GAI Consultants, Inc.

Expression of Interest
Richard Mine Drainage Access

Solicitation:
CEOI DEP1900000005

October 9, 2018

GAI Project No. E181060.00

Prepared for:
WVDEP, Office of AML&R
State of West Virginia Purchasing Division
2019 Washington Street, East
Charleston, WV 25305-0130
ATTN: Jessica S. Chambers

Prepared by:
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gai consultants

60 years

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October 9, 2018

Project E181060.00

Ms. Jessica S. Chambers
West Virginia Department of Environmental Protection
Office of Abandoned Mine Lands and Reclamation
2019 Washington Street, East
Charleston, West Virginia 25305-0130

Expression of Interest
Richard Mine Drainage Access
Monongalia County, West Virginia
Solicitation: CEOI DEP1900000005

Dear Ms. Chambers:

GAI Consultants, Inc. (GAI) is pleased to present our Expression of Interest for the Richard Mine Drainage Access Project (Project), located in Monongalia County, West Virginia (WV) pursuant to the WV Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation (WVDEP/AML) Solicitation CEOI DEP1900000005, issued on September 7, 2018.

Founded in 1958, GAI has over 60 years of experience in mine reclamation and abatement projects throughout WV and the Northeastern United States. We are a full-service engineering and environmental consulting firm with a dedicated team of engineers, geologists, hydrologists, and biologists that keep abreast of regulatory developments and investigate groundwater, acid mine drainage, waste disposal, and environmental impacts for mine lands and mining operations.

GAI believes we are exceptionally qualified for this Project based on the following:

- GAI has experience at Richard Mine Complex in performing the alternative evaluation study for the WV Conservation Agency and NRCS,
- GAI's award-winning proposed Project Team, which includes some of the nation's foremost authorities on mine reclamation and foundation engineering projects. **GAI has provided the State of WV with quality engineering services arising from abandoned mine lands since 1984.**
- GAI's key personnel proposed for this important Project includes **Project Manager, Charles F. Straley, MS, PE, PLS**. Mr. Straley is a Senior Engineering Manager out of GAI's Charleston, WV Office, and has managed and participated in the design and development of reclamation plans and feasibility studies for over 95 WVDEP mine reclamation projects and several WVDOH projects. Additionally, GAI's proposed **Assistant Project Manager, Shaun M. Long, MS, PE**, has over 10 years of civil engineering experience with an emphasis on bridge design and plan preparation.
- GAI's close proximity to the Project, and our experience working with the WVDEP/AML, will ensure prompt communication, consultation, and responsiveness to the WVDEP's needs required for this important Project.

We look forward to speaking with you about our attached Expression of Interest. Please feel free to contact Mr. Charles Straley at 681.245.8866 or via email at c.straley@gaiconsultants.com, should you have any questions.

Sincerely,

GAI Consultants, Inc.

Shaun M. Long, MS, PE
Engineering Manager

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

SML:CFS/dro

Attachment: Expression of Interest

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gai consultants

Introduction

This Expression of Interest describes the capabilities of GAI Consultants, Inc. (GAI) to provide Full Service Architect/Engineering (A/E) Design Services to the West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation (WVDEP/AML) for the Richard Mine Drainage Access Project (Project), located in Monongalia County, West Virginia (WV). GAI understands this Project will include, but not be limited to Civil, Geological, and Hydrological Services.

GAI has over 60 years of experience in mining-related projects throughout WV and the Northeastern U.S.

Since 1958, GAI has established itself as a premier engineering and consulting firm specializing in foundation and soil mechanics engineering, and has been providing geotechnical engineering-related services for abandoned mine drainage abatement and treatment projects in WV and the Northeastern United States (US) for over 60 years. We are experienced in providing subsurface investigations, site reconnaissance, landslide restoration plans, geotechnical investigation, field survey, boundary and topographic survey, site mapping, hydraulic modeling, construction drawings and specifications, and construction modeling. GAI is an award-winning, full-service engineering consulting firm with approximately 900 employees in 27 offices within the US, including two offices in WV: Charleston and Bridgeport.

GAI has served the WVDEP on over 100 AML contracts since 1984. Additionally, GAI's Charleston office has been providing engineering services to the State of WV, local and municipal government agencies, and private clients for over 30 years. GAI has a thorough knowledge and understanding of WV's geologic and mineral environment, as well as the problems posed by past mining activities and practical methods to alleviate them.

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, Geographic Information System (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 WVDEP with all the geotechnical engineering and investigation, 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.

GAI Offices Supporting this Project

GAI's Charleston, WV office will be the Primary Office for this Project. GAI's Charleston and Bridgeport, WV offices are exceptionally qualified for this Project, having a combined staff of 35 personnel, including five WV Professional Engineers (PEs), one WV Professional Land Surveyor, and a team of engineering professionals, biologists, environmental scientists, construction inspectors, surveyors, CADD operators, landscape architects, technicians, drafts persons, and administrative personnel. Additionally, GAI will utilize technical support from our offices located in Pittsburgh, Pennsylvania (PA); Cranberry, PA; and Murrysville, PA, which will work in unison with our WV offices to best meet the needs of the WVDEP for this important Project. Our close proximity to the Project, coupled with our track record of effective communication and consultation, ensures GAI will be responsive to the needs of the WVDEP AML throughout the course of this Project. The contact information of the GAI supporting offices for this Project are on the following page.

Charleston Office
300 Summers Street, Ste. 1100
Charleston, WV 25301
T. 304.926.8100
F. 304.926.8180

Bridgeport Office
600 Market Place Ave., Ste 301
Bridgeport, WV 26330
T. 304.808.6680
F. 304.808.6684

Pittsburgh Office
385 E Waterfront Drive
Pittsburgh, PA 15120
T. 724.873.3545
F. 724.873.3549

Cranberry Office
600 Cranberry Woods Dr., Ste. 400
Cranberry Township, PA 16066
T. 724.772.2011
F. 724.772.2050

Murrysville Office
4200 Triangle Lane
Export, PA 15632
T. 724.387.2170
F. 724.387.2265

GAI Advantage

GAI's office in Charleston is located within a 10-minute drive from the WVDEP Headquarters in Charleston. GAI's Bridgeport office is located 30 miles from the Project site. GAI's proposed Project Manager, **Charles F. Straley, PE, PLS, has managed and participated in for over 95 WVDEP mine reclamation projects and we have extensive experience with WVDOH**. He has a complete understanding of WVDEP's guidelines, specifications, and project expectations. GAI's direct knowledge of the WVDEP AML program guidelines and personnel will also benefit the Project.

Awards

GAI was awarded the 2003 National Award for Most Outstanding Abandoned Mine Lands Reclamation for the WVDEP's Ned's Branch Impoundment Project, Phase II, located in Mingo County, WV.

GAI has also received numerous awards for our work with the Bureau of Abandoned Mine Reclamation (BAMR). The Monongahela South Dangerous Highwall Reclamation Project received the 2006 Eastern Region Abandoned Mine Reclamation Award by the Federal Office of Surface Mining; and the 2006 Professional Achievement of the Year, by the Society of American Military Engineers, Pittsburgh Post.

Additionally, GAI received the 2008 Appalachian Region AMR Award for the PA Department of Environmental Protection (PaDEP) Bureau of Abandoned Mine Reclamation's Fishing Creek Restoration and Maude Mine Relamation Project.

Appendices

GAI is providing the following attachments to the WVDEP for this Expression of Interest:

- Appendix A – WVDEP Required Signature Pages;
- Appendix B – AML Consultant Qualification Questionnaire;
- Appendix C – AML and Related Project Experience Matrix;
- Appendix D – Project Organizational Chart and Key Personnel Resumes;
- Appendix E – GAI WVDEP AML Project List;
- Appendix F – GAI Service Briefs; and
- Appendix G – Certificates of Authorization.

Project Organization

GAI understands this Project requires "full-service" A/E design. GAI's project organization is staffed with numerous personnel from our Charleston and Bridgeport, WV offices, and supplemented with our four offices located in Western PA. GAI's Project Manager, Charles F. Straley, MS, PE, PLS, and Assistant Project Manager, Shaun M. Long, MS, PE, are both located out of GAI's Charleston, WV office. Our Charleston and Bridgeport, WV offices include 35 combined personnel, including five registered PEs, one Professional Land Surveyor, and a team of geologists, civil engineers, foundation/geotechnical engineers, environmental scientists, biologists, CADD technicians, and archaeologists. Please find our Project Organizational Chart and Key Personnel Resumes attached as **Appendix D** to this EOI.

Project Manager / Point-of-Contact Information

Charles F. Straley, MS, PE, PLS
Charleston, WV Office
300 Summers Street, Ste. 1100
Charleston, WV 25301
Work: 681.245.8866
Mobile: 304.541.0854
E-mail: c.straley@gaiconsultants.com

Qualifications of Key Personnel

The following is a summary of key personnel qualifications. All of our Key Personnel have direct experience with bridge design, mine reclamation, grading/drainage, feasibility studies, water study and design, stream restoration, and preparation of construction documents. GAI's Key Personnel are particularly well-suited for this Project due to their previous experience and expertise with AML projects. GAI proposes to utilize a staff of professional engineers (geological, structural, hydrological, civil, and water/wastewater), biologists, environmental scientists, CADD designers, and construction technicians for this important Project. A listing of Key Personnel and their qualifications are located in the following section. A Project Organizational Chart and Key Personnel Resumes located in **Appendix D**.

Project Management

Charles F. Straley, MS, PE, PLS – Project Manager

Mr. Straley is a Senior Engineering Manager out of GAI's Charleston, WV office, and has over 32 years of civil and geotechnical engineering experience. He is a registered PE in WV, Indiana (IN), Kentucky (KY), and Ohio (OH), and a Professional Land Surveyer (PLS) in WV, and will serve as the Project Manager overseeing the work of this Contract. **Mr. Straley has managed and participated in the design and development of bridge design, reclamation plans and feasibility studies for over 95 WVDEP mine reclamation projects**. He specializes 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 the WVDEP's interest by coordinating and managing all fiscal and personnel aspects of the Projects. He will also serve as the Lead Surveyor. He has managed numerous geotechnical investigations and construction support services for foundation projects located in WV and other states. He has a complete understanding of the WVDEP's guidelines, specifications, and project expectations. Mr. Straley is a native of WV, and he received his MS in Geotechnical Engineering, and BS in Civl Engineering from the University of Akron.

Shaun M. Long, MS, PE– Assistant Project Manager

Mr. Long is a Senior Engineering Manager out of GAI's Charleston, WV office, with 10 years of civil engineering experience along with multiple years of project management experience. He is a registered PE in WV, OH, and Florida (FL) and will serve as the Assistant Project Manager for this contract. Mr. Long has demonstrated talent for designing and managing various projects. He is a resourceful leader possessing exceptional communication, problem solving and organizational skills. He has experience doing bridge inspection, bridge design, and plan preparation. He is proficient in design based on the LRFD code and has designed various components using steel, reinforced concrete, prestressed concrete, post tensioned concrete, and timber. He is very skilled in using various bridge analysis and design software programs. Mr. Long received his MS in Engineering with a focus in Transportation and Structures from Marshall University, and BS in Civil Engineering from West Virginia University Institute of Technology.

Key Technical Personnel

Christopher W. Woodland, PE, STS – Bridge Engineering Support

Mr. Woodland is a Senior Engineering Manager supporting GAI's Structures group. Mr. Woodland has successfully served as Project Manager on projects with design fees ranging from $3,000 to $3 million. He has managed projects involving various agencies, including West Virginia Department of Transportation, Division of Highways (WVDOH); state Departments of Transportation (DOT); and U.S. Army Corps of Engineers (USACE). Mr. Woodland has expertise in bridge and structures design, inspection, and project management. Past duties included managing projects, preparation of contract documents for bridges and miscellaneous structures, and leading design and inspection teams. Mr. Woodland's design experience includes expertise with new bridges, bridge rehabilitations, bridge widening, bridge replacements, and designing various small structures. His design experience covers a wide range of structure types, including steel rolled beams, curved and straight steel plate girders, prestressed concrete box beams, prestressed concrete I-beams, and structural steel tube tied arch bridges. His rehabilitation experience includes load rating analysis, retrofit design on bridge structures, rehabilitation of major signature structures, redecking and widening projects, system preservation projects, and fatigue rehabilitation. Mr. Woodland has performed design tasks, including development of structure geometry, span arrangements; type, size and location (TS&L) studies; foundation submissions; final design submissions; special provisions; and construction cost estimates.

Shane A. Fisher, PE – Civil Engineering Lead

Mr. Fisher is an Assistant Engineering Manager out of GAI's Bridgeport, WV office with over 13 years of engineering experience . He is a registered PE in WV, VA, Maryland (MD), and North Carolina (NC), and is experienced in performing various site development, highway, and environmental projects. Mr. Fisher has been responsible for design and cost estimating for AML and industrial wastewater projects. He specializes in environmental permitting for numerous federal, state, and local regulatory agencies; and designing and analyzing roadways, bridge structures, drainage systems, and sanitary and industrial water and wastewater systems. His experience includes: flood mapping, floodplain compliance, and construction monitoring for disaster-related funds. Mr. Fisher received his BS in Civil Engineering Technology from Fairmont State University.

Jason Gandee – Civil Engineering Support

Mr. Gandee is a Senior Project Engineer out of GAI's Charleston, WV office with over 10 years of engineering experience. His experience includes being the Project Engineer for over 20 reclamation projects for the WVDEP/AML. Responsible for site reconnaissance to determine the scope of the project; monitoring subsurface exploration drilling; preliminary and final design drawings; technical specifications; engineer's cost estimate; and conducting pre-bid and pre-construction meetings with contractors. Submitted and obtained National Pollutant Discharge Elimination System (NPDES) construction stormwater permits and United States Corps of Engineer (USACE) regional permits for the projects. Mr. Gandee received his BS in Civil Engineering Technology from the West Virginia University Institute of Technology.

Kenneth W. Kinder, PE, CFM – Hydrology & Hydraulics Lead

Mr. Kinder is an Engineering Manager out of GAI's Charleston, WV office, and has over 15 years of civil engineering experience. He is a registed PE in WV, and is also a Certified Floodplain Manager (CFM). He has participated in the design and development of reclamation plans and feasibility studies for mine reclamation projects for the WVDEP. Mr. Kinder specializes in construction oversight and management, site inspections, landfill inspections, hydrology and hydraulics, hydraulic modeling and floodplain permitting, stormwater design, erosion and sedimentation control, and general civil engineering. He ensures accuracy of work, meeting schedule requirements and maintaining excellent client relationships. Mr. Kinder received his BS in Civil Engineering from the West Virginia University Institute of Technology.

Kerry L. Frech, MEng, PE – Hydrology & Hydraulics Support

Mr. Frech is the Civil Technical Leader out of GAI's Murrsyville, PA office, and has 40 years of engineering experience. He is a registed PE in WV and PA, specializing in applying hydrologic and hydraulic (H&H) 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. Mr. Frech has worked on numerous abandoned mine reclamation projects. He was the Project Engineer for the PaDEP's Bureau of Abandoned Mine Reclamation Fishing Creek Restoration and Maude Mine Relamation Project, which was awarded the 2008 Appalachain Region AMR Award. His experience with H&H 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. Mr. Frech received his MEng in Environmental Engineering, and his BS in Civil Engineering from Cornell University.

Kevin M. Bortz, MS, PE – Hydrology & Hydraulics Support

Mr. Bortz is an Engineering Manager out of GAI's Murrsyville, PA office, and has over 28 years of engineering experience. He is a registed PE in PA and Virginia (VA), specializing in H&H, natural stream restoration, erosion and sedimentation control, and stormwater management, as well as general civil engineering and surveying. He has been the engineer responsible for stream modeling, using HEC-2, to assess the effects of streambank rehabilitation and wetland construction for wetland replacement and stream restoration required for a coal ash/mine refuse disposal facility expansion project. He was also responsible for studying mine water in the PA Susquehanna River Basin for the PaDEP, and the installation and monitoring of a flow metering system pursuant to the base flow discharge from the mine. He provides H&H design and analysis for natural stream restorations, culverts, channels, ponds, dams, stream encroachments, and impoundments in WV, PA, MD, OH, IN, and VA. Mr. Bortz received his MS and BS in Civil Engineering from the University of Pittsburgh.

Richard M. Ruffolo, MS, PG – Geological Engineering Lead

Mr. Ruffolo is a Geological Manager out of GAI's Pittsburgh, PA office, and has over 15 years of geological experience. He is a registered PG, licensed in PA, KY, and NC, specializing in subsurface investigations for foundations, mine subsidence, and landslides. Mr. Ruffolo's AML experience includes evaluating the possibility of injecting alkaline coal ash into a 537-acre mine to mitigate AMD polluting the Conemaugh River and Big Spring Run. He has also assisted with subsurface investigations, hydrogeological site characterizations, and monitored drilling to identify abandoned deep coal mine conditions for multiple acid mine pollution abatement projects. Mr. Ruffolo received his MS in Geology from Kent State University, and his BS in Environmental Geology from the University of Pittsburgh.

Christy M. Mower, MS, CE, FP-C – Environmental & Permitting Lead

Ms. Mower is an Environmental Manager out of GAI's Southpointe, PA office, and has 18 years of environmental and permitting experience. She is a Certified Ecologist (CE) and Fisheries Professional (FP-C), specializing in biology and ecology with extensive experience in fisheries surveys, wetland and stream delineations, benthic macroinvertebrate surveys, and stream and wetland restoration principles. She has focused on compensatory mitigation and natural stream channel design techniques, writing some of the first mitigation plans in WV for the energy industry. Ms. Mower was the environmental manager for a WVDEP Narrative Water Quality (NWQ) Sampling Project, located in multiple WV-based mines, where she was responsible for in-stream biological montoring, chemical monitoring, and NWQ Reports for each of the NPDES permits. Additionally, she is trained in Rosgen I-IV Natural Stream Channel Design Techniques. Ms. Mower received her MS in Biology, and a BS in Biology/Applied Ecology from Clarion University.

Charles A. Cook (Alex) – Environmental & Permitting Support

Mr. Cook is a Senior Project Environmental Specialist out of GAI's Charleston, WV office, and has 12 years of experience specializing in environmental and biological surveys and field assessments. His experience also includes wetland delineations, jurisdictional stream determinations, vegetation surveys, benthic and water quality sampling, fish and herpetology studies, and threatened and endangered species surveys. He is familiar with current WV and federal regulations including the Section 401 and 404 permitting process (Clean Water Act and Section 7 consultation (Environmental Site Assessment). Mr. Cook received his BS in Biology from West Virginia State University.

Terry W. Queen – Construction Monitoring

Mr. Queen is a Lead Construction Technician with GAI and has over 25 years of construction monitoring and drafting experience. He works out of GAI's Charleston, WV office, and specializes in construction monitoring for impoundment, site closure, infrastructure, and municipal projects. Mr. Queen develops preliminary and final designs for mine reclamation sites and mining permits, and site development. He has been the Lead Construction Technician for numerous AML reclamation projects for the WVDEP's Abandoned Mine Lands and Reclamation Program. Mr. Queen took numerous Drafting and Design Courses from the West Virginia Institute of Technology.

David L. Workman – Civil/Site Design and Construction Plans

Mr. Workman is a Senior Technical Specialist with GAI and has over 18 years of experience preparing civil engineering design and construction plans, reports, and cost estimates for projects. He works out of GAI's Charleston, WV office, and specializes in the design of numerous land reclamation projects for the WVDEP's Abandoned Mine Lands and Reclamation Program. His computer skills include AutoCAD Civil 3D, Microstation, Bluebeam PDF, Revu, Maptech, and Terrain Navigator Pro. Mr. Doyle received his BS in Industrial Engineering Technology from West Virginia University Institute of Technology, and his AS in Computer Aided Drafting and Design from Triangle Tech.

Michael P. Doyle – CADD Designer

Mr. Doyle is a Senior Designer with GAI and has over 20 years of experience in CADD. He works out of GAI's Charleston, WV office, and specializes in civil engineering projects ranging from industrial/commercial site development and planning projects to large-scale roadway design projects. He has worked with private developers, architects, municipalities, and government agencies. Mr. Doyle has participated in the design of numerous land reclamation projects for the WVDEP's Abandoned Mine Lands and Reclamation Program. His computer skills include AutoCAD Civil 3D, Microstation, Bluebeam PDF, Revu, Maptech, and Terrain Navigator Pro. Mr. Doyle received his AS in Computer Aided Drafting and Design from Triangle Tech.

Project Team Matrix

Name	Project Role	Office Location	Education	Licenses/ Certifications
Project Management				
Charles F. Straley	Project Manager	Charleston, WV	MS, Geotechnical Engineering BS, Civil Engineering	PE: WV, KY, IN, OH PLS: WV
Shaun M. Long	Assistant Project Manager	Charleston, WV	MSE, Engineering BSCE, Civil Engineering	PE: WV, OH, FL
Key Technical Personnel				
Christopher W. Woodland	Bridge Support	Bridgeport, WV	BS, Civil Engineering	PE: WV, MD
Shane A. Fisher	Civil Lead	Bridgeport, WV	BS, Civil Engineering Technology	PE: WV, VA, MD, NC
Jason Gandee	Civil Support	Charleston, WV	BS, Civil Engineering	Troxler Nuclear Density Operator
Kenneth W. Kinder	Hydrology & Hydraulics Lead	Charleston, WV	BS, Civil Engineering	PE: WV; CFMPE: PA Soil Compaction Certification
Kerry L. Frech	H&H Support	Murrysville, PA	MEng, Environmental Eng BS, Civil Engineering	PE: WV, PA
Kevin M. Bortz	H&H Support	Murrysville, PA	MS, Civil Engineering BS, Civil Engineering	PE: PA, VA
Richard M. Ruffolo	Geological Lead	Pittsburgh, PA	MS, Geology BS, Environmental Geology	PG: PA, KY, NC
Christy M. Mower	Environmental & Permitting Lead	Southpointe, PA	MS, Biology BS, Biology/Applied Ecology	CE; C-FP
Charles A. Cook	Environmental & Permitting Support	Charleston, WV	BS, Biology	WVDNR Approved Surveyor for Running Buffalo Clover
Terry W. Queen	Construction Monitoring	Charleston, WV	Drafting & Design	WVDOH Portland Cement Concrete Inspector
David L. Workman	Civil/Site Design	Charleston, WV	BS, Industrian Engineering Technology	NICET; HAZMAT
Michael P. Doyle	CADD Designer	Charleston, WV	AS, CADD	10-Hour OSHA

Specialized Experience

GAI has provided a wide variety of services to governmental agencies related to the reclamation of mine land problems. We have also completed numerous projects for the OSMRE and AML programs in WV, PA, OH, MD, and VA. GAI staff has experience in all aspects of mining-related design engineering, geology, hydrogeology, environmental science, economics, transportation systems and land-use planning, urban and site engineering, structural engineering, engineering mechanics, agronomy, anthropology and archaeology, and various related professional disciplines.

WVDEP Contract Experience

GAI has provided the WVDEP with open-end and individual project contracts since 1984. Our WVDEP AML project experience list is found in **Appendix E**.

GAI's WVDEP project experience includes:

- Mine portal reclamation;
- AMD evaluation and treatment;
- Burning coal refuse piles, coal seams, and underground mines;
- Stream restoration;
- Subsidence investigations and stabilization plans;
- Coal refuse pile reclamation;
- Coal refuse reprocessing evaluations;
- Landslide investigations and repair;
- Demolition plans;
- Wetlands replacement and development;
- Environmental liability assessments;
- Water quality surveys and feasibility reports;
- Water supply system reviews; and
- Water supply system designs.

Mining Industry Engineering Services

GAI also provides other engineering services to the mining industry, including:

- Mining engineering;
- Mine backfill studies;
- Geology, mining, and hydrology interpretation;
- Mine subsidence evaluation and mitigation;
- Mine stabilization design;
- Hazardous waste studies;
- Mine fire investigations and abatement;
- Underground ventilation studies;
- Fire control measures;
- Multispectral thermal infrared fire mapping imagery;
- Overburden characterization;
- Mine atmosphere gas characterization;
- AML reclamation and AMD remediation; and
- Construction monitoring.

WVDEP Contract Experience

GAI's transportation engineering experience includes several projects for the WVDOH. GAI's full-service transportation department, along with our multi-talented and specialized team of professionals, is equipped with the knowledge and expertise to fulfill and handle all types of various situations. As a company, our transportation department works on projects ranging from small lane additions on rural routes, to red light additions, right-of-way services, small and large bridge replacement and renovation projects, design-build of bridges, and large highway and intersection projects. These projects have included roadways, bridges and interchanges ranging from award-winning renovations on minor local roads and bridges to full sections of the King Coal Highway and the Mon-Fayette Expressway. In addition to our traditional transportation services, GAI has a strong history of providing **hydraulics, geology, and cultural resource services** for the WVDOH.

GAI hires the very best professionals who are equipped with expert knowledge in their selected areas of responsibility. Many of our team members hold professional licenses and specialized certifications, such as being certified Bridge Inspectors, certified Professional Traffic Operations Engineers, and other high-quality distinctions. Our structures group in particular is the best in the profession in all areas of bridge design, reconstruction, and replacement. The technical competence of our team members is well represented by the following relevant WVDOH projects.

Duhring Street Project. GAI completed final design on the Duhring Street Project, WV 20/20 over the Bluestone River. Design study and preparation of the right-of-way and construction contract plans and related project documents for the replacement of the existing pony truss bridge, which lies in the sensitive historic district of Bramwell.

Romney Bridge

US Route 50 over the South Branch of the Potomac River. The design consisted of replacing the existing structure with a 930-foot, six-span structure as well as the design of over 2,020 feet of approach roadway. In addition to the design study and preparation of construction documents for the roadway and bridge, GAI's Cultural Resources Group conducted Phase I and Phase II archaeological surveys and architectural investigations.

Willowwood Bridge

WV Route 3 over the Greenbrier River. Design study and preparation of the right-of-way and construction contract plans, and related project documents for replacement of the existing bridge. The bridge was relocated upstream to accommodate traffic during construction. The total length of the bridge is 395 feet, and it has 935 feet of approach roadways, including complex framing to accommodate a new intersection on the south side of the structure.

Bellepoint Bridge Replacement

GAI provided a feasibility study, construction plans, and specialized demolition and erection procedural design for this six-span, continuous steel, multi-girder bridge superstructure replacement requiring special considerations. Water access to the bridge from the Greenbrier River was not an option; construction was performed on a 24/7 schedule through the winter months; and special precautions were required during demolition to contain the debris while Route 107 traffic continued to use the bridge. Replacement of the 685-foot bridge included pier and abutment stabilization/strengthening.

Bridge Engineering and Inspection

For more than 25 years, the experienced, award winning bridge engineers and designers at GAI Consultants have been designing, inspecting, and rehabilitating bridge structures. Our understanding of safety standards, construction processes, and material and workmanship practices results in longterm returns on infrastructure investments.

The skill GAI brings to bridge design projects for all types of steel, concrete, and timber structures is evident in our long list of project successes. From minor stream crossings and pedestrian overpasses to major river spans, highway interchanges, and grade separations, we incorporate the latest design techniques and philosophies into every design effort, including Load and Resistance Factor Design.

GAI's transportation engineers and designers build cost-saving features into each set of plans. We incorporate standards for constructible details and provisions for minimal future maintenance. And GAI keeps an eye on project delivery costs so our transportation clients can continue to build and maintain a solid transportation network.

Each bridge project is unique, and GAI's complete venue of in-house capabilities provides all the necessary support services for our engineers and technicians to evaluate conditions, determine cause, and design solutions. We upgrade load capacity and incorporate cost-effective features in our designs—fatigue-prone detail retrofits, member strengthening, deck joint elimination, drainage improvements, scour protection, earthwork retrofits, composite construction, and lightweight concrete.

Stream and river crossings have the potential for disaster when scour undercuts the supporting structure. GAI's expertise in hydraulics and scour analysis supports new and rehabilitated structures. We evaluate scour potential and design foundations and protection systems that minimize possible damage.

Whether rehab or new construction, GAI's reliable in-house construction inspection services draw from a pool of seasoned engineers and technicians. Our preand post-construction services include construction engineering and inspection, contract administration, and construction monitoring and management.

GAI delivers premier solutions for designing, inspecting, and monitoring the bridges that support highways, railways, busways, pedestrian walkways, and industrial heavy hauling systems.

Civil/Site Engineering

Land development is an integration of site planning, civil engineering, and stormwater management— and GAI has engineers, planners, and environmental professionals dedicated to developing sites. Our project managers have 10 to 30+ years of experience in managing small to complex residential, commercial, industrial, institutional, and brownfield development projects.

GAI's design process starts with client meetings. We listen to our client's needs and aspirations, and discuss their envisioned master plan. We then analyze governing municipalities at all levels, and review ordinances for allowable use, site development requirements, and stormwater management ordinances to gain a solid understanding of the site specifics.

GAI evaluates existing site conditions, including topography, natural resources, wetlands and streams, drainage patterns, and existing or nearby utility and roadway infrastructure. We understand the importance of the early planning so the site layout is in continuity with existing conditions and meets the intended use of the client.

GAI's land development professional are skilled in effectively utilizing existing conditions as much as possible to be cost effective, yet remaining compliant with current regulations, and ultimately achieving the client's goals for the project. GAI designs sites that meet the LEED® Site/Civil requirements of our clients. Our site layouts maximize development potential with cost-effective features and aesthetic stormwater management design. We design rain gardens and vegetated swales to convey stormwater runoff, and locate catch basins, piping systems, and ponds to maximize land use. GAI has practical stormwater management solutions that meet site topographic and natural resource challenges.

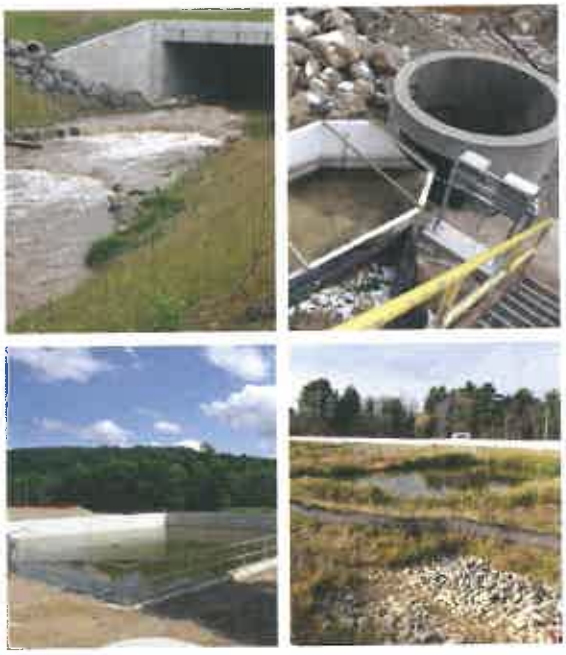
Geological and Geotechnical Engineering

Since 1958, GAI has been a leader in addressing the broad spectrum of engineering issues associated with the behavior of earth materials—soil, rock, mining refuse, coal combustion residuals, slag from steel-making processes, slurry, and others—that impact projects within the civil, mining, transportation, petroleum, natural gas, transmission, and power-generation economy sectors.

Our geotechnical engineers and geologists are highly proficient in the fundamentals of engineering, soil and rock mechanics, foundation and slope engineering, seismic analyses, underground and surface mining, mine fires, and mine subsidence. Operating out of office locations throughout the U.S., these specialists bring with them a wealth of knowledge from years of academic training, research, and practical field experience— knowledge that is bolstered by expertise from GAI staff members in other disciplines such as structural engineering, groundwater engineering, and H&H engineering.

GAI's services encompass the entire breadth of geology and geotechnical engineering. Studies typically begin with subsurface characterization of the site and culminate in a report, often accompanied by the preparation of technical drawings and specifications, and monitoring during construction to verify project compliance with design specifications.

Hydrologic and Hydraulic Engineering



Water management can include quantifying volumes and flow rates, meeting water demands and supplies, evaluating and designing conveyance systems for effective and safe movement of water through, around, and under project sites, or sizing storage facilities to meet project objectives and satisfy regulatory requirements.

GAI is highly experienced in H&H engineering, and the waterway permitting and compliance that often accompanies water management. Our H&H staff has H&H-specific training, advanced degrees, and Professional Engineering certifications. GAI assists public and private clients through analysis and evaluation of water obstructions, encroachments, and flood hazards, and design of hydraulic structures.

GAI's H&H software skills include: HEC-HMS, HEC-RAS, HEC-2, FHWA HY-8, SITES, EPA SWMM RUSLE, PondPack, Hydraflow, Hydrographs, and StormCAD.

Surveying and Mapping

To provide cost efficient and timely services for this Contract, surveying services can be conducted by GAI's in-house surveyors. GAI routinely performs the following types of surveys which are relevant to the work potentially associated with this Project, including:

- Aerial mapping control surveys, including horizontal and vertical control and reference monuments;
- Topographic and planimetric surveys;
- Construction surveys, including work layout staking, establishment of baselines and cross sections, and profiles;
- Construction quantity measurement surveys;
- Detailed as-built documentation surveys;
- Property surveys, including both surface and mineral estates; and
- Oil and gas surveying.

GAI presently operates several survey crews, and we are committed to providing timely surveying services for this Project. Our survey crews utilize Total Stations and global positioning system (GPS) surveying equipment. This is complimented by data collectors and AutoCAD workstations to generate plan views, profiles, cross sections, and other engineering drawings. These CAD-generated drawings can then be utilized by GAI's CAD-drafting/design department for design using Civil 3D.

All surveys conducted by GAI are completed under the supervision of a WV-licensed land surveyor. Surveying will also be performed under the general direction of a WV registered PE (GAI Project Engineers and Project Manager). All surveys and mapping are completed to the standards as outlined by the National Map Standards, as well as other applicable quality standards, to include AML-required specifications.

Laboratory Services

Should laboratory services be required, GAI has close relationships with several laboratories to perform the work. These laboratories have the capability to analyze natural materials, such as soil and rock, manufactured materials such as concrete and steel, and industrial waste manterials. The soil and industrial waste analysis capabilities include: classification tests, moisture content, grain size analysis, Atterberg limits, specific gravity, unit weight determinations, and chemical analyses. The characteristic test capabilities include: relative density equipment for sample particle sizes to three inches in diameter; apparatus for constant- and falling-head permeability measurements in both horizontal and vertical directions, and for moisture-density relationships for both modified and standard densities.

The compressiblity of materials can be determined in a 2.5-inch-diameter, one-dimensional consolidometer, or a 2.5-inch-diameter, one-dimensional Anteus consolidometer with back pressure and pore pressure capability. Also, volumetric consolidation can be determined isotropically or anisotropically. The strength parameters of soil and industrial/coal waste materials, can be determined by unconfined compression, direct shear, or triaxial shear tests. The rock-testing capabilities include classification by visual inspections and petrographic analysis, unconfined compression, direct shear, and triaxial shear tests. GAI also maintains several nuclear densometer testing gauges to monitor field compaction.

Design Engineering and Contract Document Preparation

GAI has extensive experience in design engineering and the preparation of contract documents for mine reclamation and related projects. GAI prides itself in development of simple, yet innovative, cost-efficient designs that are easily implmented in the field during construction. Our experience gained on various types of WV mine reclamation projects during the past 30 years will ensure that this quality continues.

GAI has prepared approximately 100 construction packages for the WVDEP/AML. GAI is completely familiar with WVDEP's guidelines for preparing construction drawings, technical specifications, and supporting documents. We are able to draw on a large collection of typical construction details contained within our CAD library for all types of mine reclamation projects. GAI also has various master specifications, which we are able to draw from to create project-specific specifications.

During the design engineering phase of our projects, GAI develops alternatives for the reclamation program and schedules meetings with the client to review options and select a mutually acceptable plan. We feel that this approach results in a more workable plan at an ultimately lower cost. We also perform a constructability review of each construction package by technical staff familiar with actual methods of construction. This review also expedites the overall reclamation plan.

Field Equipment

GAI maintains a wide assortment of field equipment to support our varied site investigations, studies, survey, and construction support activities. Among GAI's field equipment relevant to this Project are water quality/water sampling kits, M-scope depth meters and interface probes, handheld and backpack GPS equipment, digital cameras and video recorders, total station electronic survey equipment, nuclear densimeter gauges, pocket penetrometers, dynamic cone penetrometers, and flow meters.

Report Preparation

GAI makes extensive use of AutoCAD Civil 3D 2016, Microstation V8i, and ArcView. Complete reproduction facilities are availabe in our offices, which can produce high-quality color images, drawings, and reports. Our word processing abilities include the latest software (Microsoft Word), and scanning capabilities.

Past Project Performance

Abandoned Mine Reclamation Projects

Since 1958, GAI has established itself as a premier engineering and consulting firm specializing in foundation and soil mechanics engineering, and has been providing geotechnical and structural engineering-related engineering services for Abandoned Mine Reclamation Treatment projects. We are experienced in providing mine portal reclamation, subsurface investigations, site reconnaissance, landslide restoration plans, geotechnical investigation, field survey, boundary and topographic survey, site mapping, hydraulic modeling, construction drawings and specifications, and construction modeling.

GAI has been commended for our performance, by numerous federal, state, and local regulatory agencies and clients, including the WVDEP. We are particularly noted for our perserverance on difficult projects and our timely completion of projects under adverse conditions and fast-track schedules. We have included an extensive project list of WVDEP mine reclamation and applicable projects in **Appendix E**. The following project descriptions provide examples of our past performance.

Treatment of Richard Mine Acid Mine Drainage

Morgantown, West Virginia

GAI partnered with the West Virginia Conservation Agency (WVCA), Monongahela Conservation District, and Natural Resources Conservation Service (NRCS) to correct the Acid Mine Drainage (AMD) discharge problem at the Richard Mine, near Morgantown, WV. The overall goal of this project was to improve the water quality in Deckers Creek to restore the fish habitat in the lower 5 miles of the stream. The many benefits to the natural environment for Monongalia County and the City of Morgantown included removing the ugly orange and white staining caused by the AMD precipitate.

The project included five phases: 1) Analyze Problems and Compile Alternatives, 2) Develop Scope of Work, 3) Site Investigation, 4) Preliminary Design, 5) Final Design. GAI was under contract to perform Phases 1 and 2. GAI completed a Phase I Evaluation of AMD Problem Report which included bench scale testing. This report summarized the available data on the mine, mine discharge and other background data. GAI then completed a Treatment Alternatives Report, which provided recommendations for the best ways to deal with the Richard Mine AMD. This report was an evaluation of several alternatives, passive, active and innovative, for the treatment of the AMD discharge. In addition, the "no build" alternative evaluated.

Lasting Benefits: The Richard Mine Acid Mine Drainage (AMD) enters Deckers Creek about 5 miles upstream of the Monongahela River. Deckers Creek is a scenic stream that could become a great place for fly fishing and other recreational pursuits, after the AMD sources are removed from the creek. Deckers Creek meanders through Morgantown, past Marilla Park, and through neighborhoods. The creek is visible and accessible to the population of the Morgantown area. The Deckers Creek Rail Trail parallels the creek all the way from Reedsville, WV, down to the Monongahela River in the Wharf District.

Added Value: The best long-term solution was to convey the discharge to the Monongahela River where it can be diluted by the large volume of water with limited adverse effects to the river's water quality. The Morgantown Utility Board (MUB) expressed interest in the conveyance of the AMD to the Mon River because the required piping could be combined with storm sewer improvements. This helped solve combined sewer overflow (CSO) problems that had to be corrected to meet EPA mandates.

Laurel Run Point AML Reclamation Project

Laurel Point, Monongalia County, West Virginia

GAI was hired by the WVDEP/AML, to perform reclamation services of The Laurel Point Strip, located in Laurel Point, Monongalia County, WV. The project consisted of two sites with areas of exposed coal refuse; gob, collapsed and open deep mine portals, dangerous highwalls, and mine drainage.

The scope of work involved: preliminary engineering and planning; records review; surveying and reconnaissance; subsurface investigation and laboratory testing; regrading and soil covering the refuse pile, constructing access roads, providing steambank stablization, sealing the mine portals, backfilling highwalls, landslide reclamation, providing proper drainage control measures, revegetating the areas; and periodic construction monitoring. Construction plans and technical specifications were developed. GAI also prepared and obtained a Stormwater NPDES Permit and WVDOH permits.

Client: WVDEP/AML

Greystone Mine Drainage Reclamation Project

Morgantown, West Virginia

GAI was hired by the WVDEP/AML, to perform reclamation services of the Greystone Mine Drainage Reclamation Project, located near Morgantown, Monongalia County, WV to provide subsurface investigation, surveying, development of construction plans and specifications for reclamation, and an engineer's opinion of probable construction costs. The project was located within the Greystone Housing Development in an area that had been surface and deep mined. AMD seepage from the highwall benches caused hot spots in lawns and driveways and has caused flooding during heavy precipitation events. The scope of work involved: design for construction of seals for the collapsed portals, an access road, underdrains to collect seepage, a conveyance drainage system, and site reclamation.

Client: WVDEP/AML

Wheatley Branch (Luthy) Portals Project

Chapmanville, Logan County, West Virginia

The Wheatley Branch (Luthy) Portals Project is located near Chapmanville, Logan County, WV. The project consisted of 29 mine portal closures and included upgrading access to the site and drainage control measures. GAI's scope of work involved preliminary engineering and planning, access road construction, 29 mine seals, providing proper drainage control measures, records review, surveying and reconnaissance, subsurface investigation and laboratory testing, construction drawings and specifications, permits and miscellaneous clearances, and periodic construction monitoring. We also prepared and obtained a Stormwater NPDES Permit, WVDOH MM-109 permits and a non-reporting nationwide USACE 404 permit.

Client: WVDEP/AML

Earling Refuse Pile Reclamation Design Project

Earling, Logan County, West Virginia

GAI was hired by the WVDEP/AML, to perform reclamation services of the Earling Refuse Pile Reclamation Design Project, located near Earling, Logan County, WV. The project consisted of an approximate three-acre refuse pile. The refuse is lying on a steep hillside between the road and a creek, approximately 1200 feet in length. The toe of the pile is eroding and washing away in the creek. The refuse pile is unstable in several places. In addition, there are also 10 open, non-draining, portals along an access road, which are being used for disposal of garbage and trash.

The scope of work involved: preliminary engineering and planning; records review; surveying and reconnaissance; subsurface investigation to allow for a design of a detailed reclamation plan and laboratory testing; engineering, planning, construction drawings, and specifications; regrading the refuse pile; providing streambank stabilization; stream restoration; sealing the mine portals; bat gates; and providing proper drainage control measures.

Client: WVDEP/AML

Owings Mine Complex Reclamation Project

Harrison County, West Virginia

GAI was hired by the WVDEP/AML, to prepare plans and specifications for the reclamation of the Owings Mine Complex in WV. The abandoned mine site included old mine structures, open mine portals, unreclaimed refuse piles, and numerous AMD producing seeps. GAI developed a Passive Treatment Plan for reclamation that involved a Successive Alkanity Producing (SAP) system and an aerobic pond. GAI also identified monitoring points for sampling streams and AMD discharges. After three months of sampling and analysis, GAI prepared a Summary of Findings for the WVDEP and developed a design for the Passive Treatment System. GAI also designed a drainage system for four refuse piles and other refuse areas, and designed seals for eight mine portals.

Client: WVDEP/AML

Reynoldsville Refuse Reclamation Project

Reynoldsville, Harrison County, West Virginia

GAI was hired by the WVDEP/AML, to perform reclamation services of the Reynoldsville Refuse Project, located near Reynoldsville, Harrison County, WV. The project consisted of 11 sites with areas of deep mine portals, multiple collapsed mine portals, household trash, old tire piles and parts of abandoned vehicles, coal refuse, subsidence holes, abandoned structures, abandoned mine buildings, old haul roads, a wet well structure, refuse piles eroding into a stream and wetlands, a vertical shaft, and unvegetated refuse piles.

The scope of work involved: preliminary engineering and planning; records review; surveying and reconnaissance; subsurface investigation and laboratory testing; engineering, planning, construction drawings, and specifications; permits and miscellaneous clearances; pre-bid and pre-construction meetings;

periodic construction monitoring; providing regrading and soil covering refuse piles; constructing access roads; providing streambank stabilization; sealing the mine portal; bat gates; demolition of mining structures; filling of vertical shafts; regrading sink hole areas; providing proper drainage control measures; and revegetating the areas.

Client: WVDEP/AML

Ned's Branch Impoundment, Phase II Project

Mingo, Randolph County, West Virginia

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 regrading 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.

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 under way. Embracing the urgency requested by the WVDEP, GAI provided solutions that re-established the integrity of the impoundment and restored the natural beauty of the site under an accelerated work schedule.

Awards

GAI was awarded the 2003 National Award for Most Outstanding Abandoned Mine Lands Reclamation for the WVDEP's Ned's Branch Impoundment Project, Phase II, located in Mingo County, WV.

Client: WVDEP/AML

Amigo Portals

Raleigh County, West Virginia

GAI was hired by the WVDEP/AML, to provide closure of 18 mine portals with mine seals, a stable final configuration of refuse pile, and streambank stabilization.

GAI designed drainage conveyances, providing stream realignment and streambank stabilization with rock, and streambank revegetation, installation of mine seals, refuse reclamation, checked water quality, soil thickness, and soil properties, performed an opinion of probable cost, prepared construction documents, and performed quality assurance/quality control. We also prepared and obtained a Stormwater NPDES Permit and USACE 404 permit.

Client: WVDEP/AML

Larry Frederick Highwall and Refuse Project

Harrison County, West Virginia

The Larry Frederick Highwall and Refuse Project, located near Lumberport, Harrison County, WV, consisted of two mine portal closures, exposed refuse pile, residential waste, and poorly vegetated bench area. Site 1 had at least three suspected collapsed portals with drainage and approximately two acres of area with apparent mine subsidence features. Site 2 had approximately two acres of mostly unvegetated coal refuse, residential waste, and a highwall bench.

GAI's scope of work included regrading and soil covering the refuse pile; sealing the mine portals, refuse disposal, installation of temporary shoring and bracing; erosion and sedimentation control; proper disposal of mining-related debris; and upgrading access road and revegetating disturbed areas.

Client: WVDEP/AML

Bridge Projects

Willowwood Bridge Replacement

Summers County, West Virginia

GAI studied, designed, and prepared the right-of-way (ROW) and construction contract plans and related project documents for the replacement of the Willowwood Bridge carrying WV 3 over the Greenbrier River.

The bridge, approximately 0.11 miles east of WV 12, was relocated upstream, generally in accordance with Alternative 3 of the Willowwood Bridge Replacement Location Study prepared by GAI.

Willowwood Bridge provides a 44-foot-wide curb-to-curb deck consisting of two 12-foot wide vehicular lanes, a 12-foot-wide center turning lane, and two 4-footwide shoulders. The total length of the bridge is 395 feet, and it has 935 feet of approach roadways, including a new intersection on the south side of the structure.

Work Task & Services

- Design study report/alternative analysis
- Span arrangement investigation
- Multi-girder superstructure design
- Geotechnical investigation
- Roadway design
- Utility relocations
- Right-of-way development
- Maintenance of Traffic (MOT)
- Type, size and location study
- Drainage design
- Shop drawing review
- Construction consultation

Pangburn Hollow and Lowrie's Run Bridge Replacements and Rehabilitation

Allegheny County, Pennsylvania

Precast reinforced concrete box culvert structures were designed to replace two short span bridges, Pangburn Hollow Bridge No. 4 and Lowrie's Run Bridge No. 12. Another bridge on Pangburn Hollow Road (Bridge No. 3) required design of a cast-in-place concrete slab to replace the single span superstructure, and the strengthening of the existing abutments with concrete jackets. The Pangburn Hollow Road bridges cross over Perry Mill Run, and Lowrie's Run Bridge carries Highland Road over the East Branch of Lowrie's Run.

GAI provided the design portion of this project, prepared the Categorical Exclusion Evaluation (CEE) to identify potential impacts to natural systems and social features in the project area, and conducted wetland delineations. The efforts of three subconsultants and involvement with state and federal natural resource agencies were coordinated by GAI throughout the project.

Added Value: GAI's innovative approach to rehabilitating Bridge No. 3 involved using a cast-in-place reinforced concrete slab that enabled the existing reinforced concrete abutments to be incorporated into the design. This eliminated the cost of demolishing and reconstructing the abutments.

Work Tasks & Services

- Replacement structure-type investigation
- Cursory inspections
- Approach roadway and final structure design
- Hydrologic & Hydraulic (H&H) analyses and report
- Soils and geotechnical investigation
- Traffic control plan (detour)
- Right-of-Way plans
- Roadway alignment improvement
- Categorical Exclusion Evaluation (CEE) Level 1
- Type, Size & Location (TS&L) report
- (E&S) Control Plan
- Phase 1 Environmental Site Assessment (ESA)
- Wetland delineation
- Project manual preparation

T-606 Sportsman's Road Bridge Design

Blair County | Tyrone, Pennsylvania

This federal and state funded project to replace the bridge carrying T-606 (Bald Eagle Sportsman's Road) over Big Fill Run in Snyder Township was completed by GAI with oversight from the Pennsylvania Department of Transportation, District 9-0. The existing 5-ton weight restricted bridge, built in 1930 and rehabilitated in 2001, consisted of a one-lane, single span, steel I-beam superstructure with a timber plank deck and a 23'-10" clear span supported by reinforced concrete abutments.

GAI was given a 30-month design schedule to replace the structure with a single lane, precast box culvert. However, due to anticipated economic growth in the area, environmental concerns, and the failing condition of the existing bridge, the design schedule was compressed to 12 months and the scope of work changed to designing a new two-lane bridge consisting of six 48" x 12" precast, pre-stressed adjacent concrete plank beams with a 36'-0" span and a composite reinforced concrete deck. The first of its kind in District 9-0, the bridge substructure consists of Geotextile Reinforced Soil–Integrated Bridge System (GRS-IBS) abutments using geotextile stabilized compacted earth layers for support and concrete masonry units as facing.

Work Tasks and Services

- Bridge design
- GRS-IBS bridge system substructure
- Erosion and Sedimentation (E&S) control plan
- Hydrologic and Hydraulic (H&H) analysis
- Wetland delineation
- Cultural Resources

Seward Power Plant Access Road and Bridge

Indiana County | Pennsylvania

Reliant Energy reconstructed Seward Power Plant, and GAI provided design construction monitoring services for a new entrance to the plant. GAI developed plans and prepared bid documents for a 465-foot-long, 4-span prestressed concrete I-beam bridge and 1,900 feet of approach roadway to provide access from S.R. 2008. Special Live Load (SLL) design concepts were incorporated into the bridge design to ensure the structure would be capable of handling the weight and volume of truck traffic associated with daily plant operations. Approximately 600 six-axle, 95.0-kip load trucks would cross the bridge every day.

To expedite construction of the bridge and remain within the tight project schedule constraints, GAI suggested that a pile-driving subcontractor already on site be used to drive the steel H-piles for the structure foundations before the bridge contract was advertised for bid.

GAI also provided construction monitoring services for the new entrance that would tie into S.R. 2008. Construction included drainage, guide rail, and lighting for the bridge and roadway, and GAI was responsible for erosion and sedimentation controls. GAI maintained all necessary traffic on the bridge and roadway throughout construction.

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Work Tasks & Services

- Survey
- Bridge Type, Size & Location (TS&L) investigation
- Design Field View submission
- Bridge structure design
- Approach roadway design
- Erosion and Sedimentation Control Plan (E&S)
- Drainage design
- Geotechnical investigation
- Traffic Control Plans
- Signing and lighting
- Railroad coordination
- Wetland delineation
- Bid document preparation
- Construction consultation
- Shop Drawing review
- Maintenance and Protection of Traffic (MPT)
- Construction Monitoring including all drainage, guide rail, and E&S controls

SR 3009, Section 003, Lake Gordon Bridge Rehabilitation

Bedford County | City, Pennsylvania

Lake Gordon Bridge carries State Road 3009 over Gordon Lake, a reservoir owned by the Evitts Creek Water Company that supplies water to the Cumberland, Maryland area. The reservoir is also used recreationally under an agreement with the Pennsylvania Fish and Boat Commission. GAI designed a new superstructure comprising four PA-I beams and a conventional concrete deck, supported on reconstructed pedestal walls. The rehabilitation involved reusing existing inclined column and foundation elements below the waterline. Abutments were replaced with new conventional abutments, and the earth-filled arches were replaced with pier pedestal walls and a PA I-beam multi-stringer superstructure with a cast-in-place concrete deck.

GAI created three-dimensional STAAD models of both the existing and proposed structures to determine the loads applied to the column bent system and ensure they did not increase in any area of the structure.

The new bridge profile was raised so deck drainage could flow off the ends of the bridge rather than through an existing deck drainage system. Eliminating the deck drains reduced maintenance demands, increased the service life of the new structure, and lessened the amount of roadway contaminants entering the reservoir. Since the entire project site was extremely sensitive to materials unintentionally spilling into the reservoir, demolition activities required complete containment.

Work Tasks & Services

- Bridge and Roadway Design
- Construction Consultation
- Public Involvement

Huntingdon Borough Bridge Replacement

County | Huntingdon, Pennsylvania

GAI provided preliminary engineering services, using Bridge Automated Design and Drafting (BRADD 3) design software, to replace the Huntingdon Borough Bridge—a deteriorating two-span concrete spandrel arch structure that carries S.R. 1010 (Penn Street) over Standing Stone Creek in Huntingdon, Pennsylvania. A modern single-span structure was selected as the best replacement to safely carry two-way traffic over the creek. Several businesses, driveways, and houses are located very close to the bridge, so roadway reconstruction was limited to only what was necessary to incorporate the new structure into the landscape.

- BRADD 3 bridge design
- Bridge Type, Size & Location (TS&L) submission
- Approach roadway design
- Traffic control plans
- Hydrologic & Hydraulic (H&H) report
- Erosion & Sedimentation (E&S) control
- Public involvement
- Hazardous materials investigation
- Health & Safety plan
- Categorical Exclusion Evaluation (CEE)
- Construction consultation

Project Approach

The GAI Team is uniquely qualified to provide consulting engineering services associated with this Expression of Interest. Our large local presence, combined with our national resources will benefit the WVDEP during the execution of this Project. We offer unsurpassed experience in Civil, Geotechnical, Environmental, Structural, Geological, Geotechnical, and Hydrological Engineering services.

GAI has provided design, analysis, and other support services on a variety of similar projects. Our Project Approach includes an overview of potential services the WVDEP may consider relevant to this Project.

Project Implementation

This Project is to provide full-service A/E design services related to the Richard Mine Drainage Access Project within Monongalia County, WV. It is our assumption that the crossing will be designed following the requirements and design standards of the WVDOH. Based on GAI's understanding of the Project at this time, the services to be provided include the following:

- Structural/Bridge Design
- Hydrology and Hydraulic Engineering
- Geotechnical Engineering
- Civil Site Engineering

Project Goals and Objectives

GAI understands the purpose of this project is to provide permanent access from WV Rt 7 crossing Deckers Creek to the site of the Richard Mine Drainage Treatment System. Project goals and objectives are the following:

- Developing the construction plans and technical specifications for the proposed crossing;
- Preparing the design plans and technical specifications;
- The design will be based on an approximate span of 100 feet and a clear roadway width of 16 feet with the capablity of carrying all legal highway loads; and
- The design plans and specifications will be devolped to limit disturbance with regard to storm water controls and erosion and sediment prevention.

Additionally, should GAI be awarded the Project, we understand that Preliminary Design documents will meet the requirements of the Purchase Order.

The following page shows Aerial Project Map (**Figure 1**); and Project Site and GAI Office Locations Map (**Figure 2**).

Figure 1 – Aerial Project Map
Richard Mine Drainage Access Project; WVDEP

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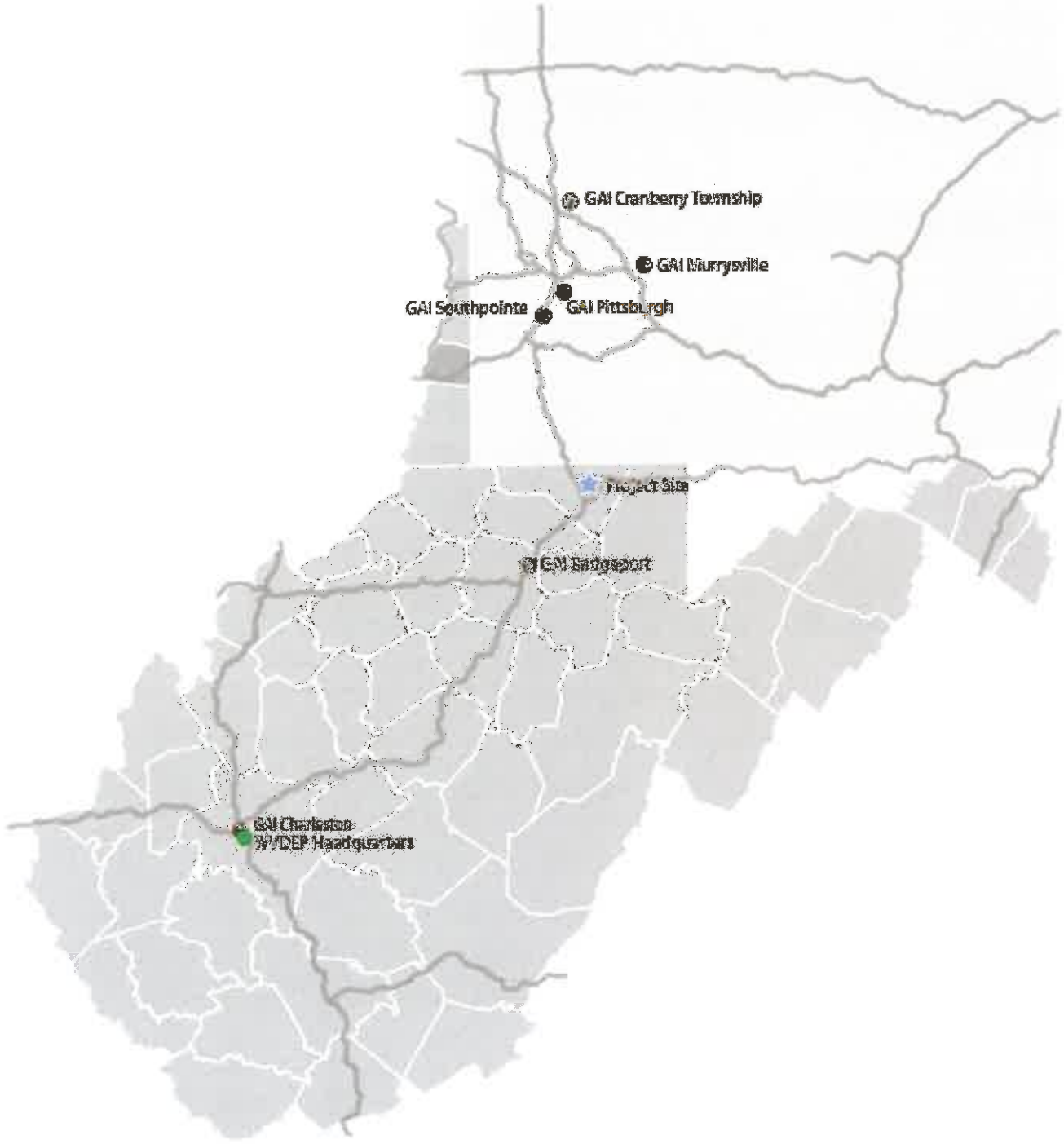
Figure 2 – Project Site and GAI Office Locations Map



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Project Management

GAI's professional, technical, and support staff have extensive experience working on abandoned mine land projects and related design projects, and are extremely well qualified to serve the WVDEP on this important Project. GAI stands ready to commit personnel and resources required to complete this Project in a timely, technically sound, and cost-efficient manner.

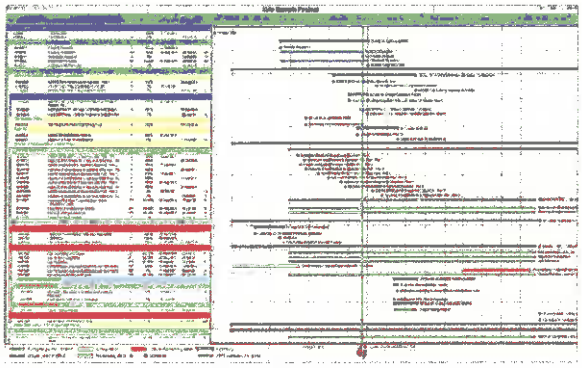
Mr. Charles F. Straley, PE, PLS, is GAI's proposed Project Manager for this contract, and he will be responsible for the day-to-day management and performance of this Project. He will review the work directive and prepare the scope of work and cost proposal. Mr. Straley will generally supervise the work in progress and review work products at intermediate points and finally prior to submittal to the WVDEP.

Project Status Reports and Meetings

GAI will participate in routine (typically weekly) conference calls with the WVDEP, as required. GAI's Project Manager can lead the calls if requested by the WVDEP. GAI will provide a conference call phone number to support the conference calls. During the calls, GAI will update the WVDEP regarding the status of permitting activities, scheduling timelines, and any proposed changes to the Scope of Work. GAI will coordinate with the WVDEP to identify information needs and proposed engineering changes that could result in scheduling changes and/or changes to the scope of work. GAI will discuss implications of design changes with the WVDEP Team to develop Project strategy adjustments, as necessary.

Scheduling

Planning and coordination are both key to keeping a project on schedule. Our design management efforts keep projects on schedule through proven planning and cost control operations that use Microsoft Project and/or Primavera scheduling software. This software enables us to create a variety of scheduling/reporting formats best suited to the individual project. These schedules can be updated on a regular basis to track overall conformance, or filtered to show short-term progress. As the final schedule develops, contractors are requested to submit and review all activities involved in their work phases. Schedules are continually updated throughout the project by daily review and weekly reporting.



GAI will begin our efforts by coordinating with WVDEP staff, so that all parties understand the Project's vision, goals, process, and specific requirements for documentation, reviews, and approvals. GAI will also correspond with various permitting agencies to determine the best strategy and streamline the review process of any required permits. Once the project's parameters and process are understood, our Team will plan efforts to implement the work. Tight schedules benefit from the use of current technology to streamline the transfer of information between the design team and the client to enable more frequent and timely reviews of the work product.

Computer Software and Networking

GAI's Information Technology Department provides an extensive array of computers and software to support the needs of GAI's staff. Our in-house computing capabilities include LAN and WAN Network capabilities, and email/internet access to staff. GAI also has a library of popular databases, spreadsheets, and statistical software, as well as a comprehensive collection of groundwater, structural, geotechnical, highway, bridge, transportation, hydraulics, transmission line, land development, and environmental computer programs. Presently, our computer library consists of well over 300 programs. GAI utilizes AutoCAD Civil 3D 2016 and Microstation V8i in producing design drawings and designing grading plans. GAI also utilizes Esri GIS applications, ArcGIS Desktop, and ArcGIS Server, including Spatial and 3D Analyst Extensions.

GAI uses Newforma Project Center software to allow convenient client access to review progress drawings and provide input into the design process during the process. Newforma is project management software utilized by GAI to organize project documentation and activities. It allows GAI to have a central location where project documents can be found, and can be linked to project activities, such as meetings or submittals. The capability to track submittals is available, so that clients have access to an interface that lists the submittals they have reviewed and returned comments on and ones they have not. It also has a web-based server, which allows clients to easily send and receive files as large as 2 GB.

GAI is equipped with the computer and software capabilities to provide quality project management. We are fully integrated using the following programs to enhance our abilities in the pre-construction and construction phases:

- **Microsoft Project/Primavera**: This scheduling program is an industry standard allowing detailed scheduling and updates for the best in work progress management.
- **AutoCAD**: Allows the viewing and printing of CAD files. This time saving tool is used for the electronic transfer of construction documents and revisions.
- **Newforma Project Center**: This software allows easy access for the WVDEP to review Project information.

Design

Research and design follow the kickoff meeting discussions with those associated with the Project and the WVDEP. GAI will undertake a geotechnical investigation to determine underlying cause(s) for the landslide, attempt to determine extent of the damage, and determine the required modifications to be made to the existing soils to restore slope stability and any roadway/building structures. A feasibility report summarizing the findings will be produced and submitted to the WVDEP. The report will include an opinion of probable cost associated with addressing landslide repair and stabilization. GAI will then determine suitable corrective actions as well as overall construction sequencing. GAI will perform a topographic survey of the areas surrounding the landslide. This survey will locate any existing structures or utilities in the area that may be impacted by construction activities.

Based on the results of the geotechnical investigation and survey, GAI will develop design drawings and specifications to be used by the contractor selected for the landslide repair.

Permitting

Permitting is a GAI strength. We permit multiple construction projects each year. We believe that our permitting experience and permitting knowledge are unparalleled. GAI will prepare the Erosion and Sediment Control Plan for the overall project to be included with the bidding documents in accordance with the Best Management Practices of the WVDEP. Once the scope of work is fully defined, GAI will determine what additional permits may be required and will obtain or assist in obtaining those permits.

GAI will develop a timeline describing the permitting process, submittal dates, and anticipated review periods, and to coordinate activities where approvals may be required from multiple entities. GAI will prepare administratively complete applications, and will promptly address technical comments as they are received.

GAI has worked with numerous clients to successfully coordinate and obtain permits and approvals for stream, highway, and railroad crossings; work within highway and rail corridors; and erosion and sedimentation control approvals. GAI has extensive experience with the specific requirements of each of the identified permit and approval entities, to help expedite the approval process.

Specifications

For all of the work described above, GAI will prepare specifications in accordance with the most updated accepted standards for materials and workmanship. GAI will consider the needs of the WVDEP and residents in the neighborhoods near the landslide, and include provisions in the specifications to minimize disruptions during all phases of the Project.

Bidding and Contract Documents

Once the contract documents reach the appropriate stage of approval, we will prepare bid documents for distribution of prospective contractors, attend pre-bid meetings, develop responses to contractors' Requests for Information, prepare addenda and review bids submitted by prospective contractors. The Design Team will prepare a tabulation of bids, check contractors' references and provide a recommendation of award. GAI has extensive experience preparing bid packages for our projects for both public and private sector clients. These include multiple projects for clients such as the WVDEP and other state and local government agencies.

Construction Monitoring

After a contractor has been selected, GAI personnel will be located onsite during construction activities to monitor progress. GAI has many field personnel experienced in construction monitoring with the training required to observe effectively. The construction monitors will be responsible for conducting onsite compaction testing, review construction practices, document conformance with plans, and provide onsite guidance for questions regarding the construction documents. The onsite monitors will take pictures and complete a log of events.

Quality Assurance/Quality Control

Project Controls Group

GAI has established a Project Controls group to monitor cost and manage reporting in our Energy Business Unit. This group utilizes Deltek Vision v7.6, GAI's enterprise management software, to monitor the progress, cost, and schedule of each project.

Quality Management System

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 Quality Management System (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.

Invoice Management

To track and manage the Project budgets, GAI proposes to use a Cost Tracking Spreadsheet. GAI will update the Cost Tracking Spreadsheet on a weekly basis, which includes the awarded value for each task, approved change order amounts, current invoice amount, amount invoiced to date, remaining amounts approved, and physical percent complete.

To manage and document the Project's scope, if activities are determined to be required that are not part of this scope (change orders), GAI will provide work plans to the WVDEP to be approved. GAI will incorporate these change orders into the Cost Tracking Spreadsheet as they are approved.

GAI's proposed weekly conference calls will include a review of the Project budget and change orders, as needed.

Project Closure

As standard protocol for this Project, our daily work logs, digital files, and technical information is collected through daily activities. This information is shared within GAI's survey department library and at the closure of the Project can be provided to the WVDEP for facilities records.

Project Schedule

GAI understands the Project is scheduled to start on November 1, 2018, and is scheduled for completion by October 31, 2019.

References

1. Michael Richardson
   Office of Surface Mine Reclamation and Enforcement, Charleston
   Formerly of WVDEP, Division of Land Restoration
   1027 Virginia Street, East
   Charleston, WV 25301
   304.747.7162, ext. 3010

2. Nick Estes, PE
   WVDEP/AML
   601 57th Street, SE
   Charleston, WV 25304
   304.926.0499, ext. 1521

3. Craig R. Treese
   Pennsylvania Department of Environmental Protection,
   Bureau of Abandoned Mine Reclamation
   Cambria District Office
   286 Industrial Park Road
   Ebensburg, PA 15931-4119
   814.472.1845

Certificates of Authorization

GAI's Certificate of Authorization to offer Engineering, Surveying, or other related services within the state issued by the appropriate West Virginia Board is located in **Appendix G**.

Closing

GAI appreciates the opportunity to present our Expression of Interest to the WVDEP. Should you have any questions or concerns pursuant to our submission or qualifications, please don't hesitate to contact Charles F. Straley at 681.245.8866 or via email at c.straley@gaiconsultants.com.

Attachments: Appendix A (WVDEP Required Signature Pages), Appendix B (AML Consultant Qualification Questionnaire), Appendix C (AML and Related Project Experience Matrix), Appendix D (Project Organizational Chart and Key Personnel Resumes); Appendix E (GAI WVDEP AML Project List); Appendix F (GAI Service Briefs); Appendix G (Certificates of Authorization)

APPENDIX A
WVDEP Required Signature Pages

gai consultants

	Purchasing Divison **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: 485901

Doc Description: EOI - Richard Mine Drainage Access

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-09-07	2018-10-09 13:30:00	CEOI 0313 DEP1900000005	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.
Suite 1100
Charleston, WV 25301
304.926.8100

FOR INFORMATION CONTACT THE BUYER

Jessica S Chambers
(304) 558-0246
jessica.s.chambers@wv.gov

Signature X Charles Straley **FEIN #** 25-1260989 **DATE** 10/9/18

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

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Charles Straley
(Name, Title)

Charles F. Straley, MS, PE, PLS, Senior Engineering Manager
(Printed Name and Title)

300 Summers Street, Suite 1100, Charleston, WV 25301
(Address)

Phone: 681.245.8866 / Fax: 304.926.8180
(Phone Number) / (Fax Number)

c.straley@gaiconsultants.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

GAI Consultants, Inc.
(Company)

Charles Straley
(Authorized Signature) (Representative Name, Title)

Charles F. Straley, MS, PE, PLS, Senior Engineering Manager
(Printed Name and Title of Authorized Representative)

October 9, 2018
(Date)

Phone: 681.245.8866 / Fax: 304.926.8180
(Phone Number) (Fax Number)

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: **GAI Consultants, Inc.**

Authorized Signature: Charles Straley Date: 10/8/18

State of **West Virginia**

County of **Kanawha**, to-wit:

Taken, subscribed, and sworn to before me this 8th day of October, 2018

My Commission expires August 31, 2021

AFFIX SEAL HERE

NOTARY PUBLIC Lena Tiller

NOTARY PUBLIC OFFICIAL SEAL
LENA TILLER
State of West Virginia
My Comm. Exp. August 31, 2021
GAI Consultants Inc
300 Summers St, Ste 1100 Charleston, WV 25301

APPENDIX B
AML Consultant Qualification Questionnaire

gai consultants

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AML CONSULTANT QUALIFICATION QUESTIONNAIRE — Appendix "B"

PROJECT NAME	DATE (DAY, MONTH, YEAR)	FEIN
Richard Mine Drainage Access	**09, October, 2018**	**25-1260999**

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
GAI Consultants, Inc.	**385 E Waterfront Drive Homestead, PA 15120**	**General Analytics, Inc.**

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise)
412.476.2000	**1958**	Individual **X** Corporation Partnership Joint-Venture	YES NO **X**

7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE

300 Summers Street, Suite 1100, Charleston, WV 25301 / 304.926.8100 / Charles F. Straley, PE, PLS / 20 Charleston, WV
15 Bridgeport, WV
15 Pittsburgh, PA
5 Cranberry, PA
8 Murrysville, PA

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
Steven E. Gould, Senior Vice President **Gary DeJidas, CEO**	**Anthony Morrocco, President - 412.399.5197** **Karl Palvisak, VP/CFO - 412.319.3021**

9. PERSONNEL BY DISCIPLINE

125	ADMINISTRATIVE	8	ECOLOGISTS	8	LANDSCAPE ARCHITECTS	20	STRUCTURAL ENGINEERS
0	ARCHITECTS	1	ECONOMISTS	17	MECHANICAL ENGINEERS	14	SURVEYORS
27	BIOLOGIST	16	ELECTRICAL ENGINEERS	2	MINING ENGINEERS	32	TRAFFIC ENGINEERS
57	CADD OPERATORS	68	ENVIRONMENTALISTS	0	PHOTOGRAMMETRISTS	217	OTHER
3	CHEMICAL ENGINEERS	8	ESTIMATORS	16	PLANNERS: URBAN/REGIONAL		
121	CIVIL ENGINEERS	13	GEOLOGISTS	5	SANITARY ENGINEERS		
35	CONSTRUCTION INSPECTORS	4	HISTORIANS	13	SOILS ENGINEERS		
35	DESIGNERS	3	HYDROLOGISTS	6	SPECIFICATION WRITERS	874	TOTAL PERSONNELL
0	DRAFTSMEN						

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 5
***RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.**

Since 1984, GAI has completed more than 140 projects for the West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation. Proposed Project Manager, Mr. Charles F. Straley, PE, PLS, out of GAI's Charleston office, has worked on 96 of these projects, and has managed 71 of these projects.

GAI has also been providing raod and bridge services to the WVDOH since the 1980's.

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? ☐ YES ☐ NO ☑ NA

11. OUTSIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Qualification Questionnaire".

NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE
None		____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ____ Yes ____ No

12. A. Is your firm's personnel experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering?

YES Description and Number of Projects: **GAI has completed 144 projects for the WVDEP, Office of AML&R over the past 34 years. GAI has completed over 175 projects for all AML Programs (WV, PA, VA, MD, Office of Surface Mining). These projects include design of abandoned refuse piles, design of abandoned portals, demolition of facilities, design of drainage control structures, mine fires, and revegetation plans.**

NO

B. Is your firm experienced in Soil Analysis?

YES Description and Number of Projects: **GAI has completed over 250 projects that required soil analysis for revegetation plans, acid/base counts, foundation, stability analysis, engineering properties, etc. Most of the 140+ WVDEP AML&R projects required some type of soil analysis. GAI has completed analysis both in-house and with subconsultants, depending on requirements.**

NO

C. Is your firm experienced in hydrology and hydraulics?

YES Description and Number of Projects: **GAI has completed over 300 projects which involve hydrology and hydraulics, including projects that were mining related. Most of the 140+ WVDEP AML&R projects required hydrology and hydraulic evaluations and design for drainage control structures, mine hydraulic level, mainstream event, water transmission, sediment control, etc. GAI is also experienced and trained in natural stream restoration and wetland mitigation.**

NO

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping?

YES Description and Number of Projects: **GAI has produced contour mapping on most of our 175+ projects completed for AML Programs. We subcontract out aerial photography, if it is not already available.**

NO

E. Is your firm experienced in domestic waterline design? (Include any experience your firm has in evaluation of aquifer degradation as a result of mining.)

YES Description and Number of Projects: **GAI has completed over 100 projects involving domestic waterline design, of which 44 were for the WVDEP AML&R program. This has included aquifer degradation evaluation and waterline design, Public Service District interaction, PSC requirements, Health Department permits, etc., to include field surveys, field inspection, and public hearings and meetings. Aquifer degradation and waterline design were the primary components of these projects.**

NO

F. Is your firm experienced in Acid Mine Drainage Evaluation and Abatement Design?

YES Description and Number of Projects: **GAI has completed approximately 130 Acid Mine Drainage (AMD) evaluations and abatement designs, of which 27 were for the WVDEP AML&R program. However, AMD was a consideration on most of the 140+ WVDEP AML&R projects. Projects include grouting programs, SAP installations, and innovative abatement design.**

NO

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Straley, Charles, F. **Project Manager**	**30**	**32**	**32**

Brief Explanation of Responsibilities

Mr. Straley has either managed or provided engineering design services for over 95 AML projects. Mr. Straley is GAI's designated Project Manager for this important Project, and will be responsible for day-to-day project activities and guidance of the GAI Team. His main activities will include development of detailed step-by-step project work plans to ensure the project activities are completed on budget and on time; review of the work product at intermediate points and at Project completion; providing guidance and direction to Project staff; as well as assisting with engineering and design work. Mr. Straley will be responsible for preparation of construction drawings, technical specifications, calculations, and cost estimates. He will oversee the geotechnical aspects of the Project, including but not limited to, subsurface exploration, foundation and embankment design, and slope stability.

EDUCATION (Degree, Year, Specialization)
MS, 1988, Geotechnical Engineering
BS, 1986, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 1992, WV, IN, KY, OH **Professional Land Surveyor (PLS), 1996, WV**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Long, Shaun **Assistant Project Manager** **Lead Structural Bridge Engineer**	**15**	**15**	0

Brief Explanation of Responsibilities

Mr. Kinder is GAI's designated Assistant Project Manager for this important Project, and will be responsible for the preparation of construction drawings, technical specifications, calculations, and cost estimates. He will oversee structural design aspects of the Project.

EDUCATION (Degree, Year, Specialization)
BS, 2005, Civil Engineering
MS, 2011, Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 2010, WV, OH, FL

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Woodland, Christopher W. **Civil Engineer - Strucures**	**20**	**20**	**0**

Brief Explanation of Responsibilities

Mr. Woodland will provide support for the design of crossing structure and preparation of construction drawings, technical specifications, calculations, and cost estimates.

EDUCATION (Degree, Year, Specialization)
BS, 1999, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 2004, WV, MD

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Kinder, Kenneth, W. **Lead H&H Engineer**	**15**	**15**	**2**

Brief Explanation of Responsibilities

Mr. Kinder is the lead H&H Engineer for this important Project. He will oversee hydraulic/hydrology aspects of the Project, including but not limited to: stormwater management, erosion and sediment control, and stream hydaulics.

EDUCATION (Degree, Year, Specialization)
BS, 2003, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 2007, WV **Certified Floodplain Manager (CFM)**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Frech, Kerry, L. **Lead Hydrologic and Hydraulic Engineer**	**15**	**36**	**2**

Brief Explanation of Responsibilities

Mr. Frech specializes in applying hydrologic and hydraulic principles to the development of water and land-related resources. His experience ranges from planning and feasibility-level studies to design and the preparation of construction documents. Mr. Frech will be the Lead Hydrologic and Hydraulic Engineer for this project and will provide expertise in the area of hydrology and hydraulics, including but not limited to, stormwater management and modeling of drainage systems.

EDUCATION (Degree, Year, Specialization)
MEng, 1978, Environmental Engineering
BS, 1977, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers	**Professional Engineer (PE), 1983, PA** **Professional Engineer (PE), 1998, WV**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Bortz, Kevin, M. **Hydrologic and Hydraulic Engineer**	**<1**	**29**	**1**

Brief Explanation of Responsibilities

Mr. Bortz specializes in hydrology and hydraulics, erosion and sedimentation control, and stormwater management, as well as general civil engineering and surveying. He provides hydrologic and hydraulic design and analysis for natural stream restoration, culverts, channels, ponds, dams, stream encroachments, and impoundments. Mr. Bortz will provide expertise in the area of hydrology and hydraulics, including but not limited to, stormwater management and erosion and sedimentation control.

EDUCATION (Degree, Year, Specialization)
MS, 1989, Civil Engineering
BS, 1987, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 1995, PA **Professional Engineer (PE), 2016, VA**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Ruffolo, Richard, M. **Lead Geological Engineer**	**15**	**15**	**3**

Brief Explanation of Responsibilities

Mr. Ruffolo specializes in site characterization, subsurface investigations, landslides, and mine subsidence; analysis of slope stability; foundation design; and geotechnical engineering. He has experience in rock strength studies, drilling and micropile installation monitoring, foundation construction monitoring, and monitoring core logging. Mr. Ruffolo will be the Lead Geological Engineer for this project, providing expertise in this area.

EDUCATION (Degree, Year, Specialization)
MS, 2005, Geology
BS, 2001, Environmental Geology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers	**Professional Geologist (PG), 2007, PA** **Professional Geologist (PG), 2010, NC** **Professional Geologist (PG), 2013, KY**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Fisher, Shane, A. **Civil Engineering Lead**	**<1**	**13**	**2**

Brief Explanation of Responsibilities

Mr. Fisher specializes in civil engineering, drainage systems, and environmental permitting. He also manages erosion and sediment control and construction stormwater projects. He will oversee the civil engineering aspects of this project and will be responsible for the preparation of construction drawings, technical specifications, calculations, and cost estimates.

EDUCATION (Degree, Year, Specialization)
BS, 2005, Civil Engineering Technology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers (ASCE), WV Northern Branch - President **American Society of Highway Engineers (ASHE)**	**Professional Engineer (PE), 2012, WV** **Professional Engineer (PE), 2017, VA** **Professional Engineer (PE), 2017, NC** **Professional Engineer (PE), 2018, MD**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Gandee, Jason **Civil Engineer**	10	**12**	**<1**

Brief Explanation of Responsibilities

Mr. Gandee specializes in civil engineering and hydrologic and hydraulic design, and has experience with NPDES permits and supporting documents. He will perform the hydrologic and hydraulic aspects of the project, including but not limited to: stormwater management, erosion and sediment control, and mine discharge.

EDUCATION (Degree, Year, Specialization)
BS, 2007, Civil Engineering Technology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Certified Troxler Nuclear Density Operator

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Mower, Christy, M.	**3**	18	**0**

Brief Explanation of Responsibilities

Ms. Mower specializes in environmental permitting and biology and ecology, with extensive experience in fisheries surveys, wetland and stream delineations, benthic macroinvertebrate surveys, and stream and wetland restoration. Additionally, she wrote some of the first mitigation plans in WV pursuant to compensatory mitigation and natural stream channel design techniques. Ms. Mower will be responsible for environmental and permitting services for this project, including, but not limited to: wetland delineation, benthic studies, wetland restoration or mitigation, endangered species, and stream restoration.

EDUCATION (Degree, Year, Specialization)
MS, 2001, Biology
BS, 1999, Biology/Applied Science

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Fisheries Society (AFS) **Ecological Society of America (ESA)**	**Certified Ecologist (CE)** **Certified Fisheries Professional (C-FP)** **Rosgen Natural Stream Channel Design Courses I-IV**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Cook, Charles, A. **Project Environmental Specialist**	**0**	**11**	**0**

Brief Explanation of Responsibilities

Mr. Cook specializes in environmental and biological surveys and field assessments, including wetland delineations, jurisdictional stream determinations, vegetation surveys, benthic and water quality sampling, fish and herpetology studies, and threatened and endangered species surveys. Mr. Cook will provide environmental support services related to natural resources, including but not limited to: wetland delineation, benthic studies, wetland restoration or mitigation, endangered species, and stream restoration.

EDUCATION (Degree, Year, Specialization)
BS, 2006, Biology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Wetland Delineation Training - NC State University **Approved WVDNR Survey for Running Buffalo Clover**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Queen, Terry, W. **Construction Technician**	**17**	**34**	**17**

Brief Explanation of Responsibilities

Mr. Queen specializes in construction monitoring, drafting for site planning, earthwork detailing, and pre-mining and pre-blast surveys. He develops preliminary and final design for mine reclamation sites and mining permits, and site development. Mr. Queen will provide construction monitoring and construction administration services. Additionally, he will be responsible for collecting field data, including but not limited to: water samples, soil borrow samples, refuse samples, and verification of mapping.

EDUCATION (Degree, Year, Specialization)
Continuing Education Courses, 1992, Drafting and Design
AD, 1975, Drafting and Design

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Troxler Nuclear Densometer Certified **ACI Certified** **Certified CQA Geosynthetic Materials and Compacted Clay Liner Inspector** **WVDOH Portland Cement Concrete Inspector** **WVDOH Compaction Inspector**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Workman, David, L. **Senior Designer**	**18**	**18**	**8**

Brief Explanation of Responsibilities

Mr. Workman specializes in civil engineering, site development, and planning projects, including abandoned mines and landfills. He will be responsible for the development of project drawings, transferring survey data to project plans, and development of project details.

EDUCATION (Degree, Year, Specialization)
BS, 2000, Industrial Engineering Technology
AS, 1997, Drafting and Design Engineering Technology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Enlisted Association of the National Guard	**NICET Certification** **Aircraft Load Planning Certification**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR AML PROJECT DESIGN** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Michael P. Doyle **Senior Designer**	**10**	**15**	**15**

Brief Explanation of Responsibilities

Mr. Doyle specializes in civil engineering, site, and roadway design projects, including abandoned mines. He will be responsible for the development of project drawings, transferring survey data to project plans, and development of project details.

EDUCATION (Degree, Year, Specialization)
AS, 1996, Computer Aided Drafting and Design

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES

Equipment: Plotters, Digital Cameras, Digital Planimeters, Surveying Stations, GPS Units, Photocopiers/Printers/Scanners

Software: AutoCAD/Civil 3D, MicroStation, Microsoft Office Suite, Sewer CAD, Water CAD, Hydrocalc Hydraulics, TR-55, Hydraulic Modeling Software, Maptech (Professional), REAME (Slope Stability), GeoPack Design

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
City of Wheeling Landfill Closure Cap Design; landfill site characterization, leachate management and closure cap design, and construction monitoring; Ohio County, WV	WVDEP Office of Environmental Protection 2031 Pleasant Valley Road Fairmont, WV 26554	Surveying and Mapping; Site Reconnaissance; Records Review & Research; Subsurface Exploration and Testing; Characterization Report Preparation; Meetings; Design Development; Permitting; Construction Documents; Construction Monitoring; and QA/QC Testing	$934,080 (fee)	25%
Confidential Geotechnical Engineering Services for Solar Array Facility; OH	CONFIDENTIAL	Site Reconnaissance; Background Research; Field Exploration; Laboratory Testing; Engineering Analysis and Reporting	$20,000 (fee)	25%

TOTAL NUMBER OF PROJECTS: **2** (primary office only)

TOTAL ESTIMATED CONSTRUCTION COSTS: **$954,000**

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS:

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
None					

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Wheatley Branch (Luthy) Portals; AML Reclamation Project involving several locations of an abandoned trash piles, access road construction 29 mine seals, and providing proper drainage control measures; also prepared and obtained WVDOH MM-109 permits and Stormwater NPDES permit; Logan County, WV	WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304	$74,855 (fee)	2013	YES
Laurel Point Strip; AML Reclamation Project, includes preparation of a reclamation plan; Monongalia County, WV	WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304	$114,820 (fee)	2014	YES
Amigo Portals; AML Reclamation Project to provide surveying, development of construction plans and specifications for reclamation, selected permit applications, and an engineer's opinion of probable construction costs; Raleigh County, WV	WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304	40,701.50 (fee)	2014	YES
Oldfield Branch (Hall) Drainage; AML Reclamation Project, included subsurface investigation, surveying, development of construction plans and specifications for reclamation, selected permit applications, and engineer's opinion of probable construction costs; Mingo County, WV	WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304	$75,269.50 (fee)	2016	YES
Larry Frederick Highwall and Refuse; AML Reclamation Project consisting of two sites with collapsed portals and drainage, mine subsidence, un-vegetated coal refuse, residential waste, and a highwall bench. GAI provided subsurface investigation, surveying, development of construction plans and specifications for reclamation, permit applications, and an engineer's opinion of probable construction costs; Harrison County, WV	WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304	$59,985 (fee)	2017	YES
City of Nitro Streambank Restoration; Rehabilitate and Stabilize 700 linear feet of existing riverbank along the Kanawha River to minimize future erosion; Kanawha County, WV	City of Nitro 2009 20th Street Nitro, WV 25143	$112,700 (fee)	2017	YES

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH
None					

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.

Please see GAI's Expression of Interest document for additional information pursuant to GAI Qualifications to perform work for the West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation.

20. The foregoing is a statement of facts.

Signature: _____ Title: **Sr. Engineering Manager** Date: **October 09, 2018**

Printed Name: **Charles F. Straley, MS, PE, PLS**

APPENDIX C
AML and Related Project Experience Matrix

gai consultants

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section(s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Mapping	Charles F. Straley, PE, PLS
Mingo County PSD Feasibility Study	C/P	Appendix E	X			X						X							M/P
Amigo Portals	C/P	Appendix E	X	X	X	X					X	X				X		X	M/P
Larry Frederick Highwall & Refuse	C/P	Appendix E	X	X	X	X	X		X		X	X			X		X	X	M/P
Oldfield Branch (Hall) Drainage	C/P	Appendix E	X	X	X	X					X	X					X	X	M/P
Eastern Wyoming County PSD Feasibility Study	C/P	Appendix E	X			X						X							M/P
Raleigh County PSD Feasibility Study	C/P	Appendix E	X			X						X							M/P
Wheatley Branch (Lutyhy) Portals	C/P	Appendix E	X	X	X	X					X	X			X		X	X	M/P
Webster County Commission Diana Area Feasibility Study	C/P	Appendix E	X			X						X							M/P
Cherokee Complex	C/P	Appendix E	X			X	X				X	X			X	X	X	X	M/P
Laurel Point Strip	C/P	Appendix E	X	X	X	X					X	X			X	X	X	X	M/P
Reynoldsville Refuse	C/P	Appendix E	X	X	X	X			X		X	X			X	X	X	X	M/P
Earling Refuse Pile	C/P	Appendix E	X	X	X	X					X	X			X	X	X	X	M/P
Erbacon CR9 Webster County WL Feasibility Study	C/P	Appendix E	X			X						X							M/P
Kanawha Rambling Hills Water Study	C/P	Appendix E	X			X						X							M/P
Davis Creek Water Study	C/P	Appendix E	X			X						X							M/P
Coalburg Water Study	C/P	Appendix E	X			X						X							M/P

* List whether project experience is corporate or personnel based or both

** Use this area to provide specific sections or pages if needed for reference

*** List Primary Design personnel and their functional capacity for the projects listed

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section(s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Mapping	Charles F. Straley, PE, PLS
Wallace 353 Water Study	C/P	Appendix E	X			X						X							M/P
Wallace 354 Water Study	C/P	Appendix E	X			X						X							M/P
Greystone Mine Drainage	C/P	Appendix E	X	X	X	X					X	X					X	X	M/P
Route 60 Drainage	C/P	Appendix E	X	X	X	X					X						X	X	M/P
Mallory Refuse	C/P	Appendix E	X		X	X	X				X				X		X	X	M/P
Lynch Run Highwall #6	C/P	Appendix E	X		X	X					X	X		X	X	X	X	X	M/P
Duck Creek Landslide	C/P	Appendix E	X			X					X						X	X	M/P
Heizer Creek Drainage	C/P	Appendix E	X	X	X	X					X						X	X	M/P
Wolfpen Landslide	C/P	Appendix E	X	X	X	X					X						X	X	M/P
Hominy Creek	C/P	Appendix E	X			X						X							M/P
Logan (Marcum) Drainage	C/P	Appendix E	X	X	X	X					X	X					X	X	M/P
Bud Alpoca	C/P	Appendix E				X						X							M/P
Nuriva Maben	C/P	Appendix E				X						X							M/P
Herndon Heights	C/P	Appendix E				X						X							M/P
Handley/Upper Creek	C/P	Appendix E	X	X	X	X					X	X					X	X	M/P
Titus Road	C/P	Appendix E	X			X					X	X		X			X	X	M/P
American Legion	C/P	Appendix E	X			X					X	X		X			X	X	M/P
Cogar	C/P	Appendix E		X	X	X							X						M/P
East Branch Phase II	C/P	Appendix E	X			X					X	X		X		X	X	X	M/P
West Branch Headwaters	C/P	Appendix E	X	X	X	X			X			X				X		X	M/P
Lake Milton Reclamation	C/P	Appendix E	X			X					X	X					X	X	M/P
Middleton Run Reclamation	C/P	Appendix E	X			X					X	X						X	M/P
Latrobe (Gibson) Landslide	C/P	Appendix E		X	X	X					X					X	X	X	M/P
Lodestar Energy	C/P	Appendix E	X	X	X	X					X		X			X	X	X	M/P

* List whether project experience is corporate or personnel based or both

** Use this area to provide specific sections or pages if needed for reference

*** List Primary Design personnel and their functional capacity for the projects listed

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section(s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Mapping	Charles F. Straley, PE; PLS
Ven's Run Maintenance	C/P	Appendix E	X			X					X						X	X	M/P
War Waterline	C/P	Appendix E										X							M/P
Clarks Gap	C/P	Appendix E				X						X							M/P
War (Dash) Impoundment	C/P	Appendix E				X											X	X	M/P
Whites Run	C/P	Appendix E	X	X	X	X	X				X	X		X		X			M/P
Helen Portals	C/P	Appendix E	X	X	X	X	X				X				X	X			M/P
Bearwallow Branch	C/P	Appendix E	X	X	X	X	X				X					X			M/P
Ned's Branch Impoundment	C/P	Appendix E	X		X	X					X	X	X			X	X		P
McAlpin Phase II & III	C/P	Appendix E	X	X	X	X	X	X		X	X	X		X	X	X	X		M/P
McAlpin Phase I	C/P	Appendix E	X	X	X	X	X				X	X		X	X	X	X		M/P
Community of Preston	C/P	Appendix E				X					X		X				X		M/P
Kingwood 52/6	C/P	Appendix E				X					X		X				X		M/P
Micajah Ridge	C/P	Appendix E				X						X							M/P
Glen Rogers	C/P	Appendix E				X						X							M/P
Rt. 20 / Gould	C/P	Appendix E				X						X							M/P
Elkins/Buckhannon	C/P	Appendix E				X						X							M/P
Laurel Creek	C/P	Appendix E		X	X	X			X		X					X	X		M/P
Superior	C/P	Appendix E								X									P
Wash. Heights Review	C/P	Appendix E				X						X							P
Gaymont	C/P	Appendix E				X						X							P
Hominy Creek	C/P	Appendix E				X						X							P
Elk Creek / Verner	C/P	Appendix E				X						X							P
Orlando Mining	C/P	Appendix E								X					X				
Scotch Hill	C/P	Appendix E									X						X		P

* List whether project experience is corporate or personnel based or both

** Use this area to provide specific sections or pages if needed for reference

*** List Primary Design personnel and their functional capacity for the projects listed

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C=Corp. P=Personnel	Additional Info Provided in Section(s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Mapping	Charles F. Straley, PE, PLS
Camp Run AMD	C/P	Appendix E	X	X	X	X					X	X		X	X	X	X		P
Mahan	C/P	Appendix E	X			X					X					X	X		M/P
Johnsons Knob	C/P	Appendix E	X	X	X	X	X				X	X		X	X	X	X		P
Carolina	C/P	Appendix E	X	X	X	X	X				X				X		X		P
Hutchinson	C/P	Appendix E		X					X		X						X		M/P
Fairmont (Grandstaff)	C/P	Appendix E		X					X		X						X		M/P
City of Summersville	C/P	Appendix E				X													P
Reynoldsville	C/P	Appendix E				X					X		X				X		M/P
Mill Creek	C/P	Appendix E				X					X			X			X		P
Majesty	C/P	Appendix E	X	X	X	X	X	X	X		X	X		X	X	X	X		P
Wash. Hts to Jeffrey	C/P	Appendix E										X							
Gauley River Review	C/P	Appendix E				X													P
Heizer/Manila Review	C/P	Appendix E				X													M/P
Owings	C/P	Appendix E	X	X	X	X	X			X	X	X		X	X	X	X		P
Omega	C/P	Appendix E		X	X	X					X	X				X	X		P
Mill Creek - Isom	C/P	Appendix E										X							
Weaver-Junior	C/P	Appendix E										X							M/P
Reynoldsville Phase II	C/P	Appendix E										X							P
Mainella	C/P	Appendix E		X					X		X						X		M/P
Glen Morgan	C/P	Appendix E		X					X		X						X		M/P
Harris AMD	C/P	Appendix E		X	X	X					X			X					P
Lefthand Fork	C/P	Appendix E	X	X	X	X	X	X			X				X	X	X		P
Madison Street/Fairview	C/P	Appendix E		X		X					X								P
Summerlee	C/P	Appendix E	X			X	X				X					X	X		M/P

* List whether project experience is corporate or personnel based or both

** Use this area to provide specific sections or pages if needed for reference

*** List Primary Design personnel and their functional capacity for the projects listed

AML and RELATED PROJECT EXPERIENCE MATRIX

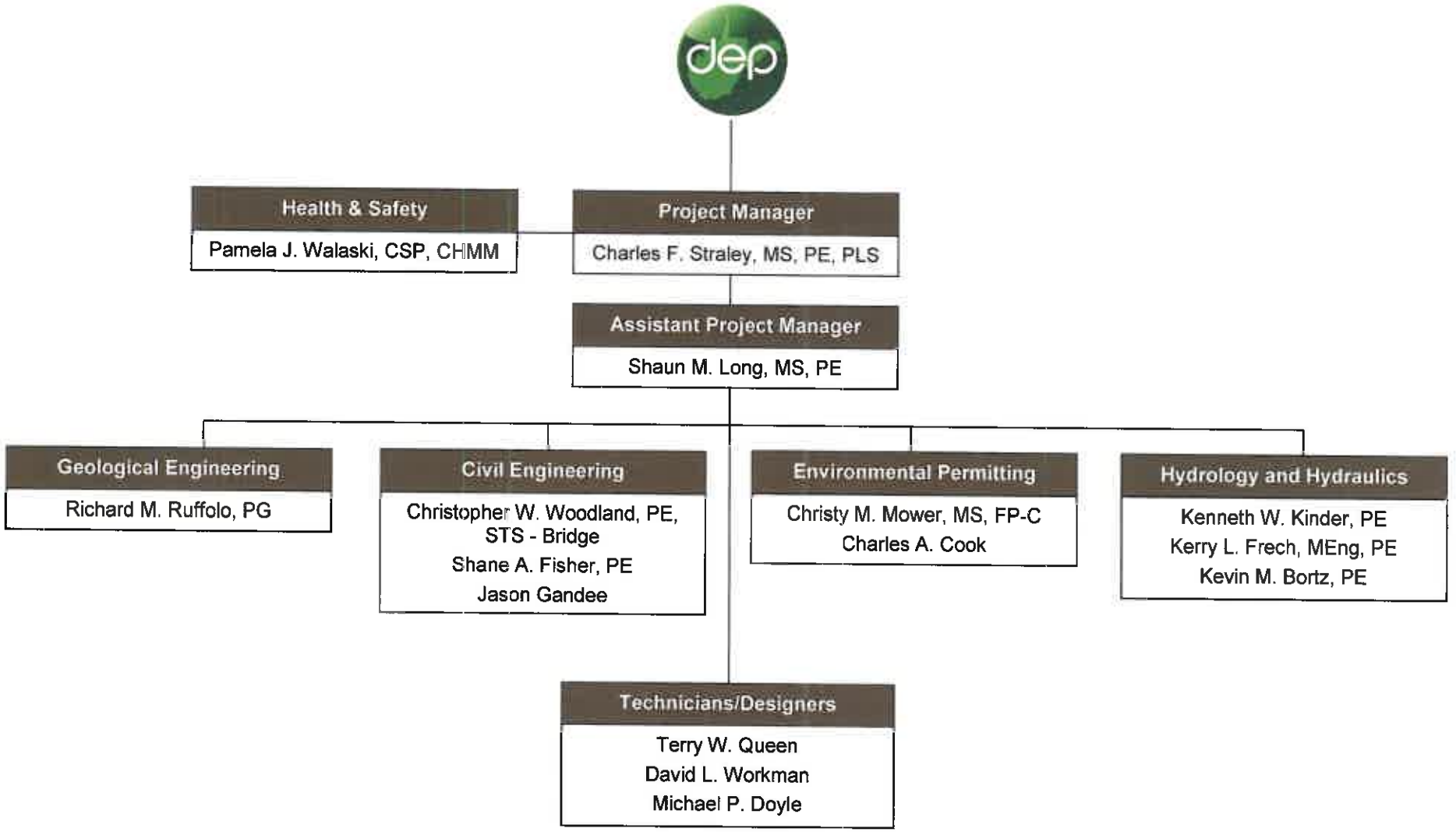
PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section(s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Mapping	Charles F. Straley, PE, PLS
Cow Creek	C/P	Appendix E		X	X	X					X						X		P
Godby Branch	C/P	Appendix E				X					X						X		P
New Haven Phase II	C/P	Appendix E										X							
Gauley River Phase II	C/P	Appendix E										X							
Heizer and Manila Ph. II	C/P	Appendix E										X							M/P
Matheny Hill Phase I	C/P	Appendix E										X							M/P
Duncan Hill No. 2	C/P	Appendix E							X		X						X		M/P
Urso Subsidence	C/P	Appendix E		X					X		X						X		M/P
Mill Creek Phase II	C/P	Appendix E										X							
Duncan Hill Subsidence	C/P	Appendix E		X					X		X						X		M/P
Cora Mine Drainage II	C/P	Appendix E		X	X	X					X	X				X			M/P
Covey Creek Mine	C/P	Appendix E		X				X			X						X		P
Vivian	C/P	Appendix E	X			X	X				X					X	X		P
Kimball	C/P	Appendix E	X			X	X				X					X	X		P
Hampden Bridge	C/P	Appendix E				X					X					X			
Bear Run Refuse	C/P	Appendix E	X			X	X				X	X		X		X	X		
Beaver Creek	C/P	Appendix E				X					X						X		
Charleston Landslide	C/P	Appendix E	X								X						X		
Garrison Complex	C/P	Appendix E		X		X					X						X		
Cassity Fork	C/P	Appendix E				X					X						X		
Mulberry Fork Landslide	C/P	Appendix E	X								X						X		
Beckley Subsidence	C/P	Appendix E		X					X		X						X		
Courtright Highwall	C/P	Appendix E	X								X						X		

* List whether project experience is corporate or personnel based or both
** Use this area to provide specific sections or pages if needed for reference
*** List Primary Design personnel and their functional capacity for the projects listed

APPENDIX D
Project Organizational Chart and Key Personnel Resumes

gai consultants

Project Organizational Chart



gai consultants

Charles F. 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

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

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

West Virginia University Library, 1981-1982

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

- Ned's Branch Impoundment, Office of Surface Mine Reclamation and Enforcement (WVDEP), Mingo County, WV. Design of and preparation of construction documents for a 600,000 cubic yard failed coal slurry impoundment 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.
- Majesty Mine Complex Project. Design of a reclamation plan for the Majesty Mine Complex in Barber County, WV for the WVDEP. The project included the design of site drainage along WV Route 16/2 (including channels and culverts), reclamation of two landslide areas along WV Route 16/2, and a soldier (pile and lagging) wall to support a landslide in WV Route 16/2.
- Owings Mine Complex Project in Harrison County, WV for the WVDEP. Design of a reclamation plan. Project included surface and subsurface drainage design (including a concrete box culvert crossing of WV County Route 12/4) and preparation of technical specifications (including traffic maintenance and other West Virginia Department of Transportation, Division of Highways (WVDOH) standard specifications), drawings, engineer's cost estimate, and obtaining the USACE permit.
- Design, construction monitoring, and construction administration for two lake dredging projects. Activities included subsurface investigation, regulatory approvals, construction drawings, technical specifications, construction troubleshooting, cost estimating, daily reports, and client interaction. WVDNR, Tomlinson Run State Park, Abandoned Mine Lands
- Design of and preparation of construction documents for a landslide above a residence as an emergency project for the WVDEP, Office of Special Reclamation and Lodestar Energy. Activities included: site grading, subsurface investigation, hydraulics and hydrology analysis, collection of mine drainage and mine seals, preparation of drawings and technical specifications, engineering cost estimate and pre-bid meeting presentation.

- Design of and preparation of construction documents for a landslide above a residence as an emergency project for the WVDEP, Abandoned Mine Lands, Latrobe (Gibson) Landslide. Activities included: site grading, subsurface investigation, hydraulics and hydrology analysis, valley fill design, COIE permitting, preparation of drawings and technical specifications, engineering cost estimate and pre-bid meeting presentation.
- Design of and preparation of construction documents for a previously repaired landslide for the WVDEP, Abandoned Mines Lands, Ven's Run Landslide #2. Activities included site grading, subsurface investigation, hydraulics and hydrology analysis, road re-design, preparation of drawings and technical specifications, engineering cost estimate and pre-bid meeting presentation.
- Summerlee Refuse Pile Project. Designed the regrading and drainage channels for a 75-acre coal refuse pile for the WVDEP. Developed specifications for the project that included earthwork, drainage structures and wetland plants. Design included analysis of water quality for determining potential treatment alternatives.
- Lefthand Fork Burning Refuse Project for the WVDEP. Designed the regrading and drainage scheme for a 60-acre coal refuse. The project included the excavation and extinguishment of burning refuse and disposal of excess refuse in a valley fill. Developed specifications for the project. Prepared an application for the WV Public Land Corporation permit and USACE 404 Nationwide Permit. Prepared an Incidental Boundary Revision application to relocate a permitted haul road.
- Kimball Coal Refuse Piles Project for the WVDEP. Performed stability analysis for three existing coal refuse embankments. Designed and evaluated the proposed regrading and geometric changes to the coal refuse embankments. Developed specifications for the project which included a reinforced earth wall and water well replacement. Prepared application for replacement well permit and the USACE 404 Nationwide Permit.
- Managed and performed the geotechnical design including foundations, site grading and mine stabilization; and developed plans and specifications for undermined sites by injecting the abandoned workings with cement grout and concrete for the WV University and NASA Independent Validity and Verification Center and the WV High Technology Consortium Center in Fairmont, WV for Hayes Large Architects, WV High Technology Consortium.
- Duncan Hill Subsidence Project for the WVDEP. Monitored subsurface exploration, designed and developed specifications for an abandoned mine subsidence project. The project included stabilizing the abandoned mine workings by injecting cement grout and concrete and providing drainage from a portion of the workings. The project included a bore and jack pipe into the mine workings.
- Cora Mine Drainage II Project for the WVDEP. Designed the mine seals and drainage scheme for a series of abandoned mine entries. Developed the specifications which included the mine seals, drainage pipes and appurtenances and a bore and jack pipe.
- Professional Engineer and Construction Manager for the mine seal and drainage collection for an abandoned mine project in Pomeroy, OH for the ODNR.
- Project Manager for a stream relocation project in Grant County, WV. The project involved crossing an existing stream channel over an acid mine drainage channel to a water treatment facility. The design consisted of a combination of relocated channels, spillways, and box culverts.
- Mill Creek Regional Water Supply Extension Project in Logan County, WV. Scope of work included construction of water transmission lines, a water distribution system, two water storage tanks, a booster station, two hydropneumatic tanks, and a water treatment plant. The total length of water line to be constructed is approximately 34 miles. The project included design of: site drainage (including channels and culverts), site grading, redesign of WV Route 12 (including approval from WVDOH, subsurface investigations, preparation five railroad crossing permits, WVDOH occupancy permit, WVDEP permit, WV Office of Environmental Health (WVOEH) permit, WV Public Lands Corporation permit, and USACE permit. Numerous meetings with the WVDEP, LCPSD, WV Public Service Commission, and the WVOEH were required. GAI coordinated water line alignment work with numerous utility companies to avoid conflicting the location of the existing utility lines and proposed water transmission line and distribution system The

scope of work also included the design of a steel tank pre-sedimentation basin, adsorption clarification/filtration treatment units with a total 3,000 GPM capacity, a pretreatment chemical feed system (including metering pumps, chemical mixers, solution tanks, and in-line mixers), water intake pumps, a decant basin (including excavation, foundations, walls, piping, etc.), sludge drying beds, a post treatment chemical feed system, clearwell and baffle assembly, and the treatment plant building. The water treatment plant was designed to provide 400 GPM of potable water.

- Expert witness in identifying the source of an acid mine drainage through a tunnel under a WVDOH highway for Mountain View Coal Company. Performed a structural inspection of the tunnel to obtain grade release for the mine permit.
- Assisted with identifying ground water and surface water monitoring points, including discussions with the regulatory agencies for deep mines located in Emerald; and Cyprus Cumberland in Boone County, West Virginia (WV) and Western Pennsylvania (PA).
- Performed geotechnical analyses for obtaining a lift variance for a coal refuse disposal area for Northland Resources. The analyses consisted for slope stability, combustion control and settlement issues.
- Completed various permit applications for renewals, incidental boundary revisions, permit modifications, inactive status, and NPDES renewals and modifications for various surface mines in Kanawha and Fayette Counties, WV.
- Completed various project designs and permit applications for renewals, incidental boundary revisions, permit modifications and NPDES renewals and modifications for surface mines in Monongalia and Marion Counties, WV for the Eastern Associated Coal Company.
- Cow Creek - Sarah Ann Water Supply Extension Project, Logan County, WV. In charge of the geotechnical investigation and foundation design for water supply structures. Project included subsurface investigation; design of three water tanks, three booster stations, one master meter assembly, and approximately 19 miles of waterline; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Bid construction cost was approximately $4,800,000. Design included an access road to WVDOH standards.
- Design, construction monitoring, and construction administration for two lake dredging projects for the WV Department of Natural Resources (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.
- Developed the site construction plans and cross sections for a coal preparation plant by combining the drawings and other material prepared by others for the permits, material handling, preparation plant, structures and railroad. Performed the conceptual design for the water supply for the preparation plant and potentially eight underground mines.
- 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.
- Kingwood 52/6 Water Extension Project in Preston County, WV. GAI designed 13 miles of waterline, one water storage tank, and one booster pump station, subsurface investigations, and special considerations for high pressures. Tasks included preparation of drawings, technical specifications, engineer's cost estimate, and preparation of applicable permit applications.
- Managed, designed, and performed stability analysis for six durable rock fills and four road fills for a mountain top removal mining operation at a proposed site in Southern WV. Performed stability analysis for reclamation plan and sediment pond embankments. Prepared the probable hydrogeologic consequence, including evaluation of surface and ground water, and acid base accounting of overburden for the DMM-4 Application.

- Phase I Water Feasibility Study, Matheny Hill Study Area in Harrison County, WV. Evaluated the potential for pre-1977 mining activity to have degraded the water supplies of residents. Work included interviews, record searches, field reconnaissance, and preparation of remedial action cost estimates. A report summarizing the findings was submitted.
- Phase I Water Feasibility Study, Weaver-Junior Study Area, Randolph and Upshur Counties, WV. Evaluated the potential for pre-1977 mining activity to have degraded the water supplies of residents. Work included interviews, record searches, field reconnaissance, and preparation of remedial action cost estimates. A report summarizing the findings was submitted.
- Phase II Logan Water Feasibility Study, Logan County, WV. Development of geologic cross sections and structural contouring as part of an investigation to determine the percentage of residents in the Cow Creek, Crooked Creek and Upper Rum Creek communities whose ground water supplies had been degraded by pre-1977 mining activity. Field reconnaissance, mine map and mine permit records search, interviews, water sampling and analysis, and classification via piper diagrams were conducted.
- Phase II Water Feasibility Study for private water supplies in the Gauley River Study Area, Fayette and Nicholas Counties, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.
- Phase II Water Feasibility Study for private water supplies in Heizer and Manila Creek Community, Putnam County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.
- Phase II Water Feasibility Study for private water supplies in Mill Creek Study Area, Boone, Lincoln, and Logan Counties, WV. Developed geologic cross sections and structural contouring for the project. Scope included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in separate reports for each community.
- Project designer for a feasibility study of Charleston Bicycle/Pedestrian Trail in Charleston, WV for the Regional Intergovernmental Council (RIC). Services addressed in the feasibility study included a field reconnaissance to identify, locate, and verify the presence or absence of undesirable characteristics that could adversely affect the socioeconomics of the project; completing a conceptual design for a one-way system (multi-use facility, bicycles and pedestrians on both levels) and a two-way system (separate use facility, bicycles on one level and pedestrians on other); and completing a cost estimate to construct the various alternatives.
- Project Manager for the modification of a slurry impoundment to a coal coarse refuse pile in West Virginia. Project consisted of an abandonment of a dam and extending the life of the pile in accordance with WV Surface Mining Regulations.
- Water Feasibility Study for the Glen Rogers Study Area, in Wyoming County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Affiliations

National Society of Professional Engineers, Member

Society of American Military Engineers, Members

as required to maintain compliance with the National Flood Insurance Program. Prepared elevation certificates and FEMA Letters of Map Amendments

- Staff Engineer responsible for performing construction oversight and construction management for a Resource Conservation and Recovery Act 120-acre environmental remediation site. Responsibilities included managing a team of CQA/quality control 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.

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Shaun M. Long, MS, PE

Assistant Project Manager

Education

MS, Engineering (focus in Transportation and Structures), 2011, Marshall University

BS, Civil Engineering, 2005, West Virginia University Institute of Technology

Registrations

Professional Engineer (PE): WV – 2010, [redacted]

Skills

Reinforced Concrete Design

Finite Element Analysis

Structural Steel Design

Bridge Inspection / Rating

Certifications / Training

NHI Course 130078, "Fracture Critical Inspection Techniques for Steel Bridges," PA, 2014

NHI Course 130055, "Safety Inspection of In-Services Bridges," WV, 2012

Bridge Access Climbing Training, University of Ohio, 2007

Affiliations

American Society of Civil Engineers (ASCE)

Prestressed Concrete Institute (PCI), 93675

Industry Experience

GAI Consultants, Inc., 2015-Present

Michael Baker International 2005-2015

Professional Summary

Mr. Long has 10 years of civil engineering experience along with multiple years of project management experience. He has demonstrated talent for designing and managing various projects. He is a resourceful leader possessing exceptional communication, problem solving and organizational skills. He has experience doing bridge inspection, bridge design, and plan preparation. He is proficient in design based on the LRFD code and has designed various components using steel, reinforced concrete, prestressed concrete, post tensioned concrete, and timber. He is very skilled in using various bridge analysis and design software programs.

Mr. Long's experience gained during his graduate studies includes various structural designs and methodologies, evaluating transportation systems, transportation planning, and traffic analysis. Mr. Long is knowledgeable in some of the latest traffic analysis and vehicle emissions software packages.

Professional Experience

- Lilly Bridge, Hinton, West Virginia (WV), for Brayman Construction Company. Project Manager. Served as lead designer and teamed with contractor to remove one girder line and reduce pier column size from 14' to 10' diameter during the Value Engineering process. The bridge is a 1,225' long five-span continuous plate girder bridge over the Bluestone River.
- 16th Street Entrance/Exit Ramps, Huntington, WV, for the West Virginia Department of Transportation, Division of Highways (WVDOT-DOH). Civil Engineer. Designed of the exit ramp bridge superstructure and substructure. The project was two simple span ramp bridges with spans of 155' and 116'.
- Coonskin Design Build, Charleston, WV, Swank Construction Company. Project Manager. Served as lead designer and teamed with contractor during design-build pursuit to come up with most cost efficient solution. The bridge is a three-span continuous steel structure over the Elk River. The odd span layout helped to stay out of a very environmentally sensitive portion of the river.
- Rodney Staton Design Build, Justice, WV, Brayman Construction Company. Project Manager. Team used precast deck slabs in a very remote part of WV where concrete was not readily available. The precast panels gave the contractor an edge in speed and materials. The bridge is a four-span continuous steel bridge which required a new deck and structural steel repairs.

- Dick Henderson Bridge Rehabilitation, Saint Albans and Nitro, WV, WVDOT-DOH. Project Manager. Responsibilities included design of concept and coordination with client for final project deliverable. The bridge project included replacing 1,000+ ft.-long through truss with a Plate Girder, while utilizing/rehabbing the existing piers. The bridge could only be closed for 10 months. Close coordination with the client and the contractor allowed for the success of this project and an early project completion.
- Kanawha River Bridge, Charleston, WV. Brayman Construction Company. Civil Engineer. Responsibilities included a full 3D model of the bridge, updating construction stages, and design of land piers. Analysis included box erection and tensioning at every construction stage. Baker's Charleston, WV office redesigned seven piers for the contractor and performed a complete analysis of the superstructure and substructure to properly size the piers.
- Veterans' Memorial tiedown retrofit. Weirton, WV to Stubenville, Ohio (OH) HNTB. Civil Engineer. Responsible for generating a complete model of the cable stayed portion of the bridge, included F.E.M. of tie-down into model. The data from the model was used with data found from strain gages attached to the tie down anchor bolts. With the known strains, we were able to change model parameters to match what was seen in the field. This enabled us to understand the behavior of the bridge and design the retrofit accordingly. The bridge is 1,650' cable stay 2 span bridge with 314' of plate girder approach spans.
- Houston Metro Northern Intermodal Transit -Transportation and Traffic Study and Conceptual Designs, Houston, Texas. Metropolitan Transit Authority of Harris County. Civil Engineer. Worked on and up to 30% submittal of C.I.P. concrete box alternative. Primarily worked on box details and tendon layouts. Baker assisted in the design of a multimodal center which is located immediately north of Downtown Houston. Transportation modes included bus, LRT, BRT, private auto and bus, commuter rail, Amtrak, bicycle, and pedestrian connections. Baker led the planning and design of traffic, roadway, drainage, and floodplain mitigation.
- Federal Highway Administration 2001-2006 Indefinite Delivery, Indefinite Quantity Agreement, Nationwide. U.S. Department of Transportation. Team Member. Responsible for updating substructure design examples for the AASHTO 2006 Code. Baker completed a task order under an indefinite delivery, indefinite quantity contract to update the popular Bridge Inspection Training Manual 90 (BITM 90) to the new Bridge Inspector's Reference Manual (BIRM) and to update National Highway Institute Course Number 130055, "Safety Inspection of In-Service Bridges," to reflect the contents of the new BIRM. Under a separate task order, Baker delivered the National Highway Institute courses, Course Number 130053A,"'Bridge Inspection Refresher Training;" Course Number 130054A, "Engineering Concepts for Bridge Inspectors;" and Course Number 130055A, "Safety Inspection of In-Service Bridges."
- Twelvepole Creek Bridge, Ceredo, WV, WVDOT-DOH. Civil Associate. Responsible for Analysis of Twin Structures and design of Main River Piers. Baker was responsible for updating and enhancing existing replacement plans using the AASHTO LRFD Bridge Design Specifications, 4th Edition, 2007 for this complex bridge replacement project. The structure is a twin bridge, prestressed concrete beam superstructure made continuous for live load. It is situated on concrete pile and caisson foundations carrying east and westbound traffic of I-64 over Twelvepole Creek.
- Lafayette Bridge Design Review Services, St. Paul, Minnesota. Minnesota Department of Transportation, District 1. Civil Engineer. Responsible for analyzing the bridge in order to attain loads on the superstructure and design of piers. Baker provided independent analysis and review services as a subconsultant for the design of twin 3,200-foot crossings of the Mississippi River. The structures are continuous multispan, steel box-girder superstructures on reinforced concrete piers. Baker's tasks included performing complete verification of the steel box-girder superstructure design, evaluating constructability issues and design criteria and providing recommendations, and performing design review of all structural elements.

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Shane A. Fisher, PE

Assistant Engineering Manager

Education

BS, Civil Engineering Technology, Fairmont State University, 2005

Registrations

Professional Engineer (PE): WV [redacted]

VA [redacted]

Skills

Civil Engineering

Drainage System Engineering and Design

Bridge Analysis and Design

Erosion and Sediment Control Permitting

Industry Experience

GAI Consultants, Inc., 2014-Present

West Virginia Department of Transportation, Division of Highways, 2008-2014

Potesta and Associates, 2005-2008

Glassworks WV, 2000-2002

Golden Bear Construction, 1996-1999

Teal Group Construction, 1992-1996

Professional Summary

Mr. Fisher specializes in civil engineering with experience in environmental permitting, the design and analysis of bridge structures, roadways, drainage systems, and sanitary and industrial water and wastewater systems. His experience meeting Federal Emergency Management Act (FEMA) requirements includes flood mapping, floodplain compliance, and construction monitoring for disaster-related funds. He has most recently been managing erosion and sediment (E&S) control, construction stormwater and roadway permitting duties for projects in both natural gas and overhead electric transmission lines in West Virginia (WV), Virginia (VA) and Pennsylvania (PA).

Mr. Fisher is skilled in Microstation and InRoads for bridge and roadway design, and Autocad Civil 3D for preparing construction plans, grading, and civil site design.

Select Professional Experience

- Task Manager for West Virginia roadway permitting, submitted to the West Virginia Division of Highways (WVDOH), and Stormwater Pollution Prevention Plan (SWPPP) preparation and submission to the West Virginia Department of Environmental Protection (WVDEP).
- Numerous site specific E&S control plans and SWPPP preparation in PA, WV and Ohio. Task Manager for the development of and completing E&S Plans and SWPPP submission to the WVDEP for approval by the agency.
- Task Manager for a Confidential Project located in Doddridge and Harrison Counties, West Virginia. Tasks included: roadway permitting, SWPPP development, site registration, and WVDEP submission.
- West Virginia Civil Engineering Projects. Design and analysis of roadway drainage systems and grading plans, including roadway design projects and numerous new subdivisions. Civil site design using Autocad Civil 3D, including grading design, stormwater management plans, utilities, and erosion control plans. Geotechnical engineering, including subsurface explorations, slope stability analysis, and design. Surface and subsurface hydrologic and hydraulic (H&H) evaluations, including stormwater runoff, peak discharge evaluations, stormwater detention analysis, and structure design.

- WV Civil Engineering Projects for Water Supply. Responsible for design including collection system design/rehabilitation and pumps stations. Conducted environmental permitting, H&H analyses, and quality assurance/quality control monitoring. Developed E&S control plans, SWPPP, and Best Management Practice plans. Responsible for design and cost estimating for sanitary and industrial wastewater projects, abandoned mine lands projects, solid waste disposal facility design and permitting, and subdivision sewer system design (both gravity and pump station). FEMA work including LOMA, flood mapping, floodplain management, and DFIRM database. Visualized and designed rain gardens, infiltration systems, and detention/retention ponds.
- WVDOH, District Seven. Highway Engineer Associate responsible for the District's Less Than 20' Bridge Program, including: the design and analysis of bridge structures, two summer co-op employees' inspections, all correspondence with external permitting agencies, and coordination of construction activities with the District's Heavy Maintenance Crew for bridge repairs and replacements. Performed civil site design using Microstation and InRoads, stream hydrologic analysis using TR-55, HEC-RAS, and hydraulic analysis for bridge replacements. FEMA work included flood mapping, floodplain compliance, estimates, correspondence with FEMA, and construction monitoring for disaster-related funds.
- Los Angeles County Community Development Commission, Assistant Superintendent. Assisted with a $2.1 million, 43-unit apartment complex project requiring building retro-fits due to severe earthquake damage and extensive renovations to entire dwelling structure in accordance with local code and commission specifications. Liaison between contractors, architect, project engineer, and county officials. Responsible for on-site CAD drawings, revisions, tools and materials lists, daily log, and scheduling over 20 sub-contractors. Worked daily with inspector and project manager to ensure work was performed to code and came in on time and on budget.

Affiliations

WVU/WVDOH Partnership Fiber Reinforced Polymer Advisory Committee (formerly)

American Society of Highway Engineers

American Society of Civil Engineers, Past President, current Branch Vice President

Jason Gandee
Senior Project Engineer

Education

BS, Civil Engineering Technology, 2007, West Virginia University Institute of Technology

Skills

Civil Engineering

Civil Site Design

Stormwater Management

Environmental Compliance

Hydrologic and Hydraulic Design

Drainage and Grading Plans

Erosion and Sediment Control

Floodplain Studies

Certifications / Training

Troxler Nuclear Density Operator, 2001

HEC-RAS Course, National Highway Institute

Industry Experience

GAI Consultants, Inc., 2018-Present

Potesta & Associates, Inc., 2007-2018

Professional Summary

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 (WVDOH) 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, Mr. Gandee 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. Mr. Gandee also has experience with sampling and testing materials, including soils and concrete. Testing included nuclear density testing for compaction of soils, concrete/grout testing, and cylinder fabrications.

Select Professional Experience

- Project Engineer for over 20 reclamation projects for the West Virginia Department of Environmental Protection (WVDEP) – Office of Abandoned Mine Lands (AML). Responsible for site reconnaissance to determine the scope of the project; monitoring subsurface exploration drilling; preliminary and final design drawings; technical specifications; engineer's cost estimate; and conducting pre-bid and pre-construction meetings with contractors. Submitted and obtained NPDES construction stormwater permits and United States Corps of Engineer regional permits for the projects.
- Project Engineer for two WVDEP – Office of Special Reclamation Bond Forfeiture Projects. Responsible for developing construction plans to eliminate highwalls; regrading refuse piles; providing hydrologic and hydraulic design to manage stormwater on the site; designing ponds for active treatment; technical specifications; engineer's cost estimate; and conducting pre-bid and pre-construction meetings with contractors.

- Calhoun County Park Improvements Project, located in Grantsville, WV for the Mid-Ohio Valley Regional Council. GAI is performing the following services for this project: preliminary design; assistance with funding applications; final design; bidding; services during construction; and construction inspection. Responsible for civil site design which includes utilities, building pad and access road layout.
- Project Engineer for an interstate widening project in Huntington, WV. Responsible for preparing maintenance of traffic plans; geometric layout plans; construction drawings; and signing and marking plans for the project.
- Project Engineer for multiple floodplain management projects. Responsible for data gathering for the projects; estimating the hydrology at the site; performing hydraulic modeling of the watershed for existing and proposed conditions using HEC-RAS to determine the flood elevations and impacts; and report summarization.

Christopher W. Woodland, PE, STS

Senior Engineering Manager

Education

BS, Civil Engineering, 1999, West Virginia University

Licenses/Registrations

Professional Engineer (PE): WV – 2009, [redacted] MD – 2004, [redacted]

Skills

Structural Engineering

Project Management

Certifications / Training

National Highway Institute (NHI) Bridge Saf Inspector

NHI Fatigue and Fracture Critical Inspectior

Board of Certified Safety Professionals (BC Safety Trained Supervisor (STS)

Industry Experience

GAI Consultants, Inc., 2018-Present

AECOM, 2005–2018

WBCM, 1999–2005

Affiliations

American Society of Highway Engineers

American Society of Civil Engineers

American Council of Engineering Companies Transportation Delegate

American Institute of Steel Construction

Professional Summary

Mr. Woodland is a Senior Engineering Manager supporting GAI's Structures group. His experience includes project management on structures and multidiscipline contracts, including development of contract documents, construction plans, specifications, estimates, and permits. Mr. Woodland has effectively managed projects of various size and complexity involving interstates, toll facilities, local and private roadways, schools, mines, and parks. He has successfully served as Project Manager on projects with design fees ranging from $3,000 to $3 million. He has managed projects involving various agencies, including West Virginia Department of Transportation, Division of Highways (WVDOH); state Departments of Transportation (DOT); historical trusts; U.S. Army Corps of Engineers (USACE); environmental; recreation and natural resource departments; and community organizations. Prior to joining GAI, Mr. Woodland's experience included business development for the WVDOH Engineering Division, Maintenance Division, and Materials Division, and past responsibilities, including mentoring junior staff, client coordination, and ensuring projects were delivered on time, on budget, with quality submissions.

Mr. Woodland has expertise in bridge and structures design, inspection, and project management. Past duties included managing projects, preparation of contract documents for bridges and miscellaneous structures, and leading design and inspection teams. Mr. Woodland's design experience includes expertise with new bridges, bridge rehabilitations, bridge widening, bridge replacements, and designing various small structures. His design experience covers a wide range of structure types, including steel rolled beams, curved and straight steel plate girders, prestressed concrete box beams, prestressed concrete I-beams, and structural steel tube tied arch bridges. His rehabilitation experience includes load rating analysis, retrofit design on bridge structures, rehabilitation of major signature structures, redecking and widening projects, system preservation projects, and fatigue rehabilitation. Mr. Woodland has performed design tasks, including development of structure geometry, span arrangements; type, size and location (TS&L) studies; foundation submissions; final design submissions; special provisions; and construction cost estimates.

Professional Experience

- Indefinite Delivery/Indefinite Quantity (IDIQ) District Engineering Assistance, District 6, WVDOH, West Virginia (WV). Project Manager and Senior Structural Engineer responsible for Parrs Camp Bridge Replacement, Playground Bridge Replacement, and Rehabilitation of 3 miles of US 22 pavement and drainage. Duties included managing all disciplines, including traffic, roadway, structures, right-of-way (ROW), utilities, hydraulics; survey and drainage design; managing project budgets; and ensuring quality deliverables. In addition, Mr. Woodland was responsible for coordination with District, utility companies, and local stakeholders. These projects, part of the

Governor's Roads to Prosperity Program, are being completed on an accelerated schedule to meet the program's needs and ultimately improve the state's infrastructure.

- Fink Creek W-Beam Bridge, WVDOH, Gilmer County, WV. Project Manager and EOR responsible for the development of a design study, report, preliminary engineering, and final design for the replacement of the Fink Creek W-Beam Bridge. This project consisted of developing a design study and contract plans and documents for replacement of the existing bridge carrying WV Route 47 (WV 47) over Fink Creek. Fink Creek W-Beam Bridge is located 0.04 miles west of Gilmer County Route 10 (CR 10) and is 173.3 ft in length. The completed design study evaluated replacement alternatives to determine the most suitable and economical alternative for the replacement of the Fink Creek W-Beam Bridge. Project work included completing the preliminary engineering and final design plans in a significantly reduced schedule to meet the WVDOH request, and completing the project on budget. The bridge is to be replaced with a 178-ft-long, single-span, curved, weathering steel plate girder bridge with normal semi integral abutments. Approach roadway work included approximately 350 ft of new roadway on each approach. The bridge is being replaced on existing alignment while traffic is maintained using a temporary bridge and roadway upstream. Mr. Woodlands managed all project disciplines, including roadway, structures, ROW, hydraulics, and drainage design. In addition, he was responsible for the coordination with WVDOH, utility companies, and local stakeholders; and managed the construction services contract, including responding to RFIs and review of shop drawings.
- Wells Bridge Replacement, WVDOH, Tyler County, WV. Project Manager/Structural Task Manager/EOR responsible for the project development of this bridge project, which consisted of developing design study and contract plans and documents for replacement of an existing bridge carrying WV Route 18 over Middle Island Creek. This project included coordination with WVDOH and resource agencies to minimize impacts to federally endangered mussels in Middle Island Creek while providing a new durable structure to replace the structurally deficient existing bridge. The replacement structure consisted of a 187-ft/0-inch, single-span, weathering steel plate girder bridge supported by fully integral concrete abutments and pile foundations.
- Sugar Run Bridge Replacement, WVDOT, WV. Structures Task Leader for design of a replacement structure for an existing 2-span concrete earth-filled arch bridge. Responsibilities included complete design from type, size, and location (TS&L) phase to the final completion of construction documents. The replacement structure consisted of a 111-ft, single-span weathering steel plate girder superstructure, supported by reinforced concrete cantilever abutments on spread footings. Included in the contract documents were plans, specifications, and engineers estimate. Also assisted in development of USACE Section 404/401p Permit, which included provisions for a temporary in stream causeway and cofferdams. Served as responsible Engineer during construction phase services.
- Mon/Fayette Expressway, WVDOH, Monongalia County, WV. Senior Bridge Engineer during the design and construction phases, which involved the design of 1.5 miles of 4-lane controlled access mainline; two interchanges, including a high-speed, tri-level connection with I-68; 1.9 miles of new or reconstructed local roads; and multiple bridge, box culverts, and retaining wall structures. Oversaw final concrete superstructure designs using Load and Resistance Factor Design (LRFD) and reviewed constructability.
- Corporal Thomas Bennett Memorial Bridge (I-79) National Bridge Inspection Standards Inspection over the Monongahela River, WVDOH, Monongalia County, WV. Project Manager and Lead Inspector responsible for a 6-year (2012–2017) inspection project in compliance with the National Bridge Inspection Standards (NBIS). The project included a complete hands-on, in-depth periodic; two periodic visual inspections; and three interim inspections for the Corporal Thomas Bennett Memorial Bridge, carrying I-79 across the Monongahela River. The bridge consists of 9 spans, a 3-span continuous deck truss, 3 continuous deck girder spans, and 3 continuous deck stringer spans with an overall length of 1,550 ft. Mr. Woodland also led the pursuit that won the repeat contract to continue inspections for this bridge until year 2023.

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Kenneth W. Kinder, PE, CFM

Engineering Manager

Education

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

Registrations

Professional Engineer (PE): WV [redacted] - 2007

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

- CCR Landfill Design and Permitting, Confidential Client, West Virginia (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 expanded an existing landfill and would allow for disposal of fly ash, bottom ash, and gypsum. 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.
- Annual CCR Landfill and Dam Inspections, Confidential Clients, WV. Performed annual CCR inspections for three CCR landfills and one CCR impoundment in WV to verify compliance with state and federal regulations.
- City of Petersburg Lunice Creek Levee, Grant County, 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.

- Coal Combustion Residuals (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. The remaining impoundment will be closed using a geosynthetic and soil cover system, in accordance with the VA Solid Waste Management Regulations and the Environmental Protection Agency's CCR Rule. Developed Closure Plans, Post-Closure Care Plans, Groundwater Monitoring Plans, Construction Drawings, Technical Specifications and Construction Quality Assurance (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.
- 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 designing gas well drilling pads and impoundments. Work included coordinating geotechnical drilling and using gathered subsurface information to assist with design. Prepared erosion and sediment control plans, completed HEC-RAS analyses and floodplain permitting for several temporary and permanent bridges. Designed impoundments including the development of grading plans to maintain an earthwork balance while achieving the required storage volume, design of a liner system and preparation of Emergency Response Plans.
- 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 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.
- 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

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Kerry L. Frech, MEng, PE

Civil Technical Leader

Education

MEng, Environmental Engineering, 1978,
Cornell 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

- Webster Mine Ecosystem in Nanty Glo for U.S. Army Corps of Engineers (USACE), Pittsburgh District. Ecosystem restoration project to treat acid mine discharge from the mine to improve overall water quality in the Blacklick Creek drainage basin. Project engineer for final design and preparation of construction documents.
- Confidential Disposal Site, Pleasants County, WV. Disposal site design for a 250-foot high sludge disposal impoundment 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. Project engineer 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.
- Lake Lynn Dam in Monongalia County, 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 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 in Pennsylvania (PA). 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 at the ash disposal landfill at the Mitchell Power Station.
- Moorefield Community on the Potomac River in Moorefield, WV for the 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.
- Monongahela Riverfront Development Sites in Marion and Monongalia Counties, WV for the USACE, Pittsburgh District. Comprehensive studies for potential development along 37 miles of the Monongahela River (700+ sites) from Fairmont, WV to the WV/PA State line.
- Lower Kanawha River Basin in WV for the USACE, Huntington District. Project engineer responsible for water supply survey investigations in the lower Kanawha River Basin. Identified and characterized potential water supply reservoir sites, including development of low flow frequency duration relationships and economic relationships for further evaluation of the sites.
- 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.
- Romney Bridge Replacement (US 50) over the Potomac River in Hampshire County, West Virginia (WV) for WV Department of Transportation, Division of Highways (WVDOH). Hydrologic and hydraulic analyses for the proposed bridge replacement.
- 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.
- 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.
- Two Lick Creek Reservoir in Homer City, PA. Project engineer responsible for preparing the Emergency Action Plan for Two Lick Creek Reservoir, a 90-foot high 16,200 acre-foot water supply reservoir for the Homer City Steam Generating Station.
- 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.

Kevin M. 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] VA – 2016 [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

- Confidential Power Station and Coal Combustion Residual (CCR) Landfill in Monongalia County, WV. Task Manager for the design, permitting, and construction package preparation of a settling pond and associated stormwater runoff collection system for the site Haul Road. Task Manager for the design of a modified outlet structure for a settling pond, and for performance analyses of the site stormwater collection and conveyance system.
- 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.
- Ghent CCR Landfill Haul Road Water Capture Engineer Project, located at Ghent Station in Ghent, KY for Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E and KU). H&H Lead for the Haul Road Stormwater Drainage Design.
- Trimble County Generating Station Landfill Project located in Trimble County, KY for LG&E and KU. Peer reviewed the H&H design of the Erosion and Sediment (E&S)/Stormwater Management Pond, which was designed to be in a dam in accordance with State and County Regulations.

- Romney Bridge Replacement in Romney, WV. Project engineer responsible for hydraulic evaluation of numerous alternative alignments and preparation of final bridge hydraulics report.
- Leetown Science Center, United States Geological Survey in Jefferson County, WV. 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 on the Ohio River 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 reservoir. Project engineer responsible for dam permit application to modify operating conditions at the dam for purposes of impoundment closure.
- Confidential Power Station, Chesterfield County, VA. Task manager and project engineer responsible for preparation of a construction package and permit package to close a CCR Impoundment under the requirements of the Environmental Protection Agency's CCR Rule.
- Confidential Power Station, Wayne County, IN. Task manager and project engineer responsible for development of conceptual closure plans for a CCR impoundment and stormwater runoff control for a coal field.
- Bradford City Water Authority Dam Evaluations in Bradford, PA for Bankson Engineers. 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 in Colver, PA. 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 Hybrid Energy Center in Virginia. Project engineer responsible for H&H design and analysis for a VA Solid Waste Part B Permit application for the Solid Waste Management Facility and various E&S Control/Storm Water Management Plans throughout construction. Project Engineer for ongoing H&H and construction considerations.
- Confidential Power Station in PA. Project Engineer responsible for preparation of operations and maintenance plans and monitoring plans for Cooling Pond A, the Gaging Weir, the Diversion Dam, Keystone Dam, and the Lower Dam. Responsible for stream modeling using HEC-2 to assess the effects of streambank rehabilitation and wetland construction for wetland replacement and stream restoration required for the coal ash/mine refuse disposal facility expansion project.
- Shawville Power Station. Project Engineer responsible for conceptual evaluation and preparation of construction documents to reduce stormwater runoff volume and peak flow rates to offsite properties.
- Culvert Extension in Westmoreland County for the PennDOT. GAI provided preliminary and final design for reconstruction of 1.5 miles of Interstate 70, including realignment of Smithton Interchange (Section A01). Project Engineer responsible for submission of an H&H report.
- SR 0119 Bridge over Big Run Creek Replacement in Indiana, PA for the PennDOT. Preliminary engineering for bridge replacement. Project Engineer responsible for submission of an H&H report.
- Sedwick Mills SR 0038 Bridge Replacement over Scrubgrass Creek in Butler PA for the PennDOT. Project Engineer responsible for submission of an H&H report.

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Richard M. Ruffolo, MS, PG

Assistant 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. He is a registered Professional Geologist in Pennsylvania (PA), North Carolina (NC), and Kentucky (KY) with over 15 years of geological experience. Mr. Ruffolo has experience in rock strength studies; drilling and micropile installation monitoring; foundation construction monitoring; and monitoring core logging.

Select Professional Experience

- 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.
- Landslide stabilization project at a Confidential Power Station in Willow Island, West Virginia (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.
- Confidential Power Station, Virginia. Abandoned Mine and Hydrogeology Site Characterization for a potential power plant. Responsibilities included performing a subsurface investigation to characterize the condition of multiple abandoned coal mines along with a hydrogeological study. Duties included subsurface investigation, geologic mapping, well installation, and testing.
- Mine Subsidence / Collapse Study, Confidential Client. Responsibilities included researching a potential projects site's past mining and providing recommendations and conclusions for the potential of subsidence. Duties included obtaining historic mining maps, researching the sites past mining methods, performing a site reconnaissance to observe subsidence features.
- Municipal Authority of Westmoreland County, Greensburg, PA. Responsibilities involved the subsurface investigation of an abandoned coal mine and development of subsidence mitigation design. Duties included subsurface exploration, site characterization, preparation of plans and specifications.

- Wyoming Street Wall Grouting, City of Pittsburgh, PA. Responsibilities involved the subsurface investigation of an abandoned coal mine and development of subsidence mitigation design. Duties included subsurface exploration, site characterization, preparation of plans and specifications.
- PennDOT, District 11-0, Open-End Contract. Assisted with various projects in Allegheny, Beaver, and Lawrence Counties for an open-end contract comprising over 80 work orders. Responsible for preparing soil, geologic, and hydrologic setting reports, and conducting surface mine inspections.
- Dolph Refuse/Abandon Mine Fire, Olyphant, PA, Office of Surface Mining. Responsibilities included abandon mine fire characterization, developing a fire monitoring program, and to develop fire controlling recommendations for abandoned anthracite coal refuse/mine fire. Duties included, site characterization, subsurface investigation, geologic mapping, aerial photograph interpretation, mine map research and interpretation, installation and data analysis of downhole temperature recorders, development of fire monitoring program and database, established limits of possible fire migration, report preparation.
- 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.
- Warren Ohl 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.

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Christy M. Mower, MS, FP-C

Environmental Manager

Education

MS, Biology, 2001, Clarion University

BS, Biology/Applied Ecology, 1999, Clarion University

Skills

Stream Restoration and Channel Design

Wetland delineation and mitigation

GIS Mapping

Global Positioning Survey

Certifications / Training

Certified Ecologist

Certified Fisheries Professional, FP-C

Rosgen I, Applied Fluvial Geomorphology, West Virginia, 2005

Rosgen II, River Morphology and Applications, West Virginia, 2006

Rosgen III, River Assessment and Monitoring, North Carolina, 2007

Rosgen IV, River Restoration/Natural Channel Design, Colorado, 2007

38-hr Wetland Delineation/Regional Supplement Trained, 2011

WVDNR Fish & Benthic Certification, 2011

Professional Employment

GAI Consultants, Inc., 2015-Present

Consol Energy, 2010-2015

Michael Baker Corporation, 2006-2010

REI Consultants, 2002-2006

Virginia Department of Game and Inland Fisheries, 2002

William B. Ellen, Inc., 2001-2002

Brigitte VandenEden, Inc., 1999-2001

Professional Summary

Ms. Mower specializes in biology and ecology with extensive experience in fisheries surveys, wetland and stream delineations, benthic macroinvertebrate surveys, and stream and wetland restoration principles. She is a Certified Fisheries Professional (FP-C) through the American Fisheries Society and a Certified Ecologist through the Ecological Society of America. Having Rosgen Level IV Training, she has focused on compensatory mitigation and natural stream channel design techniques writing some of the first mitigation plans in West Virginia (WV). With a team of restoration practitioners, she has designed miles of stream and wetland restoration projects.

Ms. Mower manages mitigation and biologically-related issues across WV, utilizing innovative ways of mitigation implementation, including developing turnkey mitigation banks. She initiated and designed a holistic watershed and state-wide sampling plan throughout WV to evaluate physical and chemical parameters, including Whole Effluent Toxicity testing, which effects the aquatic community. She is skilled in the use of electrofishing boats (Boat Safety Trained), electric-seines, tote (pram) barges, backpack shockers, seines, surbers, hess sampler, drift, plankton and kicknets, ponar dredge, secchi disk, hydrolabs and YSI and DO Meters, biological sampling, and research, and stream geomorphology equipment.

Select Professional Experience

- West Virginia Department of Environmental Protection (WVDEP) Narrative Water Quality (NWQ) Sampling Project, located in multiple WV-based mines. Environmental Manager for collection of data at approved Biological Sampling Stations per the WV National Pollutant Discharge Elimination System (NPDES) Narrative Water Quality (NWQ) guidance on six permits. Tasks included: In-Stream Biological Monitoring; Chemical Monitoring; and NWQ Reports for each of the six NPDES permits.
- Complex Delineation of Aquatic Resources Project, located in Grant County, WV. Environmental Manager for field assessments of aquatic resource delineations and stream and wetland valuation metric and hydrogeomorphic methodology assessments comprising approximately 43.5 acres.
- Confidential Surface Mine Project, located in Greenbrier County, WV. Environmental Manager to complete stream and wetland identification fieldwork; stream and wetland delineation reports; and United States Army Corps of Engineers (USACE) Field Verification.

- On- and Off-Site Restoration Plan Project, located in Doddridge County, WV. Environmental Manager for an on- and off-site stream restoration plan for restoring and monitoring over 2,200 linear feet of stream and over 1 acre of wetland. GAI's tasks included an Initial Site Assessment; Baseline/Existing Conditions Analysis; Design and Mitigation Plan; Permitting; Construction Documents; and Project Coordination and Management.
- Environmental Services Project, located in Marshall County, WV. Environmental Manager for an on- and off-site field reconnaissance and stream and wetland valuation metric and restoration plan to determine if suitable reference reach data is available for the purposes of quantifying impact resources from construction activities. Identified and calculated required mitigation for several options for client review.
- Confidential Mitigation Project, located in Susquehanna County, PA. Environmental Manager to support design and permitting services associated with this mitigation project. GAI's tasks included: Desktop Conceptual Mitigation; Preliminary Site Visit; Preliminary Conceptual Mitigation Plan; Stream and Wetland Delineation; Refined Conceptual Mitigation Plan; Pennsylvania Department of Environmental Protection (PaDEP) / USACE Site Visit; Piezometer Installation and Monitoring; Hydrology and Hydraulic Analysis and Design; Civil Survey; Final Design; Permitting; and Construction Phase Services.

CONSOL Energy, Inc. (2010 – 2015)

- Managed biology-related projects across the coal and gas operations throughout PA, WV, OH, and VA to ensure permitting requirements were met for 404/401/PA Modules/National Pollutant Discharge Elimination System (NPDES) permits, as well as special conditions sampling and implementation for approved permits. Reviewed and assisted with design strategies, conducted construction oversight and reviewed monitoring plans for coal and gas stream restoration projects related to off- and on-site mitigation, subsidence pool mitigation (i.e. gate cuts), stream liner/restoration projects, and mitigation related to pad, impoundment, and pipeline development projects.
- Biologist/Certified Ecologist. Managed a multi-million dollar mitigation banking investment coordinating with coal and gas groups including land, permitting, operation, compliance, joint venture companies, and agency representatives.
- Biologist/Certified Ecologist. Lead a holistic stream/wetland watershed restoration project in WV for a coal surface mine project under a Consent Decree, coordinating operation and construction efforts, as well as working with a legal team and Dr. Dave Penrose to evaluate biological criteria.
- Biologist/Certified Ecologist. Handled emergency situations (i.e. migratory bird issues, fish kills, etc.) being on-call for coal and gas operations.

Michael Baker, Beckley and Charleston, WV (2006 – 2010)

- Environmental Specialist II/Office Manager. Managed 4-5 Environmental Technicians, Assistants, and Interns on daily field & laboratory tasks for multiple projects in the environmental department. Managed and prepared benthic, fisheries, delineation, and mitigation reports with a team of experts across the county. Prepared scope of work and cost estimates for proposals, along with submitting invoices to various clients.

REI Consultants, Inc. (2002 – 2006)

- Environmental Project Manager. Managed day-to-day field and laboratory operations for multiple projects in the biological department, including overseeing the duties and responsibilities of biologists and field technicians. Conducted biological research and coordinated with state, federal, and local governments in regards to 401/404 permitting. Responsible for design, development and biological research for stream restoration, compensatory mitigation, jurisdictional determination, benthic, and fisheries projects.
- Fisheries Biologist. Responsibilities included supervision of field operations for research in the biological division, reporting of biological data, including all fish identification to the species level, data analysis (using ArcView, Systat), and interpretation of water quality results. Also conducted biological investigations of benthic macroinvertebrates, fisheries communities & cover, aquatic habitat, riparian evaluations, substrate characterizations, and stream geomorphology utilizing Natural Stream Design techniques.

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Charles A. Cook (Alex)

Senior Project Environmental Specialist

Education

BS, Biology, 2006, West Virginia State University

Skills

Environmental Investigation, Sampling, Analysis

Wetland Delineation

Environmental Permitting

Threatened and Endangered Species Surveys

Certifications / Training

Approved Surveyor for Running Buffalo Clover, West Virginia Division of Natural Resources

Wetland Delineation Training, North Carolina State University, 2008

NEPA and Transportation Decision Making, National Highway Institute (USDOT/ FHWA), 2009

Ohio EPA QHEI Training, Ohio EPA, 2008

24-hour MSHA Training

Industry Experience

GAI Consultants, Inc., 2014-Present

Michael Baker, 2007-2014

Professional Summary

Mr. Cook specializes in environmental and biological surveys and field assessments for private and public clients, including wetland delineations, jurisdictional stream determinations, vegetation surveys, benthic and water quality sampling, fish and herpetology studies, and threatened and endangered species surveys. He is familiar with current West Virginia and federal regulations including the Section 401 and 404 permitting process (CWA) and Section 7 consultation (ESA). He has also been involved in drafting technical reports and NEPA documents for numerous large transportation and natural resource related projects.

Select Professional Experience

- Implemented and performed bi-annual Narrative Water Quality assessments (NPDES compliance) for a proposed surface mine project that included habitat assessments, water quality sampling, fish surveys, benthic macroinvertebrate surveys, and geomorphic and sediment transport studies following West Virginia Department of Environmental Protection (WVDEP) and federal protocols.
- Conducted various stream and wetland assessments in conjunction with the Stream and Wetland Valuation Metric (SWVM) including hydrogeomorphic assessments (HGM), EPA RBP habitat assessment valuations (HAV), various water chemistry analyses, benthic macroinvertebrate sampling – for the purpose of generating a West Virginia Stream Condition Index (WVSCI), and surface water delineations to calculate mitigation requirements for individual permits on multiple projects and to establish credits for work related to mitigation banks in WV.
- Performed and led field efforts concerning surface water determinations, delineations, and additional assessments for multiple projects involving the construction of natural gas well pads, pipelines, and other associated facilities in West Virginia (WV), Ohio (OH), and Pennsylvania (PA).
- Conducted wetland delineations and vegetation surveys for several constructed compensatory wetland sites in WV to evaluate and report fulfillment of mitigation success criteria.
- Conducted routine (monthly) monitoring of compensatory wetland sites in WV to satisfy mitigation monitoring conditions for specific projects. Routine assessments involved groundwater monitoring, benthic macroinvertebrate sampling, amphibian surveys, various vegetation surveys, and annual wetland determinations.

- Performed site screening for Kentucky Department of Fish and Wildlife Resources to identify and establish stream restoration opportunities for the Kentucky (KY) In-Lieu Fee Mitigation Program in the Big Sandy Watershed.
- Assisted in habitat identification surveys, mistnet surveys, agency coordination, and subsequent reporting for the endangered Indiana Bat (*Myotis sodalis)* on several transportation and natural resources related projects.
- Conducted habitat identification and implemented project specific conservation measures pertaining to a Memorandum of Understanding and Cooperator Agreement for the formally listed West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*) on a large transpiration project in WV.
- Conducted several surveys for the endangered Running Buffalo Clover (*Trifolium stoloniferum*) on transportation projects in WV.
- Developed habitat criteria evaluations to determine the need for further habitat or capture surveys for multiple species, identified as Regional Forester Sensitive Species (RFSS), as a condition of a MOU related to work in the Monongahela National Forest.
- Contributed on several NEPA documents, including Environmental Assessments, Environmental Impact Statements, and technical reports pertaining to transportation related projects in WV.
- Drafted and contributed on several Section 404 Permits (individual permits, individual permit modifications, and pre-construction notifications for nationwide permits) for multiple transportation, civil, and natural resource related projects.

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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

- Preliminary and final site planning design of Abandoned Mine Lands (AML) sites for the WVDEP. Surveying, design drafting, site grading, haul roads, and drainage design.
- Owings Mine Complex, Harrison County, West Virginia (WV). Evaluated water quality and potential passive Acid Mine Drainage (AMD) treatment system design at the mine complex site. Project included identifying monitoring points (streams and AMD discharges), sampling monitoring points for three months and drafting conceptual design of passive AMD treatment system.
- Engineering work required to initiate an abatement plan to stabilize the hillside and abate the hazards associated with the land movement for the Protection WVDEP, Office of Abandoned Mine Lands, and Latrobe (Gibson) Landslide II at Latrobe, WV.
- Owings Mine Complex, Harrison County, WV. Subsurface investigation, grading and drainage design for four refuse piles and various other refuse areas, design of seals for eighteen mine portals.
- Omega Mine Complex, Monongalia County, WV. Prepared construction documents for the project. The project involved the injection of coal combustion byproduct grouts into mine workings to help alleviate the generation of AMD. Work included preparation of drawings.
- Geotechnical investigation for WVDEP, Office of Abandoned Mine Lands, Laurel Point Stripe, Laurel Point, WV. Duties include monitoring of drilling activities, daily bore logs, soil and coal refuse sampling and rock core sampling.

- Geotechnical investigation for WVDEP, Office of Abandoned Mine Lands, Greystone Mine Drainage Project, Morgantown, WV. Duties include monitoring of drilling activities, daily bore logs, soil and coal refuse sampling and rok core sampling.
- Construction monitoring for reclamation of a failed coal slurry impoundment. Construction included earthwork, rock buttress, and drainage channels.
- Construction oversight for a landslide reclamation project of a valley fill in Fayette County, WV. Construction included collecting drainage in rock drains, rock buttress, earthwork, and drainage channels.
- Assisted with preparation of hydraulic/hydrology calculations, supporting documentation for engineering construction cost estimate, USACE 404 applications, and grading of regarding of exposed refuse spoil piles for three projects in Southern WV for the WVDEP, Office of Abandoned Mine Lands.
- Prepared construction documents for the Harris AMD site in Harrison County, WV. Project included designing channels, wet seals, and drain pipes; and preparing drawings.
- Lead construction monitor inspector a stream restoration project in located in Marshall and Wetzel Counties, WV. Work included monitoring slope stabilization for failed well pads; monitored erosion and sediment control best management practices associated with development of well pads.
- Monitored construction of 600,000 cubic yard rock buttress for a failed coal slurry impoundment. Work included monitoring of activities, troubleshooting, preparing daily logs and construction administration coordination for the West Virginia Department of Environmental Protection (WVDEP).
- Prepared construction documents for the Mill Creek Regional Water Supply Extension Project, Logan County, WV. Project included design of water treatment plant, two water tanks, three booster stations, two master meter assemblies, and approximately 34 miles of waterline; and preparation of drawings. Drawings included 51 plan drawings using aerial photography as base mapping.
- Phase II Water Feasibility Study, Washington Heights to Jeffrey Study Area, Boone County, WV. Work included interviewing local residents and government officials; collecting surface and private water supply samples; and preparation of drawings representing existing and proposed remedial measures. Work was completed on a "fast track" schedule.
- Phase II Water Feasibility Study, Reynoldsville, Wallace, and Clarksburg Study Area, Harrison County, WV. Work included interviewing local residents and government officials; collecting surface and private water supply samples; and preparation of drawings representing existing and proposed remedial measures.
- Prepared construction documents for the Mainela Subsidence project in Fairmont, WV. Project involved drafting of layout of injection plan for grouting under three residences; and preparing drawings.
- Water supply inventories and water sample collection for the Phase II water feasibility study for the Weaver-Junior Study Area in Barbour and Randolph Counties, WV for the WVDEP.
- Assisted with preparing pre-blast and pre-subsidence surveys in conjunction with deep mine operations in Meigs and Vinton County, OH; Redhouse, MD; and several mining operations in Southern WV including videotaping and photographing structures, identifying existing conditions of structures, documenting problem areas, and writing final reports.
- Geotechnical investigation for Morgantown Utility Board Wiles Hill Tank, Morgantown, West Virginia. Duties include monitoring of drilling activities, daily bore logs, and rock core sampling.
- Geotechnical investigation for the WVDOT Summersville Regional DMV Office in Nicholas County, WV. Duties include monitoring of drilling activities, daily bore logs, soil and coal refuse sampling and rock core sampling.

David L. Workman
Senior Technical Specialist

Education

BS, Industrial Engineering Technology, 2000, West Virginia University Institute of Technology

AS, Drafting and Design Engineering Technology, 1997, West Virginia University Institute of Technology

Skills

Environmental and Civil Engineering

Infrastructure and Roadway Design

Computer Aided Drafting and Design

Certifications / Training

ESRI, ArcGIS Desktop/ Desktop 10: Python, ArcMap, and Editing, Basics of GIS, and Getting Started with GIS, 2012

NICET Certification, 2008

Aircraft Load Planning Certification, 2007, 130th APS

Hazardous Material Inspectors Course Certification, 2006, 130th APS

OSHA 10-hour Occupational Safety and Health Training

Nuclear Density Gage Training – DOT and NRC

AutoCAD Civil 3D 2009 Essentials 3-day Training and ASU 1-day Power Training, 2009

Industry Experience

GAI Consultants, Inc., 2007-Present

Floyd Browne Group, 2004-2007

Wilbur Smith Associates, 2000-2004

West Virginia Air National Guard, 1991-Present

Professional Summary

Mr. Workman specializes in environmental and civil engineering, including site development, streetscape, and planning projects. His work with private developers, architects, municipalities and government agencies has given him substantial experience in site and roadway design.

Mr. Workman has worked on a variety of construction project sites including landfills, abandoned mines, and industrial and commercial facilities. His civil engineering/site design work includes digital terrain and roadway models, cross-sections, vertical profiles, site detailing, earth work estimating, and design of both large and small sites ranging in size of one to 40+ acres.

Additionally, Mr. Workman prepares design and construction plans, reports, and cost estimates for projects, and develops highway and roadway designs. He has also contributed to the planning and design elements of several community improvement master plan and streetscape projects. He is familiar with the requirements for Design Construction plans, Spill Prevention & Countermeasure plans (SPCC), Groundwater Protection Plan (GPP), and Storm Water Pollution Prevention Plans (SWPPP). He has prepared numerous Erosion and Sedimentation Control Plans (E&SCP) and has performed inspections of sites.

Select Professional Experience

- Richard Mine Acid Mine Drainage, Morgantown, WV. Flow monitoring study.
- Nicholas County Landfill, Nicholas County, WV. Site design, grading, and detailing.
- Whites Run Highwall and Portal Project, Randolph County, WV, for the WV Department of Environmental Protection (WVDEP). Abandoned mine lands engineering.
- Major Natural Gas Client (Confidential), Ohio (OH) and WV. Twenty (20) Marcellus and Utica Well Pad Designs; (10) Site/Stream Restoration Designs; (6) Marcellus and Utica Impoundment Designs.
- Lynch Run Highwall #6 Design, WVDEP/AML, Gilmer County, WV.
- Duck Creek (Jenkins) Landslide, WVDEP/AML, Kanawha County, WV.

- Heizer Creek (Left-Zitzelsberger) Drainage, WVDEP/AML, Putnam County, WV.
- Wolfpen (McBurney) Landslide, WVDEP/AML, Harrison County WV.
- Mallory Refuse Pile, WVDEP/AML, Logan County, WV.
- Reynoldsville Refuse Design, WVDEP/AML, Harrison County, WV.
- Laurel Point Run Reclamation Design, WVDEP/AML, Monongalia County, WV.
- City of Huntington, Hal Greer Boulevard Underpass Stormwater Assessment, Cabell County, WV.
- EMS Station, Environmental Assessment, Milton, Cabell County, WV.
- Anthony Correctional Center, Neola, West Virginia (WV). Site detailing of water treatment plant.
- Chesapeake Energy Regional Headquarters, Charleston, WV, LEED® Project, and Field Offices in Mount Morris, Pennsylvania (PA) and Honey Branch, Kentucky (KY).
- City of Charleston, Riverfront Park, Retractable Canopy Foundations and Court Street Overlook, Kanawha County, WV.
- City of Charleston, Schoenbaum Performance Stage, Kanawha County, WV.
- Cranberry Township Site Design Alternate Study, Cranberry Township, PA.
- Aspen Village Site Design, Davis, WV.
- Ft. Boreman Development-Master Plan, Site Preparation, Parkersburg, WV.
- City of Mount Hope Historic Park, WV.
- ABT Water Management Waterline Replacement, Butler County, OH.
- Great Escape Theater Site Design, Cross Lanes, WV.
- Eastern WV Community and Technical College Site Improvements, WV.
- WV University Research Campus Site Design, WV.
- CURA - East End Community Park, City of Charleston, WV.
- Starlite Industrial Park, OH.
- The Clay Center Site Improvements, Charleston, WV.
- Davis Riverfront Park, City of Davis, WV.
- Marshall University Medical Center, Huntington, WV.
- Altizer and April Dawn Parks, GHPRD, Huntington, WV.
- Great Lakes Truckland Site Improvements, Cross Lanes, WV.
- Sugar Grove Site Design, Habitat for Humanity, WV.
- Powder Ridge Condos Site Improvements, Snowshoe, WV.
- Raleigh County Judicial Annex, Raleigh County, WV.
- METZ property - Road Worthy Resort Site Design, WV.
- SOLCO - West Ridge Entrance Site Design, WV.
- Laurel Hill Battlefield, City of Belington, WV.
- Golf Club House/Lodge Site Development, Stonewall Jackson State Park, WV.
- Family Carpet Plaza-Site Design, Parkersburg, WV.

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Michael P. Doyle
Senior Designer

Education

AS, Computer Aided Drafting and Design, Triangle Tech

Skills

Computer Aided Design and Drafting

Certifications / Training

Inroads

Right of Way Plans, Courthouse to Statehouse

10-Hour OSHA Construction Safety and Health

PEC Safe Land Training

Industry Experience

GAI Consultants, Inc., 2004-Present

Qk4, 2001-2004

Kimley-Horn and Associates, 1996-2001

Professional Summary

Mr. Doyle is a Senior Designer with GAI specializing in civil engineering projects, ranging from industrial/commercial site development and planning projects to large scale roadway design projects. Mr. Doyle has worked on a variety of construction project sites including industrial and commercial facilities. Some of his civil engineering/site design projects included alignment layout, cross-sections, vertical profiles, site detailing, quantities, and design of both large and small sites. He prepares design and construction plans, reports, permits, and cost estimates for projects.

Mr. Doyle's computer skills include AutoCAD Civil 3D (Surfaces, Alignments, Profiles, Corridor Modeling, and Grading), Microstation, Bluebeam PDF Revu, Maptech, and Terrain Navigator Pro.

Select Professional Experience

- Laurel Run Point Abandoned Mine Land Reclamation Project, located in Laurel Point, Monongalia County, West Virginia (WV) for the West Virginia Department of Environmental Protection (WVDEP), Office of Abandoned Mine Lands and Reclamation. Senior Designer.
- Richard Mine Acid Mine Drainage Treatment Project, located in Morgantown, WV for the West Virginia Conservation Agency, Monongahela Conservation District, and Natural Resources Conservation Services. Senior Desngier.
- Heizer Creek Drainage and Wolfpen Landslide, located in Putnam and Kanawha Counties, WV, for WVDEP, Office of Abandoned Mine Lands and Reclamation. Senior Designer.
- Bud/Alpoca Water Study, located in Wyoming County, WV, for WVDEP, Office of Abandoned Mine Lands and Reclamation. Senior Designer
- Herndon Heights Water Study, located in Wyoming County, WV, for WVDEP, Office of Abandoned Mine Lands and Reclamation, Senior Designer.
- Nuriva/Maben Water Study, located in Wyoming County, WV, for WVDEP, Office of Abandoned Mine Lands and Reclamation. Senior Designer.
- West Newton Refuse Embankment Stabilization Project, located in Westmoreland County, PA, for the Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation. Senior Designer.

APPENDIX E
GAI WVDEP AML Project List

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GAI ABANDONED MINE LANDS PROJECTS
WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION

Title: **Amigo Portals**
Location: Raleigh County, WV
Tasks: The scope of work involved providing closure of 19 mine portals with bat gates or mine seals, covering exposed refuse, providing stream realignment and streambank protection, and providing proper drainage control measures. We also prepared and obtained a Stormwater NPDES Permit and COE 404 permit.

Title: **Larry Frederick Highwall & Refuse**
Location: Harrison County, WV
Tasks: The scope of work involved providing closure of three mine portals mine seals, regrading and reseeding an exposed refuse, revegetation of a highwall bench, and providing proper drainage control measures. We also prepared and obtained a Stormwater NPDES Permit.

Title: **Wheatley Branch (Luthy) Portals**
Location: Logan County, WV
Tasks: The scope of work involved several locations of abandoned trash piles, access road construction, 29 mine seals, and providing proper drainage control measures. We also prepared and obtained a Stormwater NPDES Permit, WVDOH MM-109 permits and a non-reporting nationwide COE 404 permit.

Title: **Laurel Point Strip**
Location: Monongalia County, WV
Tasks: The project consisted of 2 sites. The scope of work involved regrading and soil covering refuse pile, constructing access roads, providing streambank stabilization, sealing the mine portal(s), backfilling highwalls, landslide reclamation, providing proper drainage control measures and revegetating the areas. Construction plans and technical specifications were developed. We also prepared and obtained a Stormwater NPDES Permit and WVDOH permits.

Title: **Reynoldsville Refuse**
Location: Harrison County, WV
Tasks: The project consisted of 11 sites. The scope of work involved providing regrading and soil covering refuse piles, construct access roads, provide streambank stabilization, sealing mine portal(s), bat gates, demolition of mining structures, filling of vertical shafts, regrade sink hole areas, provide proper drainage control measures, and revegetate the areas. Construction plans and technical specifications were developed. We also prepared and obtained a Stormwater NPDES Permit and WVDOH permits.

Title: **Earling Refuse Pile**
Location: Logan County, WV
Tasks: The scope of work included regarding the refuse pile, provide streambank stabilization, stream restoration, seal the mine portal(s), bat gates, and provide proper drainage control measures. Construction plans and technical specifications were developed. We also prepared and obtained a Stormwater NPDES Permit.

Title: **Greystone Mine Drainage**
Location: County, WV
Tasks: The scope of work involves providing seals for the collapsed portals, backfilling the highwalls, reclamation of the refuse pile, and providing proper controlled drainage including natural stream design. Construction plans and technical specifications were developed.

Title: **Route 60 Drainage**
Location: Fayette County, WV
Tasks: The scope of work involves providing seals for the collapsed portals, design of controlled drainage, and design of a pneumatic concrete wall for a rock highwall. Construction plans and technical specifications were developed.

Title: **Lynch Run Highwall #6**
Location: Gilmer County, WV
Tasks: The scope of work involves providing seals for the collapsed portals, backfilling the highwalls, reclamation of the refuse pile, and providing proper controlled drainage including natural stream design. Construction plans and technical specifications were developed.

Title: **Mallory Refuse Pile**
Location: Logan County, WV
Tasks: The scope of work involves regarding the refuse pile, sealing the mine portal(s), and design of drainage control measures. Construction plans and technical specifications were developed.

Title: **Heizer Creek (Lett-Zitselberger) Drainage**
Location: Putnam County, WV
Tasks: The scope of work involves stabilizing a slope, providing seals for collapsed portals, and providing controlled drainage. Construction plans and technical specifications were developed.

Title: **War (Dash) Impoundment**
Location: McDowell County, WV
Tasks: The scope of work included providing aerial mapping and ground survey for verification of two sites consisting of a small impoundment, several mine portals, and coal refuse disposal. In addition, stability analyses were performed on various scenarios for the elimination of the impoundment including subsurface investigation.

Title: **Whites Run Highwall and Portal**
Location: Randolph County, WV
Tasks: The scope of work consist of preparing construction documents for the reclamation of 6,000 linear feet of highwall, three deep mine portals, a coal refuse spoil area, and treatment of acid mine drainage (AMD). The treatment of the AMD will utilize passive treatment techniques. The project also includes re-establishment of a stream by natural stream techniques.

Title: **Helen Portals**
Location: Raleigh County, WV
Tasks: The scope of work included the preparation of construction documents for four sites, consisting of abandoned mine portals, unstable refuse piles, small impoundment, and demolition of a mining related structure. The project also included re-establishing a stream by natural stream techniques.

Title: **Ned's Branch Impoundment (Phase II)**
Location: Mingo County, WV
Tasks: The scope of work included this preparation of construction documents for reclamation of the failed impoundment. The scope of work included regrading of refuse, eliminating impoundment capability, sealing of mine portals, stream restoration, highway relocation and construction management services for the above activities.

Title: **Madison Street/Fairview Route 218 Portals**
Location: Marion County, WV
Tasks: Preparation of construction documents for the Madison Street/Fairview Route 218 Portals project. Work included subsurface investigation; surveying; design of wet mine seals and associated drains at multiple sites; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings.

Title: **Bearwallow Branch Refuse Pile**
Location: McDowell County, WV
Tasks: The scope of work included the preparation of construction documents for reclamation of seven sites. The various sites consist of unstable refuse piles, abandoned mine portals, small impoundments, and miscellaneous structures.

Title: **Duck Creek (Jenkins) Landslide**
Location: Harrison County, WV
Tasks: The scope of work involves the design of stabilization measures for the slide and design of seepage and stormwater drainage controls. Construction plans and technical specifications were developed.

Title: **Wolfpen (McBurney) Landslide**
Location: Kanawha County, WV
Tasks: The scope of work involves stabilizing a slope, providing seals for collapsed portals, and providing controlled drainage. Construction plans and technical specifications were developed.

Title: **Latrobe (Gibson) Landslide Emergency Project**
Location: Logan County, WV
Tasks: The scope of work involved emergency evaluation and investigation to develop alternatives to reduce slopes, eliminate instability, and provide for controlled drainage. Once an alternative was selected, construction plans and specifications were developed.

Title: **Charleston (Ratcliffe) Landslide**
Location: Kanawha County, WV
Tasks: The project included subsurface investigation; research of mine mapping; and determination if the slide was due to mining.

Title: **Mulberry Fork (Stover) Landslide**
Location: Fayette County, WV
Tasks: The project included subsurface investigation and design of corrective measures for a landslide.

Title: **Courtright Highwall**
Location: Bridgeport, WV
Tasks: The project included a subsurface investigation to determine extent of landslide and whether mining related, field surveying to establish topographic mapping and control, and subsequent design of landslide repair alternatives. Design ultimately selected included a reinforced slope using stabilizing grid. Landslide contained 400,000 cubic yards of material.

Title: **Belle (Malcolm) Landslide**
Location: Belle, WV
Tasks: Landslide stabilization including excavation of slide mass, sealing of several mine entries, and drainage controls. Project included drilling, sampling, and piezometer installation and monitoring to develop project plans and specifications.

Title: **Williamson (Elias) Landslide - Emergency**
Location: Williamson, WV
Tasks: Subsurface investigation and determination of whether or not a landslide threatening one home was mining related with subsequent development of plans for a retaining wall were conducted.

Title: **Kitchen/Gibson Landslide - Emergency**
Location: Boone County, WV
Tasks: Subsurface investigation and determination of whether or not a landslide threatening four homes was mining related were conducted.

Title: **Duck Creek Landslide**
Location: Gilmer County, WV
Tasks: The project included subsurface investigation, development of construction specifications and drawings, and construction monitoring for remedial work on a landslide resulting from uncompacted strip bench spoils.

Title: **Ven's Run Maintenance Project**
Location: Harrison, County, WV
Tasks: The scope of work involves stabilizing the slopes and provide for controlled drainage. It is GAI's initial approach to the abatement of the landslide is to provide a proposed reclamation plan that will grade the slide in place as much as practical and not conduct a total removal of material.

Title: **Oldfield Branch (Hall) Drainage**
Location: Mingo County, WV
Tasks: The scope of work involved providing mine seals or bat gates for four mine entries, landslide mitigation with a retaining wall, and providing proper drainage control measures. We also prepared and obtained a Stormwater NPDES Permit and COE 404 permit.

Title: **Mingo County PSD Feasibility Study (ID#405)**
Location: Mingo County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing of the previous water system' supplies; researching water quality records; designing and costing remedial measures; and summarizing the findings in a report

Title: **Eastern Wyoming County PSD Feasibility Study (ID#401)**
Location: Wyoming County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Raleigh County PSD Feasibility Study (ID#397)**
Location: Raleigh County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Webster County Commission Diana Area Feasibility Study (ID#383)**
Location: Webster County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Cherokee Complex**
Location: McDowell County, WV
Tasks: The scope of work involved providing regrading and soil covering of the refuse pile, providing natural stream restoration and streambank protection, structure demolition, and providing proper drainage control measures. We also prepared and obtained a Stormwater NPDES Permit and COE 404 permit.

Title: **Erbacon CR9 Webster County WL Feasibility Study (ID#376)**
Location: Webster County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Kanawha Rambling Hills Water Study**
Location: Kanawha County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Davis Creek Water Study**
Location: Kanawha County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Coalburg Water Study**
Location: Kanawha County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Wallace 353 Water Study**
Location: Harrison and Wetzel Counties, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Wallace 354 Water Study**
Location: Harrison County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Hominy Creek Area Waterline Extension Feasibility Study**
Location: Nicholas County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Logan (Marcum) Drainage Emergency Project**
Location: Logan County, WV
Tasks: The scope of work involves emergency evaluation and investigation to develop a method to collect and discharge the seepage from the coal seam and conveyance to a downstream drainage system. Construction plans and specifications were developed.

Title: **Bud/Alpoca Waterline Extension Feasibility Study**
Location: Wyoming County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Nuriva/Maben Waterline Extension Feasibility Study**
Location: Wyoming County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Herndon Heights Waterline Extension Feasibility Study**
Location: Wyoming County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Handley/Upper Creek Drainage Project**
Location: Kanawha County, WV
Tasks: The reclamation plan included dewatering the underground impoundment(s) and creating diversion ditches to redirect the drainage around structures to the nearby stream. Regrading the areas behind the retaining wall, revegetating, and providing proper drainage for all disturbed areas is also included in the plan.

Title: **War Waterline Extension Feasibility Study**
Location: McDowell County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Clark's Gap Waterline Extension Feasibility Study**
Location: Mercer and Wyoming Counties, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Community of Preston - State Route 72 Waterline**
Location: Preston County, WV
Tasks: The scope of work included the preparation of construction documents for a water transmission line. The total length of waterline is approximately 1.1 miles.

Title: **Anchor Road Waterpumping, Storage and Distribution Feasibility Study**
Location: Logan County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Standard, Paint Creek, Collinsdale Waterline Extension Feasibility Study**
Location: Kanawha County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **McAlpin Eroding Dump - Phase II**
Location: Raleigh County, WV
Tasks: The scope of work included the preparation of construction documents for eleven sites. The sites consisted of ten coal refuse piles (one of which is burning), numerous mine openings (both collapsed and open), old mine buildings, possible AMD, and various mine related debris.

Title: **McAlpin Eroding Dump - Phase I**
Location: Raleigh County, WV
Tasks: The scope of work included the preparation of construction documents for six sites. The sites consisted of six coal refuse piles, numerous mine openings (both collapsed and open), old mine buildings, possible AMD, and various mine related debris.

Title: **Kingwood 52/6 Water Supply Extension**
Location: Preston County, WV
Tasks: The scope of work included the preparation of construction documents for a water transmission line. Included in the distribution system are a 96,000 gallon water storage and a booster pump station. The total length of waterline is approximately 13 miles.

Title: **Micajah Ridge - Herndon Heights/Itman Waterline Extension Feasibility Study**
Location: Wyoming County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Water Feasibility Study, Glen Rogers Study Area**
Location: Wyoming County, WV
Tasks: Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Rt. 20 / Gould Community Waterline Extension Feasibility Study**
Location: Upshur County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Water Feasibility Study, Elkins/Buckhannon Study Area**
Location: Upshur County, WV
Tasks: Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Laurel Creek Subdivision Subsidence**
Location: Raleigh County, WV
Tasks: Preparation of construction documents for the Laurel Creek Subdivision Subsidence project in Beckley, WV. Project involved subsurface investigation (including borehole camera work); sampling of mine water; injection plan layout for grouting under over 40 residences; surface water drainage structure, preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings.

Title: **Superior (PocaLand) Complex**
Location: McDowell County, WV
Tasks: The assessment included a site reconnaissance, asbestos observations and sample analysis, lead-based paint observations and analysis, and limited surficial soil sample analysis. The assessment was concluded in a report to aid in evaluating the existing subsurface soil quality in the area to better understand the costs involved during reclamation efforts.

Title: **Washington Heights to Jeffrey Waterline Extension**
Location: Boone County, WV
Tasks: The project involved a technical review plans and specifications presented by the WVAWC as part of the Boone County Public Service District: Regional Water Supply System. The plans included a total of seven contracts. The scope of work was to identify areas of the contracts that were within project limits set by a Phase II Water Feasibility Study conducted for the WVDEP and to determine the amount of the contract costs that were the responsibility of the WVDEP. Included were field reconnaissance, review of plans, hydraulic calculations, and cost estimating.

Title: **Water Feasibility Study, Gaymont, Edmond, and Winona Study Area**
Location: Fayette County, WV
Tasks: Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Water Feasibility Study, Hominy Creek Study Area**
Location: Nicholas County, WV
Tasks: Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Elk Creek / Verner Waterline Extension Feasibility Study**
Location: Logan County, WV
Tasks: The scope of work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Orlando Mining Facility**
Location: Gilmer County, WV
Tasks: The scope of work included preparation of a report identifying the results from an investigation/evaluation of the facilities and equipment at the site. The investigation included determining the value, usefulness and/or condition of the facilities and equipment.

Title: **Scotch Hill / Miller Hill Water Supply Extension**
Location: Preston County, WV
Tasks: The scope of work included the preparation of construction documents for a water transmission line beginning at the existing hydropneumatic booster station. Included in the distribution system is 96,000 gallon water storage. The total length of waterline is approximately 7.5 miles.

Title: **Camp Run AMD**
Location: Barbour County, WV
Tasks: The scope of work included the preparation of construction documents for two sites. The sites consisted of ten to fifteen mine portals and mine drainage seep locations, one pond (to be drained), concrete tramway abutments (and debris), coal refuse, and various areas of saturated soil from mine drainage (one of which is sliding).

Title: **Mahan Tipple and Refuse Maintenance**
Location: Fayette County, WV
Tasks: The scope of work included the preparation of construction documents for the repair of a sliding reclaimed coal refuse pile. The project consisted of installing a rock toe buttress and drainage channels

Title: **Johnsons Knob**
Location: Fayette County, WV
Tasks: The scope of work included the preparation of construction documents for four sites. The sites consisted of five coal refuse piles totaling approximately twenty acres, numerous mine openings (consisting of auger hole and portals, both collapsed and open), six old mine buildings, possible AMD, and various mine related debris (including two old conveyors and a collapsed tipple).

Title: **Carolina Refuse**
Location: Marion County, WV
Tasks: The project consisted of two sites. The sites consisted of a refuse pile totaling approximately three acres, various non-mine related debris, and two concrete mine shafts with some various debris.

Title: **Omega Mine Complex Project**
Location: Monongalia County, WV
Tasks: The project involved writing a final report to the Electric Power Research Institute to include a comparison of the pre- and post-injection water quality data, the results of a post-construction benthic survey, and the results of an analysis of data from injection operations.

Title: **Omega Mine Complex Completion**
Location: Monongalia County, WV
Tasks: The scope of work included the preparation of construction documents for a booster station upgrade as part of the Omega Mine Complex project. Hydraulic analyses were performed, new pumps were selected, and a demonstration was made that the new pumps had higher efficiencies than the old pumps. Construction documents for the booster station upgrade and pressure reducing assembly were prepared.

Title: **Hutchinson Subsidence**
Location: Fairmont, WV
Tasks: Preparation of construction documents for the Hutchinson Subsidence project in Fairmont, WV. Project involved subsurface investigation (including borehole camera work); sampling of mine water; injection plan layout for grouting under three residences; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings.

Title: **Fairmont (Grandstaff) Subsidence**
Location: Fairmont, WV
Tasks: Evaluation of potential subsidence effects for the Grandstaff Subsidence project in Fairmont, WV. Project involved subsurface investigation (including borehole camera work); sampling of mine water; and preparation of a report describing the findings of the above investigations.

Title: **City of Summersville (Rt. 39)**
Location: Nicholas County, WV
Tasks: The project included the review of another consultants water feasibility study report and determination if the findings of the report were accurate.

Title: **Reynoldsville, Wallace, and Clarksburg Water Supply Extension Project**
Location: Harrison County, WV
Tasks: The project included a feasibility/rate analysis, design of 9,400 feet of 8-inch water line, 33,000 feet of 6-inch water line, 12,200 feet of two-inch water line, a 96,000 gallon (nominal) water storage tank, and other appurtenances, selection, surveying, and geotechnical investigation of a water storage tank site, and preparation of construction documents, regulatory permit applications, and an engineer's report.

Title: **Mill Creek Regional Water Supply Extension Project**
Location: Logan County, WV
Tasks: Preparation of construction documents for the construction of water transmission lines, a water distribution system, two water storage tanks, a booster station, two hydropneumatic tanks, and a water treatment plant. The total length of water line to be constructed was approximately 34 miles.

Title: **Majesty Mine Complex**
Location: Barbour County, WV
Tasks: Preparation of construction documents for the reclamation of the Majesty Mine Complex. The Majesty Mine Complex was an abandoned mine site which included old mine structures, open mine portals, unreclaimed refuse piles and an extensive highwall, existing wetlands and ponds, and numerous seeps producing acid mine drainage (AMD).

Title: **Phase II Water Feasibility Study, Washington Heights to Jeffrey Study Area**
Location: Boone County, WV
Tasks: Phase II water feasibility study for private water supplies in the Washington Heights to Jeffrey Study Area in Boone County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report. Work was completed on a "fast track" schedule.

Title: **Evaluation of Construction Documents, Gauley River Water Line Extension**
Location: Fayette and Nicholas Counties, WV
Tasks: Evaluation of construction documents for the Gauley River Water Line Extension, to be funded by AML. Evaluation included a review of technical specifications and drawings; evaluation of hydraulics; completion of letter summarizing the evaluation; and meetings to discuss the evaluation.

Title: **Evaluation of Construction Documents, Heizer/Manila Creek Water Line Extension**
Location: Putnam County, WV
Tasks: Evaluation of construction documents for the Heizer/Manila Creek Water Line Extension, to be funded by AML. Evaluation included a review of technical specifications and drawings; evaluation of hydraulics; completion of letter summarizing the evaluation; and meetings to discuss the evaluation.

Title: **Owings Mine Complex**
Location: Harrison County, WV
Tasks:
(1) Evaluation of water quality and potential passive AMD treatment system design at the Owings Mine Complex Site. Project included identification of monitoring points (streams and AMD discharges); sampling and analysis of monitoring points for a three-month period; preparation of a report summarizing the findings; and conceptual design of passive AMD treatment system including costs.

(2) Preparation of construction documents including subsurface investigation; surveying; refuse processing evaluation; grading and drainage design for four refuse piles and various other refuse areas; design of seals for eighteen mine portals; and preparation of technical specifications, drawings, and engineer's cost estimate.

Title: **Omega Mine Complex**
Location: Monongalia County, WV
Tasks: Preparation of construction documents for the Omega Mine Complex project in Monongalia County, WV. The project involved the injection of coal combustion byproduct grouts into mine workings to help alleviate the generation of AMD. Work included subsurface investigation; surveying; grout mix evaluation; acid-base accounting analysis of overburden and coal; and preparation of drawings, technical specifications, and engineer's cost estimate.

Title: **Mill Creek - Isom Community**
Location: Logan County, WV
Tasks: Design of water system to service approximately 800 residents of the Mill Creek-Isom Community in Logan County, WV. Work included sizing of water treatment plant, four water tanks, four booster stations, one pressure reducing valve, and approximately 23 miles of water line. Construction cost was estimated at approximately $5,500,000.

Title: **Phase II Water Feasibility Study, Weaver-Junior Study Area**
Location: Randolph and Upshur Counties, WV
Tasks: Phase II water feasibility study for private water supplies in the Weaver-Junior Study Area in Randolph and Upshur Counties, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Phase II Water Feasibility Study, Reynoldsville, Wallace, and Clarksburg Study Area**
Location: Harrison County, WV
Tasks: Phase II water feasibility study for private water supplies in the Reynoldsville, Wallace, and Clarksburg Study Area in Harrison County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Mainella Subsidence**
Location: Marion County, WV
Tasks: Preparation of construction documents for the Mainella Subsidence project in Fairmont, WV. Project involved subsurface investigation (including borehole camera work); sampling of mine water; injection plan layout for grouting under three residences; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Approximately 15 injection holes were proposed at an estimated construction cost of approximately $138,000.

Title: **Glen Morgan Subsidence**
Location: Raleigh County, WV
Tasks: Preparation of construction documents for the Glen Morgan Subsidence project near Beckley, WV. Project included subsurface investigation (including borehole camera work); base mapping development; sampling of mine water; injection plan layout for grouting under one residence; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Estimated construction cost was approximately $164,000.

Title: **Harris AMD**
Location: Harrison County, WV
Tasks: Preparation of construction documents for the Harris AMD site in Harrison County, WV. Project included subsurface investigation; surveying; sampling of mine discharges; design of channels, wet seals, and drain pipes; preparation of technical specifications, drawings and engineer's cost estimate; and participation in pre-bid and pre- construction meetings. Bid construction cost was approximately $65,000.

Title: **Lefthand Fork (See) Burning Refuse**
Location: Logan County, WV
Tasks: Preparation of construction documents for Lefthand Fork (See) Burning Refuse project. Project included subsurface investigation including temperature probe readings; surveying; refuse processing evaluation; grading and drainage design for regrading of refuse pile; delineation of burning refuse areas; design of excess material disposal site; completion of IBR for relocating existing bonded haul road; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Bid construction cost was approximately $940,000.

Title: **Cow Creek - Sarah Ann Water Supply Extension Project**
Location: Logan County, WV
Tasks: Preparation of construction documents for the Cow Creek - Sarah Ann Water Supply Extension project in Logan County, WV. Project included subsurface investigation; design of three water tanks, three booster stations, one master meter assembly, and approximately 19 miles of waterline; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings. Bid construction cost was approximately $4,800,000.

Title: **Godby Branch Water Supply Extension**
Location: Logan County, WV
Tasks: Preparation of construction documents for the Godby Branch Water Supply Extension project. 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.

Title: **Phase II Water Feasibility Study, New Haven Study Area**
Location: Fayette County, WV
Tasks: Phase II water feasibility study for private water supplies in the New Haven Study Area in Fayette County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report. Conceptual design of water system included sizing a water treatment plant, one booster station, five water tanks, and approximately 87 miles of water line. Estimated construction cost was approximately $13,800,000.

Title: **Phase II Water Feasibility Study, Gauley River Study Area**
Location: Fayette and Nicholas Counties, WV
Tasks: Phase II water feasibility study for private water supplies in the Gauley River Study Area. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the investigation in a report.

Title: **Summerlee Refuse - Post Construction Water Quality**
Location: Fayette County, WV
Tasks: Water sample collection, analysis, and evaluation at the reclaimed Summerlee Refuse site. Findings were summarized in a report.

Title: **Phase II Water Feasibility Study, Heizer and Manila Creek Community**
Location: Putnam County, WV
Tasks: Phase II water feasibility study for private water supplies in the Heizer and Manila Creek Community in Putnam County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Phase I Water Feasibility Study, Reynoldsville, Wallace, & Clarksburg Study Area**
Location: Harrison County, WV
Tasks: Phase I water feasibility study of the Reynoldsville, Wallace, & Clarksburg Study Area in Harrison County, WV to evaluate the potential for pre-1977 mining activity to have degraded the water supplies of residents. Work included interviews, record searches, field reconnaissance, and preparation of remedial action cost estimates. A report summarizing the findings was submitted.

Title: **Phase I Water Feasibility Study, Weaver-Junior Study Area**
Location: Randolph and Upshur Counties, WV
Tasks: Phase I water feasibility study of the Weaver-Junior Study Area in Randolph and Upshur Counties, WV to evaluate the potential for pre-1977 mining activity to have degraded the water supplies of residents. Work included interviews, record searches, field reconnaissance, and preparation of remedial action cost estimates. A report summarizing the findings was submitted.

Title: **Phase I Water Feasibility Study, Matheny Hill Study Area**
Location: Harrison County, WV
Tasks: Phase I water feasibility study of the Matheny Hill Study Area in Harrison County, WV to evaluate the potential for pre-1977 mining activity to have degraded the water supplies of residents. Work included interviews, record searches, field reconnaissance, and preparation of remedial action cost estimates. A report summarizing the findings was submitted.

Title: **Duncan Hill Subsidence No. 2**
Location: Harrison County, WV
Tasks: Completed subsidence evaluation investigation at the Duncan Hill Subsidence No. 2 project site in Clarksburg, WV. Work included subsurface investigation; mapping development; surveying; records review; water sampling; and preparation of a report summarizing the findings. The report did not recommend stabilization for the structures in the project area, due to a lack of evidence that subsidence was causing problems.

Title: **Urso Subsidence**
Location: Fairmont, WV
Tasks: Field reconnaissance, resident interviewers, videotape surveys of existing conditions, subsurface investigation, surveying, and subsequent evaluation to determine if mine subsidence was affecting structures within a several block area of Fairmont. Ultimately, stabilization program was limited to 5.4 acre area with approximately 28 residences and businesses. Construction documents, including drawings, technical specifications, and engineer's cost estimate were prepared. Proposed construction included approximately 140 injection holes and 18,000 cubic yards of injection material. Construction cost was estimated at approximately $1,200,000.

Title: **Phase I Water Feasibility Studies**
Location: Brooke County, along Gauley River in Fayette County & Nicholas Counties, and New Haven area (around Hico) in Fayette County, WV.
Tasks: Preliminary investigation of three separate communities to evaluate the possibility that pre-1977 mining activity degraded water supplies. The investigation included a review of mining records, existing water quality data, and conductance of resident interviews to assess possible impacts. Separate reports were prepared for each community, documenting findings and providing a cost estimate for extending public water supply systems.

Title: **Phase II Water Feasibility Study, Mill Creek Study Area**
Location: Boone, Lincoln, and Logan Counties, WV
Tasks: Phase II water feasibility study for private water supplies in the Boone County Community, Lincoln County Community, and Logan County Community all encompassed in the Mill Creek Study Area. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in separate reports for each community. Estimated construction cost for extending a public water supply to residents of the Mill Creek Study Area was approximately $15,400,000 and included one water treatment plant, one booster station, seven water storage tanks, and approximately 40 miles of water line.

Title: **Phase II Water Feasibility Study, Godby Branch Community**
Location: Logan County, WV
Tasks: Phase II water feasibility study for private water supplies in the Godby Branch Community in Logan County, WV. Work included interviewing local residents and government officials; collecting and analyzing surface and private water supply samples; researching water quality records; designing and costing remedial measures; calculating the percentage of wells that had been degraded by mining activity; and summarizing the findings in a report.

Title: **Summerlee Refuse Project**
Location: Fayette County, WV
Tasks: Preparation of construction documents for the Summerlee Refuse pile project. Project included subsurface investigation; surveying; water quality sampling; grading and drainage design for regrading and revegetation of 60 acre refuse pile, two impoundments, and two ponds; preparation of technical specifications, drawings, and engineer's cost estimate; and participation in pre-bid and pre-construction meetings.

Title: **Putnam County Phase I Water Studies**
Location: Two communities in Putnam County, WV
Tasks: Preliminary investigation of the Manila Creek and Heizer Creek areas of Putnam County to determine the possibility of pre-1977 mining activity degrading water supplies. Study included review of historical mining records, geological data, and resident interviews to assess possible impacts. Report prepared documenting findings and a cost estimate for extending public water supply system.

Title: **Boone County Phase I Water Studies**
Location: Various communities in Boone County, WV
Tasks: Preliminary investigation of the Greenview/Big Branch, Ramage/Six Mile Creek, Secoal/Jeffrey/Obes Branch, Hewett Creek/Missouri Fork, and Meadowfork communities of Boone County to determine the possibility of pre-1977 mining activity degrading water supplies. Study included review of historical mining records, geological data, and resident interviews to assess possible impacts. Reports prepared documenting findings and cost estimates for extending public water supply systems.

Title: **Duncan Hill Subsidence**
Location: Clarksburg, WV
Tasks: Field reconnaissance, resident interviews, videotape surveys of existing conditions, subsurface investigation, borehole video camera surveys, and surveying to determine whether subsidence was affecting numerous homes, water tank, and YMCA over a 16 acre area. Development of report documenting that damages to water tank and YMCA were not subsidence related. Preparation of stabilization plan including plans, specifications, etc. for residential area.

Title: **Phase II Logan Water Feasibility Study**
Location: Logan County, WV
Tasks: Investigation to determine the percentage of residents in the Cow Creek, Crooked Creek and Upper Rum Creek communities whose ground water supplies had been degraded by pre-1977 mining activity. Field reconnaissance, mine map and mine permit records search, interviews, water sampling and analysis, and classification via piper diagrams were conducted.

Title: **Cora Mine Drainage No. II**
Location: Logan County, WV
Tasks: Mine drainage abatement project included drilling and water analysis with subsequent design of several mine seals with piping and channels to convey flow to the receiving stream. Project included boring and jacking pipeline under railroad.

Title: **Covey Creek Mine**
Location: Logan County, WV
Tasks: Field reconnaissance, historical records review, and subsurface investigation to determine extent of mine fire and to develop options for remediation.

Title: **Logan Phase I Water Study**
Location: Logan County, WV
Tasks: Preliminary investigation of the Clothier, Cow Creek, Crooked Creek, Godby Branch, Godby Heights, Upper Rum Creek, and Whitman Creek/Holden communities to determine the possibility of pre-1977 mining activity degrading the water supplies of the communities. Field reconnaissance, interviews, and mining and water quality record searches were conducted, and a remedial cost estimate was provided with reports summarizing the findings for each community.

Title: **Vivian Refuse Pile**
Location: Vivian, WV
Tasks: Subsurface investigation, surveying, and design for reclamation of a large coal refuse pile and two mine entries. Plans, specifications, cost estimate, coal refuse reprocessing evaluation, and supporting documents for regrading over 150,000 cubic yards of refuse, surface water control, mine seals, and riprap toe protection were completed.

Title: **Kimball Refuse Piles**
Location: Kimball, WV
Tasks: Subsurface investigation, surveying and design for reclamation of three coal refuse piles and six mine entries. Design included replacement of a water well and related supply piping for the town of Kimball. Completed preparation of plans, specifications, cost estimate, coal refuse reprocessing report, WV Department of Health permit for new well, and other supporting documents for reclaiming this large site with over ½ million cubic yards of regrading.

Title: **Hampden (Smith) Bridge**
Location: Mingo County, WV
Tasks: Design of metal arch culvert to replace a bridge to allow access to a landslide repair project. Development of plans and specifications were on a fast-track schedule.

Title: **Bear Run Refuse**
Location: Gilmer County, WV
Tasks: Field reconnaissance to establish project limits, develop reclamation options, and collect water quality information to design a wetlands reclamation project. Subsurface investigation, surveying, and development of aerial mapping for 160 acres were conducted. Plans, specifications, cost estimate, reprocessing evaluation and report, and permit application assistance to develop reclamation plan for 13 former coal refuse disposal ponds/impoundments and three refuse piles were completed. Plan included developing and enhancing wetlands.

Title: **Beaver Creek Waterline Extension**
Location: Barbour and Randolph Counties, WV
Tasks: The project included design of a 1.5 mile, 6-inch diameter water line extension including fire hydrants, stream crossings, and service to 13 residents. Preparation of plans, specifications, cost estimate, and supporting documents were completed.

Title: **Garrison Complex**
Location: Garrison, Boone County, WV
Tasks: Subsurface investigation, surveying, and design for the removal of a railroad embankment posing a water impounding hazard were conducted. Project also included several mine entries and surface water runoff control channels. Plans, specifications, cost estimate, and supporting documents were prepared.

Title: **Cassity Fork Water Supply Extension**
Location: Randolph County, WV
Tasks: The project consisted of a water study to document existing water quality and impacts due to mining, subsurface investigations, surveying, and design of an eight-mile waterline extension including booster station, reservoir, pressure reducing valves, and provision for fire flow. Preparation of plans, specifications, cost estimate and supporting documents, and a review of contractor submittals during construction were conducted.

Title: **Beckley (Queen Street) Subsidence**
Location: Beckley, WV
Tasks: Subsurface investigation to determine if mine subsidence was responsible for damages experienced by a home was conducted. Preparation of a report documenting that subsidence was not responsible for the observed damage was completed.

Title: **Jonben (Haga) Subsidence**
Location: Jonben, WV
Tasks: Subsidence control on an emergency basis including sinkhole backfilling and drainage control. Project included drilling to determine the extent of mining and subsidence, field surveying to develop topographic mapping, and development of a backfilling and drainage plan.

Title: **Holden (Padgett) Subsidence**
Location: Whitman Junction, WV
Tasks: The project included subsurface investigation to determine extent of mine workings, development of stabilization plan including drainage channels/pipes, and mine seals. Construction documents were prepared, and participation in pre-bid and pre-construction meetings was completed.

Title: **Minden Mine Fire**
Location: Minden, WV
Tasks: The project included subsurface investigation to determine source and extent of underground fire.

Title: **Doug Gray Subsidence**
Location: Fairmont, WV
Tasks: Subsidence control by injecting grout to fill mine voids. Project included exploratory drilling and sampling including both vertical and angle borings with the subsequent development of a grouting program to support homes and businesses in Fairmont, WV.

Title: **St. John's Road Subsidence**
Location: Brooke County, WV
Tasks: Subsurface investigation and development of specifications and construction drawings for remedial work on mine subsidence affecting 30 acres and 50 homes were conducted.

Title: **High Coal Tipple**
Location: Boone County, WV
Tasks: The project included development of specifications and construction drawings for remedial work on 16 mine portals and an abandoned tipple and its several associated structures.

Title: **Route 19/28 Subsidence**
Location: Harrison County, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings, and topographic mapping for remedial work on mine subsidence affecting a road.

Title: **Omar Refuse Piles**
Location: Logan County, WV
Tasks: The project included subsurface investigation and development of specifications and construction drawings for remedial work on regrading five refuse piles with over 330,000 cubic yards of earthwork, and sealing six mine portals and a large vertical shaft.

Title: **Mt. Hope (Sawyer) Subsidence**
Location: Fayette County, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings, and topographic mapping for remedial work on mine subsidence affecting one home.

Title: **Morgantown Airport Drainage**
Location: Morgantown, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings, and some topographic mapping for remedial work on mine subsidence effecting a day care center and an airport access road, and for closure of four mine portals below the end of a runway.

Title: **Logan Drainage Project**
Location: Logan, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings, and some topographic mapping for remedial work on four mine portals, a mine seep, and 400 feet of abandoned conveyor with its headhouse and loadout platform.

Title: **Huffman Street Subsidence**
Location: Fairmont, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings for remedial work on mine subsidence affecting 20 homes.

Title: **Switzer/Adams/Robinson Drainage**
Location: Logan County, WV
Tasks: The project included subsurface investigation and development of construction specifications, drawings, and topographic mapping for remedial work on three mine portals, including the design of an energy dissipater with associated piping under railroad and state highway.

Title: **Follansbee (Hultsburg) Drainage**
Location: Brooke County, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings for remedial work on acid mine drainage problems.

Title: **Fairmont East Subsidence**
Location: Fairmont, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings for remedial work on mine subsidence affecting 125 homes on 20 acres.

Title: **Fairmont IV**
Location: Fairmont, WV
Tasks: The project included subsurface investigation to determine if subsidence of three homes was related to mining and subsequent development of construction specifications and drawings for remedial work on the subsidence.

Title: **Hawkins AMD**
Location: Harrison County, WV
Tasks: The project included subsurface investigation and development of construction specifications, drawings and topographic mapping for remedial work on acid mine drainage emanating from mine portals following a "blow-out" and causing a large saturated area above five homes.

Title: **Kistler Refuse and Mine Fire Extinguishment Program**
Location: Logan County, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings for extinguishment through grout injection, and subsequent construction monitoring.

Title: **Rebrook Street Drainage**
Location: Clarksburg, WV
Tasks: The project included subsurface investigation and development of construction specifications and drawings for remedial work on acid mine drainage from two mine portals which was effecting a house and its garage, and subsequent construction monitoring.

Title: **Hurricane Fork/Five-Mile Fork Burning Coal Seams**
Location: Kanawha County, WV
Tasks: The project included subsurface investigation and development of costs which would be associated with extinguishment.

Title: **Kingmont Complex Reclamation**
Location: Marion County, WV
Tasks: The project included development of specifications and construction drawings for sealing four mine portals and demolishing a steel river truss and buildings associated with an abandoned deep-mine complex.

Title: **Fairmont No. 2 Subsidence**
Location: Fairmont, WV
Tasks: The project included report with recommendations after a subsurface investigation to determine whether or not subsidence of three homes was mining related, and subsequent development of specifications and construction drawings.

Title: **Green's Run Highwall and Marrara Spoil Area Reclamation Projects**
Location: Preston County, WV
Tasks: The project included subsurface investigation with test-pits and development of specifications and construction drawings for reclaiming 30 acres of strip mine with three highwalls, six refuse piles, and two access roads.

APPENDIX F
GAI Service Briefs

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Service Profile

Bridge Engineering and Inspection

For more than 25 years, the experienced, award-winning bridge engineers and designers at GAI Consultants has been designing, inspecting, and rehabilitating bridge structures. Our understanding of safety standards, construction processes, and material and workmanship practices results in long-term returns on infrastructure investments.

Experienced bridge design engineers and certified bridge inspectors mean long-term solutions with an eye on cost.

The skill GAI brings to bridge design projects for all types of steel, concrete, and timber structures is evident in our long list of project successes. From minor stream crossings and pedestrian overpasses to major river spans, highway interchanges, and grade separations, we incorporate the latest design techniques and philosophies into every design effort, including Load and Resistance Factor Design.

GAI's transportation engineers and designers build cost-saving features into each set of plans. We incorporate standards for constructible details and provisions for minimal future maintenance. And GAI keeps an eye on project delivery costs so our transportation clients can continue to build and maintain a solid transportation network.

Inspecting a bridge is a complex assignment that requires skill and experience. GAI's certified bridge inspectors identify conditions that may impair safe operation or useful life expectancy, and recommend repairs. Having conducted hundreds of inspections on all types of bridges from 20'- to 1,000'-span structures, GAI solves structural problems economically using insight and innovation to recommend rehabilitation over replacement.

Each bridge rehabilitation project is unique, and GAI's complete venue of in-house capabilities provides all the necessary support services for our engineers and technicians to evaluate conditions, determine cause, and design repairs. We upgrade

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load capacity and incorporate cost-effective features in our designs—fatigue-prone detail retrofits, member strengthening, deck joint elimination, drainage improvements, scour protection, earthwork retrofits, composite construction, and lightweight concrete.

Stream and river crossings have the potential for disaster when scour undercuts the supporting structure. GAI's expertise in hydraulics and scour analysis supports new and rehabilitated structures. We evaluate scour potential and design foundations and protection systems that minimize possible damage.

Whether rehab or new construction, GAI's reliable in-house construction inspection services draw from a pool of seasoned engineers and technicians. Our pre- and post-construction services include construction engineering and inspection, contract administration, and construction monitoring and management.

GAI delivers premier solutions for designing, inspecting, and monitoring the bridges that support highways, railways, busways, pedestrian walkways, and industrial heavy hauling systems.

Bridge Engineering and Inspection Services

- Simple and continuous span bridge design
- Horizontally curved girder modeling and design
- Thru and deck truss bridge design
- Culvert and drainage design
- Hydrologic and Hydraulic (H&H) analyses
- Certified bridge and structure inspections
- Historic bridge restoration techniques
- Bridge rehabilitation inspection and design
- Scour analysis and scour protection design
- Earthquake and fatigue-prone detail retrofitting, and member strengthening
- Load capacity determinations and useful life expectancy estimates
- Geotechnical engineering and foundation design
- Environmental studies and cultural resources
- Design build delivery systems

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
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- Economic Analyses and Strategies
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- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

Service Profile

Mining Engineering

With a growing need for lucrative energy sources and continued advances in mining technology, coal remains a valuable resource. GAI Consultants approaches mining engineering projects with a strong background in academic training, research experience, and practical engineering skills.

Our reputation as one of the nation's foremost authorities on mine stabilization, mine fires, mine reclamation, and acid mine drainage remediation is the foundation for the solutions we provide to help mine owners and operators maintain profitability.

A full range of services that address the unique challenges of mine owners and operators means we provide solutions that support a healthy industry.

GAI's broad range of mining engineering, geological, geotechnical, environmental, water, and health and safety related services for the mining industry is supported by a dedicated staff of engineers, geologists, hydrogeologists, and environmentalist specialists.

For more than 50 years GAI has been delivering premier services—geotechnical investigations, overburden characterizations, mine subsidence evaluations and mine stabilization design, mine shaft backfill operations, underground ventilation studies, mine atmosphere gas characterization, economic studies, risk assessments, abandoned mine land reclamation studies, and mine fire investigations and abatement.

Our design capabilities for mine facilities include mine seals, haul roads, dams and impoundments, sedimentation ponds, coal preparation plants, water control and treatment facilities, acid mine drainage treatment, and waste disposal areas. We collaborate with mine owners and governmental agencies to maintain mining operations that support a healthy industry.

Mining operations consume large volumes of freshwater and generate large volumes of

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wastewater, and this water life cycle is essential to operations. GAI's services cover water chemistry investigations and testing, water balance studies, water feasibility studies, water and waste water management, mine water permits, and acid mine drainage mitigation and treatment. Knowing the overall financial success of mining operations rests on avoiding long-term liability issues and remaining compliant with regulatory agencies, GAI addresses the challenges unique to mining and provides solutions that meet their needs.

GAI, known for our ability to advance project siting and permitting for energy projects, uses these skills to assist the mining industry. We work closely with state and federal regulatory agencies and are thoroughly familiar with NPDES requirements, EIS programs, and air quality regulations. By assisting federal, state, and local agencies in strategic planning, technical reviews, and abandoned mine remediation design and construction, we also help stakeholders understand the value, as well as the impacts, of mining projects.

Mining Engineering Services

- Mining engineering
- Mine backfill studies
- Geology, mining, and hydrology interpretation
- Mine subsidence evaluation and mitigation
- Mine stabilization design
- Hazardous waste studies
- Abandoned Mine Land (AML) reclamation
- Acid Mine Drainage (AMD) remediation
- Mine fire investigations and abatement
- Underground ventilations studies
- Fire control measures
- Multispectral thermal infrared fire mapping imagery
- Overburden characterization
- Mine atmosphere gas characterization
- Construction monitoring

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Mine Fire Engineering

Mining for coal and other precious resources is a major industry in global economies, despite increasing regulation and social responsibility concerns. The large mining infrastructures that support the industry are faced with production challenges that need sustainable solutions. GAI Consultants provides cost-effective engineering consulting for mine owners and operators.

A formidable background in mine fire control means detailed subsurface investigations that support reclamation.

Our award-winning team has included some of the nation's foremost authorities on mine fires, mine reclamation, and acid mine drainage treatment. We have a dedicated team of environmentalists, engineers, geologists, hydrogeologists, archaeologists, agronomists, and economists that keep abreast of regulatory developments and investigate groundwater, acid mine drainage, waste disposal, environmental impacts, and cultural resources for mine lands and mining operations.

GAI is uniquely qualified to address any aspect of mine fire diagnosis and control. Our team of mine fire specialists and technical support staff design controls for fires in active and abandoned underground mines and refuse banks in the U.S. and around the world.

GAI's subsurface investigations for mine fires determine the limits of active cinder bank fires and proper location for fire cutoff trenches. Whether designing for fire remediation in flat-lying coal seams or steeply sloping mined seams, our concern for public health and environmental impacts is reflected in the risk assessment and air pathway analyses we conduct at every site.

Over the years, our geotechnical and geological

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professionals have been responsible for reclaiming hundreds of acres of mine lands, and bringing more than 85 underground mine and refuse bank fires under control. GAI's high-profile work in mining and mine fire extinguishment has taken our crews from the mountains of West Virginia to the burning Jharia mine fires in India. We collaborate with mine owners and governmental agencies to maintain mining operations that support a healthy industry.

Mine Fire Engineering Services

- Mine fire investigations and abatement
- Fire control measures
- Multispectral thermal infrared fire mapping imagery
- Geology, mining, and hydrology interpretation
- Underground ventilations studies
- Overburden characterization
- Mine atmosphere gas characterization
- Mine backfill studies
- Construction monitoring

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Civil/Site Engineering

Land development is an integration of site planning, civil engineering, and stormwater management—and GAI Consultants has engineers, planners, and environmental professionals dedicated to developing sites. Our project managers have 10 to 30+ years of experience in managing small to complex residential, commercial, industrial, institutional, and brownfield development projects.

Assessing existing conditions with client's goals in mind means we maximize development potential.

Development projects embody unique site layout, grading, roadway, and utility design characteristics; and every region has topography, property constraints, and infrastructure design challenges. This is why land development requires seasoned project managers skilled in determining the best use of a site—through planning, design, permitting, and construction.

GAI's design process starts with client meetings. We listen to our client's needs and aspirations, and discuss their envisioned master plan. We then analyze governing municipalities at all levels, and review ordinances for allowable use, site development requirements, and stormwater management ordinances to gain a solid understanding of the site specifics.

GAI evaluates existing site conditions, including topography, natural resources, wetlands and streams, drainage patterns, and existing or nearby utility and roadway infrastructure. We understand the importance of the early planning so the site layout is in continuity with existing conditions and meets the intended use of the client.

GAI's land development professional are skilled in effectively utilizing existing conditions as much as possible to be cost effective, yet remaining compliant with current regulations, and ultimately achieving the client's goals for the project.

GAI designs sites that meet the LEED® Site/ Civil requirements of our clients. Our site layouts

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maximize development potential with cost-effective features and aesthetic stormwater management design. We design rain gardens and vegetated swales to convey stormwater runoff, and locate catch basins, piping systems, and ponds to maximize land use. GAI has practical stormwater management solutions that meet site topographic and natural resource challenges.

Our engineers and construction specialists are skilled in developing construction cost estimates and performing construction inspection, documentation, monitoring, and management for site projects.

GAI's award winning professionals have the experience and vision to handle a broad range of development needs, including the design, approvals, and construction of civil site development and stormwater management projects.

Civil/Site Engineering Services

- Land use and economic feasibility studies
- Impact fee studies and code impact assessments
- Facilities planning and design
- Site selection and permit acquisition
- Hydrologic and Hydraulic (H&H) studies
- Soil-structure interaction investigations
- Foundation investigations and design
- Structural/non-structural alternative analysis
- Cultural and historic resources investigations
- Environmental assessments and species studies
- Wetland mitigation, design, and permitting
- Storm water management and site drainage design
- Water and sewer design
- Utility assessment, rehabilitation and design
- E&S Control Plans and permitting
- Surveying, construction layout, and as-builts
- Site geometry, demolition, and grading plans
- Subdivision, roadway, lighting, and traffic design
- Traffic impact studies and MOT plans
- Landscape architecture and streetscape design
- Parks and recreation trails design

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Geotechnical Engineering

Since 1958, GAI Consultants has been a leader in addressing the broad spectrum of engineering issues associated with the behavior of earth materials—soil, rock, mining refuse, coal combustion residuals (CCR), slag from steel-making processes, slurry, and others—that impact projects within the civil, mining, transportation, petroleum, natural gas, transmission, and power-generation economy sectors.

GAI's services encompass the entire breadth of geology and geotechnical engineering.

Our geotechnical engineers and geologists are highly proficient in the fundamentals of engineering, soil and rock mechanics, foundation and slope engineering, seismic analyses, underground and surface mining, mine fires, and mine subsidence.

Operating out of office locations throughout the U.S., these specialists bring with them a wealth of knowledge from years of academic training, research, and practical field experience—knowledge that is bolstered by expertise from GAI staff members in other disciplines such as structural engineering, groundwater engineering, and hydrologic/hydraulic engineering.

GAI's services encompass the entire breadth of geology and geotechnical engineering. Studies typically begin with subsurface characterization of the site and culminate in a report, often accompanied by the preparation of technical drawings and specifications, and monitoring during construction to verify project compliance with design specifications.

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Geotechnical Engineering Services

- Geologic studies using aerial photographs, topographic maps, and mine maps
- Subsurface and ground-surface investigations
- Instrumentation programs to monitor ground movements
- Mine fire mitigation studies
- Mine subsidence studies
- Blasting plans and vibration monitoring reviews
- Mine waste and CCR management and land reclamation
- Design studies for earth- and rock-fill dams and appurtenances
- Seismic evaluation of earth works
- Earth and rock slope stability evaluation, recommendations, and design
- Forensic studies for attorneys including reports, depositions, and testimony
- Design of shallow and deep foundations
- Design of specialty foundations such as micropiles and metal-finned pipe piles
- Retaining wall support analysis and design
- QA/QC construction observation and testing
- Soil improvement design to reduce settlement and increase bearing capacity
- Ground support development of mine grouting plans and specifications
- Karst investigations and sinkhole remediation

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Service Profile

Hydrogeology and Groundwater

GAI hydrogeologists and other groundwater professionals provide expert solutions to our clients' groundwater assessment, investigation, monitoring, restoration, and remediation needs.

The groundwater professionals at GAI stay informed on current regulations, and provide innovative solutions for complex groundwater problems. Our hydrogeologists, geologists, environmental engineers, and environmental scientists apply the principles of hydrogeology and geology to address groundwater challenges and impacts by formulating efficient and cost-effective solutions.

Our experienced hydrogeologists routinely perform statistical analyses to define background water quality and evaluate potential impacts at downgradient points of compliance.

When developing an effective solution to a groundwater concern, defining the problem is a critical first step in determining future site action.

Combining extensive experience and academic training, GAI's professionals evaluate geological conditions of the water-bearing zones underlying a site and begin to develop a Conceptual Site Model (CSM). Based on the existing information, additional investigation is focused on mitigating the groundwater impacts or the risk-based liabilities. The CSM is tested throughout the investigative process to determine whether anomalous conditions exist that affect the validity of the understanding of the site.

Once a conceptual understanding of the site hydrogeology and geology is formulated, GAI designs and installs effective monitoring systems. GAI groundwater professionals are highly experienced in the design and installation of effective groundwater monitoring networks in complex geologic conditions.

GAI professionals follow established standard operating procedures in compliance with United States Environmental Protection Agency (USEPA) and other regulatory requirements for the collection and interpretation of reliable and defendable groundwater quality data.

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Should there be the need to quantitatively determine aquifer parameters or evaluate remedial options, aquifer testing is performed to define aquifer characteristics and estimate the rate of groundwater transport. We use state-of-the-art computer models to conduct hydrogeologic analyses, design efficient extraction well/trench drain networks, and evaluate the radius of influence and capture zones, to the standard and regulatory-accepted models for evaluation of fate and transport of constituents for risk-based closures.

GAI's groundwater investigation and remediation experience encompasses waste disposal sites, underground storage tanks, transportation facilities, commercial /industrial facilities, voluntary remediation sites, brownfields, mine sites, Resource Conservation Recovery Act (RCRA) facilities, and sites that fall under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Our remedial designs reduce or eliminate the effects of water contamination.

The environmental professionals at GAI are dedicated to evaluating and remediating the potential environmental liabilities of past practices.

Hydrogeology and Groundwater Services

- Hydrogeology and Geology
- Monitoring Well Network Design
- Monitoring Well Installation
- Groundwater Monitoring
- Aquifer Testing
- Groundwater Fate and Transport Modeling
- Extraction Design and Installation
- Feasibility Studies
- Risk Assessments
- Risk-Based Closure

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Hydrologic and Hydraulic Engineering

Tap Into GAI's Experience and Skills

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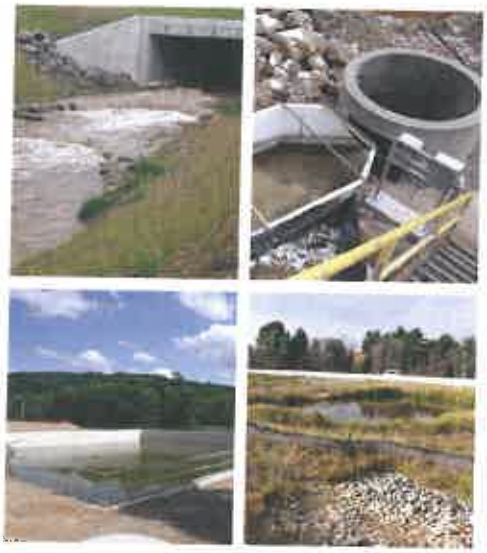

Clients understand the need for water management on their projects...and GAI has the solutions.

Water management can include quantifying volumes and flow rates, meeting water demands and supplies, evaluating and designing conveyance systems for effective and safe movement of water through, around, and under project sites, or sizing storage facilities to meet project objectives and satisfy regulatory requirements.

Why GAI? GAI is well experienced in hydrologic and hydraulic (H&H) engineering, and the waterway permitting and compliance that often accompanies water management. Our H&H staff has H&H specific training, advanced degrees, and Professional Engineering certifications.

GAI assists public and private clients through analysis and evaluation of water obstructions, encroachments, and flood hazards, and designs hydraulic structures.

Our professionals' H&H software skills include:

HEC-HMS, HEC-RAS, HEC-2, FHWA HY-8, SITES, EPA SWMM, RUSLE, PondPack, Hydraflow Hydrographs, StormCAD

GAI Consultants—practical, innovative solutions that meet client's needs.

GAI's water management expertise:

- Local, state, federal waterway permitting and compliance
- Stream and floodplain field recon and surveys
- Statistical, probabilistic, regression rainfall-runoff analysis
- Peak flow and hydrograph determination
- Channel, culvert, pond analyses and design
- Bridge hydraulics, scour analyses, countermeasure design
- E&S control and stormwater management plans and BMPs
- Dam inspections, breach analysis, inundation mapping, EAPs
- Spillway and outlet works design
- Reservoir management, drought management plans
- Floodplain/floodway delineation and flood risk assessments
- FEMA letter of map revision (LOMAs, LOMRs)
- DOT H&H reports for bridge and culvert rehab/replacement
- Natural stream channel design-based on geomorphologic principles
- Stream relocation/restoration, design, permitting, and construction support
- Wetland mitigation design, permitting, and construction support
- Pipe network analysis
- Sediment transport analysis
- Legacy model interpretation and update to current forms (HEC-1, HEC-2, TR-20, DAMBRK)
- Pumping system design
- Coastal engineering-wave analysis
- Power station water balance analysis

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Environmental Studies and Permitting

GAI Consultants guides clients through the complexity of federal, state, and local agency environmental and permitting regulations. Our established agency relationships and precise study processes advance small projects as well as large regional efforts. Whether new gas and electric corridors, infrastructure rehab, or brownfield redevelopment, GAI conducts detailed environmental studies in the initial project planning stages to keep permitting, planning, and construction on schedule.

Advanced GIS capabilities and in-house cultural resources services means GAI has the skills and range of disciplines to deliver complete project solutions.

We anticipate environmental and developmental issues that can put a project on hold and conduct comprehensive assessments that address impacts to wetlands and floodplains, terrestrial and aquatic natural systems, vegetation and wildlife, cultural resources and socioeconomics, air and water quality, noise levels, aesthetics, and geologic and hazardous conditions. Our professionals identify issues to avoid and minimize impacts where possible, prepare permit applications, and develop mitigation plans for unavoidable impacts. We develop cost-effective solutions to meet regulatory requirements while keeping projects on schedule.

GAI's environmental services encompass siting and master planning, as well as permitting. Our environmental specialists evaluate alternative sites, handle site inspections and features inventories, and rank sites by their potential for successful development—for energy facilities, industrial plants, commercial and retail centers, trails, transmission line corridors, and more. GAI's master plans identify infrastructure, layout, and access needs. Clients benefit from extensive scheduling, cost estimating, and regulatory agency approval experience.

With sophisticated Geographical Information System (GIS) capabilities, the database systems GAI creates streamline the National Environmental

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Policy Act (NEPA) process through large-volume data sharing that optimizes the regulatory review process. We work extensively with regulatory agencies to obtain permits and clearances for all types of facilities.

GAI's in-house cultural resource services complete the full-service package we bring to environmental assessment, study, planning, or engineering efforts.

From a few hours of consultation to total design and environmental impact assessment responsibility, our dedicated specialists are skilled in a broad range of disciplines. Whatever the required level of involvement, GAI delivers full-service project services with continued success.

Environmental Studies and Permitting Services

- Gas and electric transmission siting and permitting
- NEPA compliance and FERC certification
- Environmental Impact Statements and Assessments
- Permitting and environmental reporting
- NPDES and 404/401 permitting
- Groundwater and surface water modeling
- Navigability and floodplain studies
- Water quality permitting and air quality monitoring
- Noise studies and mitigation
- GIS database management
- State power siting board certification
- Threatened and endangered species surveys
- Invasive species surveys and management
- Route evaluation studies
- Siting and alignment evaluation and selection
- Land use assessments for site development
- Subdivision and zoning site approvals
- Model ordinances for land-use control
- Market analyses for highway/roadside plazas
- Recreational site demographic and use analyses
- Community and land-use planning
- Fiscal impact analysis
- Public outreach coordination
- Cultural resources investigations

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Wetlands

GAI Consultants' wetland scientists, highly skilled in wetland investigations, permitting, and mitigation design, work closely with private and public developers, utilities, industrial firms, and local, state, and federal agencies. Our environmental specialists find practical solutions for projects that affect wetlands, terrestrial and aquatic biota, and endangered/threatened plant and animal species.

Teams of hydrologists and hydraulic engineers working closely with wetland biologists means sustainable hydrology solutions that support thriving wetland communities.

GAI's first step in wetland investigations is to evaluate sites to determine suitability, potential environmental impacts, and engineering constraints. Wetland delineations are conducted in accordance with U.S. Army Corps of Engineers and appropriate state guidelines. They typically involve evaluating vegetation characteristics, wetland hydrology, and evidence of hydric soil conditions. Our staff is thoroughly familiar with federal Section 404 regulatory requirements and state regulatory needs. We have successfully obtained permits for thousands of projects requiring individual or nationwide permits.

Regulatory agencies only issue permits for unavoidable impacts. In many cases, these impacts must be mitigated by replacing ecological functions. GAI's skilled wetland teams guide clients through options that include on-site restoration, mitigation banks, or developing project-specific mitigation sites. We have extensive experience developing mitigation sites and address site selection, site and hydraulic engineering, habitat design, permitting, and construction monitoring.

In preparing site-specific plans, GAI develops conceptual wetland mitigation plans for agency review and approval that meet sustainable requirements for saturated soil, wetland vegetation, and reliable hydrology. We conduct functional assessments in the design process to assess the

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quality of existing wetland habitat and predict future function. Our extensive wetland mitigation work has cultivated an experienced team of environmental scientists that work closely with clients to move projects forward.

GAI's staff has extensive training and experience in applying natural stream restoration techniques—as stand-alone stream restorations or in conjunction with wetland mitigations. One of the most difficult goals in designing wetlands is maintaining a reliable water supply. GAI's hydrologists and hydraulic engineers work closely with our biologists to prepare designs with sustainable hydrology for thriving wetlands. GAI's long-term monitoring of restored and created wetlands effectively identifies and resolves any issues.

GAI evaluates wildlife habitats following standard Habitat Evaluation Procedures (HEP) developed by the U.S. Fish and Wildlife Service. Skilled environmental specialists determine the existing and after-project quality of area habitats for representative species. We also prepare habitat mitigation plans, guide clients through the agency approval process, and follow through with construction monitoring services. For more than 50 years, GAI has been a premier wetland and wildlife consultant, providing cost-effective wetland solutions.

Wetlands Services

- Wetland investigation and delineation
- Wetlands function and value assessments
- Permit application and agency coordination
- Wetland mitigation and natural stream restoration
- Post-construction monitoring
- Threatened and endangered species surveys
- Stream assessments and water quality studies
- Wildlife habitat evaluations
- Terrestrial and aquatic habitat monitoring
- Fish and macroinvertebrate population surveys
- H&H analysis, and groundwater monitoring
- Flood storage and management analysis
- Shoreline stabilization and site revegetation
- Sediment trapping and nutrient retention

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Service Profile

Wildlife Habitats and Protected Species

Regulatory agencies are diligent in protecting natural habitats and endangered species—requiring environmental clearance for underground pipelines, overhead and underground transmission line routing, transportation corridors, and new development projects. GAI Consultants, working closely with clients and regulatory agencies, assesses the positive and negative impacts of altering habitats. We provide practical solutions for projects that affect terrestrial and aquatic biota, and threatened/endangered plant and animal species.

Dedicated environmental specialists and a history of success in obtaining environmental clearances means projects move forward seamlessly.

GAI evaluates wildlife habitats following standard habitat evaluation procedures developed by the U.S. Fish and Wildlife Service (USFWS) and other agencies. We assess the existing and after-project quality of area habitats for representative species and prepare mitigation plans as needed. Our professionals have surveyed thousands of acres, gaining the experience and insight to address protected species issues on any size project.

GAI's certified plant surveyors conduct presence/absence plant surveys utilizing federal and state survey protocols. Our habitat assessments and rare, threatened, and endangered (RTE) plant and animal species surveys support management plans that identify occupied habitat, degree of anticipated impact, and the appropriate steps for meeting regulatory requirements.

With a long history of helping clients successfully navigate RTE species consultation and critical issues analyses, GAI's solid reputation in environmental consulting is supported by a proven ability to conduct initial siting and red flag analyses, field habitat evaluations, presence/absence surveys, GIS mapping and spatial analyses, avoidance or mitigation planning, and agency coordination. We keep projects on schedule by successfully helping clients avoid, minimize, or mitigate impacts to species and habitats in the vicinity of proposed projects.

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GAI's environmental studies and ecological surveys cover a broad range of RTE species, and our bat studies are conducted by in-house certified bat specialists. During USFWS project reviews across the eastern U.S., the federally-endangered Indiana bat is one of the most frequently found species, and bat species protected by individual states are often considered for federal listing under the Endangered Species Act. Our bat professionals identify, count, and photograph bats when conducting species surveys for client projects.

In Florida, GAI's environmental specialists develop management plans for the Florida black bear, Florida scrub jay, bald eagle, Florida mouse, sand skink, gopher tortoise, and Eastern indigo snake. We understand the ecology of each species and the regulatory requirements of the Florida Fish and Wildlife Conservation Commission (FFWCC) and USFWS.

Guiding clients through the permitting processes of regulatory agencies assigned to preserve native species habitats can be cumbersome without the guidance of the dedicated ecologists, biologists, scientists, and environmental specialists at GAI.

Wildlife Habitats and Protected Species Services

- Rare, Threatened, and Endangered (RTE) species surveys
- State and federal agency coordination
- Environmental permitting
- Critical issues analyses
- Field habitat evaluations
- Presence/absence surveys
- GIS mapping and spatial analyses
- Avoidance or mitigation planning
- Species-specific evaluations
- Habitat assessments
- Protected species management plans
- Capture and relocation

GAI Services Summary

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Service Profile

Environmental Engineering

Since the introduction of federal environmental legislation in the 1960s, GAI Consultants has worked closely with clients to understand and meet environmental challenges. We guide clients through agency regulations that include NEPA, the National Environmental Policy Act, and RCRA, the Resource Conservation and Recovery Act, and the Clean Water Act. Our skilled professionals, working within time constraints and overcoming logistical complications, consistently achieve superior results.

Highly skilled staff and a long history of accomplishments means clients expect and receive novel solutions for their environmental engineering challenges.

GAI's environmental professionals clear the way for site development and brownfield projects with compliant solutions that satisfy government agencies and benefit communities. GAI designs solutions that mitigate threats to ecological and historic resources. We provide complete siting, site design, and permitting services for residential, commercial, industrial and power facilities, including landfills and impoundments.

Skilled engineers, geologists, hydrogeologists, soil scientists, biologists, ecologists, planners, GIS specialists, chemists, and industrial hygienists make up the environmental engineering staff at GAI. Our professionals approach projects with a strong background in academic training and practical engineering. Coupling our broad range of expertise with practical thinking strengthens GAI's ability to address complex environmental permitting, planning, and design challenges.

One analytical tool GAI uses for environmental engineering is Geographical Information System (GIS) software, a computer-based system to capture, analyze, manage, and display referenced information geographically. Our specialists can synthesize large quantities of data efficiently, and display the data in high quality, easy-to-follow maps and graphs. We also use Global Positioning System (GPS), a valuable field survey tool that uses satellite technology to determine precise survey locations.

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Clients come to GAI for support and assistance with plant outages, plant operation and maintenance, landfills, and failure investigations. Our skilled professionals also develop and deliver state-of-practice waste byproduct reports and design manuals that help plant owners minimize disposal costs.

Over the past 50 years, GAI has completed a diverse range of environmental projects recognized by leading industry experts, and we are proud of our solid reputation for delivering premier environmental engineering services.

Environmental Engineering Services

- Environmental studies, impact statements, site assessments
- Permitting and Compliance
- Natural re-stream and ecosystem restoration
- Stream and wetland reclamation and restoration
- Watershed restoration
- Hydrologic and Hydraulics engineering
- Stormwater management planning
- Watershed management
- Inundation studies, FEMA floodplain map revisions
- Contaminated soil and groundwater remediation
- Wastewater treatment and permitting
- Waste minimization plans
- Municipal solid waste facility consulting
- UST/AST compliance
- Site evaluation and selection
- Brownfield site development
- Environmental compliance/management systems
- Environmental Health and Safety (EHS)
- Mining engineering
- CCR management and beneficial use
- Abandoned Mine Lands stabilization/reclamation
- Acid mine drainage and mine fire abatement
- Highwall reclamation/coal refuse reclamation
- Utilities Management

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Service Profile

Construction Engineering and Inspection

GAI Consultants monitors the daily activities and building materials that are critical to Construction Engineering and Inspection (CEI) projects with the following in mind—client service, construction integrity, and a successfully completed project. Whether GAI provides transportation construction monitoring, construction engineering and inspection for development, or construction management services for massive energy facility projects, our pool of resident engineers and construction specialists skillfully address the distinct construction challenges of clients in all industries.

Fully understanding the importance of project team communication and public information processes means project impacts are avoided and goals are met.

GAI's engineering and inspection services cover all elements of the building process. We start by evaluating each construction project before it begins, tailoring staff and resources to fit the need, and setting a tone of cooperation and close communication. GAI uses pre-construction meetings with client, owner, contractors, and subcontractors to outline communication methods, detail change order and pay request processes, and emphasize milestone completion dates. We believe successful pre-construction conferences are the basis for superior project performance.

GAI's construction professionals test construction material quality, inspect workmanship, and monitor on-site construction safety. Our services often include progress and materials reporting, shop drawing review, plan interpretation, pay request administration, claims and disputes resolution, and more. We follow each stage of construction to verify that the work is executed in accordance with the contract documents, and administer concrete, bituminous material, steel, and soil sample testing.

GAI understands the importance of implementing public information processes that keep all project

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stakeholders well informed. We work with each client to prepare public outreach programs as needed, and when construction is complete, we submit a detailed report to the client. Our final reporting summarizes overall performance and includes a full evaluation of the established goals and objectives.

GAI's project portfolio includes construction services for major highways and bridges, large-scale site developments, wastewater treatment plants, industrial facilities, and power plants. We specialize in complex, multiphase construction projects for state agencies, municipalities, institutions, private developers, and power providers. Our repeat success is based on building trusted relationships with clients and contractors, and helping them meet their project goals.

As a client's eyes and ears, GAI provides quality control and cost protection throughout the building process so the work meets or exceeds quality standards. Clients' projects are professionally delivered with minimal or no construction delays, cost overruns, or safety violations.

Construction Engineering and Inspection Services

- Pre-construction project evaluation and conference
- Post-construction inspection and evaluation
- Value engineering
- Biddability and constructability reviews
- Cost estimating
- Scheduling
- Permit approval
- Construction inspection and monitoring
- Project management
- Contract administration
- Progress reporting
- Change order review and processing
- Supplier/construction deliveries
- Shop drawing review and plan interpretation
- Contractor quality control program monitoring
- Project closeout
- Public outreach

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Service Profile

Air Quality Studies

GAI Consultants provides a broad range of environmental services related to air quality compliance, permitting, and studies. We play a crucial role for our clients in compliance with state and local air quality regulations and the federal Clean Air Act/Amendments (42 USC Chapter 85).

Federal, state, and local requirements are constantly evolving. GAI's experience working with a diverse base of industries—power generation, natural gas, manufacturing, chemical, and more—and our familiarity with environmental regulations, amendments, and permitting helps clients navigate the intricacies of the ever-changing regulatory environment.

Customized air quality consulting services means our clients get practical solutions for each and every project.

Regulatory Applicability Analysis

GAI provides the regulatory applicability and analysis services essential for the preparation of many permit types. Typically, a Potential to Emit (PTE) analysis is performed to determine what regulatory requirement(s) are applicable for a given facility, including:

- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Prevention of Significant Deterioration (PSD)
- New Source Review (NSR)
- Maximum Achievable Control Technology (MACT)
- Reasonably Achievable Control Technology (RACT)
- Facility Aggregation Analysis

Air Permit Preparation, Guidance, Modification, Submission, and Negotiation

GAI works with clients to obtain the permits that meet their current air quality needs, future performance considerations, and required operational flexibility, including:

- General Permits (GPs)
- Title V (Major Source) Permits
- Minor and Major Modifications
- Federally Enforceable State Operating Permits (FESOP)
- State and Local Minor Source Air Permits
- Minor Source Operating Permit (MSOP)
- Request for Determinations (RFDs)
- Permit by Rule (PBR)
- Synthetic Minor Permits
- Administrative Amendments
- Renewals
- Minor and Major Modifications

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Service Profile

Emissions Inventories

GAI completes and prepares emission inventories for clients, as required, for submittal to local, state, and federal agencies. Emission inventories are integral to the compliance process, and often essential in validating that a client's facility is operating within its permitted parameters and air emission limits. Third-party review of the information is often critical to validate data prior to submittal to the applicable agencies. These reports can be prepared and submitted based on the frequency of a client's needs and permit requirements (annual, semi-annual, quarterly, or other as necessary).

Regulatory Review and Compliance Audits

GAI assists clients with review of compliance status with applicable regulations, whether on a voluntary "housekeeping" basis or in response to an agency request or notice of violation (NOV).

Our cost-effective approach involves examining the overall impact of regulations on a site or facility and determining what programs apply. We prepare comprehensive reports that include recommendations for obtaining and maintaining compliance.

Compliance Management

GAI assists clients with tracking when permits must be renewed, when performance and stack testing are required, with completing and submitting annual reports, and in making sure these tasks are completed in a timely manner. We work with each client to develop a customized program to meet their permit requirements and compliance goals.

Contaminant Emissions and Dispersion Modeling

Contaminant emission and dispersion modeling is used to predict the effects of exposure to sudden or long-term release scenarios. GAI identifies the need for emission-stack and mobile-source testing through our database of U.S. EPA air analysis reference methods and our Quality Management program for sampling and analysis.

Additional Specialized Services

- Greenhouse Gas Reporting Program (GHGRP)
- Greenhouse Gas (GHG) Risk Analysis
- GHG emissions inventory preparation, management, reduction planning, and reporting
- Continuous Emission Monitoring System (CEMS) assistance and agency coordination
- Facility Reactivation Assistance
- Facility emissions audit and air screening analyses
- Stack sampling and performance emissions testing management
- FERC Resource Report 9 Filings for Air Quality
- MOVES (Motor Vehicle Emissions Simulator) modeling

GAI Services Summary

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APPENDIX G
Certificates of Authorization

CERTIFICATE OF *Authorization*

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

The West Virginia State Board of Registration for Professional Engineers having verified the person in responsible charge is registered in West Virginia as a professional engineer for the noted firm, hereby certifies

GAI CONSULTANTS, INC.
C00208-00

Engineer in Responsible Charge: ANTHONY F MORROCCO - WV PE 012843

has complied with section §30-13-17 of the West Virginia Code governing the issuance of a Certificate of Authorization. The Board hereby notifies you of its certification with issuance of this Certification of Authorization for the period of:

January 1, 2018 - December 31, 2019

providing for the practice of engineering services in the State of West Virginia.

IF YOU ARE REQUIRED TO REGISTER WITH THE SECRETARY OF STATE'S OFFICE, PLEASE SUBMIT THIS CERTIFICATE WITH YOUR APPLICATION.

IN TESTIMONY WHEREOF, THE WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS HAS ISSUED THIS COA UNDER ITS SEAL, AND SIGNED BY THE PRESIDENT OF SAID BOARD.

BOARD PRESIDENT

WEST VIRGINIA BOARD OF PROFESSIONAL SURVEYORS

Certificate of Authorization

GAI Consultants, Inc.

Charleston, West Virginia

CERTIFICATE OF AUTHORIZATION # 18-5823

This certificate is issued by the West Virginia Board of Professional Surveyors in accordance with *W.Va. Code §30-13A-20*
The person or organization identified on this certificate is licensed to conduct professional surveying and mapping services in the State of West Virginia for the period

January 1, 2018 through December 31, 2018

This certificate is not transferrable and must be displayed at the office location for which issued.

In witness whereof I have put my hand, this 20th day of December, 2017

2018

R. Michael Shepp, P.S., Chairman

James T. Rayburn, P.S., Member

Nelson B. Douglass, P.E., P.S., Secretary

Sefton R. Stewart, P.S., Member

Douglas C. McElwee, *Esq.*, Public Member