wall of the dam's emergency spillway. GAI evaluated the sinkhole based on site observations and the historical data for the dam and concluded that concentrated seepage along the base of the spillway, originating from the rock below and from cracks in the spillway floor, had eroded soil from below the base of the concrete spillway.

GAI prepared a design in 1996 for removal of the base of the spillway and installation of a filtered underdrain to collect and safely discharge seepage from the soil or rock subgrade below the spillway. Although total seepage flows did not increase, significant concentrated flows from springs encountered in the newly exposed rock during the repairs in 1997 required increased drainage capacity to be included in the construction. The concrete base slab of the spillway was then replaced. Water began to flow over the repaired spillway on January 11, 1998, and the completed repair of the spillway performed satisfactorily. The City recorded flow rates from the various discharge pipes around the spillway. The flow rates initially were fairly constant, however, the flow from the 15-inch diameter pipe and corrugated plastic drain later increased through the summer of 1998 to peaks in September. During this same period, the pool level was dropping. On October 2, 1998, leakage was reported to be existing the base of the repaired spillway along joints near the lower end. Thus, there was an apparent anomaly because the rates of flow from the 15-inch pipe and corrugated pipe were increasing when the pool level was dropping. By November 1998, the leakage through the joints in the slab ceased and the flows from the 15-inch pipe and the corrugated pipe returned to the lower flow rates. A similar pattern of behavior occurred in subsequent years.

After the spillway was repaired, the PaDEP requested that the City make plans for a grouting program to reduce the seepage below the dam. GAI conducted an exploration to obtain data to design the grouting program in October 2000. GAI prepared preliminary plans and specifications for the grouting in August 2002, and the plans were reviewed by the PaDEP. In January 2004, the updated plans were submitted for final review by the PaDEP. The grouting plans were approved with minor modification in February 2004. The grouting program was then inactive while the City was pursuing loans to perform the grouting.

Once the grouting program was finally in place, the entire process took about six months, and was completed by March 2008. The total cost was \$3.4 Million, with 2,100,000 lineal feet of drilling and 54,000 cubic feet of grout place. Final restoration of the site was completed in the summer of 2008. The normal pool level of the dam had been restored, and the seepage at the toe of the dam had been reduced substantially from the pre-grouting condition. The grouting program was successful in significantly reducing the seepage through the rock below the dam and that the stability of the embankment had been improved significantly, and that the risk of piping failure due to erosion from seepage had been reduced.

**Project Status:** Completed 2009

**Client Contact:** Jason Dershem  
City Engineer  
City of Lock Haven  
570.893.5904  
jasond@kcnet.org





## Colver Dam and Reservoir Design and Inspection

*Cambria County, PA*

Colver Dam and Reservoir are operated by the Cambria Township Water Authority, located in West-Central PA. The Colver Reservoir provides drinking water to the township, as well as cooling water to a nearby 110MW Co-Generation Power Plant.

The dam is a 51-foot high, 102-foot long earth embankment with 3H:1V upstream and 2.5H:1V downstream slopes. GAI designed the dam and appurtenances, performing all geotechnical, structural, hydrologic, and hydraulic design; prepared associated permit application documents; prepared the EAP; provided Construction Management services; monitored construction, and in the years following construction, has performed annual inspections of the facility, including the 2017 dam inspection.

The dam embankment is partially underlain by abandoned underground coal mine workings, for which the possibility of future trough subsidence could not be ruled out. A geosynthetic membrane was incorporated into the embankment to limit the potential for piping in the event of mine subsidence. The "new" dam incorporates a spillway with reinforced concrete overflow weir with an abutting reinforced concrete cantilevered retaining wall, a reinforced concrete chute and baffle blocks, a reinforced concrete intake with sluice gates and electrical operators, and a reinforced concrete box culvert low level outlet.

**Project Status:** Ongoing

### Work Tasks:

- Annual Dam Inspections
- Geotechnical Engineering
- Hydrologic and Hydraulic Investigations
- Dam Engineering Design
- Structural Engineering
- Permitting and Agency Correspondence
- EAP Preparation
- Construction Management Services

**Client Contact:** Mr. Ken Taylor  
Cambria Township Water Authority  
814.533.1358  
ctwa\_77@yahoo.com





## H.B. Norton Dam and Ridgeway Water Treatment Plant Rehabilitation

Elk County, PA

GAI performed a geotechnical exploration for water treatment plant additions in 1987 and discovered unusual artesian waters below the plant and the toe of the adjacent H.B. Norton Dam. Our subsequent geotechnical exploration defined the artesian pressures, installed piezometers in the dam, and analyzed the effects of artesian water pressures on dam stability. GAI recommended and monitored installation of a deep well dewatering system to lower artesian pressures during construction of the treatment plant additions and testing and installation of rock anchors to prevent flotation of empty tanks.

When treatment plant additions were completed in 1993, artesian pressures were low and dam stability met state-required safety factors; however, in 2004, the piezometers indicated that a rise in artesian pressures required mitigation. GAI concluded that installing a compacted buttress fill on the downstream slope of the dam to flatten it from 2H:1V to 3H:1V would achieve a satisfactory safety factor for the range of anticipated artesian pressures. A leak along the back of the concrete emergency spillway was sealed by grouting in 2009. Buttress fill was added to the dam in 2010 to improve facility stability and ease maintenance of the face of the dam.

**Project Status:** Completed 2011

### Work Tasks:

- Geotechnical Exploration
- Drilling/Sampling of Rock and Soil
- Laboratory Testing of Soil for Parameters
- Piezometer Installation, Monitoring, and Evaluation
- Evaluation of Artesian Pressures
- Dewatering and Foundation Design Recommendations
- Rock Anchor Design Recommendations, Monitoring, and Testing
- Deep Well Pump Testing and Dewatering Monitoring
- Seepage and Stability Analyses
- Buttress Design
- Grout Monitoring
- Earthwork Construction Testing and Monitoring

**Client Contact:** Mr. Timothy P. Wells, PE  
Senior Project Engineer  
Hill Engineering, Inc.  
814.725.8659  
twells@heingr.com





## Indian Lake Dam Assessment and Remediation

*Somerset County, PA*

GAI was retained by Indian Lake Borough to assess the condition of Indian Lake Dam and to develop subsurface and soil testing investigations. The acquired information and technical data were used to rehabilitate and update the 45 year old facility. Maintenance work included a new Outlet Works pipe; a downstream embankment buttress to control seepage and improve overall stability; and an enlarged emergency spillway discharge capacity to comply with new regulatory standards. GAI also conducted annual dam inspections required by the PaDEP.

**Project Status:** Completed 2009

### Work Tasks:

- Bi-Annual Dam Embankment Inspection
- Technical Specifications for Remediation
- Construction Monitoring Services
- Remediation of Outlet Works Control Pipe
- Remediation of Downstream Dam Embankment Buttress
- Remediation of Embankment Inverted Filter
- Remediation of Labyrinth Emergency Spillway
- Installation of Piezometers, Slope Indicators, and Weirs for Monitoring

**Client Contact:** Ms. Theresa L. Weyant  
Borough Manager  
Indian Lake Borough  
814.754.8161  
Theresa@indianlakepa.us





## Cross Creek Dam Sluice Gate Replacement

*Washington County, PA*

GAI provided a site visit and assessment, engineering design, and bid and construction period services for the sluice gate repair at Cross Creek Dam for the Washington County Planning Commission. The Dam is an approximately 80-foot tall earth embankment dam that was constructed in 1977 under the Watershed Protection and Flood Prevention Act. A reservoir drainpipe at the base of the dam controls flow through the dam. The main reservoir drain consists of a 24 inch inside diameter precast concrete pipe, a reinforced concrete junction box with a 70-foot tall riser, and a 42 inch inside diameter precast concrete pipe, downstream of the riser. A 24-inch square cast-iron sluice gate is located on the upstream side of the junction box and controls flow from the 24-inch upstream drainpipe. The 3.5 foot by 10.5 foot (inside dimensions) reinforced concrete riser on the upstream side of the dam, serves as a high-water level drain. The sluice gate is operated manually and the valve stem extends up through the top of the concrete riser.

GAI observed and documented the condition of the dam and concrete riser; reviewed existing structural drawings and developed sluice gate repair drawings and specifications; provided bid specifications and drawings; and provided bid and construction period services.

**Project Status:** Completed 2016

### Work Tasks:

- Site Visit and Assessment
- Documented and Photographed Dam and Concrete Riser
- Verified As-Built Drawings
- Reviewed Structural Drawings
- Developed Sluice Gate Repair Drawings and Specifications
- Agency Correspondence
- Created Bid Drawings and Specifications
- Reviewed Contractor Shop Drawings and Submittals
- Observed Construction Progress
- Prepared Punch List Items and Perform Final Site Inspection

**Client Contact:** Ms. Lisa L. Cessna  
Executive Director  
Washington County Planning Commission  
724.228.7337  
CessnaL@co.washington.pa.us





## Health and Safety

GAI believes all employees should go home in the evening just as healthy and safe as they were when they arrived in the morning. GAI is committed to a culture of safety. At GAI, project tasks are completed in accordance with all applicable state and federal regulatory requirements including Occupational Health and Safety (OSHA) standards, client-specific health and safety requirements, and GAI policies and procedures. GAI employees are provided health and safety training as needed, particularly OSHA 10-hour and 30-hour construction awareness and/or SafeLand Training. New employees are introduced to GAI Health and Safety policies during the new employee orientation. GAI also provides OSHA 40-hour HAZWOPER training and the eight-hour HAZWOPER refresher classes as needed.



Completing project tasks safely and without injury is an achievable goal for all involved. As such, GAI field staff begins and ends each day with a safety discussion. Field staff wear proper personal protective equipment, including reflective vests, hard hats, safety glasses, and safety footwear. Field teams are provided a site-specific Health and Safety Plan before performing field activities.

**Bill Gourdie, CSP, CET**, serves as GAI's Director of Health and Safety. As such, he is responsible for ensuring that GAI complies with all applicable health, safety, and environmental regulations; client requirements; and corporate policies and procedures to maintain the safest possible working conditions for all employees. He embodies GAI's commitment to safety by coordinating the development, implementation, and continuous improvement of the company's Safety and Health Program to enhance effectiveness and performance results.

## Product Quality Assurance

GAI understands the importance of providing our clients with on-time, cost-effective, high-quality professional services. The continued success of our firm is directly related to our ability to continue to meet the cost, quality, and schedule requirements of our projects. We achieve this goal through our experienced professional staff and by utilizing our QMS. GAI's QMS is based upon a continuously improving project delivery strategy that reflects our client's needs and utilizes current technology. The Project Delivery System provides the quality assurance and quality control functions from project inception through project closeout. The Project Delivery System incorporates processes and procedures that describe how professional services are planned, executed, checked, verified, and delivered to our clients. The system is flexible so that it allows GAI to meet the needs of individual clients.

GAI is structured so that personnel whose function includes activities affecting quality have the necessary authority and organization freedom to control quality and especially to do the following: 1) initiate action to prevent occurrence of any nonconformance relating to service, process, and/or QMS; 2) Identify and record any service, process, and/or QMS problems; 3) Initiate, recommend, or provide solutions to those problems; 4) Verify the implementation of those solutions; and 5) Limit or control further processing or delivery of nonconforming services or deliverables until nonconforming conditions have been resolved; and implement corrective action to eliminate the causes of quality problems.

GAI's QMS verifies that activities which affect the quality of services are performed in a controlled manner and are documented to provide evidence of conformance to specified requirements. The Scope of the QMS includes project management, engineering, consulting, analysis, design, testing, construction monitoring, inspection, and purchasing.

**Mr. Bradley F. Cellier, PE**, is GAI's Director of Quality. He specializes in QMS maintenance and development and has over 25 years of experience in engineering and quality assurance. He is responsible for overseeing the corporate-wide QMS and Quality Assurance (QA) Programs, including the ongoing implementation, success, development, and verification of compliance with the QMS initiative and GAI's QA Program.



## Project Schedule and Cost Control

Before the start of each new project, GAI's the Project Manager must fill out a Project Plan, which includes a Project Description, Scope, Client Team, GAI Team, Contract History, Proposal/Supplement History, a detailed Scope of Work from the GAI Proposal, which details each task, and a Project Schedule with Milestone Dates.

GAI uses Primavera P6 for critical method scheduling and Deltek Vision 7.6 for Cost Reporting. These programs track deliverables and costing and keep the project on time and on budget. Scope and budget must be agreed to prior to the task budget entry in Deltek. The Task Budget creation is the end result of the development and distribution of final scope, fee, budget, and schedule with the Project Team. The Task Budget establishes the base line to monitor and measure project progress and financial performance. Task Budget creation includes: Obtaining external scope, budget, schedule, and fee commitments; and distribution of labor, subconsultant/subcontractor fees, and direct expenses for the purposes of establishing baseline or supplemental task budgets using the Deltek Project Planning Module. The baseline schedule is then updated on a periodic basis, typically weekly or monthly, depending on the pace of the project.

GAI runs a weekly cost report to monitor the actual spend rates compared to the planned spend rates, specifically focusing on man-hours and large purchases. GAI tracks milestones against the project schedule and any variance is noted and discussed with the Client Project Manager. GAI also tracks "Estimate at Completion" and "Estimate to Completion" for projects. GAI implements a change control process that monitors scope and initiates client contact if out-of-scope items are identified or if scope creep begins to occur.





## Supplemental Information

### WVARNG Signed Forms

Pursuant to the EOI, GAI has provided the following signed forms, attached and incorporated as part of this submission, as **Appendix B**:

- EOI Cover Page
- Designated Contact
- State of West Virginia Purchasing Affidavit

### Certificate of Authorization

GAI's Certificate of Authorization to perform Professional Engineering services in the State of West Virginia, is provided in **Appendix C**.

GAI's license number is C00208-00.

### Supplemental Services

GAI is a full-service consulting engineering company. In addition to the services we are proposing to provide for the base scope of work, GAI has extensive dam safety, geotechnical, hydrology and hydraulics, structural, civil, and environmental capabilities and experience. In addition, GAI has mechanical and electrical engineering staff that can address issues that arise during construction.

## Closing

We look forward to working with the WVARNG on this important Project. Should you have any questions or require additional information regarding our Proposal, please feel free to contact Mr. Charles F. Straley at 681.245.8866, or via email at C.Straley@gaiconsultants.com.

Sincerely,

**GAI Consultants, Inc.**

Charles F. Straley

Digitally signed by Charles F. Straley  
DN: E=c.straley@gaiconsultants.com,  
CN=Charles F. Straley  
Date: 2020.05.13 15:48:40-04'00'

Charles F. Straley, MS, PE, PLS  
Senior Engineering Manager

Bruce L. Roth

Digitally signed by Bruce L. Roth  
DN: E=b.roth@gaiconsultants.com,  
CN=Bruce L. Roth  
Date: 2020.05.13 15:42:15-04'00'

Bruce L. Roth, MS, PE  
Engineering Director

CFS:BLR/bfh

Attachments: Appendix A (Project Organizational Chart and Key Personnel Resumes)  
Appendix B (WVARNG Signed Forms)  
Appendix C (Certificate of Authorization)

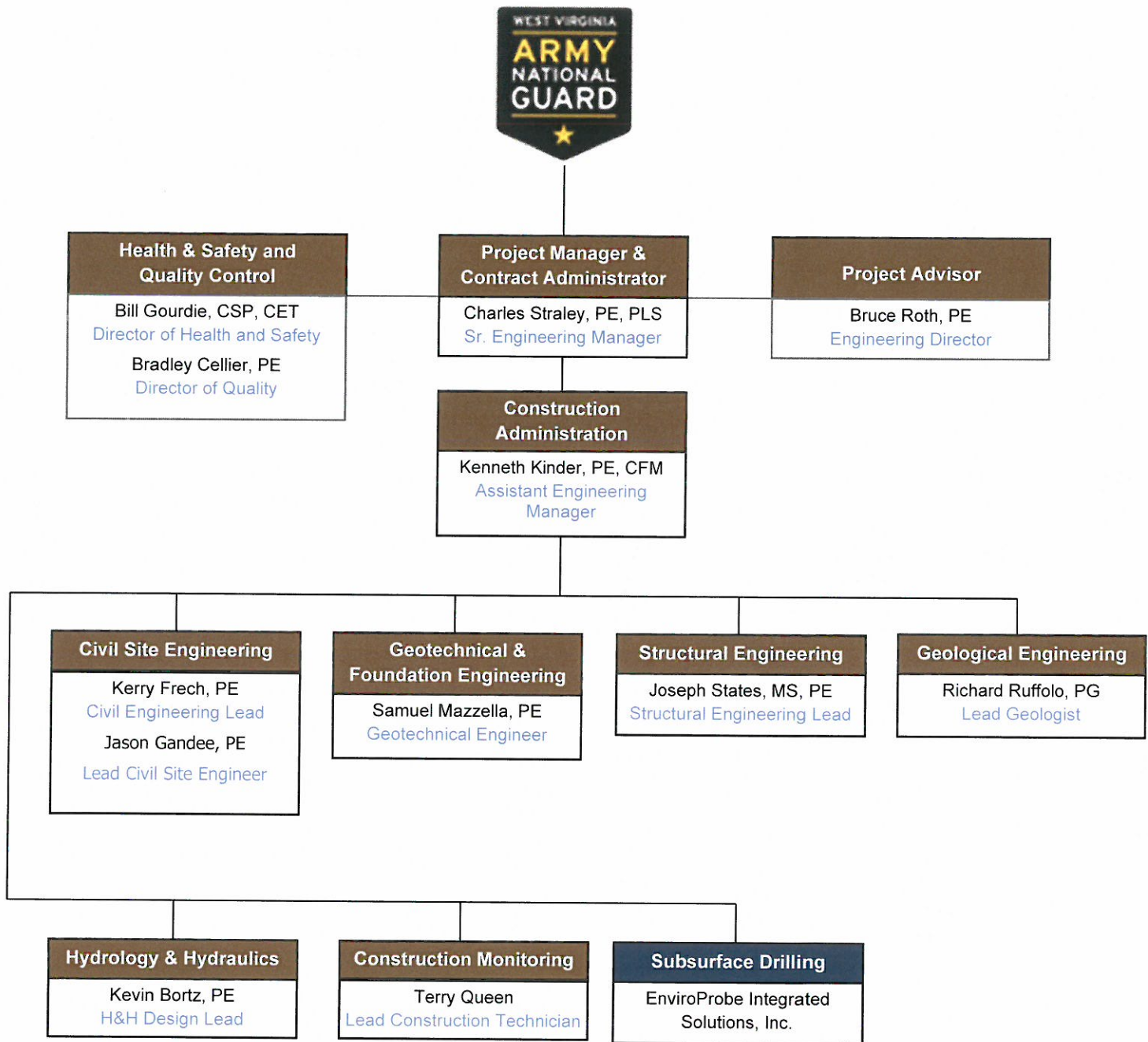


## **APPENDIX A**

### **Project Organizational Chart & Key Personnel Resumes**



## PROJECT ORGANIZATIONAL CHART







## Charles Straley, MS, PE, PLS

Senior Engineering Manager

### Education

MS, Geotechnical Engineering, 1988,  
University of Akron

BS, Civil Engineering, 1986, University of  
Akron

### Registrations

Professional Engineer (PE): KY, IN, OH,  
WV

Professional Licensed Surveyor (PLS):  
WV [REDACTED]

### Skills

Subsurface Exploration

Foundation & Embankment Design

Slope Stability & Landslide Engineering

Landfill Planning & Design

Water Feasibility Studies

Acid Mine Drainage

### Certifications / Training

Leaders to Watch, GAI Consultants, Inc.,  
2011

Advanced Project Management Training,  
GAI Consultants, Inc., 2009

Troxler Certified

40-hour Health and Safety Training

8-hour Supervisor Health and Safety  
Training

### Industry Experience

GAI Consultants, Inc., 1988-Present

University of Akron, Private Consulting and  
Testing, 1986-1987

R&W Contracting and Excavating, Inc.,  
Summers, 1982-1984

### Professional Summary

Mr. Straley specializes in civil engineering with an emphasis in geotechnical engineering, including all aspects of subsurface exploration, laboratory testing, foundation and embankment design, slope stability, material and construction specifications, and construction administration, management and monitoring.

### Select Professional Experience

- Performed periodic dam inspection and certification for three earthen dams at Blackwater Falls and Cacapon State Parks in WV for the West Virginia Department of Natural Resources (WVDNR), Parks and Recreation.
- Project Manager for the design, construction monitoring, and construction administration for two lake dredging projects for the WVDNR at Tomlinson Run State Park and Kanawha State Forest. Activities included subsurface investigation, regulatory approvals, construction drawings, technical specifications, construction troubleshooting, cost estimating, daily reports, and client interaction.
- Ned's Branch Impoundment Dam, Office of Surface Mine Reclamation and Enforcement (WVDEP), Mingo County, WV. Project Manager. Design of and preparation of construction documents for a 600,000 cubic yard failed coal slurry impoundment dam as an emergency reclamation project. Activities included site grading, subsurface investigation, hydraulics and hydrology analysis, road re-design, mine seals, preparation of drawings and technical specifications, engineering cost estimate and pre-bid meeting presentation.
- Assisted with the preparation of construction documents for an earthen dam for the Lake Chaweva Homeowners Association in Charleston, WV. Project included evaluation of existing drainage structures, stormwater routing analysis, design of earth embankment, and design of a principle and emergency spillway.
- Lead Inspector and Certifying Engineer. This confidential large, slurry impoundment consists of a 215-foot high zoned earth and ash embankment (dam) that creates a lake for slurry disposal of Coal Combustion Residuals (CCRs), located in Century, WV. The dam was progressively built over many years to increase storage to its ultimate design capacity. GAI monitored dam construction and permitted, designed, and monitored construction of an emergency spillway. Development required geotechnical investigations and design modifications due to site geology and the presence of weak, landslide-prone soils.

- Inspected, evaluated and designed repair alternatives for Spruce Island and Sand Run Dams in Tucker County, WV for Timberline Association. Design included evaluation and improvement of slope stability for both earthen embankments, improvements to inlet and outlet works, and the geometry of the spillways. Permit applications for both dams were prepared. Performed the construction administration and certification of the completed repairs.
- Project engineer for the modification of a slurry impoundment to a coal coarse refuse pile located in WV. Project consisted of an abandonment of a dam and extending the life of the pile in accordance with WV Surface Mining Regulations.
- Lake Milton Dam Rehabilitation and Safety Restoration, located in Jackson County, Ohio (OH) for the Ohio Department of Natural Resources (ODNR), Division of Mineral Resource Management. Project Manager responsible for professional engineering services to investigate and design the Lake Milton Reclamation Project, located within the Flint Run Tributary of Little Raccoon Creek Watershed. The project included two large water impoundments, known as Lake Milton and Upper Lake Milton, with the watershed area covering approximately 155 acres. Lake Milton covers 16.7 acres and holds 72 million gallons of water.
- Middleton Run Reclamation Project, located in Jackson County, OH, for the ODNR, Division of Mineral Resource Management. Project Manager responsible for geotechnical engineering and development of remediation measures for the Middleton Run Reclamation Project, an abandoned mine site in Ohio. The 80 acre site was the largest major acid mine drainage contributor degrading the Raccoon Creek Watershed, and contained four acidic strip-pit lakes, an abandoned deep mine, and large areas of toxic mine spoil and mine tailings.
- Confidential Dam Safety Inspections located in Ohio, Indiana, and Kentucky. Lead Geotechnical Engineer performing dam safety inspections and evaluations for compliance with CCR Rules of Impoundment Structures at eight power generations located in Ohio, Kentucky, and Indiana.
- Performed annual dam inspection and certification for a 15-foot high earthen dam in Monroeville, PA for Belmont Ridge Development.
- Performed inspection of galleys of the concrete Lake Lynn Dam in Lake Lynn, PA.
- Evaluated, inspected, and designed the rehabilitation for a concrete hydroelectric dam in Luray, VA. Rehabilitation included the replacement for a fish ladder.
- Confidential Impoundment CCR Inspection, located in Pleasants County, WV. Lead Inspector and Certifying Engineer performing for the annual Impoundment CCR landfill inspections.
- Confidential Generating Station, CCR Surface Impoundment Closures Project. Lead Geotechnical Engineer to obtain subsurface information relative to the design of the CCR surface impoundment closures project. This project included doing Cone Penetrometer Testing (CPT) testing off of a barge, to determine soil properties and site stratigraphy.
- Assisted with a Confidential Slurry Impoundment in Mingo County, WV. Design included grading channels, culverts, and roads.
- Assisted in reevaluated a plug and dike design to optimize construction by minimizing the number, length, and cross-sectional area without compromising structural integrity or limiting storage capacity for a Confidential Client.
- Godby Branch Water Supply Extension Project in Logan County, WV. Managed geotechnical investigation and foundation design for water supply structures. Project included subsurface investigation; surveying; design of water tank, booster station, and approximately 2.5 miles of water line; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Bid construction cost was approximately \$680,000.
- Project Manager for the South Ruffner Phase I Drainage Project for the City of Charleston, WV. Evaluated storm water flows and identified problem areas. Contract plans and related documents were prepared to upgrade a portion of the drainage area.





## Kenneth Kinder, PE, CFM

Engineering Manager

### Education

BS, Civil Engineering, 2003, West Virginia University Institute of Technology

### Registrations

Professional Engineer (PE): WV [REDACTED]

Certified Floodplain Manager (CFM)

### Skills

Civil Engineering

CCR Landfill and Impoundment Design

Hydraulic Design and Floodplain Management

Construction Management

### Certifications / Training

Troxler Nuclear Density Operator, 2001

MSHA 8-Hour Safety Refresher, 2011

HAZWOPER 40-Hour Safety Training, 2012

HEC-RAS Course, National Highway Institute

### Industry Experience

GAI Consultants, Inc., 2014-Present

Potesta & Associates, Inc., 2000-2014

Eagle Surveying, Inc., 1996-2000

### Professional Summary

Mr. Kinder specializes in civil engineering design for civil engineering projects including civil site design, erosion and sediment control, stormwater management, hydraulic modeling, floodplain permitting, coal permitting, limestone quarry permitting, and solid waste landfill design.

Mr. Kinder ensures accuracy of work, meets schedule requirements, and maintains excellent client relationships. He develops engineering calculations, prepares project drawings, generates contract documents and specifications, and completes engineering reports. He also has experience with construction oversight and construction management, site inspections, landfill inspections, and levee and dam inspections.

His software skills include AutoCAD, Flowmaster, Culvertmaster, StormCad, PondPack, SedCad, Win TR-55, HEC-HMS, and HEC-RAS.

### Select Professional Experience

- City of Petersburg Lunice Creek Levee, Grant County, West Virginia (WV). Project Engineer. Performed services to assist the community with applying to Federal Emergency Management Agency (FEMA) for accreditation of a 4,500 linear feet levee system. The levee system provided flood protection several dozen homes. Tasks included an in-depth inspection of the current levee system to evaluate stability, evidence of erosion and scour, settlement, vegetation, available freeboard, seepage, and interior drainage design.
- Annual Confidential Coal Combustion Residual (CCR) Landfill and Dam Inspections located in WV. Performed annual CCR inspections for three CCR landfills and one CCR impoundment in WV to verify compliance with state and federal regulations.
- Staff Engineer responsible for performing construction oversight and construction management for a Confidential Resource Conservation and Recovery Act 120-acre environmental remediation site. Responsibilities included managing a team of Construction Quality Assurance (CQA)/Construction Quality Control (CQC) observers, tracking construction pay quantities and reviewing monthly invoices, ensuring construction is being performed according to the plans and specs and enforcing implementation of a site specific health and safety plan.

- Engineer responsible for preparing civil site design on numerous projects. Tasks included: preparing erosion and sediment control plans, designing utility systems, site layouts and grading plans, and designing surface drainage including storm sewer systems and stormwater detention and retention ponds. Prepared permit applications for the WV Department of Environmental Protection construction stormwater permits, WV Department of Transportation, Division of Highway MM-109 permits, and floodplain development permits as required.
- Staff Engineer responsible for preparing design and construction documents for municipal solid waste and industrial waste (coal combustion byproduct) landfill cells and caps. Work included developing stormwater control plans, design of leachate collection systems, design of liner systems for leachate collection and leak detection systems. Work also included preparing construction drawings, technical specifications, and an engineer's estimate of probable construction cost.
- Confidential CCR Landfill Design and Permitting, located in WV. Project Engineer. Assisted with the preparation of the design, permitting and construction documents for a 94-acre expansion of a Class F Industrial CCR Landfill Facility. The project included two additional sedimentation ponds and the expansion of a force main leachate pumping station. Design tasks included preparation of permitting documents, preparation of construction drawings for two separate phases of landfill construction, and preparing construction certifications for preparation of subgrade and placement of geosynthetics.
- CCR Surface Impoundment Closures, Confidential Client, Virginia (VA). Assistant Project Manager. Responsible for providing permitting and construction engineering support for the closure of multiple CCR Surface Impoundments. The ponds covered a combined area of more than 100 acres and are being closed by removing the CCR in most of the ponds and consolidating it into a single CCR Surface Impoundment. Developed Closure Plans, Post-Closure Care Plans, Groundwater Monitoring Plans, Construction Drawings, Technical Specifications and CQA Plans for the VA Solid Waste and CCR Rule permitting of the project. Prepared a dam alteration permit application that was approved by the VA Department of Conservation and Recreation to permit the modification of the dams that form the five surface impoundments. The dam alteration permits include design plans, technical specifications, geotechnical and hydrologic and hydraulic calculations required for the closure.
- Bottom Ash Settling Ponds Retrofit, Confidential Client, PA. Assistant Project Manager. Completed conceptual engineering, design and permitting for the power station to replace their existing bottom ash settling ponds for CCR Rule compliance. The ponds consist of three CCR surface impoundments that are approximately one-acre each. The design approach involved sequencing the construction to allow for two ponds to be functional at all times for plant operation. The design includes a PA Department of Environmental Protection (PaDEP) compliant Class 1 liner system and concrete protective cover system designed to facilitate future cleaning operations. The design included new leak detection manholes, new outlet structure with overflow weir troughs, new inlet flow splitter box, and new stainless steel piping to sluice bottom ash from the station's hydrobins. Completed a Water Quality Management Permit Modification that was approved by the PaDEP to modify the ponds. Completed construction drawings and bid documents for construction.
- Staff Engineer responsible for geotechnical work including developing boring layouts, coordinating geotechnical drilling, and using the gathered information to develop grading plans, design rock toe keys as needed for impoundments and valley fills, develop slope stability analyses, and to assist with foundation design for buildings, bridge abutments and retaining walls. Assisted with preparation of geotechnical reports, development of structural contour mapping, and preparation of subsidence control plans for underground mining.
- Staff Engineer responsible for hydraulic analyses and permit application preparation for developments proposed within the FEMA regulatory floodplain. Work included coordinating with community floodplain managers, preparation of HEC-RAS hydraulic analyses, adjusting proposed grading plans or bridge layouts as required to maintain compliance with the National Flood Insurance Program. Prepared elevation certificates and FEMA Letters of Map Amendments





## Bruce Roth, MS, PE

Engineering Director

### Education

MS, Civil and Environmental Engineering,  
1991, Cornell University

BS, Geological Engineering, 1985,  
University of Arizona

### Registrations

Professional Engineer (PE): WV [REDACTED]  
PA [REDACTED], NC [REDACTED]  
VA [REDACTED], MD [REDACTED]

### Skills

Foundation Analysis and Design

Rock and Soil Mechanics

Slope Stability Analysis and Design

Subsurface Exploration and Investigation

Geophysical Investigations

Geosynthetic Engineering and Design

### Certifications / Training

Leaders to Watch Program, GAI  
Consultants, Inc., 2009

Advanced Project Management Training,  
GAI Consultants, Inc., 2009

High Performance Management Training,  
GAI Consultants, Inc., 2008

ASFE Fundamentals of Professional  
Practice, 2001

Troxler Moisture-Density Gauge Operation

Commonwealth of PA Drilling Inspector  
Level 2

### Industry Experience

GAI Consultants, Inc., 1990-Present

Cornell University, 1988-1990

Western Technologies, Inc., 1985-1988

### Professional Summary

Mr. Roth has over 30 years of geotechnical experience, specializing in foundation and slope stability analysis and design, rock and soil mechanics, subsurface exploration, geophysical investigation techniques, and geosynthetics. He provides geotechnical engineering services for dam and building foundations, coal combustion residuals (CCR) facilities, electrical and gas transmission lines, and the geotechnical aspects of transportation projects. His geotechnical engineering experience for clients in both the public and private sectors includes 20 years of project management experience. He has prepared and presented papers on the Mt. Washington landslide in Pittsburgh, Pennsylvania (PA), a transmission line foundation design project in an environmentally sensitive area, and on foundations for a transmission line crossing at Albermarle Sound in North Carolina (NC).

Mr. Roth specializes in earthquake induced permanent ground deformations and the effects on lifeline facilities. His research work at Cornell University included evaluating earthquake induced ground failure from soil liquefaction and surface faulting, and assessing buried lifeline response to large soil deformation. Mr. Roth studied case histories of the 1971 San Fernando and 1979 Imperial Valley earthquakes. He participated in post-earthquake site investigations in San Francisco and the epicentral area after the 1989 Loma Prieta earthquake.

### Select Professional Experience

- Confidential Power Station Impoundment Dam Project, Pleasants County, WV. Disposal site design project for a 250-high sludge disposal impoundment (dam) at the power station. Geotechnical engineer responsible for design and stability analysis for the spillway, including comparing costs between removing and relocating landslide soils and excavating a large rock cut.
- Bradford Dam No. 2 Rehabilitation Project, located in McKean County, Pennsylvania (PA) for the Bradford Water Authority. Project Director. Responsible for the subsurface investigation for the dam, consisting of soil borings, piezometers installation, and Cone Penetrometer and Dilatometer Testing. Selected soil samples were submitted for laboratory analysis. Engineering analyses consisted of stability runs, seepage models, settlement analysis, and bearing capacity. A geotechnical report consisting of background, site descriptions, findings, and recommendations was prepared.

- Bradford Dam No. 3 (Marilla Dam), located in McKean County, PA, for the Bradford Water Authority. Project Director. On the basis of geotechnical, structural, hydrologic and hydraulic evaluations, GAI designed rehabilitation measures that satisfied dam safety standards of the Commonwealth of Pennsylvania. These included an earth buttress with chimney and blanket drains to satisfy embankment stability requirements, and a roller compacted concrete cap and downstream face to provide overtopping protection.
- Tamarack Lake Dam A and Dam B in Crawford County, PA, for the PA Department of General Services (PADGS), Bureau of Engineering and Architecture. Served as the Director of Engineering to the GAI project team. GAI is working with the PADGS and PA Fish and Boat Commission to redesign two high-hazard dams associated with Tamarack Lake, a 1,000-acre flood control lake located near Meadville, PA. In 2014, GAI completed a significant geotechnical investigation that involved a drilling program, lab testing, ground penetrating radar, in-situ testing, stability analyses, and settlement calculations. A hydrologic and hydraulic study of the two dams utilizing HEC-RAS and HEC-HMS for a five-square-mile drainage area was also completed. Multiple permits have been submitted, including PA Department of Environmental Protection (PaDEP) Dam Safety, National Pollutant Discharge Elimination System, USACE, and township stormwater management.
- West Newton Coal Logistics Refuse Embankment Stabilization Project, PaDEP, Westmoreland County, PA. GAI conducted subsurface exploration, including soil drilling and in-situ testing, laboratory testing program, and geotechnical engineering analyses. Embankments included three ponds. Stabilization of the embankments included regrading the embankment slopes; and fill placement over the pond areas. The engineering analyses for the proposed stabilization of the embankments included (a) evaluation of field and laboratory data to estimate soil design properties; (b) slope stability and seepage analyses of the regraded 3H:1V (18.5 degrees from the horizontal) embankment face slope; (c) settlement analyses of pond materials under proposed fill placement; (d) geosynthetic design analyses to enable fill placement upon pond material; (e) wick drain design for the drainage of pore water from the pond material to promote the consolidation and increase in shear strength of the pond material.
- Brookville Water Works Dam in Jefferson County, PA for Brookville Municipal Authority. Dam rehabilitation to repair damages incurred by flood-induced overtopping of the dam. Geotechnical engineer.
- Colver Dam in Cambria County, PA for Inter-Power/AhlCon Partners, LP. Geotechnical and hydrologic investigation projects to design and inspect a 53'-high embankment dam to provide a municipal water supply and cooling water for a cogeneration power plant. Design team senior geotechnical engineer responsible for coordinating laboratory soil tests, stability analysis, settlement calculations, seepage evaluation using finite element analysis, preparing specifications and construction drawings, technical supervision, field observation during the dam construction, and annual dam inspections.
- Warren Ohi Dam in Lock Haven, Clinton County, PA for the City of Lockhaven. Geotechnical engineer for emergency project to repair the 55'-high, 915'-long dam's 600'-long emergency spillway.
- H.B. Norton Dam in Ridgway, Elk County, PA for Hill Engineering, Inc. Stability analyses for a 30'-high earth dam to determine artesian groundwater pressures discovered during geotechnical studies for new water treatment plant facilities below the dam. Geotechnical engineer responsible for evaluating the stability of dam considering the effects of artesian ground water pressures.
- Clark Landfill, Indiana Harbor Works in East Chicago, Indiana for International Steel Group, Indiana Harbor. Landslide repair and closure project to determine the cause of a .5M c.y. landslide in a 130'-high fill slope and to design the repair and closure of the 2M c.y. disposal area for residual wastes. Geotechnical engineer.
- Keystone Station Dam, Two Lick Creek Dam, and Williamsburg Station Dam in PA. Dam inspection project for safety evaluations of the 100'-high earth and rockfill Keystone Station Dam, the 115'-high combination concrete gravity and earth and rockfill Two Lick Creek Dam, and the 27'-high earthfill with concrete gravity spillway Williamsburg Station Dam.





## Kerry Frech, MEng, PE

Civil Technical Leader

### Education

MEng, Environmental Engineering, 1978,  
Cornel University

BS, Civil Engineering, 1977,  
Cornell University

### Registrations

Professional Engineer (PE): PA - 1983,  
[REDACTED] WV [REDACTED]

### Skills

Hydrology and Hydraulics

Stormwater Management

Water Quality Analyses

### Industry Experience

GAI Consultants, 1978-Present

### Professional Summary

Mr. Frech specializes in applying hydrologic and hydraulic principles to the development of water and land related resources. He has prepared numerous state and federal permit applications for public and governmental entities and for private industry. His project experience ranges from planning and feasibility-level studies to design and the preparation of construction documents. His experience with hydrologic and hydraulic modeling includes HEC-RAS, HEC-HMS, HEC 1, HEC 2, DAMBRK, PSRM, SCS TR 20 and TR 55, RIVER2, WSPRO, and the Water Resources Council's Bulletin 17B.

### Select Professional Experience

- Confidential Dam Analysis and Safety Evaluation, located in Monongalia County, West Virginia (WV). Dam analysis project to perform downstream routing procedures using HEC-1 and DAMBRK models. Project engineer responsible for hydrologic and hydraulic analyses and inundation studies performed as part of the Federal Energy Regulatory Commission (FERC) safety evaluations. Preparation of technical analyses and inundation mapping for the emergency action plan. Calibration of hydrologic and hydraulic analyses based on the November 1985 flood.
- Confidential Power Station Dam Assessment Project, located in Moundsville, WV. Assessment of the effects of future normal pool lowering of the river by more than three feet on existing water intake and discharge facilities. Project engineer responsible for preparing an Emergency Action Plan for the 55-foot high, 16.7 acre-foot dam.
- Petersburg Community on the South Branch of the Potomac River in Grant County, Petersburg, WV for the USACE, Baltimore District. Reconnaissance study project requiring engineering analysis for flood protection for local community that incurred \$18M in damages in a 400-year flood event.
- Tamarack Lake Dam A and Dam B in Crawford County, PA for the PA Department of General Services (PA Fish and Boat Commission). Principal Engineer for H&H analyses and design for replacement of Tamarack Lake Dams A and B. Responsibilities included dam safety storm classification, flood analyses, spillway re-designs, design of dam overtopping protection using articulated concrete block, and preparation of design drawings for both dams.

- Moorefield Community on the Potomac River in Moorefield, WV for the United States Army Corps of Engineers (USACE), Baltimore District. Reconnaissance studies at the confluence of the South Branch and the South Fork of the South Branch of the Potomac River for a community that incurred \$23M in damages in a 400-year flood. Project engineer responsible for reconnaissance and feasibility level flood protection studies including field reconnaissance, survey, two-river system HEC 2 modeling, interior drainage, cost estimates, and reports. Development of an economically feasible and implementable flood protection plan.
- Colver Dam in Cambria County, PA for Inter-Power/AhlCon Partners, LP and Cambria Township Water Authority. Hydrologic investigations to modify and design a 53-foot high embankment dam for a municipal water supply and cooling water for a cogeneration power plant. Technical and economic issues indicated replacement would be more effective than enlarging and rehabilitating the existing structure. Project engineer assisting with water yield analyses and H&H designs for proposed water supply reservoir to serve municipal and industrial water supplies for the Water Authority.
- Emergency Action Plans for Confidential Dam Projects, located in PA. Project engineer for preparation of the technical analyses and inundation mapping for the emergency action plan, under FERC criteria.
- Confidential Dam Emergency Action Plan, located in Armstrong County, PA. Project engineer assisting in the preparation of the Emergency Action Plan for the dam. Responsibilities included overview of field reconnaissance and technical analyses, including DAMBRK.
- Confidential Dam Safety Inspections and Analysis, located in Beaver County, PA. Principal Engineer responsible for performing the dam safety annual dam inspection and the technical analyses for the Emergency Action Plan for a 410-foot high coal combustion residual impoundment dam.
- Confidential Reservoir Emergency Action Plan, located in Homer City, PA. Project engineer responsible for preparing the Emergency Action Plan for this 90-foot high 16,200 acre-foot water supply reservoir.
- PA Game Commission. Project engineer for providing design analyses for rehabilitation of several Commission dams.
- Confidential Power Station Reservoir Management Plan Project, located in Pleasants County. Disposal site design for a 250-foot high sludge disposal impoundment (dam) at the power station, including an Emergency Action Plan. Project Engineer responsible for developing a reservoir management plan for the 300-acre residual waste impoundment. The plan included design of a siphon discharge system, and modifications to the principal spillway and to the operation of the emergency spillway. Responsible for emergency action plan technical analyses and inundation studies to satisfy state requirements for a solid waste (wet) disposal facility. Project engineer for landfill expansions, including extension of the reservoir spillway pipe and design of pump station for landfill discharges to the station's treatment plant.
- Pine Creek Flood Area in Etna Borough, Allegheny County, PA for the Allegheny County Department of Economic Development. Flood stage control project along Pine Creek requiring engineering, final design, and construction monitoring services. Included PA Department of Environmental Protection (PaDEP) study review, field reconnaissance, sediment sampling/analysis, environmental assessment, wetlands identification and delineation, endangered species survey, aquatic habitat assessment, survey and mapping, utility coordination with the Borough of Etna, bridge structural assessments, hydraulic analyses, plan formulation and assessment (dredging, levees, channel improvements, debris boom, interior drainage), environmental permitting, plans and specifications.
- Fishing Creek Restoration and Maude Mine Reclamation Project, for the South Fayette Conservation Group and PaDEP, Bureau of Abandoned Mine Reclamation. Project engineer for design and preparation of construction documents for the reclamation of a mining site. The site included several highwalls, a stream channel that discharged to an open mine portal, and abandoned coal processing structures. Restoration included diversion and restoration of stream channels, mine portal sealing, highwall elimination, and general site cleanup, drainage improvements, and restoration. The project was awarded the 2008 Appalachian Region AMR award.





## **Samuel Mazzella, PE**

Technical Manager

### **Education**

BS, Civil Engineering, 1979, University of Pittsburgh

Graduate Studies, Soil Mechanics and Foundation Engineering, University of Pittsburgh

### **Registrations**

Professional Engineer (PE): PA – 1997

### **Skills**

Transition Monopole Foundation Analysis and Design

Subsurface Exploration and Investigations

Slope Stability Analysis and Design

Retaining Wall Systems Design

Soil Characterization and Field Testing

Dam Inspections

### **Certifications / Training**

Identification and Mitigation of Acid Bearing Rock, PennDOT, April 13, 2011

Hazardous Materials Incident Response Operations, April 1, 2010

Analysis and Design of Foundations on and in Rock, ASCE, Oct. 23, 2010

Westinghouse Training, 2008-2009

Landslide Recognition and Investigation, ASCE, 2009

Earth Retaining Structures, NHI Course No. 132036, 2007

### **Industry Experience**

GAI Consultants, Inc., 1984-Present

Ackenheil & Associates Geo Systems, Inc., 1979-1984

### **Professional Summary**

Mr. Mazzella specializes in geotechnical and foundation engineering with emphasis on construction monitoring and applications for transmission line, bridge, highway, and earthwork projects. He joined GAI in 1984 and has gained professional experience through his work on an extensive variety of geotechnical and civil projects. Mr. Mazzella has over 36 years of geotechnical engineering experience including construction monitoring, site explorations, litigation investigations, analysis, and design recommendations for both public and private projects. In the past years, his experience has expanded to include project management of individual projects or task management of the geotechnical portions of larger multi-disciplined projects for GAI.

### **Select Professional Experience**

- Concrete Gravity Dam Inspection for the City of Thomas, in Thomas, West Virginia (WV). Provided inspection, stability analysis with revised flood level estimates, and engineering cost estimate for repair options.
- Warren H. Ohl Dam, Lock Haven, PA. Developed the engineering technical specifications and plans for the foundation grouting of the embankment and spillway areas.
- Confidential Dam Project located in Monongalia, WV. Remediation of an existing 1,000' long, 125' high concrete gravity type, hydroelectric dam to meet FERC guidelines for the Probable Maximum Flood (PMF) Conditions by designing and installing 75 tendon anchors. Engineer field representative responsible for an 18-strand pre-production bond stress test to evaluate the acceptability of the bond stress used to adjust the planned anchor evaluation criteria and for the design of 75 anchors. Numerous cycled load steps were carried out, and the 24-hour load hold periods developed bond stresses ranging from 20 psi to 250 psi. Field representative during the tendon anchor tension testing for the 75 permanent rock anchors installed at the dam. Testing involved performance and proof creep testing and evaluating the anchors (ranging in design load capacity from 556 to 2040 kips; in number of 0.6-inch-diameter, 7-wire steel cable strands, from 16 to 58; in required bond lengths, from 61' to 131'; and in total length from 110' to 300'), an average length of over 200'.

- Bradford Dam No. 2 in McKean County, Pennsylvania (PA) for Bradford Water Authority. Geotechnical and construction consultation during planning phase for developing repair options. Rehabilitation for the dam included installing roller compacted concrete (RCC) overtopping protection to provide for dam stability under a PMF event. The energy dissipater for the spillway was extended to achieve compliance with its 100-year design flow, and water supply pipes from the reservoir were slip-lined to prevent leakage. Engineering analyses consisted of stability runs, seepage models, settlement analysis, and bearing capacity. A geotechnical report consisting of background, site descriptions, findings, and recommendations was prepared.
- Indian Lake Dam in Somerset County, PA for Indian Lake Borough. Evaluated piezometer, inclinometer and current and historic subsurface information in order to perform a stability analysis on the as-constructed embankment profile.
- H.B. Norton Dam, Ridgeway Water Treatment Plant in Elk County, PA. Developed details for the sand blanket drain. GAI performed a geotechnical exploration for water treatment plant additions in 1987, and discovered unusual artesian waters below the plant and the toe of the adjacent H.B. Norton Dam. Our subsequent geotechnical exploration defined the artesian pressures, installed piezometers in the dam, and analyzed the effects of artesian water pressures on dam stability. GAI recommended and monitored installation of a deep well dewatering system to lower artesian pressures during construction of the treatment plant additions, and testing and installation of rock anchors to prevent flotation of empty tanks.
- Webster Lake Dam Rehabilitation Project, located in Kosciusko County, Indiana, for the Indiana Department of Natural Resources. Provided geotechnical and structural engineering design and construction support services for a multiple spillway rehabilitation at the southwest corner of the Dam. Rehabilitation included repairing or replacing the existing deteriorated concrete and replacing six spillway gates and the existing steel catwalk and gate support structure in the east spillway. In the west spillway, the existing deteriorated concrete was repaired or replaced, and the single spillway gate was replaced.
- Colver Dam, for Inter-Power/AhlCon Partners, LP, in Colver, PA. Engineer responsible for stability analysis and design of an emergency spillway retaining wall structure for expansion of the existing earth dam.
- Confidential Dam Project located in Williamsburg, PA. Feasibility study as a part of the evaluation of the power station. Monitored the subsurface investigation for a concrete gravity dam (coring through the dam and in the reservoir), performed a reservoir sounding survey to develop sediment profiles at various cross-sections, performed stability analysis, and prepared a report for the short or long-term feasibility repairs, including the engineer's cost estimates.
- Morewood Point Retaining Wall System, Pittsburgh, PA. Ground surface settlements behind a series of occupied condominium units led to the discovery of a landslide on a steep, 80-foot high downhill slope on the neighboring property only ten feet behind the condos. While local underpinning of the condos was promptly undertaken, a retaining structure was designed for installation within the ten foot wide corridor entirely upon condominium association property, eliminating the need to access the adjacent property or disturb the landslide. Responsible for performing the subsurface investigation, slope stability analysis and in preparing the retaining wall repair concepts, details and cost estimates.
- West Liberty University Retaining Wall, West Liberty, WV. Performed the analysis and design for the drilled pier foundations as a part of a soldier pile and lagging retaining wall system. The retaining wall system was designed to resist the effects of lateral earth pressures from sloping backfill, surcharge loads and a potential layer of residual decomposed coal with low shear strength.
- Fort Steuben Mall located in Steubenville, OH. Construction and renovation activities spanning 15+ years at a shopping mall requiring extensive geotechnical and structural engineering services to repair problems with expansive shale. Engineer providing landslide site reconnaissance and subsurface exploration (SPT and rock coring); slope stability analysis (Simplified Bishop Method) for pre-slide and remediation of slope geometries; developing repair schemes, an engineer's cost estimate, and construction documents; and providing construction monitoring for the repairs.





## Joseph States, PE, MS

Senior Project Engineer

### Education

MS, Structural Engineering, 2011, Lehigh University

BS, Civil and Environmental Engineering, 2009, Carnegie Mellon University

### Registrations

Professional Engineer (PE): PA

### Skills

Structural Engineering Design and Analysis

Foundations Engineering Analysis and Design

Retaining Wall System Design

### Industry Experience

GAI Consultants, Inc., 2011-Present

Paul C. Rizzo Associates, Inc., 2009

Geo-Solutions, 2008

### Professional Summary

Mr. States specializes in structural engineering and design of steel and concrete structures, including reinforced concrete slabs, beams, columns, walls, foundations, and retaining walls as well as steel framing and connections. His experience covers dam and parking garage rehabilitation, transmission line maintenance, concrete structure inspection, concrete foundation design, and steel structure analysis and design. He is proficient in MathCAD, AutoCAD, and RISA and has worked with Microstation, PLS-CADD, STAAD Pro, and GT Strudl.

### Professional Experience

- ELG compliance support at two coal fired generation stations. Engineer responsible for tank evaluation and structural design support relating primarily to tank repairs and foundations. GAI provided the clients with 30% design packages for storage and treatment of the flue gas desulfurization (FGD) wastewater to comply with the National Pollutant Discharge Elimination System permits that became effective in 2018 at the stations. The scope of the project included biological treatment vendor coordination, pump selection, existing tank evaluations, pipeline routing and design, and engineering estimates of probable costs. The 30% design package included process, mechanical, structural, and civil design drawings, preliminary specifications and design basis, and a project permitting matrix.
- Washington County Property Condition Assessment. GAI provided a Property Condition Assessment located in Washington County, PA. The property is comprised of four floors, including the basement. Each floor is approximately 36 feet by 175 feet, for an area of 6,300 square feet per floor, and a total of 25,000 square feet. The building was originally constructed in 1873 and has gone through multiple renovations. GAI reviewed building architectural and structural systems, HVAC and plumbing systems, electrical systems, fire protection and life safety systems, and accessibility and building code information.
- GAI performed design of plaza renovations, including membrane repair for an existing exterior plaza at the corner of Stanwix Street and the Boulevard of the Allies in Downtown Pittsburgh. GAI's scope included the following: a site visit to assess the condition of the underside of the plaza deck; preparing detail and concrete repair drawings for the plaza area; providing design services for the terrazzo paved areas and planters along the sides of the building; preparing construction level drawings for a proposed pavilion/arbor; performing a field survey to document the

existing ventilation system, including fans and ductwork; designing a new ventilation system in accordance with the 2012 IBC; preparing demolition plans for abandoned piping and/or equipment; providing a new lighting plan; performing fire protection engineering assessments and developing a design document for a new sprinkler system; providing ADA access; storm piping design and drawings; and reviewing contractor RFI's.

- Nuclear Power Plant (AP1000) Module Wall Analysis. Analysis and qualification of the CA05 module wall (~100' x 30') in the AP1000 nuclear power plant. Analysis included redlining of module drawings, development of local loads on the wall, and assisting with the calculation of required steel area in the composite module wall, and the design of connections between the module wall and the surrounding floor and wall modules.
- Fender Design for 500kV transmission line structures in the James River, Virginia (VA). Designed fiber reinforced polymer fender structures to protect transmission towers from vessel impact.
- Metal Finned Pipe Foundation Design. Updated the MathCAD metal foundation design electronic calculation worksheet. Calculations included geotechnical design and structural design of pipes, bolts, welds, and steel plates.
- Transmission Line Structural Component Analysis and Design in VA and North Carolina. Designed transmission line hardware including crossarms, distribution arms, pole bent plate assemblies and bayonets.
- Substation Foundation Design in Lexington, VA. Designed concrete pile cap and reviewed micropile design for 500kV breaker foundations.
- Bradford Dam Rehabilitation in Pennsylvania (PA) for Bradford City Water Authority. Provided structural design and assembled structural drawings for rehabilitation and extension of stilling basin.
- Transmission Line Engineering. Produced construction package for Florida transmission line maintenance work on 230kV lines and 115kV lines. Assisted in the design of a new 230kV transmission line including structure sizing and insulator selection. Produced construction packages and material orders for over 10 locations for LiDAR remediation.
- Substation Expansion Foundation Design in Marion County, West Virginia (WV). Designed pile and mat foundations for substation equipment with a leveling system to accommodate settlement due to anticipated long-wall mining.
- Power Station Structural Condition Report in Kittanning, PA. Conducted a structural assessment of concrete beams and roof slabs and developed a structural condition report.
- Dam Sluice Gate Repair in Washington County, PA for the Washington County Planning Commission. Designed sluice gate replacement including the development of specifications and drawings.
- Landfill Culvert Bridge Structure Design in Kentucky. Prepared calculations for the design of a 30-foot composite steel beam and concrete slab bridge.
- Manhole and Underground Conduit Relocations for the Cincinnati Streetcar Project in Cincinnati, Ohio (OH). Provided material quantity takeoffs for the relocation of manholes over a half-mile length of road in the vicinity of the proposed Cincinnati Streetcar.
- Steel Structure Designs for a confidential client in Pittsburgh, PA. Designs included a steel pipe bridge, a three-story test stand, exterior and interior steel mezzanines, and a steel framed high-bay building including a crane. Work also included assessment of existing structures for modified loading conditions including added equipment and modified crane loading.
- Soldiers and Sailors Parking Garage Condition Assessment in Pittsburgh, PA for the University of Pittsburgh. Performed a structural assessment of the underground basement walls and floors as well as a forensic assessment to determine the source of water infiltration into the garage.
- Dam Riser Structure Design in Trimble County, Kentucky. Designed a reinforced concrete riser structure and foundation for the primary spillway pipe of the dam.





## Richard Ruffolo, MS, PG

Geological Manager

### Education

MS, Geology, 2005, Kent State University

BS, Environmental Geology, 2001,  
University of Pittsburgh

### Registrations

Professional Geologist (PG):

PA [REDACTED] KY [REDACTED] NC [REDACTED]

### Skills

Subsurface Exploration and Investigations

Landslide Investigation and Remediation

Foundation and Slope Stability Analysis  
and Design

### Certifications / Training

Advanced Project Management Training,  
GAI Consultants, Inc., 2009

ASFE Fundamentals of Professional  
Practice, 2005

### Industry Experience

GAI Consultants, Inc., 2002-Present

Pennsylvania Department of  
Transportation, 2000-2001 (Summer  
internship)

U.S. Marine Corps, 1993-1997, Sergeant,  
Honorable Discharge

### Professional Summary

Mr. Ruffolo specializes in site characterization, subsurface investigations for foundations, landslides, and mine subsidence; analysis of slope stability; foundation design; and geotechnical report writing.

### Select Professional Experience

- Tamarack Lake Dam A and Dam B in Crawford County, Pennsylvania (PA) for the PA Department of General Services (PADGS), Bureau of Engineering and Architecture. Assistant Geological Manager. GAI is working with the PADGS and PA Fish and Boat Commission to redesign two high-hazard dams associated with Tamarack Lake, a 1,000-acre flood control lake located near Meadville, PA. In 2014, GAI completed a significant geotechnical investigation that involved a drilling program, lab testing, ground penetrating radar, in-situ testing, stability analyses, and settlement calculations. A hydrologic and hydraulic study of the two dams utilizing HEC-RAS and HEC-HMS for a five-square-mile drainage area was also completed.
- Bradford Dam No. 2 in McKean County, PA for Bradford Water Authority. Assistant Geological Manager. The Bradford Water Authority requested that GAI evaluate the stability of the existing Dam No. 2 and design rehabilitation measures to upgrade the dam to currently accepted standards of the Commonwealth of PA. GAI conducted a subsurface investigation consisting of soil borings, piezometers installation, and Cone Penetrometer and Dilatometer Testing. Selected soil samples were submitted for laboratory analysis. Engineering analyses consisted of stability runs, seepage models, settlement analysis, and bearing capacity. A geotechnical report consisting of background, site descriptions, findings, and recommendations was prepared.
- Colver Dam and Reservoir Design and Inspection Project, located in Cambria County, PA for Cambria Township Water Authority. Assistant Geological Manager. Provided oversight of the design of the 53-foot high embankment dam and appurtenances, performing all geotechnical, structural, hydrologic, and hydraulic design; prepared associated permit application documents; prepared the Emergency Action Plan; provided Construction Management services; and monitored construction. The project was to provide a municipal water supply and cooling water for a cogeneration power plant.

- Indian Lake Dam in Somerset County, PA for Indian Lake Borough. Geological Specialist. GAI assessed the condition of Indian Lake Dam and to develop subsurface and soil testing investigations. The acquired information and technical data was used to rehabilitate and update the 45-year old facility. Maintenance work included a new Outlet Works pipe; a downstream embankment buttress to control seepage and improve stability; and an enlarged emergency spillway discharge capacity to comply with new regulatory standards.
- Bradford Dam No. 3 (Marilla Dam), located in McKean County, PA for the Bradford Water Authority. Assistant Geological Manager. On the basis of geotechnical, structural, hydrologic and hydraulic evaluations, GAI designed rehabilitation measures that satisfied dam safety standards of the Commonwealth of Pennsylvania. These included an earth buttress with chimney and blanket drains to satisfy embankment stability requirements, and a roller compacted concrete cap and downstream face to provide overtopping protection.
- H.B. Norton Dam, Ridgeway Water Treatment Plant in Elk County, PA for Hill Engineering, Inc. Geologist. GAI performed a geotechnical exploration for water treatment plant additions in 1987, and discovered unusual artesian waters below the plant and the toe of the adjacent H.B. Norton Dam. Our subsequent geotechnical exploration defined the artesian pressures, installed piezometers in the dam, and analyzed the effects of artesian water pressures on dam stability. GAI recommended and monitored installation of a deep well dewatering system to lower artesian pressures during construction of the treatment plant additions, and testing and installation of rock anchors to prevent flotation of empty tanks.
- Warren Ohi Dam, located in Clinton County, PA, for the City of Lockhaven. Senior Geologist for the development and engineering technical specifications and plans for the foundation grouting of the embankment and spillway areas.
- Romney Bridge (US 50) Replacement over the Potomac River in Hampshire County, WV for the West Virginia Department of Transportation, Division of Highways (WVDOH). Responsible for subsurface investigations and a geotechnical report for the replacement.
- Gateway Connector at East Marion County Park in Fairmont for the WVDOH. Impact assessment project to address impacts to the park resulting from construction of the 1-mile expressway from Interstate 79 to the City of Fairmont, completed in 2003. Assisted with subsurface investigation.
- Landslide stabilization project at a Confidential Power Plant located in WV. The 300'-wide and 500'-long landslide affected the power station's ash disposal area haul road. Monitored drilling and auger cast pile column installation.
- Dolph Refuse/Abandon Mine Fire, Lackawanna County, PA. Responsibilities included abandon mine fire characterization, developing a fire monitoring program, and to develop fire controlling recommendations for abandoned anthracite coal refuse/mine fire. Tasks included: site characterization, subsurface exploration, geologic mapping, aerial photograph interpretation, mine map research and interpretation, installation and data analysis of down hole temperature recorders, development of fire monitoring program and database, established limits of possible fire migration, report preparation.
- Ninevah Mine in Seward, PA, for the CTC Foundation in Washington, D.C. to evaluate the possibility of injecting alkaline coal ash into the 537-acre Valley No. 2 Mine to mitigate acid mine drainage polluting the Conemaugh River and Big Spring Run. Assisted with subsurface investigation and monitored drilling to identify abandoned deep coal mine conditions for acid mine pollution abatement project.
- Confidential Texas Wind Farms. Foundation investigations for 212'-tall towers supported on 14' diameter, 18'-deep concrete foundations experiencing excessive movement. Responsible for site characterization, subsurface boring and sampling, a rock strength study, drilling and micropile installation monitoring, and foundation construction monitoring.





## Kevin Bortz, MS, PE

Engineering Manager

### Education

MS, Civil Engineering, 1989,  
University of Pittsburgh

BS, Civil Engineering, 1987,  
University of Pittsburgh

### Registrations

Professional Engineer (PE):  
PA -1995 [REDACTED]

### Skills

Hydrology and Hydraulics

Stream Restoration

E&S Control

Stormwater Management

### Certifications / Training

Certified Open Water Scuba Diver, PADI

Countermeasure Design for Bridge Scour  
and Stream Instability Training Course,  
National Highway Institute

4-week training course on Natural Stream  
Restoration, WV University / WV Dept. of  
Transportation

HEC-RAS Continuing Education Training

PA Stormwater Best Management  
Practices Manual, PADEP, 2006

PA's New Chapter 102 E&S Control  
Regulations, PADEP, 2010

### Industry Experience

GAI Consultants, Inc., 1989-Present

### Professional Summary

Mr. Bortz specializes in hydrology and hydraulics, natural stream restoration, erosion and sedimentation (E&S) control, and stormwater management, as well as general civil engineering and surveying. He provides hydrologic and hydraulic (H&H) design and analysis for natural stream restorations, culverts, channels, ponds, dams, stream encroachments, and impoundments in Pennsylvania (PA), West Virginia (WV), Maryland (MD), Ohio (OH), Indiana (IN), and Virginia (VA). Mr. Bortz has extensive experience with hydrologic/hydraulic computer models including: HEC-RAS, HEC-HMS, Storm CAD, EPA SWMM, DAMBRK, PSRM, SCS TR-20, SCS TR-55, HEC-1, HEC-2, CYBERNET, and WSPRO.

### Select Professional Experience

- Leetown Science Center Impoundment Conceptual Design, located in Jefferson County, WV for the United States Geological Survey (USGS). Project Engineer responsible for the conceptual design and cost estimate of a low-level impoundment to improve hydraulic conditions at a fishery research facility. The impoundment was to be used as a replacement for beaver impoundments that had improved ground water supplies at the facility.
- Confidential Dam Project, located in Wise County, VA. Project Engineer responsible for design and permit application process for two dams to be used at an energy facility. Project Engineer responsible for the preparation of an Operations Certificate Application and an Emergency Action Plan for the Stage 1 Leachate Pond and the Final Leachate Pond at the facility.
- Dam Permit Application for a Confidential CCB Landfill Site in Shinnston, WV. Project engineer responsible for complete H&H design, analysis, and report preparation as part of a successful dam permit application process for expansion of the site Sediment Pond.
- Confidential Power Station Reservoir in PA. Project Engineer for preparation of a Drought Management Plan for the Keystone Reservoir, including oversight of reservoir operations computer simulations and drought management plan modeling.
- Confidential Dam Project in Clarion County, PA. Dam-break analysis and inundation mapping using the National Weather Service's DAMBRK computer model for a hydroelectric project.

- Brookville Water Works Dam in Jefferson County, PA for the Brookville Municipal Authority. Dam rehabilitation project to repair damages incurred by flood-induced overtopping of the dam, including environmental permitting, breach analyses, flood wave propagation, inundation mapping, and an emergency action plan. Project engineer responsible for H&H analyses, preparing inundation mapping, and successful completion of a dam permit application.
- Confidential Dam Project located in Beaver County, PA. Dam project to modify the outlet works for a 420-foot high earth and rockfill embankment dam designed to impound CCR waste. Project engineer responsible for complete design and construction package preparation for secondary service spillway installation at the existing dam and modifications to the discharge lines and emergency spillway. Also responsible for inundation studies associated with failure of the Saddle Dam Embankment located along the perimeter of the dam's reservoir. Project engineer responsible for dam permit application to modify operating conditions at the dam for purposes of impoundment closure.
- Bradford Dams 2 and 3 Evaluation and Remediation Projects, located in Bradford, PA for the Bradford City Water Authority. Project engineer responsible for obtaining the necessary permits for maintenance dredging at Bradford Dam No. 3. Project engineer responsible for preparation of an H&H design package required for rehabilitation work for Bradford Dam No. 2.
- Colver Dam Expansion for the Colver Power Plant in Colver, PA for Inter-Power/AhlCon Partners, LP. Project engineer responsible for hydraulic layout and design of the reservoir intake tower and water distribution system, and hydraulic analysis and modeling of the reservoir for successful application for a water allocation permit. Flows simulation was accomplished using extensive historical records and reservoir operation modeling including inflows, conservation releases, consumptive uses, and losses such as seepage and evaporation. Allowable reservoir yield was also determined.
- Confidential Power Station, located in Chesterfield County, VA. Task manager and project engineer responsible for preparation of a construction package and permit package to close a coal combustion residuals (CCR) Impoundment (dam) under the requirements of the Environmental Protection Agency's CCR Rule.
- Confidential Power Station, located in Wayne County, IN. Task manager and project engineer responsible for development of conceptual closure plans for a CCR impoundment dam.
- Mine Water Use Study in the Susquehanna River Basin for the PA Department of Environmental Protection (PADEP) to study mine water use in the Susquehanna River Basin. Responsible for installing and monitoring a continuous flow metering system and determining base flow discharge from the mine, average discharge from the mine, and available water volume to use for supplemental flow. The final report was titled Susquehanna River Basin Low Flow Mine Storage and Treatment Project Evaluation.
- Saw Mill Run in Pittsburgh, PA for the City of Pittsburgh, Department of Planning. Flood mitigation project to review, analyze, assess and summarize hydrologic conditions and associated flooding along Saw Mill Run. Project engineer responsible for documenting previous flood studies, summarizing the state of the practice in flood mitigation and prevention, providing recommendations for the City of Pittsburgh, and producing a comprehensive study report.
- Flood Stage Reduction Project to alleviate flooding along Pine Creek for the Allegheny County Department of Economic Development, in the Borough of Etna. Project Engineer responsible for hydraulic modeling, assessment of inundated areas, flood damage estimates, cost estimates for construction of flood alleviation projects, and preparation of cost-benefit ratios.
- Confidential Stream Restoration Project, located in Potter County, PA. Project Engineer responsible for a Rosgen natural stream restoration design and construction package preparation for a stream restoration project. Total restoration length is 270 feet.
- Confidential Erosion and Sedimentation Control Project, located in Harrison County, WV. Project engineer responsible for preparing an E&S Control Plan for an engineered rock fill.





## **Terry W. Queen**

Lead Construction Technician

### **Education**

Drafting and Design, 1992, West Virginia  
Institute of Technology

Math & Physical Education, 1986, West  
Virginia Northern Community College

### **Skills**

Construction Monitoring

Civil Engineering

Subsurface Sampling and Testing

### **Certifications / Training**

Troxler Nuclear Densometer Certified

ACI Certified

WVDOH Portland Cement Concrete  
Inspector

40-Hour HAZWOPER Health and Safety  
Training

10-Hour OSHA Construction Safety  
Trained

OSHA 30-Hour Hazard Recognition  
Training

Certified CQA Geosynthetic Materials and  
Compacted Clay Liner Inspector

Virginia Responsible Land Disturber  
Trained

WVDOH Compaction Inspector

### **Industry Experience**

GAI Consultants, Inc., 1995-Present

Ultrasonic Specialists, Inc., 1994-1995

Dan Hill Construction Company, 1989-1992

D.E. Leonard & Associates, 1987-1988

WACO, 1986-1987

W&W Fabrication, 1984-1985

### **Professional Summary**

Mr. Queen specializes in construction monitoring for impoundment, site closure, infrastructure, and municipal projects. He provides drafting for site planning, earthwork detailing, and pre-mining and pre-blast surveys. Mr. Queen develops preliminary and final designs for mine reclamation sites and mining permits, and site development, and prepares construction drawings for highway and bridge projects. He compiles engineering data from a variety of sources; processes data using well-defined methods and presents data in prescribed formats.

### **Select Professional Experience**

Tomlinson Run State Park and Kanawha State Forest Projects for the West Virginia Department of Natural Resources (WVDNR). Performed construction monitoring for two lake dredging projects, located in West Virginia (WV). Activities included subsurface investigation, regulatory approvals, construction drawings, technical specifications, construction troubleshooting, cost estimating, daily reports, and client interaction.

- Confidential Dam Geotechnical Investigation and Foundation Exploration, located in Gauley Bridge, WV. Duties include monitoring of drilling activities, daily bore logs, concrete core and rock core sampling.
- Monitored construction of 600,000 cubic yard rock buttress for a failed coal slurry impoundment dam. Work included monitoring of activities, troubleshooting, preparing daily logs and construction administration coordination for the West Virginia Department of Environmental Protection (WVDEP).
- Geotechnical investigation for Freshwater Impoundment Dams in Columbiana and Carroll Counties, Ohio. Duties include monitoring of drilling activities and daily bore logs, soil sampling, and rock core sampling.
- Lead construction monitor inspector for a Confidential Client located in Marshall and Wetzel Counties, WV. Work included monitoring slope stabilization for failed well pads located in Marshall and Wetzel Counties, WV. Monitored erosion and sediment control best management practices associated with development of well pads. Monitored Blake Fork stream restoration.

## **APPENDIX B**

### **WVARNG Signed Forms**





Purchasing Division  
2019 Washington Street East  
Post Office Box 50130  
Charleston, WV 25305-0130

State of West Virginia  
Centralized Expression of Interest  
02 - Architect/Engr

Proc Folder: 720409

Doc Description: Camp Dawson Pierce Lake Dam Repair Design

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2020-04-27	2020-05-14 13:30:00	CEOI 0603 ADJ2000000010	1

#### BID RECEIVING LOCATION

BID CLERK  
DEPARTMENT OF ADMINISTRATION  
PURCHASING DIVISION  
2019 WASHINGTON ST E  
CHARLESTON WV 25305  
US

#### VENDOR

##### Vendor Name, Address and Telephone Number:

GAI Consultants, Inc  
500 Lee Street East, Suite 700  
Charleston, West Virginia 25301  
304.926.8100

#### FOR INFORMATION CONTACT THE BUYER

Tara Lyle  
(304) 558-2544  
tara.l.lyle@wv.gov

Signature X

Charles F. Straley

Digitally signed by Charles F. Straley  
DN: E=c.straley@gaiconsultants.com,  
CN=Charles F. Straley  
Date: 2020.05.13 15:50:12-04'00'

FEIN #

25-1260999

DATE

May 14, 2020

All offers subject to all terms and conditions contained in this solicitation

**ADDITIONAL INFORMATION:**

The West Virginia Purchasing Division, for the agency, the West Virginia Army National Guard, Construction and Facilities Management Office, is soliciting Expressions of Interest from qualified firms to provide professional design services to develop construction documents to repair existing leaks and provide a maintenance plan for future use of an earthen dam on Pierce Lake, at Camp Dawson, WV, per the attached documentation.

INVOICE TO		SHIP TO	
DIVISION ENGINEERING & FACILITIES ADJUTANT GENERALS OFFICE 1707 COONSKIN DR		FACILITY MAINTENANCE MANAGER CAMP DAWSON ARMY TRAINING SITE 240 ARMY RD	
CHARLESTON	WV25311	KINGWOOD	WV 26537-1077
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	Camp Dawson Pierce Lake Dam Repairs Design		

Comm Code	Manufacturer	Specification	Model #
81101508			

**Extended Description :**

Provide professional architectural and engineering design services per the attached documentation.



# State of West Virginia



## Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

**GAI CONSULTANTS INC**

a corporation formed under the laws of Pennsylvania filed an application to be registered as a foreign corporation authorizing it to transact business in West Virginia. The application was found to conform to law and a "Certificate of Authority" was issued by the West Virginia Secretary of State on March 24, 1975.

I further certify that the corporation has not been revoked by the State of West Virginia nor has a Certificate of Withdrawal been issued to the corporation by the West Virginia Secretary of State.

Accordingly, I hereby issue this

## CERTIFICATE OF AUTHORIZATION



*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
September 28, 2009*

*Natalie E. Tennant*

Secretary of State