

GAI Consultants, Inc.
Expression of Interest
Pine Bluff (Wilson) Refuse -
EPAM 16038

Solicitation:
CEOI 0313 DEP1800000004
July 10, 2018

GAI Project No. E180654.00

RECEIVED

2018 JUL 10 PM 12:16

WV PURCHASING
DIVISION



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

Prepared by:
GAI Consultants, Inc.
Charleston Office
300 Summers Street, Suite 1100
Charleston, WV 25301
304.926.8100 | gaiconsultants.com





Charleston Office
 300 Summers Street, Suite 1100
 Charleston, WV 25301

T 304.926.8100
 F 304.926.8180

July 10, 2018

Project E180654.00

Ms. Brittany E. Ingraham
 West Virginia Department of Environmental Protection
 Office of Abandoned Mine Lands and Reclamation
 2019 Washington Street East
 Charleston, WV 25305-0130

Expression of Interest
Pine Bluff (Wilson) Refuse – EPAM 16038
Solicitation: CEOI 0313 DEP1800000004

Dear Ms. Ingraham:

GAI Consultants, Inc. (GAI) is pleased to present our Expression of Interest for the Pine Bluff (Wilson) Refuse Project (Project) pursuant to the West Virginia Department of Environmental Protection (WVDEP) Office of Abandoned Mine Lands and Reclamation (AML&R) Solicitation CEOI 0313 DEP1800000004, originally issued on May 15, 2018, and revised per Addendum 01 on June 7, 2018.

Founded in 1958, GAI has approximately 60 years of experience in mine reclamation-related projects and mitigation practices throughout West Virginia and the Northeastern United States. We are a full-service engineering and environmental consulting firm with a dedicated team of engineers, biologists, geologists, and hydrogeologists 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 that we are exceptionally qualified for this Project based on the following:

- GAI's award-winning proposed Project Team, which includes some of the nation's foremost authorities on mine reclamation and acid mine drainage treatment. **GAI's Charleston office has provided the State with quality engineering services arising from abandoned mine lands since 1985.**
- 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, West Virginia Office, and has managed and participated in the design and development of reclamation plans and feasibility studies for over 95 WVDEP mine reclamation projects. Additionally, GAI's proposed **Project Advisor, Robert W. Bruhn, ABD, PE,** has over 45 years of geotechnical engineering experience, and is a nationally recognized expert in subsidence engineering and the stabilization of abandoned underground mine workings.
- GAI's available staff of civil, geotechnical, structural, hydrogeological, and mining engineers, geologists, surveyors, biologists, and designers with extensive experience in reclamation engineering.

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

Sincerely,
 GAI Consultants, Inc.

Kenneth W. Kinder, PE
 Engineering Manager

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

KWK:CFS

Attachment: Expression of Interest

Table of Contents

Introduction	1
Mining Engineering Qualifications	3
Project Organization	4
Project Manager / Point-of-Contact Information	4
Qualifications of Key Personnel	5
Specialized Experience and Capacity to Accomplish the Work	11
Past Performance	15
References	22
Certificates of Authorization	22
Closing	22

Appendices

- 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 – WVDEP AML Project List
- Appendix F – GAI Service Briefs
- Appendix G – Certificates of Authorization

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 (WVDEP) Office of Abandoned Mine Lands and Reclamation (AML&R) for the Pine Bluff (Wilson) Refuse Project (Project), located in Harrison County, West Virginia (WV). GAI understands that this Project will include, but not be limited to Civil, Structural, Geological, and Hydrogeological Services.

Founded in 1958, GAI is a full-service engineering consulting firm with approximately 900 employees in 26 offices within the United States (US), including offices in Charleston and Bridgeport, WV. GAI is currently ranked 116 out of Engineering News-Record's Top 500 Design Firms. Our commitment to proactive employment of the most proficient and motivated talent helps our clients tackle the ever-changing challenges of our industry, technology, and regulatory practices. In the process, GAI has become an engineering and environmental hub of in-house engineers, scientists, and other professionals who are always accessible to our clients. We study, analyze, design, inspect, and manage for our clients, pooling our skills and resources to deliver superior client services throughout the US and abroad.

GAI has 60 years of experience in mine-related projects throughout WV and the Northeastern United States. 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 has been at the forefront in the design of wetlands for passive treatment of Acid Mine Drainage (AMD). Additionally, we have recently completed the design of an AMD Treatment Plant, which has included innovative technologies for active treatment systems. GAI has also worked with several electric utilities in developing projects that involve the beneficial use of coal ash in the reclamation of mine lands.

GAI Offices

GAI has served the WVDEP on over 100 AML contracts since 1984. GAI's Charleston, WV office has served the WVDEP on previous Abandoned Mine Lands (AML) projects since 1985, and will be the Primary Office for this Project. GAI's Charleston office is exceptionally qualified for this Project, having a staff of 23 personnel, including four WV Professional Engineers, one Professional Land Surveyor, and a team of geologists, biologists, environmental scientists, construction inspectors, CADD operators, technicians, drafts persons, and administrative personnel.

Additionally, GAI will utilize technical support from our offices located in Bridgeport, WV; Pittsburgh, Pennsylvania (PA); Cranberry, PA; and Murrysville, PA, which will work in unison to best meet the needs of the WVDEP for this important Project. Our close proximity to the Project and Agency, coupled with our track record of effective communication and consultation, ensures that GAI will be responsive to the needs of the WVDEP AML&R throughout the course of this Project.

Charleston Office

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

Cranberry Office

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

Bridgeport Office

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

Murrysville Office

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



Project Understanding

GAI understands that the Project is located in Harrison County, WV and that the anticipated contract will be for "full-service" A/E design. Should GAI be awarded this Project, we understand that we will be responsible for the Design of the following:

- Upgrade access, as required;
- Protect area of the adjacent cemetery;
- Clear and grub affected areas;
- Regrade, as necessary;
- Entomb acid-forming materials with on-site available borrow material and away from any water source;
- Install drainage channels, underdrains, and/or other controls to safely convey water off-site;
- Condition and revegetate all disturbed areas; and
- Obtain required permits, including NPDES and MM109.

GAI understands that the Project goals and objectives are the following:

- Design plans and develop specifications for site access;
- Design plans and develop specifications for cemetery protection;
- Design plans and develop specifications for limits of disturbance, stormwater control, and erosion and sediment prevention;
- Design plans and develop specifications to regrade and entomb acid-forming materials with on-site available borrow material and away from any water source;
- Design plans and develop specifications for drainage channels, underdrains, and/or other controls to safely convey water off-site; and
- Design plans and develop specifications for all conditions encountered on Project site.

Additionally, should GAI be awarded the Project, we understand that Preliminary Design documents will be due 60 calendar days from the issuance of the Purchase Order.

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 Pennsylvania Department of Environmental Protection (PaDEP) Bureau of Abandoned Mine Reclamation's Fishing Creek Restoration and Maude Mine Reclamation 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.

Mining Engineering Qualifications

Since 1958, GAI has conducted thousands of geotechnical and hydrological investigations, many of which involved the reclamation of mine lands. By successfully completing so many reclamation projects, GAI has obtained "expertise" status on an international basis for mining engineering projects. Our award-winning team has included some of the nation's foremost authorities on mine reclamation and AMD treatment. We have a dedicated team of engineers, geologists, hydrogeologists, biologists, agronomists, and economists that keep abreast of regulatory developments and investigate groundwater, AMD, waste disposal, environmental impacts, and cultural resources for mine lands and mining operations.



GAI has served the WVDEP on over 100 AML contracts since 1984. Additionally, we have prepared 93 construction packages for the WVDEP AML&R since 1985. Services for these AML projects have included: subsidence investigations and stabilization plans; coal refuse pile reclamation; coal refuse reprocessing evaluations; stream restorations; AMD evaluation and treatment; landslide investigations and repair; demolition plans; mine portal reclamation; burning coal refuse piles, coal seams, and underground mines; wetland replacement and development; environmental liability assessments; water quality surveys and feasibility reports; water supply system reviews; water supply system designs; permitting; and coordination with local, state, and federal regulatory agencies.

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

- AML reclamation;
- AMD remediation;
- Design of coal refuse piles, including impoundment structures;
- Hydrologic/hydraulic design of erosion and sediment control devices;
- Soil analysis and revegetation plans;
- Coal refuse reprocessing evaluations, including mining and reclamation plans;
- Construction monitoring services;
- Design of excess overburden disposal fills, both conventional and durable rock fills;
- Detailed reclamation plans;
- Detailed subsurface/geotechnical investigations for foundation, subsidence, slope stability, and reserve analysis;
- Mine closure plans/post-reclamation land use;
- Permitting for deep and surface mine applications, including: NPDES, MM109 permits, U.S. Army Corps of Engineers (USACE) Section 404 permits, WV Public Land permits, air pollution control permits, etc.;
- Probable hydrologic consequences (PHC) statement preparation;
- Reclamation/environmental liability assessments in conjunction with property transfers; and
- Subsidence control plans.

As a result of this experience, GAI will provide the required expertise to complete this Project in a timely, economical, and efficient manner. Our direct knowledge of the AML program guidelines and personnel will also benefit the WVDEP. Because GAI is a "full-service" engineering firm, we will not require any subconsultants to be utilized on this Project. GAI will utilize our geologists, hydrologists, civil engineers, structural engineers, water and wastewater engineers, biologists, environmental scientists, construction technicians, CADD designers, permitting specialists, and quality assurance experts for this Project.

GAI service briefs relevant to this Project are located in **Appendix F**.

Project Organization

GAI understands that 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, Kenneth W. Kinder, PE, are both located out of GAI's Charleston, WV office.

Our Charleston and Bridgeport, WV offices include 36 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.

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

A listing of Key Personnel and their qualifications are located in the following section. A Project Organizational Chart is located in **Appendix D**.

Qualifications of Key Personnel

The following is a summary of key personnel qualifications. All of our Key Personnel have direct experience with 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. Key personnel resumes are 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 Professional Engineer (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 reclamation plans and feasibility studies for over 95 WVDEP mine reclamation projects.** 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 Civil Engineering from the University of Akron.



Kenneth W. Kinder, PE, CFM – Assistant Project Manager

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 registered PE in WV, and will serve as the Assistant Project Manager for this Contract. Mr. Kinder 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. He specializes in civil site design, erosion and sediment control, stormwater management, hydraulic modeling, floodplain permitting, wastewater treatment, geotechnical solutions, and surface and underground coal permitting. 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.



Robert J. Turka, PG, CPG – QA/QC and Geological Engineering Support

Mr. Turka is a Senior Geological Manager with GAI out of GAI's Murrysville, PA office with over 35 years of engineering experience. He is a registered Professional Geologist (PG), in PA and KY, and is a Certified Professional Geologist (CPG) through the American Institute of Professional Geologists. Mr. Turka specializes in AML reclamation work involving regrading and revegetating old surface coal mines, deep mine grout stabilization, extinguishing burning coal mine refuse, correcting mine drainage discharges, evaluating and remediating mine gas problems, and evaluating and plugging abandoned mine entries and shafts. Mr. Turka was the Project Manager on the team responsible for analyzing and developing mitigation measures for the Jerry Hill Refuse Fire in Cassville, Monongalia County, WV. GAI's tasks included: site characterization, subsurface exploration, geologic mapping and report preparation along with preparation of a fire extinguishment plan including specifications and drawings. AML clients have included the WV Department of Natural Resources (WVDNR); U.S. Bureau of Mines; U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSMRE); the PA BAMR; Maryland Bureau of Mines, and the Ohio Department of Natural Resources (ODNR). Mr. Turka received his BS in Earth and Planetary Science from the University of Pittsburgh, and his MAT in Secondary Education, focusing on Natural Science.



Robert W. Bruhn, ABD, PE – Project Advisor

Mr. Bruhn is an Engineering Director out of GAI's Murrysville, PA office, and has over 45 years of engineering experience. He is a registered PE licensed in PA specializing in geotechnical engineering, particularly as it relates to abandoned underground and surface mines. He is a nationally recognized expert in subsidence engineering, and has studied subsidence above mines in WV, PA, KY, OH, Illinois (IL), Virginia (VA), the United Kingdom, and India. Mr. Bruhn has written numerous technical articles that have been published concerning subsidence and its effects on structures and on the ground water regime. This experience extends to the stabilization of abandoned underground mine workings and to the control of mine fires in such mine workings. Mr. Bruhn designs and interprets subsurface rock instrumentation and testing programs for dams and tunnels, rock cuts, and mines. Mr. Bruhn received his All But Dissertation (ABD) in Civil Engineering from Carnegie Mellon University; his MS in Civil Engineering from the Massachusetts Institute of Technology; and his BS in Geology (Honors) from the University of Wisconsin.



Key Technical Personnel

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 Office of AML&R. 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. Mr. Gandee received his BS in Civil Engineering Technology from the West Virginia University Institute of Technology.



David A. Weakley II, MS, PE – Wastewater Engineering Lead

Mr. Weakley is an Engineering Manager out of GAI's Pittsburgh, PA Office, and has over 11 years of experience specializing in water and wastewater processes and treatment plant design and optimization. He is a registered PE in PA, MD, and Texas, and has worked with the PaDEP and the BAMR on the Cresson AMD Treatment Project as the lead wastewater process engineer. Mr. Weakley has designed both active and passive AMD treatment systems to remove suspended solids, metals, and restore pH levels back to suitable ranges. He has previously worked on projects conveying mine pool waters via temporary pumping and piping to impoundments and other mine pools. Mr. Weakley received his MS in Environmental Engineering and his BS in Civil and Environmental Engineering from the University of Pittsburgh.



Emma N. Wolff, MS, PE – Wastewater Engineering Support

Mr. Wolff is a Senior Project Engineer out of GAI's Pittsburgh, PA Office, and has over five years of experience specializing in water and wastewater processes. She is a registered PE in PA, and has worked on numerous AMD projects, including providing an evaluation of an aerator system in a wastewater treatment system treating acid mine seep water. Ms. Wolff has conducted treatment feasibility study of flowback water from natural gas drilling in Marcellus Shale formation utilizing AMD as a sulfate source. Additionally, she has permitting and design experience with both active and passive treatment systems for AMD and similar leachate wastewater systems. Ms. Wolff received her MS and BS in Civil and Environmental Engineering from the University of Pittsburgh.



Jason R. Truckenbrod, PE – Structural Engineering Lead

Mr. Truckenbrod is a Senior Engineering Manager out of GAI's Cranberry, PA Office, and has over 25 years of experience. He is a registered PE in WV, PA, OH, VA, IN, and MD, specializing in complete structural design of complex projects, from the selection of structural systems and definition of design criteria to the preparation of detailed calculations, specifications, and construction drawings. Mr. Truckenbrod was the lead structural engineer for the PaDEP, Bureau of Abandoned Mine Reclamation's Cresson AMD Treatment Project, where he was responsible for the design of the water containment structures, the plant control building, support framing for the pipes, and open troughs that conveyed water and chemicals throughout the plant, support framing for the elevated access platform, and mat foundations for the pumps, pre-fabricated storage tanks and a silo. Mr. Truckenbrod received his BS in Civil Engineering from the University of Buffalo.



Abby L. Miser, PE – Structural Engineering Support

Ms. Miser is a Project Engineer out of GAI's Cranberry, PA Office, and has over 10 years of experience. She is a registered PE in PA, specializing in structural analysis and design, structural condition assessments, rehabilitation design, transportation design. Ms. Miser was the project engineer for the PaDEP, Bureau of Abandoned Mine Reclamation's Cresson AMD Treatment Project, where she worked on the design of the water containment structures, plant control building, support framing for piping, and open troughs that conveyed water and chemicals throughout the plant. Ms. Miser received her BS in Civil Engineering from Calvin College.



Kerry L. Frech, MEng, PE – Hydrology and Hydraulics Lead

Mr. Frech is the Civil Technical Leader out of GAI's Murrysville, PA office, and has 40 years of engineering experience. He is a registered 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 Reclamation Project, which was awarded the 2008 Appalachian Region AMR Award. 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. Mr. Frech received his MEng in Environmental Engineering, and his BS in Civil Engineering from Cornell University.



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

Mr. Bortz is an Engineering Manager out of GAI's Murrysville, PA office, and has over 28 years of engineering experience. He is a registered PE in PA and Virginia (VA), specializing in H&H, natural stream restoration, erosion and sedimentation (E&S) 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 and 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 monitoring, 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 and 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 (CWA) and Section 7 consultation (ESA). 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 Computer Aided Design and Drafting (CADD). He works out of GAI's Charleston, West Virginia 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
Kenneth W. Kinder	Assistant Project Manager	Charleston, WV	BS, Civil Engineering	PE: WV; CFM
Robert J. Turka	Quality Assurance/ Geological Support	Murrysville, PA	MAT, Secondary Education BS, Earth & Planetary Science	PG: PA, KY
Robert W. Bruhn	Project Advisor	Murrysville, PA	ABD, Civil Engineering MS, Civil Engineering BS, Geology	PE: PA
Key Technical Personnel				
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
David A. Weakley, II	Wastewater Lead	Pittsburgh, PA	MS, Environmental Engineering BS, Civil & Environmental Eng.	PE: PA, MD, TX
Emma N. Wolff	Wastewater Support	Pittsburgh, PA	MS, Civil & Environmental Eng BS, Civil & Environmental Eng	PE: PA
Jason R. Truckenbrod	Structural Lead	Cranberry, PA	BS, Civil Engineering	PE: WV, PA, OH, VA, IN, MD
Abby L. Miser	Structural Support	Cranberry, PA	BS, Civil Engineering	PE: PA Soil Compaction Certification
Kerry L. Frech	H&H Lead	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, Industrial Engineering Technology	NICET; HAZMAT
Michael P. Doyle	CADD Designer	Charleston, WV	AS, CADD	10-Hour OSHA



Specialized Experience and Capacity to Accomplish the Work

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 Office of Surface Mining, Reclamation and Enforcement (OSMRE) and AML programs in 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.

Specialized Experience

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:

- AMD evaluation and treatment;
- Mine portal reclamation;
- 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.

Other Mining Industry Engineering Services

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

- Design of coal refuse disposal piles, including impoundment structures;
- Hydrologic/hydraulic design of erosion and sediment control devices;
- Soil analysis and revegetation plans;
- Coal refuse reprocessing evaluations, including mining and reclamation plans;
- Construction monitoring services;
- Design of excess, overburden disposal fills, both conventional and durable rock fills;
- Detailed reclamation plans;
- Detailed subsurface/geotechnical investigations for foundation, subsidence, slope stability, and reserve analysis;
- Mine closure plans/post-reclamation land use;
- Permitting for deep and surface mine applications, National Pollutant Discharge Elimination System (NPDES), U.S. Army Corps of Engineers (USACE) Section 404 permits, West Virginia Public Land permits, and air pollution control permits, among others;
- Probable hydrologic consequences (PHC) statement preparation;
- Reclamation/environmental liability assessments in conjunction with property transfers; and
- Subsidence control plans.

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 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 materials. 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 compressibility 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 implemented in the field during construction. Our experience gained on various types of West Virginia mine reclamation projects during the past 30 years will ensure that this quality continues.

GAI has prepared approximately 100 construction packages for the WVDEP's Office of AML&R. Other WV AML&R projects completed by GAI did not result in the preparation of construction drawings, such as water quality surveys and feasibility reports and landslide investigations, where it was determined that the

problems were not mining related. 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.

Proposed Staffing Plan and Capacity to Accomplish the Work

Proposed Staffing Plan

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

GAI has over 900 professional and technical staff in 26 offices located within the U.S. **Our Charleston and Bridgeport, WV offices include 36 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.** Clients served by these offices include mining and industrial companies; federal, state, and local government agencies; engineers and architects; and private developers.

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.

GAI's staff has the depth, flexibility, and experience to produce a quality product on time and has demonstrated this capability to the WVDEP on many previous projects since 1985. Appropriate staff members, most with WVDEP experience, are immediately available for project assignments. We are prepared to begin work immediately.

GAI's large and experienced staff permits us to respond quickly, provides flexibility, and permits high level input to the Project's staff from in-house experts. GAI's method of staffing projects, as evidenced by our performance on prior projects for the WVDEP, is to assign a small team with total responsibility for completion of the work to the WVDEP's satisfaction and budget. When necessary, GAI can draw on the expertise available from other offices.

Computer Facilities

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.

In order to coordinate project information more quickly and efficiently, GAI uses Newforma Project Center. Our clients and vendors can join GAI in using this web-based program in a project-by-project basis. When utilized, Newforma is a project management software used 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 that they have reviewed and returned comments on, and ones they have not. It also includes a web-based server called InfoExchange, which allows clients to easily send and receive files as large as 2 GB.

Report Preparation

GAI makes extensive use of AutoCAD Civil 3D 2016, Microstation V8i, and ArcView. Complete reproduction facilities are available 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.

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, hand-held and backpack GPS equipment, digital cameras and video recorders, total station electronic survey equipment, nuclear densimeter gages, pocket penetrometers, dynamic cone penetrometers, and flow meters.



Past Performance

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 perseverance 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 projects in **Appendix E**. The following project descriptions provide examples of our past performance.

Mine Reclamation Projects

Laurel Run Point AML Reclamation Project

Laurel Point, West Virginia

GAI was hired by the WVDEP, Office of AML&R, 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 streambank stabilization, 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, Office of AML&R

Key Personnel: Charles F. Straley, MS, PE – Project Manager; Terry W. Queen – Lead Construction Technician; David L. Workman – Senior Technical Specialist; Michael P. Doyle – Senior Designer

Reynoldsville Refuse Reclamation Project

Reynoldsville, West Virginia

GAI was hired by the WVDEP, Office of AML&R, 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, Office of AML&R

Key Personnel: Charles F. Straley, MS, PE – Project Manager; Terry W. Queen – Lead Construction Technician; David L. Workman – Senior Technical Specialist

Earling Refuse Pile Reclamation Design Project *Earling, West Virginia*

GAI was hired by the WVDEP, Office of AML&R, 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, Office of AML&R

Key Personnel: Charles F. Straley, MS, PE – Project Manager; Terry W. Queen – Lead Construction Technician

Greystone Mine Drainage Reclamation Project *Morgantown, West Virginia*

GAI was hired by the WVDEP, Office of AML&R, to perform reclamation services of the Greystone Mine Drainage Reclamation Project, located near Morgantown, Monongalia County, West Virginia 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, Office of AML&R

Key Personnel: Charles F. Straley, MS, PE – Project Manager; Terry W. Queen – Lead Construction Technician; David L. Workman – Senior Technical Specialist



Ned's Branch Impoundment, Phase II Project *Mingo, 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.

Client: WVDEP, Division of Land Restoration – AML

Tasks/Services

Reclamation plan to stabilize the impoundment; Survey and topographic mapping; Site reconnaissance to locate and identify structures and features; Subsurface investigation plan to evaluate site conditions; Slope stability analysis; Stream relocation and county road design; Construction monitoring and testing.

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.

Key Personnel: Charles F. Straley, MS, PE – Project Manager; Terry W. Queen – Lead Construction Technician



West Newton Refuse Embankment Stabilization Project *Westmoreland County, Pennsylvania*

A steel company began disposing of coal refuse from their Banning No. 4 deep mine on site in the early 1960s. The pile is built up with coarse refuse material transported by conveyer and fine refuse pumped as slurry from the steel company's adjacent coal preparation (prep) plant. Three ponds were constructed on the top of the pile. Ponds 2 and 3 contain coal refuse slurry. Pond 1 contains primarily sludge from the company's adjacent Banning No. 4 AMD treatment plant. Based on the company's August 19, 1976 site plan map, the pile is shown as 3,300 feet long, 1,300 feet wide on average, and 100 feet to 141 feet high at the pond embankments.

The West Newton Coal Refuse project site is located adjacent to the Monongahela River approximately 1.5 mile south of the Borough of West Newton. The site has been declared environmental and physical safety hazard as multiple surface water runoff points have been documented to be laden with AMD pollution, and has had landslides during heavy rain events that have overrun the rails to trails path and sections of power distribution lines with debris. The site is also plagued with stormwater drainage structures that convey stormwater from the area between the site and the Rails to Trails path to the Monongahela River that are in disrepair and causing severe erosion in and around the laying length of the pipes.



GAI was tasked with evaluating the site, performing geotechnical boring, developing a site stabilization and stormwater management plan, and soils amendment and AMD remediation plan. GAI provided preliminary and final design plans that regraded the refuse pile to provide stable slopes and conveyed stormwater runoff to minimize erosion. The final design amended the coarse soils with bauxite residue ore and top soil to provide additional soil stabilization, add alkalinity to the site, and remediate AMD laden runoff (pollutants) that had been transported within the site's groundwater and surface water runoffs. GAI's final design was submitted and approved for construction by the Pennsylvania Department of Environmental Protection (PaDEP), but the project is currently on hold.

Client: PaDEP, Bureau of Abandoned Mine Reclamation

Key Personnel: Charles F. Straley, MS, PE – Senior Engineering Manager; Robert W. Bruhn, ABD, PE – Project Advisor; Michael P. Doyle – Senior Designer

Mine Drainage Water Treatment Projects

Treatment of Richard Mine AMD

Morgantown, West Virginia

GAI partnered with the West Virginia Conservation Agency (WVCA) - Monongahela Conservation District, and Natural Resources Conservation Service (NRCS) to correct the 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 five 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 was also evaluated.

GAI's tasks included: literature search; site reconnaissance; data collection of mine maps and mine hydrology; AMD; preliminary feasibility assessment; hydrology and hydraulics analysis; water quality analysis; and cost estimate.

Value Added Innovations: 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.

Lasting Benefits: The Richard Mine AMD enters Deckers Creek about five 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 the Monongahela River in the Wharf District.

Client: WVCA - Monongahela Conservation District, and NRCS

Key Personnel: Charles F. Straley, MS, PE – Senior Engineering Manager; Robert J. Turka, PG, CPG – Senior Geological Manager; Kerry L. Frech, MEng, PE – H&H Lead; Kevin M. Bortz, PE – H&H Support; Terry W. Queen – Lead Construction Technician; David L. Workman – Senior Technical Specialist; Michael P. Doyle – Senior Designer



Lake Milton AMD Reclamation and Abatement Project

Jackson County, Ohio

The team of Bergmann Associates and GAI provided professional engineering services to investigate and design the Lake Milton Reclamation project, located within the Flint Run tributary of Little Raccoon Creek Watershed in Jackson County, Ohio. The project site includes two large water impoundments known as Lake Milton and Upper Lake Milton. Lake Milton covers 16.7 acres and holds 72 million gallons of water.



Stability issues with the Lake Milton embankment required ODNR to contract with the team of Bergmann and GAI to design embankment repairs and treatment facilities within the impoundments and downstream to abate AMD. The final design included a slurry wall for the dam rehabilitation and a steel slag leach bed and vertical flow pond for the AMD abatement.

Lasting Benefits: The Lake Milton Reclamation Project improved water quality for Flint Run and produced a large recreational lake.

Client: ODNR, Division of Mineral Resource Management

Key Personnel: Charles F. Straley, MS, PE – Senior Engineering Manager

Cresson AMD Treatment Project

Cambria County, Pennsylvania

GAI partnered with the PaDEP and the Bureau of Abandoned Mine Reclamation (BAMR) to provide treated AMD to the West Branch Susquehanna River. The overall goal of this project was to restore fisheries by supplementing flow during low-flow periods with treated water from the mine pools. The AMD treatment facility is located in the Clearfield Creek watershed, a major tributary of the West Branch Susquehanna River. The many benefits to the natural environment for Cambria County and the Town of Cresson included removing the ugly orange and white staining caused by the AMD precipitate.



GAI, under the direction of BAMR, completed the "Phase 1 SRB Low Flow Mine Storage and Treatment Project Evaluation" in May 2007. This evaluation looked at several mine pools and determined that the required make-up flow could be provided by the collection and routing of discharges to a treatment plant from mine pools located in upper Clearfield Creek and adjacent watershed, Sugar Run. Phase 1 evaluation recommended construction of a treatment plant near the Town of Cresson, in Northern Cambria County. Under the direction of BAMR, GAI performed a preliminary design evaluation associated with the proposed Cresson AMD Treatment Plant. This included evaluating water quality impacts, determining an approach to routing mine pools, and evaluating low-flow requirements and water supply loss. GAI selected a location for the treatment plant and related infrastructure, evaluated treatment processes and selected a treatment process to mitigate population from the AMD and to restore water quality to the Clearfield Creek watershed.

Client: PaDEP, Bureau of Abandoned Mine Reclamation

Key Personnel: Charles F. Straley, MS, PE, PLS – Senior Engineering Manager; Richard M. Ruffolo, PG – Geological Manager; David A. Weakley II, MS, PE – Wastewater Engineer; Jason R. Truckenbrod, PE – Structural Engineering Lead; Abby L. Miser, PE – Structural Engineer

Acid Seepage Mitigation and Abatement Project

Pennsylvania

GAI provided preliminary engineering design for mitigation and abatement of seepage in order to meet the requirements of the client's NPDES permit special conditions relating to seeps along the river. GAI also prepared and submitted the environmental permit applications required for the project. Designs were based on the conclusions of an engineering study report, as well as the requirements of the client's Design Criteria Document.



The project goal was to lower the water table in order to eliminate the seeps. The technology GAI explored comprised a barrier wall set to the depth of bedrock in conjunction with a cutoff trench French drain to collect the seeps and a sump and pump station to transport the water for treatment and reuse. A French drain used as a stand-alone system was also explored as an alternative.

GAI investigated whether an existing facility water system was capable of accepting the seepage and advised the client that minimal pre-treatment would be required before sending discharge to the existing facility system. GAI also conducted a cultural resources survey, and prepared and submitted a Pennsylvania Department of Environmental Protection and U.S. Army Corps of Engineering Joint Permit, and Erosion and Sedimentation Control Plan.

GAI conducted a Water Balance Study to review the amount of water flows in and out of the station, and determined that additional water could be handled by the station and water treatment would not be needed while the station was generating power. GAI recommended that a water treatment system be installed to handle flows only during a station outage, reducing operating costs. GAI prepared an Engineering, Procurement, and Construction (EPC) Technical Specification, which was incorporated into the contract between the client and EPC contractor, and was used as the technical scope of work requirement.

Lasting Benefits: GAI's mitigation measures prevented seepage from contaminating the river and complied with the Clean Streams Law. The seepage water will be reused for facility processes, reducing the client's operating costs.

Confidential AMD Passive Wetland Treatment System

Pennsylvania

GAI designed, permitted, and prepared construction plans for the collection and passive treatment of AMD surface seepage from nine hillside seeps. The seepage was emanating from the abandoned mines located on the power station's property. The purpose was to clean up AMD seepage that was mixing with stormwater runoff and discharging at existing station NPDES Stormwater Points. The design treated acidic, metal-contaminated water up to a flowrate of 40 gpm and pH ranging 3.2 to 3.5. The passive treatment system consisted of a 0.31-acre vertical flow pond (clay lined/limestone underdrain/anaerobic organic substrate) to neutralize pH and precipitate metals, and a 0.34-acre constructed wetland (clay lined/emergent wetland plants) to remove residual iron and dissolved organic compounds carried over from the vertical flow pond. The successful system was constructed in 2000. Associated work included construction specifications and an operation and maintenance manual for longterm maintenance of the treatment system. In 2009, GAI refurbished the vertical flow pond with new limestone and organic substrate.



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, Office of AML&R
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 Letter of Qualification and Unpriced Prospectus 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.

CFS:KCC/mdw/jbm

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





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

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

Proc Folder: 425927

Doc Description: Addendum No.01 EOI - Pine Bluff (Wilson) Refuse - EPAM16038

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-06-07	2018-07-10 13:30:00	CEOI 0313 DEP1800000004	2

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.
 300 Summers Street
 Suite 1100
 Charleston, WV 25301
 (304) 926-8100

FOR INFORMATION CONTACT THE BUYER

Brittany E Ingraham
 (304) 558-2157
 brittany.e.ingraham@wv.gov

Signature X *Charles Stratley*

FEIN # 25-1260999

DATE July 10, 2018

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

ADDITIONAL INFORMATION:

Addendum

Addendum No.01 issued to publish and distribute the attached information to the vendor community.

Expression of Interest
(DEP Pine Bluff (Wilson) Refuse Project)

The West Virginia Purchasing Division is soliciting Expression(s) of Interest for the Agency, The Department of Environmental Protection (WVDEP) from qualified firms to provide engineering services and other related professional services per the bid requirements, specifications, and terms and conditions as attached hereto.

* Online submission of Expression of Interest are Prohibited.*

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
1	EOI Engineering Design Services		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :

*Dates of Service are estimated for bidding purposes only.

SOLICITATION NUMBER: CEOI DEP1800000004

Addendum Number: No.01

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- | Modify bid opening date and time
- | Modify specifications of product or service being sought
- | Attachment of vendor questions and responses
- | Attachment of pre-bid sign-in sheet
- | Correction of error
- | Other

Description of Modification to Solicitation:

Addendum issued to publish and distribute the attached documentation to the vendor community.

THE PURPOSE OF THIS ADDENDUM IS TO CHANGE THE FOLLOWING:

Question Deadline: WAS 06/05/2018 at 9 AM EST, IS NOW 06/28/2018 at 9 AM EST
Bid Opening Date: WAS 06/12/2018 at 1:30 PM EST, IS NOW 07/10/2018 at 1:30 PM EST
Buyer: WAS Guy Nisbet, IS NOW Brittany Ingraham

Email: Brittany.E.Ingraham@wv.gov

No other changes.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0313 DEP 1800000004

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:


(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

GAI Consultants, Inc.

Company


Authorized Signature

July 10, 2018

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.

Revised 6/8/2012

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, 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, Engineering Manager

 (Printed Name and Title of Authorized Representative)

June 12, 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 exceeds 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 Stratton* Date: 7-9-18

State of West Virginia

County of Kanawha, to-wit:

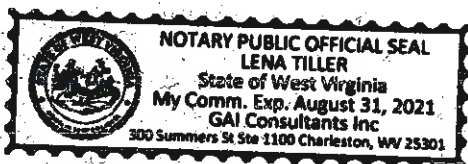
Taken, subscribed, and sworn to before me this 9th day of July, 2018.

My Commission expires August 31, 2021.

AFFIX SEAL HERE

NOTARY PUBLIC *Lena Tillier*

Purchasing Affidavit (Revised 01/19/2018)



APPENDIX B

AML Consultant Qualification Questionnaire



**WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AML CONSULTANT QUALIFICATION QUESTIONNAIRE**

Attachment "B"

PROJECT NAME Pine Bluff (Wilson) Refuse - EPAM 16038		DATE (DAY, MONTH, YEAR) 10, 07, 2018	FEIN 25-1260999
1. FIRM NAME GAI Consultants, Inc.		2. HOME OFFICE BUSINESS ADDRESS 385 E Waterfront Drive Homestead, PA 15120	3. FORMER FIRM NAME General Analytics, Inc.
4. HOME OFFICE TELEPHONE 412.476.2000	5. ESTABLISHED (YEAR) 1958	6. TYPE OWNERSHIP Individual <input checked="" type="checkbox"/> Corporation Partnership <input type="checkbox"/> Joint-Venture	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) YES NO <input checked="" type="checkbox"/>
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 / 25 Charleston, WV 12 Bridgeport, WV 15 Pittsburgh, PA 5 Cranberry, PA 8 Murrysville, PA			
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Steven E. Gould, Senior Vice President Gary DeJidas, CEO		8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS Anthony Morrocco, President - 412.399.5197 Karl Palvisak, VP/CFO - 412.319.3021	

9. PERSONNEL BY DISCIPLINE

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

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 4
 *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.

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: <u>None</u>	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
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.) Straley, Charles, F. Project Manager	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 30	YEARS OF AML RELATED DESIGN EXPERIENCE: 32	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 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.) Kinder, Kenneth, W. Assistant Project Manager	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 2	YEARS OF AML RELATED DESIGN EXPERIENCE: 15	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 2

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 hydraulic/hydrology aspects of the Project, including but not limited to: stormwater management, erosion and sediment control, and mine discharge.

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.) Bruhn, Robert, W. Project Advisor	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 34	YEARS OF AML RELATED DESIGN EXPERIENCE: 46	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Mr. Bruhn specializes in geotechnical engineering, particularly as it relates to above active and abandoned underground and surface mines. He is a nationally recognized expert in subsidence engineering. This experience extends to the stabilization of abandoned underground mine workings and to the control of mine fires in such mine workings. He will be the Project Advisor and will provide expertise in the areas of subsurface investigation, mine fires, soil and rock mechanics, and subsidence.

EDUCATION (Degree, Year, Specialization)

ABD, 2000, Civil Engineering
MS, 1969, Civil Engineering
BS, 1967, Geology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers
Association of Engineering Geologists
Society of Mining Engineers

REGISTRATION (Type, Year, State)

Professional Engineer (PE), 1982, PA

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.) Turka, Robert, J. QA/QC and Senior Geologist	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 30	YEARS OF AML RELATED DESIGN EXPERIENCE: 40	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Mr. Turka specializes in AML reclamation work involving regrading and revegetating old surface coal mines, deep mine grout stabilization, extinguishing burning coal mine refuse, correcting mine drainage discharges, evaluating and remediating mine gas problems, and evaluating and plugging abandoned mine entries and shafts. He designs and conducts subsurface investigations to determine soil and rock types, physical, groundwater and chemical subsurface conditions, foundation design parameters, subsidence or landslide potential, and groundwater conditions. Mr. Turka supervises groundwater monitoring operations and prepares QA/QC standards. He will provide QA/QC services and will provide Geologic and Hydrogeologic expertise in areas of coal refuse reclamation, mine subsidence, and Acid Mine Drainage remediation.

EDUCATION (Degree, Year, Specialization)

MAT, 1972, Secondary Education (Natural Science)
BS, 1971, Earth and Planetary Science

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Institute of Professional Geologists
Association of Environmental and Engineering Geologists
Pittsburgh Geological Society

REGISTRATION (Type, Year, State)

Professional Geologist (PG), 1989, PA,
Professional Geologist (PG), 2009, KY
Certified Professional Geologist (CPG)

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

American Society of Civil Engineers

REGISTRATION (Type, Year, State)

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

American Society of Civil Engineers

REGISTRATION (Type, Year, State)

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:
Truckenbrod, Jason, R. Lead Structural Engineer	2	25	0

Brief Explanation of Responsibilities

Mr. Truckenbrod specializes in structural engineering and design for multi-disciplined design-engineering projects. His experience includes providing structural engineering and design services for the Pennsylvania Department of Environmental Protection's Bureau of Abandoned Mine Reclamation in Cambria County, PA, for the Cresson Acid Mine Drainage Treatment Project, where he was responsible for the design of the water containment structure, the plant control building, the support framing for the elevated access platform, and mat foundations for the pumps, pre-fabricated storage tanks, and silo. Mr. Truckenbrod will be the Lead Structural Engineer for this project and will support civil with design structures, if needed, and support geotechnical engineering for the design of the retaining structure for the cemetery, as well as any other miscellaneous structural support.

EDUCATION (Degree, Year, Specialization)

BS, 1992, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Institute of Steel Construction (AISC)

REGISTRATION (Type, Year, State)

Professional Engineer (PE), 2008, WV, VA
Professional Engineer (PE), 1997, PA
Professional Engineer (PE), 2005, MD, OH
Professional Engineer (PE), 2006, IN
Professional Engineer (PE), 2013, 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:
Miser, Abby, L. Structural Engineer	2	10	0

Brief Explanation of Responsibilities

Ms. Miser specializes in structural engineering, including design foundations, retaining walls, tanks, slabs, and beams. She is experienced in structural analysis and design, structural condition assessments, and rehabilitation design. Ms. Miser is certified in the use of nuclear density gauges to test soil compaction. She has conducted on-site testing of soil and concrete, and inspected rebar in footings and walls prior to concrete placement. Her experience includes providing structural engineering and design services for the Pennsylvania Department of Environmental Protection's Bureau of Abandoned Mine Reclamation in Cambria County, PA for the Cresson Acid Mine Drainage Treatment Project. Ms. Miser will provide structural engineering support, as needed.

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

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer (PE), 2014, PA Nuclear Density Gauge, Soil Compaction 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:
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	Professional Engineer (PE), 2012, WV
American Society of Highway Engineers (ASHE)	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:
Weakley, David, A. II Water and Wastewater Engineering Lead	6	10	4

Brief Explanation of Responsibilities

Mr. Weakley specializes in water and wastewater processes, and treatment plant design and optimization. His professional experience includes water treatment for municipalities (wastewater and drinking water), mining, seawater desalination, fertilizer production, and oil and gas facilities. Mr. Weakley has worked with the Pennsylvania Department of Environmental Protection and the Bureau of Abandoned Mine Reclamation on the Cresson AMD Treatment Project as the lead wastewater process engineer. He has previously worked on projects conveying mine pool waters via temporary pumping and piping to impoundments and other mine pools. Mr. Weakley will provide assistance on Water and Wastewater Engineering Services, as applicable.

EDUCATION (Degree, Year, Specialization)
MS, 2009, Environmental Engineering
BS, 2007, Civil and Environmental Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State) Professional Engineer (PE), 2013, PA Professional Engineer (PE), 2017, MD Professional Engineer (PE), 2018, TX
--	--

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.) Wolff, Emma, N. Water and Wastewater Engineer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 3	YEARS OF AML RELATED DESIGN EXPERIENCE: 6	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 2

Brief Explanation of Responsibilities

Ms. Wolff specializes in advanced water and wastewater treatment processes. Her professional experience includes engineering system and equipment design, and process support. Ms. Wolff has regulatory agency experience pursuant to specific project permitting requirements and regulatory compliance concerns. Her work on mine projects includes the evaluation of an aerator system in a wastewater treatment system treating acid mine seep water. Ms. Wolff has conducted treatment feasibility study of flowback water from natural gas drilling in Marcellus Shale formation utilizing acid mine drainage as a sulfate source. Additionally, she has permitting and design experience with both active and passive treatment systems for AMD and similar leachate wastewater systems. Ms. Wolff will provide assistance on Water and Wastewater Engineering Services, as applicable.

EDUCATION (Degree, Year, Specialization)

MS, 2016, Civil and Environmental Engineering
BS, 2011, Civil and Environmental Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers (ASCE)
Southwestern Pennsylvania Engineering Outreach

REGISTRATION (Type, Year, State)

Professional Engineer (PE), 2017, PA

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.) Mower, Christy, M.	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 3	YEARS OF AML RELATED DESIGN EXPERIENCE: 18	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 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

American Fisheries Society (AFS)
Ecological Society of America (ESA)

REGISTRATION (Type, Year, State)

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.) Cook, Charles, A. Project Environmental Specialist	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 11	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 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.) Queen, Terry, W. Construction Technician	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 17	YEARS OF AML RELATED DESIGN EXPERIENCE: 34	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 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 Enlisted Association of the National Guard	REGISTRATION (Type, Year, State) 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)
---	---

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		

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)
<p>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</p>	<p>WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304</p>	<p>\$74,855 (fee)</p>	<p>2013</p>	<p>YES</p>
<p>Laurel Point Strip; AML Reclamation Project, includes preparation of a reclamation plan; Monongalia County, WV</p>	<p>WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304</p>	<p>\$114,820 (fee)</p>	<p>2014</p>	<p>YES</p>
<p>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</p>	<p>WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304</p>	<p>40,701.50 (fee)</p>	<p>2014</p>	<p>YES</p>
<p>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</p>	<p>WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304</p>	<p>\$75,269.50 (fee)</p>	<p>2016</p>	<p>YES</p>
<p>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</p>	<p>WVDEP Office of AML&R 601 57th Street SE Charleston, WV 25304</p>	<p>\$59,985 (fee)</p>	<p>2017</p>	<p>YES</p>
<p>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</p>	<p>City of Nitro 2009 20th Street Nitro, WV 25143</p>	<p>\$112,700 (fee)</p>	<p>2017</p>	<p>YES</p>

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
<u>None</u>					

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: Charles F. Straley

Title: Sr. Engineering Manager

Date: July 10, 2018

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

APPENDIX C

AML and Related Project Experience Matrix



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	Hydrological/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
Mingo County PSD Feasibility Study	C/P	Appendix A	X			X												M/P
Amigo Portals	C/P	Appendix A	X	X	X	X					X	X			X		X	M/P
Larry Frederick Highwall & Refuse	C/P	Appendix A	X	X	X	X	X		X		X	X		X		X	X	M/P
Oldfield Branch (Hall) Drainage	C/P	Appendix A	X	X	X	X					X	X				X	X	M/P
Eastern Wyoming County PSD Feasibility Study	C/P	Appendix A	X			X						X						M/P
Raleigh County PSD Feasibility Study	C/P	Appendix A	X			X						X						M/P
Wheatley Branch (Lutyhy) Portals	C/P	Appendix A	X	X	X	X					X	X		X		X	X	M/P
Webster County Commission Diana Area Feasibility Study	C/P	Appendix A	X			X						X						M/P
Cherokee Complex	C/P	Appendix A	X			X	X				X	X		X	X	X	X	M/P
Laurel Point Strip	C/P	Appendix A	X	X	X	X					X	X		X	X	X	X	M/P
Reynoldsville Refuse	C/P	Appendix A	X	X	X	X			X		X	X		X	X	X	X	M/P
Earling Refuse Pile	C/P	Appendix A	X	X	X	X					X	X		X	X	X	X	M/P
Erbacon CR9 Webster County WL Feasibility Study	C/P	Appendix A	X			X						X						M/P
Kanawha Rambling Hills Water Study	C/P	Appendix A	X			X						X						M/P
Davis Creek Water Study	C/P	Appendix A	X			X						X						M/P
Coalburg Water Study	C/P	Appendix A	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	
Wallace 353 Water Study	C/P	Appendix A	X			X														M/P
Wallace 354 Water Study	C/P	Appendix A	X			X														M/P
Greystone Mine Drainage	C/P	Appendix A	X	X	X	X				X	X							X	X	M/P
Route 60 Drainage	C/P	Appendix A	X	X	X	X				X								X	X	M/P
Mallory Refuse	C/P	Appendix A	X		X	X	X			X								X	X	M/P
Lynch Run Highwall #6	C/P	Appendix A	X		X	X				X				X				X	X	M/P
Duck Creek Landslide	C/P	Appendix A	X			X				X	X		X	X	X			X	X	M/P
Heizer Creek Drainage	C/P	Appendix A	X	X	X	X				X								X	X	M/P
Wolfpen Landslide	C/P	Appendix A	X	X	X	X				X								X	X	M/P
Horniny Creek	C/P	Appendix A	X			X					X									M/P
Logan (Marcum) Drainage	C/P	Appendix A	X	X	X	X				X	X							X	X	M/P
Bud Alpoca	C/P	Appendix A				X					X									M/P
Nuriva Maben	C/P	Appendix A				X					X									M/P
Herndon Heights	C/P	Appendix A				X					X									M/P
Handley/Upper Creek	C/P	Appendix A	X	X	X	X				X	X							X	X	M/P
Titus Road	C/P	Appendix A	X			X				X	X		X					X	X	M/P
American Legion	C/P	Appendix A	X			X				X	X		X					X	X	M/P
Cogar	C/P	Appendix A		X	X	X						X								M/P
East Branch Phase II	C/P	Appendix A	X			X				X	X		X		X	X	X			M/P
West Branch Headwaters	C/P	Appendix A	X	X	X	X		X			X				X					M/P
Lake Milton Reclamation	C/P	Appendix A	X			X				X	X							X	X	M/P
Middleton Run Reclamation	C/P	Appendix A	X			X				X	X								X	M/P
Latrobe (Gibson) Landslide	C/P	Appendix A		X	X	X				X								X	X	M/P
Lodestar Energy	C/P	Appendix A	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 A	X			X					X							X	X	M/P
War Waterline	C/P	Appendix A																		M/P
Clarks Gap	C/P	Appendix A				X														M/P
War (Dash) Impoundment	C/P	Appendix A				X														M/P
Whites Run	C/P	Appendix A	X	X	X	X	X				X	X		X				X	X	M/P
Helen Portals	C/P	Appendix A	X	X	X	X	X				X				X					M/P
Bearallow Branch	C/P	Appendix A	X	X	X	X	X				X				X					M/P
Ned's Branch Impoundment	C/P	Appendix A	X		X	X					X	X	X		X	X				P
McAlpin Phase II & III	C/P	Appendix A	X	X	X	X	X	X		X	X	X		X	X	X	X			M/P
McAlpin Phase I	C/P	Appendix A	X	X	X	X	X				X	X		X	X	X	X			M/P
Community of Preston	C/P	Appendix A				X					X		X					X		M/P
Kingwood 52/6	C/P	Appendix A				X					X		X						X	M/P
Micajah Ridge	C/P	Appendix A				X						X							X	M/P
Glen Rogers	C/P	Appendix A				X						X								M/P
Rt. 20 / Gould	C/P	Appendix A				X						X								M/P
Elkins/Buckhannon	C/P	Appendix A				X						X								M/P
Laurel Creek	C/P	Appendix A		X	X	X			X		X					X	X			M/P
Superior	C/P	Appendix A								X								X		P
Wash. Heights Review	C/P	Appendix A				X						X								P
Gaymont	C/P	Appendix A				X						X								P
Hominy Creek	C/P	Appendix A				X						X								P
Elk Creek / Verner	C/P	Appendix A				X						X								P
Orlando Mining	C/P	Appendix A								X				X						P
Scotch Hill	C/P	Appendix A									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																			PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional
PROJECT	Exp. Basis C=Corp. P=Personnel	Additional info Provided in Section(s) ***	PROJECT EXPERIENCE REQUIREMENTS															Mapping	
			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		
Camp Run AMD	C/P	Appendix A	X	X	X	X					X	X		X	X	X	X		P
Mahan	C/P	Appendix A	X			X					X				X	X			M/P
Johnsons Knob	C/P	Appendix A	X	X	X	X	X				X	X		X	X	X	X		P
Carolina	C/P	Appendix A	X	X	X	X	X				X			X	X	X	X		P
Hutchinson	C/P	Appendix A		X						X				X		X			P
Fairmont (Grandstaff)	C/P	Appendix A		X						X						X			M/P
City of Summersville	C/P	Appendix A				X										X			M/P
Reynoldsville	C/P	Appendix A				X					X		X			X			P
Mill Creek	C/P	Appendix A				X					X			X		X			M/P
Mill Creek	C/P	Appendix A				X					X			X		X			P
Majesty	C/P	Appendix A	X	X	X	X	X	X	X		X	X		X	X	X	X		P
Wash. Hts to Jeffrey	C/P	Appendix A										X							P
Gauley River Review	C/P	Appendix A				X													P
Heizer/Manila Review	C/P	Appendix A				X													M/P
Owings	C/P	Appendix A	X	X	X	X	X				X	X		X	X	X	X		P
Omega	C/P	Appendix A		X	X	X					X	X				X	X		P
Mill Creek - Isom	C/P	Appendix A										X							P
Weaver-Junior	C/P	Appendix A										X							M/P
Reynoldsville Phase II	C/P	Appendix A										X							P
Mainella	C/P	Appendix A		X						X	X					X			M/P
Glen Morgan	C/P	Appendix A		X						X	X					X			M/P
Harris AMD	C/P	Appendix A		X	X	X					X			X					P
Lefthand Fork	C/P	Appendix A	X	X	X	X	X	X				X			X				P
Madison Street/Fairview	C/P	Appendix A		X		X						X			X	X	X		P
Summerlee	C/P	Appendix A	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 A		X	X	X				X						X		P
Godby Branch	C/P	Appendix A				X				X						X		P
New Haven Phase II	C/P	Appendix A																
Gauley River Phase II	C/P	Appendix A																
Heizer and Manila Ph. II	C/P	Appendix A																
Matheny Hill Phase I	C/P	Appendix A																M/P
Duncan Hill No. 2	C/P	Appendix A							X	X						X		M/P
Urso Subsidence	C/P	Appendix A		X					X	X						X		M/P
Mill Creek Phase II	C/P	Appendix A																
Duncan Hill Subsidence	C/P	Appendix A		X					X	X							X	
Cora Mine Drainage II	C/P	Appendix A		X	X	X				X	X					X		M/P
Covey Creek Mine	C/P	Appendix A		X				X		X						X		M/P
Vivian	C/P	Appendix A	X			X	X			X							X	P
Kimball	C/P	Appendix A	X			X	X			X						X	X	P
Hampden Bridge	C/P	Appendix A				X				X						X	X	P
Bear Run Refuse	C/P	Appendix A	X			X	X			X	X			X		X		
Beaver Creek	C/P	Appendix A				X				X		X				X	X	
Charleston Landslide	C/P	Appendix A	X							X							X	
Garrison Complex	C/P	Appendix A		X		X				X							X	
Cassity Fork	C/P	Appendix A				X				X							X	
Mulberry Fork Landslide	C/P	Appendix A	X							X							X	
Beckley Subsidence	C/P	Appendix A		X					X	X							X	
Courtright Highway	C/P	Appendix A	X							X							X	

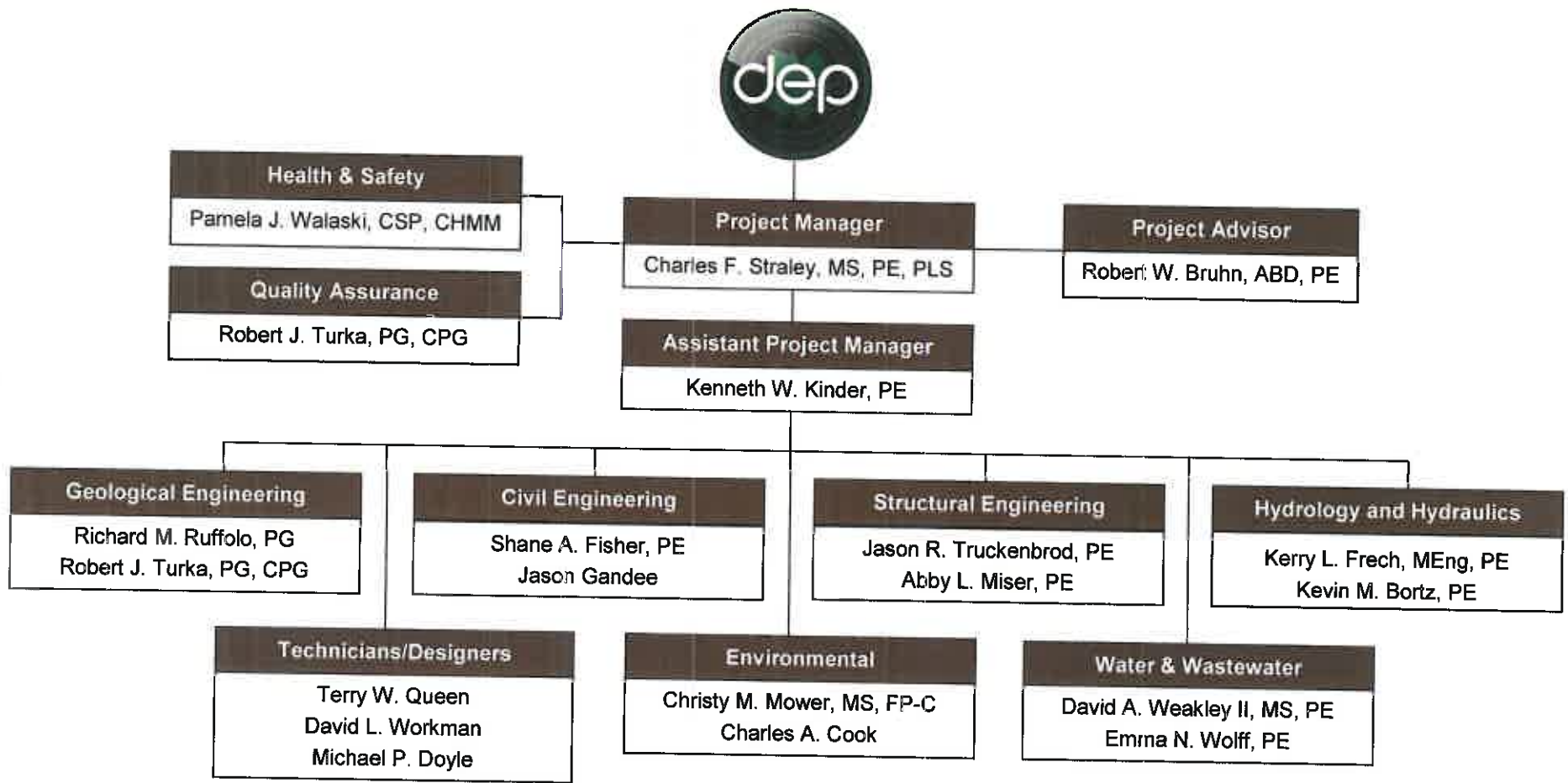
* List whether project experience is corporate or personnel based or both
 ** Use this area to provide specific sections or pages if needed for reference
 *** List Primary Design personnel and their functional capacity for the projects listed

APPENDIX D

Project Organizational Chart and Key Personnel Resumes



Project Organizational Chart





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 #1888

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

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



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

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.



Robert J. Turka, PG, CPG

Senior Geological Manager

Education

MAT Secondary Education (Natural Science), 1972, University of Pittsburgh

BS, Earth and Planetary Science, 1971, University of Pittsburgh

Registrations

Professional Geologist (PG): PA, KY

Skills

Geological Engineering and Studies

Karst

Hydrogeology

Subsurface Exploration and Investigations

Groundwater Investigations

Abandoned Mine Lands Reclamation

Certifications / Training

Certified Professional Geologist (CPG) – American Institute of Professional Geologists

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

Industry Experience

Geologist at NUS Corporation, 1983-1984

Volunteer in the Peace Corps, 1972-1973

Professional Summary

Mr. Turka specializes in geologic, hydrogeologic (groundwater), mining, and site contamination evaluations based on office and field determinations. He is a skilled interpreter of investigation data, determining potential or existing site problems, evaluating their severity, and recommending solutions. He has conducted this work throughout Central and Eastern U.S., and he has been involved in projects in Thailand and Chile.

Mr. Turka designs and conducts subsurface investigations to determine soil and rock types, physical, groundwater and chemical subsurface conditions, foundation design parameters, subsidence or landslide potential, and groundwater conditions. These investigations include auger and air rotary drilling, soil sampling, rock coring, borehole and surface geophysics, groundwater dye testing, ground vibration testing and test pits and trench excavation.

Mr. Turka's Abandoned Mine Lands (AML) reclamation work involves regrading and revegetating old surface coal mines, deep mine grout stabilization, extinguishing burning coal mine refuse, correcting mine drainage problems, draining mine gas, and obstructing or filling old abandoned mine entries.

Select Professional Experience

- Power Generation Sites, IN and PA. Geotechnical investigations of seven proposed gas-fired electric generation sites. Responsible for evaluating subsidence potential from abandoned coal mines, solution cavities in limestone (karst) and the potential for damage from expansive shales. Included collecting background data on geologic and mining and mining conditions, site reconnaissance and drilling and geophysical subsurface investigations.
- Mine Railroad near Kirby, PA. Field reconnaissance of a 23-mile-long railroad connecting the Mine and the Monongahela River. Responsible for targeting areas in which rock falls, landslides, settlement, drainage problems, and/or mine subsidence were occurring, or were likely to occur, and the proposal of measures to repair or prevent them.
- Evaluation of abandoned underground limestone mines for: stability and stabilization methods for a 600-acre proposed business park in Kansas City, MO; stabilization of a parking lot that partially subsided in Glen Falls, NY; and water supply to buffer acidic low flow conditions in the Tygart Valley River, Randolph County, WV.

- Proposed Power Station Site, PA. Evaluation of six sites for a proposed anthracite burning power station in the southern and western middle fields of the anthracite coal region in Northeastern PA. Field reconnaissance and analysis of geologic data and mine maps for each site. Determination of the degree of undermining and corresponding subsidence potential as well as a comparative evaluation of each site to determine its viability as a power plant location.
- Abandoned coal mine land projects in PA, WV, OH, MD, IN, and MI, dealing with problems related to mine subsidence, mine gas tracing, mine drainage and dewatering, hazardous shafts, burning mine refuse and mining related landslides. Principal investigator conducting initial site evaluation and proposal preparation, site investigation, determination of cause and preparation of remedial design and construction documents. The clients included the U.S. Office of Surface Mining, the PA Bureau of Mine Reclamation, WV Department of Natural Resources, MD Bureau of Mines, and the OH Department of Natural Resources.
- Responsible for preparing: a Cumulative Hydrologic Impact Assessment evaluating the effects of a mine refuse disposal site on surface and ground water for a site located along the Potomac River in WV; a geologic and hydrologic module for a surface mine permit in MD; an evaluation of potential impacts on a water supply well from blasting of a nearby surface mine in MD; a hydrologic monitoring plan for a mine located near Philippi, WV; evaluation of the Probable Hydrologic Consequences for a mine in MD; and a subsidence control plan for a proposed mine located near Blairsville, PA.
- Assessments of the potential for mine subsidence from abandoned underground coal mines at proposed fly ash disposal sites at three Power Stations in PA, the potential for surface and ground water contamination from surface mining of coal within the watershed of those sites, and the impact of surface mining in the watershed of the make-up water reservoir on the water quality and treatment requirements for water used at one of the Power Stations.
- Abandoned underground coal mine stabilization at proposed construction sites in PA and WV. Encompassed initial mine investigation, determining stabilization parameters, preparing bid package, contractor selection and construction monitoring.
- Research project involving injection of stabilized scrubber sludge into an abandoned underground mine, establishment of plan, selection of underground mine, monitoring of surface water and ground and evaluation of strength results. Conducted at a Generating Station in IN for a publication by the Electric Power Research Institute.
- Power Station Site, Midwestern U.S. Undermining study and mine stabilization of 40 acres of an Integrated Gasification Combined Cycle (IGCC) power station site. Project manager responsible for determining the extent of abandoned underground coal mining on the site, preparing a mine stabilization plan and stabilization construction specifications and drawings along with a project cost estimate, technical support to client as required and quality assurance/quality control of the mine stabilization work and summary report of the completed work. Unique project items included utilizing existing pond ash and mixing it with mine water for the grouting of shallow (50' deep or less) mine workings.
- Site in Marshall County, WV. Project geologist and hydrogeologist responsible for the geologic investigation and Phase I/II environmental site assessment. Developed project scope and costs for the drilling investigation to determine chemical contamination. Obtained background information, and supervised drilling and piezometer installation. Prepared portions of the site report on mining and mine shafts, site geology, potential contamination, and the potential for ground water supply to the facility. Site takes scrubber sludge from two power plants. Environmental studies project for a proposed wallboard plant site utilizing Flue Gas Desulfurization (FGD) scrubber sludge for source material.
- Abandoned mine shafts in Michigan (MI) for Office of Surface Mining. Principal investigator responsible for identifying, locating, and evaluating abandoned coal mine shafts in Saginaw County, MI and the Bay City, MI area. Collected and evaluated available records, conducted site reconnaissance, supervised geophysical and drilling investigation of selected shaft sites, and reported results including recommendations for filling dangerous shafts and consulting with client on shaft filling methodology.



Robert W. Bruhn, MS, PE

Director, Engineering

Education

MS, Civil Engineering, 1969,
Massachusetts Institute of Technology

BS, Geology (Honors), 1967,
University of Wisconsin

ABD, Civil Engineering,
Carnegie Mellon University

Registrations

Professional Engineer (PE):
PA - 1982, [REDACTED]

Skills

Geotechnical Engineering

Soil and Rock Mechanics

Foundation Engineering

Abandoned Mine Lands

Mine Subsidence

Mine Fire Abatement

Karst Evaluation and Foundation Design

Certifications / Training

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

Industry Experience

GAI Consultants, Inc., 1974-2014

U.S. Army Corps of Engineers, Baltimore
District, 1972-1974

U.S. Army Corps of Engineers, Missouri
River Division, 1969-1972

Professional Summary

Mr. Bruhn specializes in geotechnical engineering, particularly as it relates to above active and abandoned underground and surface mines. He has studied subsidence above mines in West Virginia (WV), Pennsylvania (PA), Ohio (OH), Kentucky (KY), Illinois (IL), Virginia (VA), the United Kingdom, and India. Mr. Bruhn is a nationally recognized expert in subsidence engineering and has written numerous technical articles that have been published concerning subsidence and its effects on structures and on the ground water regime. This experience extends to the stabilization of abandoned underground mine workings and to the control of mine fires in such mine workings. Mr. Bruhn designs and interprets subsurface rock instrumentation and testing programs for dams and tunnels, rock cuts, and mines. He prepares specifications and design memoranda on field instrumentation of rock, and rock testing and support; and geologic mapping of joints, faults, and rock types in rock slopes and tunnels.

Select Professional Experience

- West Newton Coal Logistics Refuse Embankment Stabilization Project, Pennsylvania Department of Environmental Protection (PADEP), Westmoreland County, PA. GAI conducted subsurface exploration, including soil drilling and in-situ testing, laboratory testing program, and geotechnical engineering analyses. Embankments included three ponds. Stabilization of the embankments included regrading the embankment slopes; and fill placement over the pond areas. The engineering analyses for the proposed stabilization of the embankments included (a) evaluation of field and laboratory data to estimate soil design properties; (b) slope stability and seepage analyses of the regraded 3H:1V (18.5 degrees from the horizontal) embankment face slope; (c) settlement analyses of pond materials under proposed fill placement; (d) geosynthetic design analyses to enable fill placement upon pond material; (e) wick drain design for the drainage of pore water from the pond material to promote the consolidation and increase in shear strength of the pond material.
- Analyzed subsidence potential and recommended mitigation measures for a hazardous waste site in PA anthracite region underlain by abandoned mine workings in six underground coal seams.

- Performed geotechnical analysis of the stability of Simpson railroad tunnel in Fayette County, PA located 140 feet below the Mon/Fayette Expressway and underlain at 50-foot depth by abandoned mine workings.
- Provided design and consultation services regarding implementing underground mine stabilization programs to mitigate mine subsidence impacts on six solid waste disposal sites in PA and WV.
- Assessed potential impact of underground total extraction coal mining on the following: an operating 50-acre natural gas transmission line compressor station complex including mechanical equipment, piping, and buildings; an operating sewage treatment plant including pumps, piping, clarifiers, and holding tanks; a concrete arch railway bridge; and a 300'-high 500kV transmission tower.
- Served as consultant to the mining company, assessing the stability of proposed multiple below-river mine headings to connect the existing mine with a new coal reserve. He was also responsible, as a consultant to the mining company, for geotechnical analysis of the stability of the existing and proposed underground bulkheads subjected to significant head of impounded water in an active underground coal mine.
- Served as geotechnical engineer on a consulting team developing an electronic subsidence warning system for an elementary school in Boonville, Indiana that is underlain by shallow abandoned coal mine workings.
- Responsible for subsidence monitoring of a full extraction panel of an active room and pillar mine, in Philippi, WV, including an in-mine and ground surface instrumentation program, for the U.S. Department of Energy and U.S. Bureau of Mines. He was also responsible for designing and analyzing the stability of outcrop and in-mine barrier pillars under hydrostatic pressure and loadings due to overburden weight and mining in adjacent active mine workings.
- Responsible for the geotechnical issues related to design of a shaft/tunnel lining and shaft plug for a proposed alternate access to coal reserves in the vicinity of an underground mine fire in Greene County, PA.
- Determined the dominant mechanisms of subsidence at 300 sites above the mined Pittsburgh Coalbed and determining site parameters dictating damage severity to structures at 300 deep mined sites for the U.S. Bureau of Mines.
- Evaluated methods to mitigate a residential mine gas problem at locality in PA Northern Anthracite Field. Responsible for preparing specifications for closure of shafts and slopes in anthracite field.
- Evaluated subsidence potential at four power plant sites in eastern PA anthracite region for a confidential Pennsylvania energy company.
- Supervised groundwater monitoring plan development to bring five deep coal mines in PA and WV into compliance with state and federal environmental regulations.
- Determined the feasibility of using geophysical techniques to locate naturally occurring toxic zones in surface mineable coal lands overburden in the Northern Great Plains Coal Province for U.S. Bureau of Mines.
- Responsible for a subsurface exploration at the site of a proposed power plant in Fayette County, PA to assess the potential for subsidence above room and pillar mine workings partially retreat mined decades earlier.
- Served before and during long wall mining as consultant to mining companies for analysis and development of support measures to prevent collapse of two residences in Greene County, PA, and one house in Washington County, PA.
- Evaluated potential for mine fires to develop in abandoned underground mine workings underlying a battery disposal site in Luzerne County, PA.
- Evaluated subsidence potential and made recommendations for suitable building foundation types for commercial structure planned at site underlain by an abandoned underground limestone mine in Kansas City, Missouri.



Shane A. Fisher, PE
Assistant Engineering Manager

Education

BS, Civil Engineering Technology,
Fairmont State University, 2005

Registrations

Professional Engineer (PE): WV [REDACTED],
VA #57536

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.



David A. Weakley II, MS, PE
Engineering Manager

Education

MS, Environmental Engineering,
2009, University of Pittsburgh

BS, Civil and Environmental Engineering,
2007, University of Pittsburgh

Registrations

Professional Engineer (PE): PA
██████████ MD, TX

Skills

Demineralized Water, Industrial
Wastewater, Municipal Water and
Wastewater Treatment Plant Design,
Process Engineering, and Optimization

Industry Experience

GAI Consultants, Inc., 2014-Present

Aquatech International Corporation,
2009-2014

ELGA Process Water (Veolia), 2008

NA Water Systems (Veolia), 2007-2008

Camp Dresser & McKee, 2005-2006

Professional Summary

Mr. Weakley specializes in water and wastewater processes, and treatment plant design and optimization. His professional experience includes water treatment for municipalities (wastewater and drinking water), power generation, oil and gas (production and refining), fertilizer production, petrochemicals, mining, and seawater desalination.

Professional Experience

Industrial Water Treatment

- Lead Process Engineer on Effluent Limit Guidelines (ELG) Compliance Study, Confidential Client, East Coast. Investigated five power stations, and developed individual recommendations, cost estimates, and implementation schedules comply with the ELG regulations for bottom ash handling systems and flue gas desulfurization systems. Project completed within the clients aggressive schedule that required completion in less than three months after project kickoff, while being under budget.
- Lead Process Engineer on a project evaluating different available wastewater treatment technologies to treat Flue Gas Desulfurization wastewater at a confidential coal-fired steam electric power plant focusing on selenium removal. Responsibilities for the project included supporting one onsite piloting effort (reverse osmosis system), coordinating two bench studies with water treatment vendors (ion exchange and electrocoagulation), and evaluating a number of other available technologies (biological, ultrafiltration, evaporative and crystallizer Zero-liquid discharge (ZLD) systems, forward osmosis, and zero valent iron (ZVI) technology).
- Lead process on engineer on a conceptual engineering study evaluating ELG Bottom Ash ZLD for a coal-fired steam electric power plant. Work included direct station, vendor and contractor coordination, data evaluation of the existing site, and developing process modification alternatives and cost estimates to achieve ZLD.
- Responsible for process design engineering for complete system integration and individual unit process equipment specification. Developed mass and water balances, process flow diagrams, piping and instrumentation diagrams, general arrangements, sizing calculations, costing, and provided process improvements for reduced power and chemical consumption and increased reliability.

- Projects consisted of fully customized water treatment plants for industrial processes that included integrated membrane / ZLD thermal systems, produced water, refinery wastewater, demineralized boiler feed water, cooling tower makeup / blowdown, flue gas desulfurization, and seawater desalination / remineralization.
- Analyzed and designed unit processes including clarifiers, thickeners, filter presses, lime-soda softeners, gravity and pressure media filters, activated carbon filters, green sand filters, ultrafiltration, brackish water reverse osmosis (RO), seawater RO, high efficiency RO, electro-deionization, and ion exchange used in softening, demineralization, and polishing.
- Assisted service engineers in maintenance and troubleshooting of clarifiers, RO systems, and ion exchange systems.
- Generated standard operating procedures for industrial water treatment plant equipment including start up, shut down, and routine maintenance for all pumps, filters, ion exchangers, clarifiers, and vapor compressors.

Municipal Wastewater

- Demineralization Upgrade Project, Energy Recovery Facility (ERF) in Allegheny County, Pennsylvania (PA). Lead Technical and Process Engineer for two-year term services contract for on-call engineering and design services to provide for repairs and / or modifications to the ERF. The project includes investigating and evaluating the current demineralizer plant, defining the current design basis for capacity, throughput and water quality, and designing and optimizing the process, mechanical, structural, and electrical engineering components of the new / refurbished system. After the basis of design is finalized and 30 percent, 60 percent, and 90 percent design is complete, bid specifications, bid drawings, cost estimates will be prepared, and bid and construction phase support will be provided, as required by the Owner.
- On-Site Services in Pittsburgh, PA. The work including hydraulic grade line analyses of combined sewers, land surveying of manholes and diversion structures, biological oxygen demand and total suspended solids analyses of influent / effluent flow with respect to rain fall and assisted in planning and balancing the budget for future plant expansion.

Municipal Drinking Water

- Master's Thesis: *The Removal of Manganese in Drinking Water* under direction of Dr. Leonard Casson, PE (University of Pittsburgh) and Dr. Stanley States [Director of Water Quality and Production at the Pittsburgh Water and Sewer Authority (PWSA)].
- Testing of Alternative Methods for the PWSA in Pittsburgh, PA. Completed bench, pilot and full plant-scale experiments testing alternative methods of manganese removal in municipal drinking water plant for the PWSA. Novel technologies such as prefilter hydrogen peroxide and prefilter permanganate oxidation were both tested in bench and pilot scale experiments along with more traditional treatment, prefilter chlorination. Bench-Scale studies utilizing ferric sulfate as a primary coagulant were conducted to determine the degree of manganese contamination compared with use of ferric chloride, PWSA's current coagulant. Prefilter chlorination and the effects on disinfection byproduct formation were also extensively studied.

Affiliations

Society of Petroleum Engineers, Member

Young Professionals in Energy, Member

American Association of Drilling Engineers, Member



Emma N. Wolff, MS, PE
Senior Project Engineer

Education

MS, Civil & Environmental Engineering,
2016, University of Pittsburgh

BS, Civil & Environmental Engineering,
2011, University of Pittsburgh

Registrations

Professional Engineer (PE): PA

Skills

Environmental Engineering

Permitting and Regulatory Compliance

Certifications / Training

Risk Management – GAI Consultants, April
2016

Introduction to Project Management – GAI
Consultants, June 2016

Industry Experience

GAI Consultants, Inc., 2016-2017

Aquatech International Corporation,
2012-2016

University of Pittsburgh, 2011-2012

Groundwater & Environmental Services
Inc. (Internship), 2009

Professional Summary

Ms. Wolff is Senior Project Engineer with five years of engineering experience, specializing in advanced water and wastewater treatment processes. Her professional experience includes engineering system and equipment design, process support, and engineering consulting primarily for the industrial and municipal water/wastewater market sectors. Ms. Wolff has regulatory agency experience pursuant to specific project permitting requirements and regulatory compliance concerns. Additionally, she has worked as an Owner's Engineer preparing conceptual engineering studies, project cost estimates, bid specification packages, providing engineering services during construction and reviewing contractor and engineering submittals.

Select Professional Experience

- Engineering evaluation of an aerator system in a confidential wastewater treatment system treating acid mine seep water. Prepared a summary report detailing design issues and provided alternatives for improving the system.
- Supported an engineering evaluation of four treatment vendor bids for colloidal iron removal in an industrial water treatment effluent at a confidential coal-fired steam electric power plant. Responsible for evaluating the vendor bids and preparing bid evaluation summaries and system recommendation.
- Task Manager conducting a full conceptual engineering study evaluating Effluent Limit Guidelines (ELG) Bottom Ash ZLD for a coal-fired steam electric power plant. Work included direct station, vendor and contractor coordination, data evaluation of the existing site, and developing process modification alternatives and cost estimates to achieve ZLD.
- Task Manager and lead on a project evaluating different available wastewater treatment technologies to treat FGD wastewater at a confidential coal-fired steam electric power plant focusing on selenium removal. Responsibilities for the project included supporting one onsite piloting effort (reverse osmosis system), coordinating two bench studies with water treatment vendors (ion exchange and electrocoagulation), and evaluating a number of other available technologies (biological, ultrafiltration, evaporative and crystallizer ZLD systems, forward osmosis, and zero valent iron (ZVI) technology).

- Supported final efforts on two conceptual studies for coal-fired steam electric power plants which evaluated potential water balance/process modification options to achieve zero liquid discharge (ZLD) for bottom ash transport water and to achieve compliance with new EPA regulations.
- Engineering support for a confidential coal combustion residual (CCR) ash pond closure project. This project was high profile and under considerable oversight from the client. Efforts included preparing draft in-line process and compliance sampling procedures, and making necessary edits to the Draft Operations and Maintenance Manual to reflect onsite operating and process conditions, in addition to client comments, so that the Manual could be finalized. Also preformed QA/QC work focusing on an onsite third party lab (utilizing ICP-MS instruments) and GAI sampling/reporting protocols to identify areas of possible improvement and responsible for coordinating the implementation of corrective measures to improve the procedures.
- Task Manager for the preparation and development of Decision Documents and supported development of detailed statements of work for interim remedial measures of two solid waste management units at a Confidential Chemical Depot. GAI reviewed historic documentation and analytical data dating back to the late 1950s on over 250 individual disposal features, including burn areas, ash mounds, burial pits and trenches, and high explosive craters containing a variety of chemical contaminants. GAI also conducted field reconnaissance and collected geospatial data to approximate quantities of material requiring removal.
- Confidential Energy Center Project, located in Pennsylvania (PA). Performed construction oversight of sewer and water line installation to be documented in as-builts submitted to the Pittsburgh Water and Sewer Authority. GAI is providing Engineering, Permitting, Construction Monitoring, and Scheduling Support for the project.
- Investigated and compared the costs for incorporation of a reverse osmosis (RO) polisher system for existing wastewater treatment system to reduce TDS and chloride concentrations in landfill leachate. Work included generating preliminary RO design projections.
- Engineering design support for an upgrade to a large potable water pump station (20,000 gallons per minute). Role focused on valve design selection, specifications, and vendor coordination.
- Demineralization Upgrade Project, Energy Recovery Facility (ERF), for Allegheny County Sanitary Authority (ALCOSAN), in Pittsburgh, PA. Engineering support and design of a new demineralizer plant, which included defining the current design basis for capacity, throughput and water quality, and designing and optimizing the process, mechanical, structural, and electrical engineering components of the new system. Assisted with project cost estimates, the 90% design basis, the preparation of 100% Design Drawings and Bid Package, and supporting the Owner during the Bid Addenda process. Assistant Engineering Manager for engineering services during construction for the Demineralization Upgrade Project, ERF, for ALCOSAN, in Pittsburgh, PA. Coordinating with the Owner, project Construction Manager, and the GAI engineering design team on efforts including shop drawing and contractor submittal reviews, responding to requests for information and change order requests, and attending pre-installation and contractor progress meetings as the Owner's engineering representative. Project scope also includes the coordination of the final wiring diagrams, site visits during construction, review of final record drawings and operation and maintenance (O&M) manuals, and startup and training assistance. Actively monitoring the overall project budget and the individual task assignments and budgets.
- Engineering support for a full conceptual engineering study evaluating and intergrating ELG Bottom Ash ZLD, and CCR Compliance for a coal-fired steam electric power plant. Led efforts on ELG compliance aspects of the project, including direct station coordination, data evaluation of the existing site, and developing process modification alternatives and cost estimate to achieve ZLD.
- Provided engineering support and onsite sampling oversight for the startup and commissioning of membrane filtration systems (MFS) at two coal-fired steam electric power plants on their flue gas desulfurization (FGD) wastewater treatment systems.



Jason R. Truckenbrod, PE
Senior Engineering Manager

Education

BS, Civil Engineering, University of Buffalo

Registrations

Professional Engineer (PE): PA, OH, WV,
VA, IN, MD

Skills

Structural Engineering Design and Analysis

Foundation Engineering Analysis and
Design

Certifications / Training

GAI Advanced Project Management
Training, 2011

ASFE Project Manager Training: 2004,
2005, 2006

PennDOT CMTW Construction
Management Training, February 2003

Industry Experience

GAI Consultants, Inc., 2010-Present

Civil & Environmental Consultants, Inc.,
2004-2010

M.A. Beech Corporation/Beech
Construction, 2002-2004

Eichleay Engineers, Inc., 1995-2002

Tredo Engineers, 1992-1995

Publications

"Winfall to Trowbridge Transmission Line
Foundation Design" ASCE-SEI Electric
Transmission and Substation Structures
Conference Proceedings, 2015

Professional Summary

Mr. Truckenbrod specializes in project management and design for industrial, commercial, and electric and gas utility projects. Mr. Truckenbrod manages multi-disciplined design-engineering projects and supervises a staff of structural engineers and drafting personnel. He is focused on client satisfaction, financial management and technically sound design. His experience includes the complete structural design of complex projects, from the selection of structural systems and definition of design criteria to the preparation of detailed calculations, specifications, and construction drawings. Additional experience includes structural assessments, forensic evaluations, building demolitions, bridge and highway projects, and construction administration. He has a working knowledge of the latest design manuals for steel, concrete, masonry, and timber, as well as the International Building Code.

Professional Experience

- Acid Mine Drainage Treatment Project, PA. Senior Engineering Manager responsible for the design of the water containment structures, the plant Control Building, support framing for the pipes and open troughs that convey water and chemicals throughout the plant, support framing for the elevated access platform, and mat foundations for the pumps, pre-fabricated storage tanks and a silo.
- Outlet Riser Structure for Ash Filter Pond, PA. Engineering Manager responsible for the design of three new riser structures comprised of reinforced concrete walls, slabs, and shallow mat foundations. The outlet structures are tied into the HDPE pond liners and 18-inch diameter HDPE outlet pipes.
- Gypsum Pond Sump, PA. Project Engineer responsible for the design of a 25,000 square foot concrete sump for the collection and treatment of stormwater runoff. The design included the reinforced concrete slab and walls as well as rack anchors attached to the base slab designed to resist hydrostatic uplift forces from groundwater.
- Foundation and Structural Platform Modifications, PA. Engineering Manager responsible for the foundation design for two new tanks (acid and caustic) within the existing water treatment facility. The project also included the modification of the building and mezzanine walkway steel framing, in order to provide space for installation and operation of the new tanks.

- Cross-Creek Dam Sluice Gate Replacement, PA. Engineer responsible for the design and specification for a new sluice gate to replace the existing gate. The project included removal of the existing sluice gate, inspection of the thimble and installation of the new gate. A new valve stem was also installed.
- Power Generating Station, Maryland (MD). Project Manager and engineer responsible for the design for building foundations for new 3,000 sf, one-story, waste-water treatment building. Foundations consisted of drilled piers, grade-beams and a structural floor slab, which supported the building columns and process equipment. Project also included preparation of life-safety code analysis for permitting.
- Power Generating Station, MD. Project Manager and engineer responsible for the design for building foundations for new 3,200 sf, one-story, waste-water treatment building. Foundations were shallow spread footings which supported the building columns and process equipment. Project also included preparation of life-safety code analysis for permitting.
- Dam Intake Structure Assessment – Project Manager responsible for the structural assessment of the existing intake structure at the Dam. The results from the visual assessment were documented in an assessment report, which included photographs and a summary of the observed distress.
- Stack Testing Platform Design, PA. Project Manager and Engineer responsible for the design for six new steel platforms, which are mounted to existing steel exhaust stacks. The project included the analysis for the existing stacks to verify that the stacks have adequate strength to support the new platforms. The client provided 3D digital scans (point clouds) for the existing stacks and GAI utilized the digital scan to verify existing dimensions and clearances.
- Waste Transfer Facility, OH. Project Manager/Engineer, responsible for the design of spread footing foundations, retaining walls, anchorages of columns to foundations, high strength concrete slab using silica fume, and concrete push walls for 25,300 sf pre-engineered metal recycling transfer building. Designed spread footing foundations, anchorage of columns to foundations, concrete slab, and second floor steel framing for 13,300 sf pre-engineered metal maintenance building.
- Nuclear Remediation Project, PA. Project Manager/Engineer, responsible for the analysis of existing nuclear facility and provided consultation on the removal and modification of structural members in the nuclear facility for the remediation of a contaminated nuclear facility in support our client in litigation.
- Confidential Dam Project, PA. Engineer responsible for the design of two new concrete spillway structures at the existing lake. The new spillways were designed to replace the existing deteriorated spillways and included two cast-in-place concrete spillway towers and steel framed pedestrian bridges, as well as pre-cast concrete spillway pipes.
- Dam Rehabilitation, PA. Project Engineer responsible for the assessment and rehabilitation design of the structural components of the existing earthen dam. Items included in the structural rehabilitation included the reinforced concrete gatehouse, steel beam pedestrian bridge from the embankment to the gatehouse, and the concrete spillway. The spillway modifications included additional reinforced concrete retaining walls and 2,000 sf of new spillway slab to extend the existing spillway.
- Confidential Dam Spillway Design, Indiana. Engineer responsible for the design of a new spillway to replace the existing primary spillway, and also for the rehabilitation of the secondary spillway at the outfall of a local Lake. The primary spillway design included six sluice gates, which were mounted to a steel-framed pedestrian bridge, which spanned across the spillway. Rehabilitation included concrete spall repairs and replacement of the sluice gate at the secondary spillway.
- Condition Assessment Existing Dam Spillway, West Virginia (WV). Engineer responsible for the condition assessment of an existing concrete tower spillway at the existing impoundment within the power plant. The assessment included a camera survey for the 300-foot long spillway pipe as well as an under-water survey of the exterior of the spillway tower. The interior of the tower was inspected by lowering a camera down the inside of the tower. Prepared a condition assessment report which was submitted by the Owner to the DEP



Abby L. Miser, PE
Project Engineer

Education

BS, Civil Engineering, Structural
Concentration, 2007, Calvin College

Registrations

Professional Engineer (PE): PA
[REDACTED]

Skills

Civil Engineering

Structural Engineering Design and Analysis

Foundation Engineering Analysis and
Design

Retaining Wall Systems Design

Concrete Sampling and Testing

Certifications / Training

Nuclear Density Gauges, Soil Compaction
Certification

Industry Experience

GAI Consultants, Inc., 2011-Present

Westinghouse Electric Co., 2009-2011

BKBM Engineers, 2007-2009

Professional Summary

Ms. Miser specializes in civil and structural engineering including the design of foundations, retaining walls, tanks, slabs, and beams. She is experienced in structural analysis and design, structural condition assessments, rehabilitation design, transportation design and transmission line rebuilds.

Ms. Miser is certified in the use of nuclear density gauges to test soil compaction. She has conducted on-site testing of soil and concrete, and inspected rebar in footings and walls prior to concrete placement. She also has performed lab work including testing of concrete cylinders, soils, bituminous, and fireproofing materials. She is experienced with construction administration work including coordinating site activities with the contractors, responding to RFI's and submittals and reviewing project schedule and costs.

Ms. Miser's computer design software experience includes RISA 3-D, STAAD, GT Strudl, ANSYS, RAM Structural System, MathCAD, AutoCAD, TEDDS, and REVIT. She is familiar with industry codes including AISC 13th Edition, ASCE 07-10, ACI 318-10, ACI 530-05, IBC 2009, AASHTO, and ASME III NF Boiler and Pressure Vessel code.

Select Professional Experience

- Power Station Pipe Repairs in Harrison County, WV. Performed structural condition assessment on a coal-handling tunnel. Used an ultrasonic thickness gauge to take steel thickness measurements and provided recommendations for repair.
- Rehabilitation of Wastewater Lines for a Power Station in Haywood, WV. Performed engineering study to assess the conditions of two existing wastewater pipelines built in 1971, and develop recommendations for repair.
- Cresson Acid Mine Drainage Treatment Project in Cambria County, PA for PA Department of Environmental Protection, Bureau of Abandoned Mine Reclamation. Project Engineer. GAI's Structural Engineering Group was responsible for the design of the water containment structures, the plant Control Building, support framing for the pipes and open troughs that convey water and chemicals throughout the plant, support framing for the elevated access platform, and mat foundations for the pumps, pre-fabricated storage tanks and a silo.

- Flue-gas desulfurization & Gypsum Pond and Haul Road Pond Reconstruction, Confidential Power Station, Western PA. Design Engineer for concrete wastewater tanks. Designed rock anchor system to prevent tank buoyancy. Coordinated drafting efforts and prepared all specifications. Prepared budgetary costs.
- Outlet Riser Structure for Ash Filter Pond located in Shelocta, PA. Project Engineer responsible for the analysis and design of three new riser structures comprised of reinforced concrete walls, slabs, and shallow mat foundations. Coordinated drafting efforts.
- Design Engineer for concrete drop boxes for storm water collection concrete riser structure for leachate pond located in Wise County, VA. Coordinated drafting and wrote specifications.
- Ghent Pump Stations for Kentucky Utilities. Design Engineer for composite culvert bridge at landfill site. Prepared drawings and specifications.
- Monongahela River Crossing Retaining Wall, Washington County, PA. Analysis and design of sheet pile retaining wall system. Design included two rows of rock anchors and details for end connections. Coordinated drafting efforts and wrote specifications.
- West Liberty University, West Liberty, West Virginia (WV) for PWWG Architects. Design Engineer responsible for performing analysis and design of soldier pile and lagging wall.
- Intake Structure Modifications for a Confidential Client located in Nevada. Structural Engineer. Assisted our client in the evaluation of options to extend intake piping approximately 80 feet further into this Confidential Nevada Lake. GAI conducted a site visit to make observations and take photographs of the existing intake facility and developed cost estimates based on preliminary structural and geotechnical calculations; provided evaluation of existing equipment and selection of new pumps, piping, and appurtenances; and performed analysis of existing structure and development of extension options; and analysis of existing conditions, including existing foundations and modifications to allow for structure extension.
- Bradford Dam No. 2 Rehabilitation, Bradford Water Authority, Bradford, PA. Project Engineer assisting on the assessment and rehabilitation design of the structural components of the existing earthen dam. Items included in the structural rehabilitation included the reinforced concrete gatehouse, steel beam pedestrian bridge from the embankment to the gatehouse, and the concrete spillway. The spillway modifications included additional reinforced concrete retaining walls and 2,000 square feet of new spillway slab to extend the existing spillway. Prepared construction drawing and specifications. Coordinated all construction administration activities.
- Piney Creek Dam Penstock Inspection in Clarion, PA. Performed structural condition assessment on the three penstock pipes of the dam. Performed visual inspection and used ultrasonic thickness gauge to take steel thickness measurements. Provided report of findings.
- Tamarack Lake Dam A and Dam B, Pennsylvania (PA) Department of General Services (PADGS), Bureau of Engineering and Architecture, Crawford County, PA. Project Engineer for a 1,000-acre flood control lake located near Meadville, PA. There are two high hazard dams associated with this lake. GAI is currently working the PADGS and the PA Fish and Boat Commission to redesign the dams, concrete risers, outfall structures, auxiliary spillways, diversion dam, and saddle dike. Project Engineer assisting in structural design of two concrete riser structures and two pedestrian bridges that extend from each dam crest to riser structure. Designed concrete box culvert that extend from riser structure, through the dam and to an outfall area. Prepared construction drawings and specifications.

Affiliations

American Institute of Steel Construction

American Concrete Institute



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 (WVDOT). 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
VA – 2014

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.



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 Ohi Dam, located in Clinton County, PA, for the City of Lockhaven. Senior Geologist for the development and engineering technical specifications and plans for the foundation grouting of the embankment and spillway areas.



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.



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 transportation 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.



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 rock 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.



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 Designer.
- 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



**GAI ABANDONED MINE LANDS PROJECTS
WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION**

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

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: 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: 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: 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: 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: **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: **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: 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: 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



> 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



gai consultants

Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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.

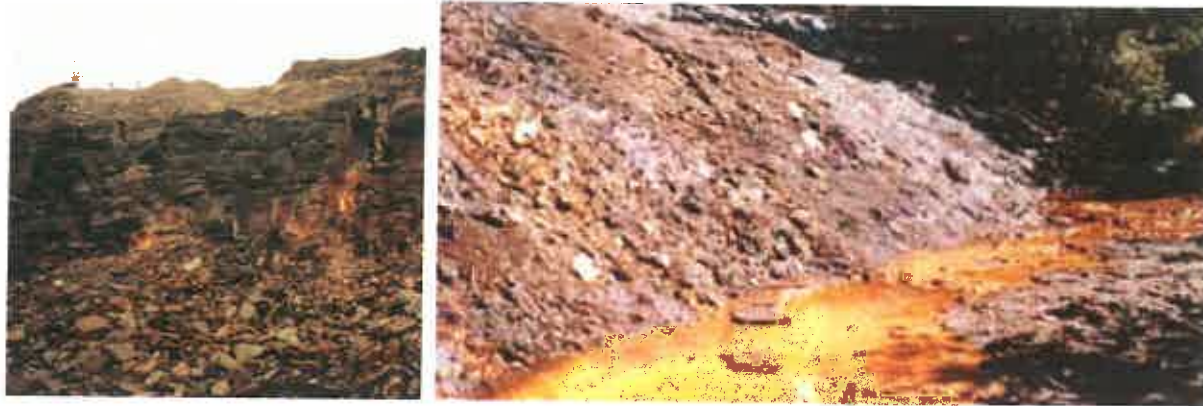
GAI is uniquely qualified to address any aspect of mine fire diagnosis and control. Our team of mine fire specialists and technical support staff design controls for fires in active and abandoned underground mines and refuse banks in the U.S. and around the world.

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



Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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



Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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.



Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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.

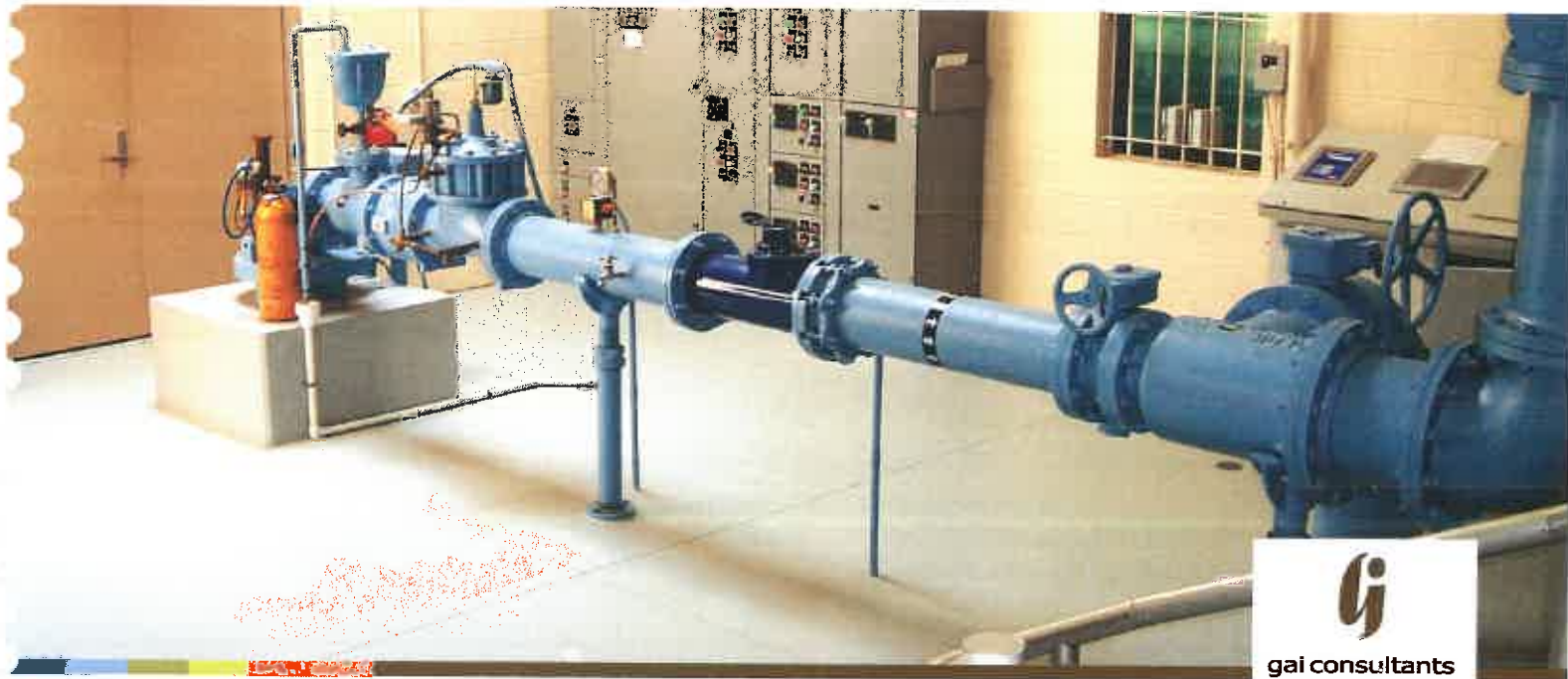
Our experienced hydrogeologists routinely perform statistical analyses to define background water quality and evaluate potential impacts at downgradient points of compliance.

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 defensible groundwater quality data.



Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

Structural Engineering

Since 1958, GAI Consultants has been utilizing advanced technology in applied structural engineering and mechanics to solve complex structural engineering problems and address analysis and design projects.

GAI has built a solid reputation for providing outstanding engineering and project management services to our clients; always available, responsive and innovative.

GAI's structural engineering staff utilizes their knowledge, experience, understanding of structural engineering and the latest codes and standards in their structural engineering practice. We are committed to providing proactive project management on every project.

GAI specializes in structural design for commercial, industrial, and municipal buildings and process structures, as well as existing structure evaluations and rehabilitation assessments. We are versed in various project delivery approaches, including

Design-Bid-Build, Construction Management at Risk, Design - Build and Open Book (time and material).

GAI's structural engineering expertise encompasses design and analysis of a variety of unique specialty structures which include heavy industry support structures and foundations, steel and concrete storage tanks and process structures, spillway and dam structural support, metal structural design and fabrication support for steel stacks, rigging and safety equipment, walkways and service platforms. GAI's professionals identify and evaluate structural deterioration causes and develop remediation measures that solve space, capacity, and performance issues. We tailor structural assessments to each client's specific needs and provide alternative solutions with safety, economic, operational, and environmental considerations. Our structural engineering services are enhanced by our access to GAI's in structural, civil, geotechnical, mechanical, electrical, and transportation expertise.



Service Profile



Structural Engineering Services

- Building structure and foundation analysis and design
- Existing structure investigations for current condition, rehabilitation, and capacity
- Construction phase structural engineering services, including construction monitoring.
- Soil-structure interaction studies
- Structural reliability studies
- Vibration and seismic analyses
- Heavy lift rigging consultation
- Fatigue analysis
- Noise and vibration problem design mitigation
- Theoretical and experimental stress analyses
- Analysis and simulation software development
- Load and stress determinations
- Instrument and on-site testing
- Failure investigations
- Catastrophic damage inspections and design
- Visual inspections
- Detailed deficiencies documentation
- Rehabilitation design
- Remedial measures analysis and design
- Engineer's construction estimates
- Life-cycle costing
- Underwater and tall structure inspection
- Hazardous waste site structural inspections
- Construction monitoring
- Materials and non-destructive testing
- Peer review of design by others
- Expert witness

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> Water and Wastewater Engineering

GAI Consultants knows the present and future challenges facing water, wastewater, reclaimed water, and storm water utilities. Providing a unique blend of water and wastewater engineering and consulting services to both public and private clients throughout the United States, our seasoned licensed professionals deliver solutions that work.

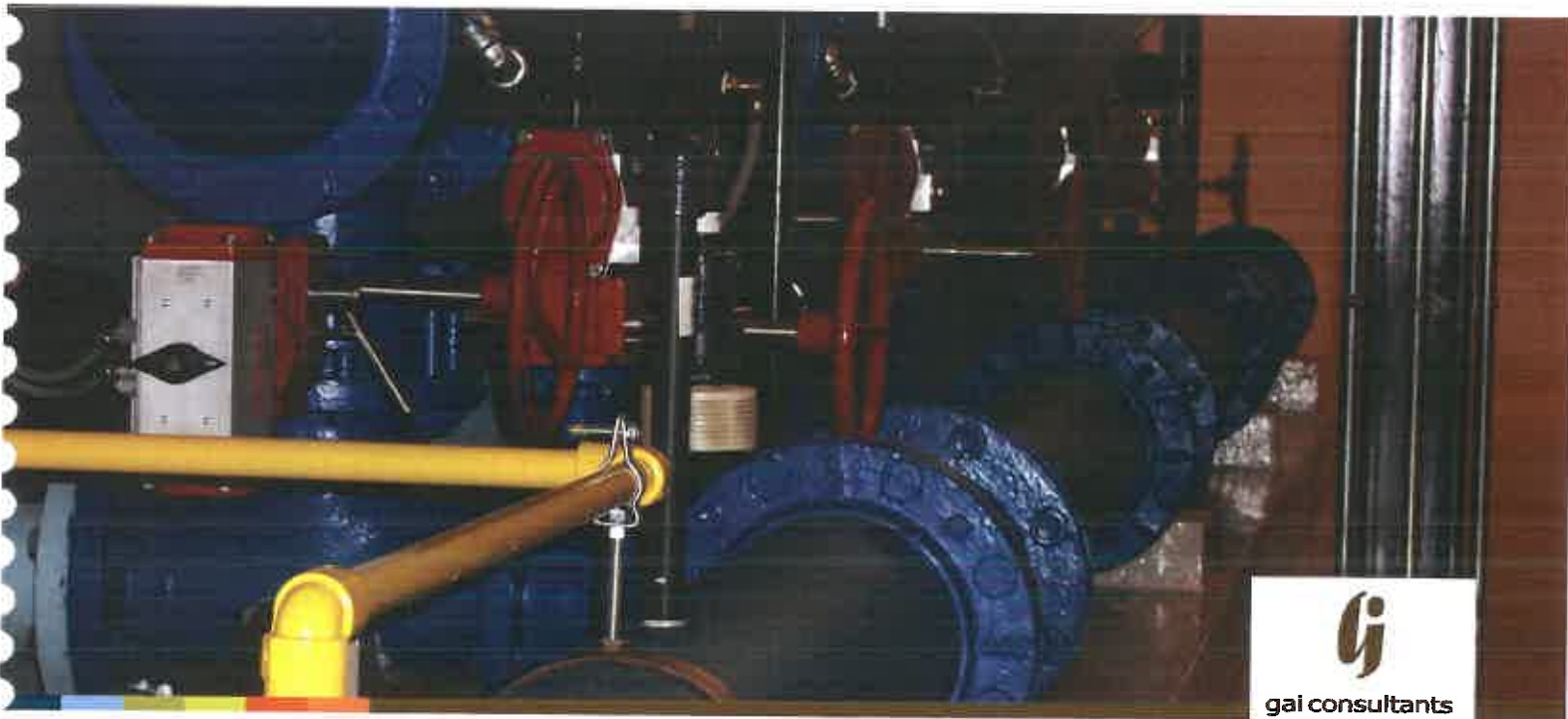
Intricate industry knowledge and proven skills in water engineering mean utilities and their customers benefit from innovative and practical solutions.

Dedicated to helping communities, utilities, and private developers identify and maximize water supplies, GAI delivers water and wastewater solutions that incorporate options for groundwater, surface water, and potential purchase from nearby communities. We use advanced hydraulic software models to find practical, low cost answers, and our modeling, resource optimization, and permit negotiation strategies guide clients seamlessly

through the consumptive use permitting process. GAI's innovative and creative designs for water infrastructure include raw water intakes and piping, ground wells, and treatment and storage facilities.

To help protect and preserve the environment, GAI designs wastewater infrastructure—collection pipelines, pump stations, force mains, treatment facilities—that produce high quality effluent for reuse and nutrient removal. Reclaiming “used” water is essential to using existing water supplies efficiently. GAI's services for water reuse promote the most versatile use, storage, and transmission options. We take care of public, commercial, and agricultural application site permitting and work with utilities and developers to foster agreements for sharing reuse water resources.

As a standard, GAI's engineers work closely with water clients to select processes that best meet their objectives and resources. Our planning strategies involve advanced hydraulic and process engineering models that optimize future facilities, and scheduling that moves projects forward. And



Service Profile



GAI's construction inspectors have many years of hands-on experience working in wastewater facilities.

Water and wastewater utility system projects for capacity expansion or acquisitions that have significant capital needs are often funded with revenue bonds. The terms of the bonds are a function of market conditions and the financial feasibility of the project. GAI prepares written documentation to demonstrate financial feasibility, presents to rating agencies and bond insurers, and assists utilities in securing good

credit ratings, obtaining low-cost bond insurance, and getting the best possible financing terms.

GAI guides utilities on permitting, operations, capital upgrades, and modernizing existing infrastructure. Our water specialists help define and plan for the future through master planning that addresses water, wastewater, and storm water. With limited water resources available, GAI's value lies in our ability to help clients plan for future growth and determine the optimal use of existing water supplies.

Water and Wastewater Engineering Services

- Plant evaluation and operation optimization
- Project procurement strategies
- Capital project planning
- Pilot studies
- System valuation and financing
- Rate and cost of service studies
- Feasibility, financial and capacity analysis reports
- Proposal and grant preparation
- Facility siting
- Permitting assistance
- Raw water intake studies and piping design
- Water treatment facility and ground well design
- Water transport and storage design
- Wastewater collection, treatment, disposal design
- Membrane softening system design
- Reverse osmosis system design
- Effluent disposal and reuse facilities design
- Project start-up

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

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



Service Profile



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

GAI Services Summary

- ▣ Airport Planning and Design
- ▣ Bridge and Structure Inspection and Design
- ▣ Coal Combustion Residuals Management
- ▣ Construction Inspection and Management
- ▣ Cultural Resources Management
- ▣ Economic Analyses and Strategies
- ▣ Electric Transmission Design and Siting
- ▣ Environmental Engineering
- ▣ Environmental Studies, Species Studies, Permitting
- ▣ Gas Pipeline Surveying and Mapping
- ▣ Geographic Information Systems (GIS)
- ▣ Geotechnical Engineering and Geology
- ▣ Impoundment and Landfill Permitting and Design
- ▣ Land Development Engineering
- ▣ Landscape Architecture and Design
- ▣ Master Planning and Urban Design
- ▣ Mechanical, Electrical, Structural Engineering
- ▣ Natural Gas FERC Certification and Permitting
- ▣ Nuclear Energy Engineering Support
- ▣ Right of Way and Appraisal Support
- ▣ Land Surveying and Mapping
- ▣ Transportation Planning and Design
- ▣ Utility Management Consulting
- ▣ Water, Stormwater, Wastewater Management

> 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



Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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.



gai consultants

Service Profile



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 (FWCC) 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

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

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.



Service Profile



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

GAI Services Summary

- ▣ Airport Planning and Design
- ▣ Bridge and Structure Inspection and Design
- ▣ Coal Combustion Residuals Management
- ▣ Construction Inspection and Management
- ▣ Cultural Resources Management
- ▣ Economic Analyses and Strategies
- ▣ Electric Transmission Design and Siting
- ▣ Environmental Engineering
- ▣ Environmental Studies, Species Studies, Permitting
- ▣ Gas Pipeline Surveying and Mapping
- ▣ Geographic Information Systems (GIS)
- ▣ Geotechnical Engineering and Geology
- ▣ Impoundment and Landfill Permitting and Design
- ▣ Land Development Engineering
- ▣ Landscape Architecture and Design
- ▣ Master Planning and Urban Design
- ▣ Mechanical, Electrical, Structural Engineering
- ▣ Natural Gas FERC Certification and Permitting
- ▣ Nuclear Energy Engineering Support
- ▣ Right of Way and Appraisal Support
- ▣ Land Surveying and Mapping
- ▣ Transportation Planning and Design
- ▣ Utility Management Consulting
- ▣ Water, Stormwater, Wastewater Management

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



gai consultants

Service Profile



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

GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

> 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



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

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

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

R. Michael Shepp, P.S., Chairman

James T. Rayburn, P.S., Member

2018



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

Sefton R. Stewart, P.S., Member

Douglas C. McElwee, Esq., Public Member