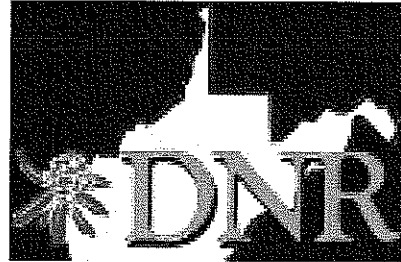


**Expression of Interest for
Professional Engineering Services**

To The

West Virginia



Division of Natural Resources

For The

Engineering Study of DNR Fish Hatcheries

RFQ Number DNR90076

Submitted to:

Division of Natural Resources

Procurement Office

Capitol Complex

Building 3, Room 630

Charleston, WV 25305

304-558-3397

January 8, 2008



Stantec

1206 Virginia Street, East Suite 200 Charleston West Virginia 25301



Stantec Consulting Services Inc.
1206 Virginia Street East Suite 200
Charleston WV 25301
Tel: (304) 345-7140
Fax: (304) 345-0887

Stantec

January 8, 2008

Division of Natural Resources
Procurement Office
Capitol Complex
Building 3, Room 630
Charleston, West Virginia 25305

Re: Engineering Study of DNR Fish Hatcheries
RFQ Number 90076

Dear Selection Committee:

Please find attached one (1) original plus three (3) convenience copies of our Expression of Interest for the above referenced project.

R. D. Zande and Associates has recently joined Stantec Consulting Services. Stantec is a full service, multidiscipline engineering firm with offices throughout North America. Zande's two offices in West Virginia will continue to operate as before and we are excited about our new capabilities.

The West Virginia Division of Natural Resources, Wildlife Resources Section, is seeking qualified engineering firms to provide a study to determine how annual trout production can be increased from 750,000 pounds to 1,000,000 pounds. For this project, Stantec has selected Fisheries Technology Associates, Inc. (FTAI) of Fort Collins, Colorado, as our sub-consultant. As you will see in the Expression of Interest, FTAI is very experienced in all areas of aquaculture and fisheries science. Stantec, from our offices in Charleston and Buckhannon, will provide all surveying, engineering design, construction management and material testing as well as assisting FTAI with the field visits. We feel this combination of talents will provide the best solution to the WV DNR along with the best value.

The West Virginia offices of Stantec have been providing quality engineering and surveying services to various West Virginia state agencies for years under the name R.D. Zande and are looking forward to providing the high level of product now that we are Stantec. We have provided surveying, engineering design, construction management and material testing on many projects for the Division of Highways even winning Engineering Excellence Awards for Construction Inspection in 2004 and 2005.

Stantec

Fisheries Technology Associates Inc., have been providing quality aquaculture and fish farming services for over 20 years. They have completed numerous studies similar to the study proposed by the DNR.

As you will see in our Expression of Interest, the team of Stantec and Fisheries Technology Associates Inc. is a perfect combination for this project.

The Charleston Office of Stantec, located minutes away from the Main Offices of the Division of Natural Resources, will be your one point of contact for this project. We will then coordinate field work with our Buckhannon office which is centrally located to the hatcheries to provide a cost effective work plan for your project.

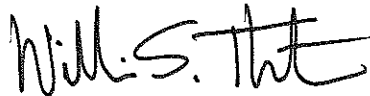
We are very excited about the opportunity to continue our working relationship with the State of West Virginia and look forward to providing engineering services on this most important Project. We believe no other company can meet our quality of work, which coupled with our experience allows us to be more efficient and therefore very cost competitive.

If you have any questions or comments regarding this submittal, please contact me at your earliest convenience.

Respectfully Submitted,

Stantec

(formerly R.D. Zande & Associates, Inc.)



William S. Thornton, P.E., P.S.
Manager, Charleston WV Office

**Expression of Interest for
Professional Engineering Services**

**To The
West Virginia
Division of Natural Resources**



**For The
Engineering Study of DNR Fish Hatcheries
RFQ Number DNR90076**

**Submitted to:
Division of Natural Resources
Procurement Office
Capitol Complex
Building 3, Room 630
Charleston, WV 25305
304-558-3397**

January 8, 2008



Stantec

1206 Virginia Street, East Suite 200 Charleston West Virginia 25301

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Section 1 – Stantec Company Profile and Areas of Expertise

Stantec

One Team. Infinite Solutions.

Stantec, founded in 1954, provides professional design and consulting services in planning, engineering, architecture, surveying, economics, and project management. Continually striving to balance economic, environmental, and social responsibilities, we are recognized as a world-class leader and innovator in the delivery of sustainable solutions. We support public and private sector clients in a diverse range of markets in the infrastructure and facilities sector at every stage, from initial concept and financial feasibility to project completion and beyond.

In simple terms, the world of Stantec is the water we drink, the roadways we travel, the buildings we visit, the industries in which we work, and the neighborhoods we call home.

Our services are offered through over 8,000 employees operating out of more than 100 locations in North America. Stantec trades on the TSX under the symbol STN and on the NYSE under the symbol SXC.

Company History in WV— RD Zande to Stantec

R.D. Zande & Associates was established in 1968 in Columbus, Ohio. Functionally organized in five departments – Environmental, Transportation/Structural, Land Planning/Development, Surveying, and Construction Services – the firm provides engineering, planning, and consulting services to both the public and private sectors.

In 1991, the firm acquired Donald E. Garrod, Inc., a professional services firm well known in Cincinnati for its 35 years of excellence. After operating in Cincinnati under the name Zande-Garrod, Inc. for four years, the Columbus and Cincinnati offices merged and now operate under a single name.

The firm's analytical laboratory, Zande Environmental Service, Inc., was founded in 1988 to allow the firm's to provide single-source services for environmental quality monitoring, testing, assessment and remediation projects. This Ohio EPA certified laboratory is staffed with scientists, chemists and skilled laboratory technicians certified to perform work in Ohio, West Virginia, Kentucky and Indiana.

In 1997 we opened an office in St. Albans, West Virginia to better assist our West Virginia clients. In order to better serve our clients in the Charleston region, the St. Albans office recently relocated to Charleston. Our West Virginia services were then further expanded by the acquisition of Miller Technical Services in 1999. Now doing business as R.D. Zande & Associates, this office, located in Buckhannon, West Virginia, offers a full range of the company's services across the state of West Virginia.

In 2000, the firm entered northwest Ohio with the establishment of our Toledo office, and southeast Ohio with the establishment of our Logan office. In 2001 the firm acquired the firm of Jon Guerry Taylor, P.E., Inc. in South Carolina. This firm is now doing business as Zande-Jon Guerry Taylor, P.E., Inc. providing marina and coastal engineering.

In 2004, the firm entered the Kentucky market with the establishment of an office in Louisville, Kentucky. Later that same year, the firm acquired Reveille, Ltd, a northwestern Ohio firm providing comprehensive planning and GIS services to communities across the state.

In late 2006, the firm acquired GMS Surveying & Engineering. This acquisition led to establishing an office in Youngstown, Ohio, which is managed by Patrick Ginnetti, P.S., E.I.

In December 2007, R.D. Zande and Associates entered into an agreement to become a part of Stantec. This deal, completed in early January 2008, allows clients of Zande to enjoy the benefits of increased capabilities and specialized expertise. The same familiar faces will conduct business in the same manner with our existing and new clients.

Transportation/Structural Engineering

Our Transportation/Structural Engineering Department is divided into five independent, yet interlocked divisions; Roadway Engineering, Structural Engineering, Traffic Planning/ Engineering, Airport Engineering, and Land Acquisition. Our professionals are familiar with the requirements and restrictions of not only state agencies, but also of numerous municipalities. Services provided include:

Structural

- Bridge Inspection and Design
- Dams and Retaining Walls
- Culverts and Tunnels
- Parking Garages
- Aircraft Hangars
- Pre-engineered Buildings
- Drainage Structures
- Building Condition Surveys
- Erection Plans
- Demolition Plans
- Shop Drawing Review
- Storage Tanks

Roadway

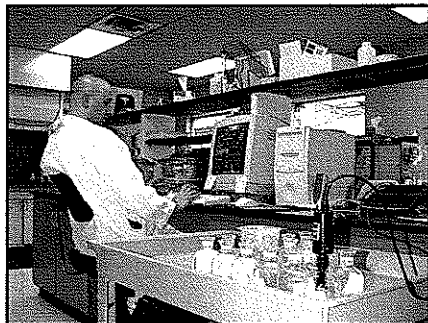
- Highway and Street Improvements
- Intersection, Interchanges, and Ramp Studies
- Pavement Analysis and Design
- Bikeway Studies and Design

Traffic Planning/Engineering

- Transportation Plans
- Corridor Studies and Circulation Plans
- Environmental Impact Statements
- Traffic Impact Assessments

Land Acquisition

- Title Research
- Appraisal Waiver
- Appraisal Preparation
- Acquisition
- Closing and Instrument Recording
- Relocation
- Project Management



ANALYTICAL LABORATORY SERVICES

The firm's analytical laboratory, Zande Environmental Service, Inc., was founded in 1988 to expand the firm's ability to provide single-source services to our clients for environmental quality monitoring, testing, assessment, and remediation projects. Our analytical chemists and technicians are certified by the States of Ohio, Indiana, Kentucky, and West Virginia for multiple analytical procedures. Our laboratory is certified by the Ohio EPA to perform analysis under the Voluntary Action Program.

Drinking Water Analyses

Bacteriology
Inorganics
Metals
Organics

Microbiological Testing

Fecal Coliform
Fecal Streptococcus
Total Plate Count
Total Coliform

Solid/Hazardous Waste Analysis

Toxicity Characteristic (TCLP)
Flash Point/Ignitability
Reactivity
Corrosivity
Paint Filter
PCBs

Industrial Hygiene

Asbestos Fibers & Bulk
Asbestos
Metals
Organics

Wastewater Analyses

NPDES Permit Compliance
Monitoring
Inorganic and Organic
Characterization
Sludge Analysis
Inorganics
Metals
Low Level Mercury
Organics

Groundwater Monitoring

Subtitle D, Appendix I and II
Appendix IX
Priority Pollutants
Target Compounds and Target
Analyte Lists

Voluntary Action Program (VAP)

Inorganics
Metals
Organics



SURVEY DEPARTMENT

Our well-staffed Survey Department is positioned to respond quickly to provide surveying services on short notice. Our professionals are aware that the design of a site, structure, or facility can be no better than the accuracy of the initial data collected. Therefore, it is of major importance to us that we deliver accurate, thorough, and comprehensive information. This department is comprised of registered professionals and technical personnel skilled in all aspects of surveying. Our professionals are supported by state-of-the-art equipment. Additionally, we have the full capability of integrating GPS with our GIS division.

R.D. Zande has recently made a substantial investment in Robotic survey equipment. This state-of-the-art equipment increases field productivity by allowing us to move from a 3-man crew to a 2-man, and sometimes 1-man crew. Robotic survey equipment is ideal for both survey and stakeout work. Our services include:

- ALTA/ACSM
- Boundary and Topographic
- Zoning and Annexations
- Record Plats
- Plot Plans
- Mortgage Surveys
- Foundation Surveys
- FEMA Elevation Certificates
- House Staking
- Construction Staking
- GPS/GIS



CONSTRUCTION SERVICES DEPARTMENT

The final element of a successfully completed project is the construction phase. Our Construction Services Department can work as the client's agent to ensure this complex phase contributes to the successful completion of the project and the satisfaction of the client.

Our professionals can observe the construction for compliance with contract requirements and review contract pay requests with the contractor's field superintendents, recommending all compliant work for acceptance and payment. During construction, we conduct regular progress meetings to address issues and identify problems, working with all parties to quickly clear up questions and keep the work on schedule.

R.D. Zande's Construction Services Department has provided services to projects as small as \$20,000 and as large as \$60 million. We maintain a full-time staff of construction services personnel. This staff can be, and often is, supplemented with additional personnel on an as-needed basis. The department also has personnel certified as plans examiners, building inspectors, and electrical safety inspectors, augmented with contractual inspectors.

In addition, R.D. Zande provides Clerk of the Works (COTW) services for numerous clients. Our most recent COTW project was for the St. Joseph Hospital in Buckhannon, West Virginia. This project included an addition to the existing hospital as well as renovations to the existing hospital valued at \$6,500,000.00. What is significant about this project is that due to R.D. Zande's diligence, the cost overruns and change orders were kept to less than 3.25% of the overall budget.

Our construction services provide reasonable assurance the project is constructed in conformance with the intent of the applicable plans and specifications. These services generally include:

- Maintenance of project schedule
- Coordination of inspections
- Confined space entry
- Mitigation of construction disputes
- Pay request review and approval
- Measurements
- Prepare force account statements
- Daily records of work progress
- Verification of installed materials
- Maintain field drawings

Section 2 – Recent Relevant Experience

Client:

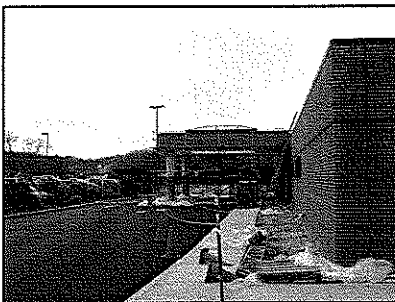
St. Joseph's Hospital of
Buckhannon, West Virginia

Project Cost:

\$6,500,000.00

Key Elements:

- Clerk of the Work Services
- Permitting
- Surveying
- Contract Administration
- Construction Observation
- Processing of Pay Estimates
- Processing of Change Orders
- Attending of State and Local Inspection Meetings for



St. Joseph's Hospital of Buckhannon Building Additions and Renovations Clerk of the Works Services Buckhannon, West Virginia

RDZ's position as the Clerk of the Works (Clerk) has been to become a key member of St. Joseph's Hospital's team. RDZ's Clerk continued to serve as the on-site representative during this 28-month renovation project that began in March 2005 and ended in April 2007. RDZ's Clerk has a detailed understanding of all aspects of construction, although technical skill in any one particular construction trade has not been necessary. RDZ's Clerk has maintained a holistic view (i.e. a view that is concerned with the overall project and not the individual parts) of the project, while appreciating the details of various parts of the work.

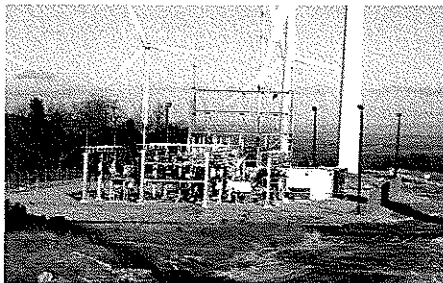
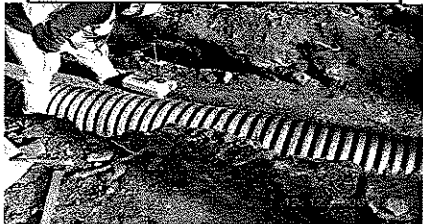
Highlights of some of RDZ's responsibilities during this project include:

- Shop Drawing Review
- Maintaining clear and precise communication between the Contractor and SJH
- Daily Resident Observation throughout the 27-month construction period
- Detailed Daily Logs of work completed during each 24-hour period, including weather conditions, site visits, and activities
- Detailed photographic evidence of work completed each day
- Meeting with State and Local regulating officials
- Review and approval of monthly pay estimates
- Review and approval (if the claim was valid) of project Change Orders
- Project was less than 3.25% over budget (\$210,000.00)
- Kept records of inventory and materials arriving on-site
- Performing of concrete and compaction testing for compliance with Contract Specifications
- Assisted SJH with development of final walk-through punchlist

Client:
M.A. Mortenson
P.O. Box 710
Minneapolis, MN.
Eli Matson
304-693-7742

Key Elements:

- Design of 17 miles of roadway and 84 turbine pads
- Construction Layout of roadways and structures
- Materials testing of all construction



Mount Storm Wind Power Grant County, West Virginia

Wind Power Project

The Mount Storm Wind Power Project is an alternative power project commissioned by Shell Energy. This project consists of the construction of 84, two-megawatt turbines and 17 miles of roadway and crane pads. In addition, Dominion Recourses is constructing the electrical substation.

R.D. Zande and Associates presented civil drawing, Permits and bid documents in May 2006. R.D. Zande & Associates entered into a contract with M.A. Mortenson on November 13, 2007 to provide QC/QC services for the project. QA/QC requirements for the project were to provide full time compaction testing for the construction of 17 miles of roadway. Our Buckhannon ASSHTO Accredited Laboratory is utilized for performing sieve analysis, soil classifications, proctors and gradations. Concrete testing of over 30,000 cubic yards of concrete is being performed at the rate of 700 cubic yards per day. Specifications for concrete require 80 cylinders per day with breaking requirements at 3,7,14,28 and 56 day intervals. Due to the volume of cylinders R.D. Zande & Associates established an onsite concrete laboratory to perform concrete breaks. In addition to compaction and concrete testing, grout testing is also being performed. Anchor bolt tensioning will be performed during installation of the turbines.

In October of 2006 R. D. Zande & Associates, Inc. survey crews broke ground on this project working for A.L.L. Construction Co. R. D. Zande & Associates, Inc. began GPS and Conventional construction layout for the earthwork portion of this project. Currently we are working one GPS crew fulltime for construction layout.

Earthwork and structural concrete testing will continue through Summer 2008. Work schedule will require RDZ staffing 7 days a week and 14 hours per day. We are currently providing 6 full time technicians onsite to meet the needs of our clients.

Client:

West Virginia Bureau for Public Health

Completion Date:

January 2003

Key Elements:

- Compilation of an inventory of potential contaminant sources within the zone of critical concern
- Gathering and compiling water quality monitoring results

**Source Water Assessment Program
Berkeley, Fayette, Jefferson, Mingo, Morgan,
Kanawha, Summers & Wayne Counties
West Virginia Bureau for Public Health (WVBPH)**

R.D. Zande & Associates conducted an assessment of possible contaminant sources to water and gathered and compiled Water Quality Monitoring Results.

Compiling this information involved developing an inventory based on existing, regulated entities, geographic information system (GIS) coverage and general land use data provided by the WVBPH. We then included a detailed inventory of potential significant contaminant sources, including agricultural, residential, municipal, commercial, and industrial sources that are not covered under the existing regulatory programs.

R.D. Zande & Associates gathered and compiled water quality samples, which were tested for contaminants with a maximum contaminant level (MCL) for finished water, contaminants regulated under the surface water treatment rule (SWR) and the microorganism cryptosporidium.

This project required the use of global positioning system (GPS) surveying technology at potential contaminant source sites and ArcView GIS mapping technology.

Client:

Pope Properties, Inc.

Key Elements:

- Design of water treatment system
- Preparation of documents for bid submittals

Water Treatment System Design

Pope Properties

Cross Lanes, WV

R.D. Zande & Associates handled coordination with the designer, the builder and West Virginia American Water Company for this site of an apartment complex. We designed a water treatment system and prepared pertinent documents for bid submittals. In addition, we were asked to provide the future construction observation and administration services.

Client:

WVDOH

Rob Pennington, P.E., Project Mgr.
801 Madison Avenue
Huntington, WV 25712
528-5620

Key Elements:

- Construction inspection, quality assurance and survey services for structural, concrete, grade, drainage and asphalt pavement
- Knowledge of construction practices, surveying procedures, contract interpretation, special provisions, plans and specifications, engineering, testing and office equipment
- Performance of work at night

**Culloden Bridge
Construction Inspection Services
West Virginia Div. of Highways (WVDOH)
Culloden, WV**

R.D. Zande & Associates performed construction inspection, quality assurance and survey services as needed. The areas of emphasis were structural, concrete, grade, drainage and asphalt pavement.

Other requirements included: knowledge of good construction practices and surveying procedures, ability to interpret contracts, special provisions, plans and specifications, ability to use engineering, testing and office equipment.

The work week for inspection consisted of five 10-hour work days of day shift and six months of 5 to 8-hour nights of night shift.

Client:

WVDOH

Dave Bodnar, Design Project Mgr.

Building 5, Room 317-A

1900 Kanawha Blvd. E.

Charleston, WV 25305

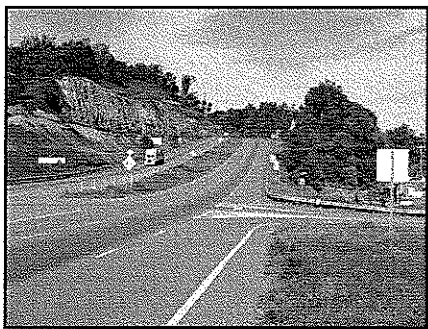
Telephone #: 304-558-2830

Construction Budget:

\$33,700,000

Key Elements:

- Field survey
- Horizontal and vertical geometry
- Intersection and turn lane design
- Structural design
- Hydrologic analysis for two mile creek and three mile creek
- Erosion and sediment control
- Right-of-Way design
- Section 404 and NPDES permit application
- Major and minor drainage



US Route 35 Improvements Little Fivemile Creek to Coast Guard Station Roadway and Structural Design West Virginia Div. of Highways (WVDOH) Mason County, West Virginia

Professionals in the Buckhannon and Charleston offices are responsible for the design and plan preparation for a 1.85-mile project in Mason County, West Virginia. The project involves the upgrading of U.S. Route 35 to a four-lane divided highway between Point Pleasant and Winfield, West Virginia. The construction budget for the project totals over \$30 million. Approximately 2 million cubic yards of earthwork is required to be moved for this project.

In addition to the 1.85 mile mainline roadway design, the project includes the relocation and design of Mason County Route 34 and existing U.S. Route 35. The intersection of Mason County Route 34 was planned and designed to include a turn lane for optimum traffic control. Several design options were studied and the design team at R.D. Zande worked with the client to ensure the most cost effective and feasible plan was chosen.

All field survey was completed by survey crews from the Buckhannon office. This allowed the design team to gain data quickly and efficiently. R.D. Zande was also responsible for all erosion and sediment control as well as hydrologic analysis for Two Mile and Three Mile Creeks. Subsequently, the project also includes a 400 foot dual bridge over Three Mile Creek and a 92 foot dual bridge over Two Mile Creek along with a 10 foot x 6 foot reinforced concrete box culvert.

The relocation of over 2000 linear feet of 4 inch water line was designed due to the new roadway. Natural stream channel design techniques were utilized to relocate over 500 linear feet of an unnamed stream.

Other key factors to the project included all major and minor drainage design, maintenance of traffic plans, signing and pavement marking plans and the preparation of the NPDES Permit application.

Client:

P.J. Dick Corporation

Completion Date:

January 2003

Key Elements:

- Site engineering design for construction of a new federal prison
- Construction QA/QC services



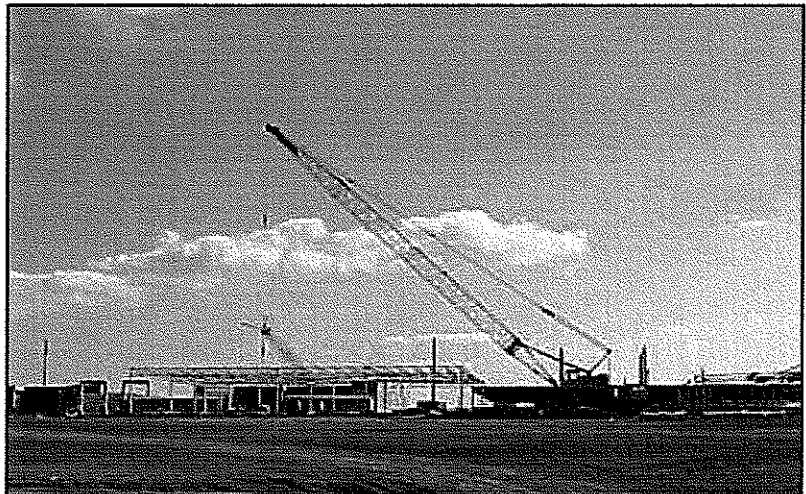
Hazelton Facility, Federal Bureau of Prisons

P.J. Dick Corporation

Hazelton, WV

R.D. Zande & Associates provided site engineering for construction of a new federal prison near Hazelton.

Our scope of services included: all field surveys for construction layout and calculations for earthwork, utilities, building footprints and access roads. In addition, we also provided construction QA/QC services including: concrete testing (and mortar prism, block prism and floor flatness testing), floor level testing, soils testing, aggregate testing, anchor bolt pull testing, water testing and weld inspection.



Client:

WVDOH

Dirar M. Ahmad, Project Engineer
Building 5, Room A-317
1900 Kanawha Blvd., E.
Charleston, WV 25305
Telephone # 304-558-2830

Construction Budget:

\$11,000,000

Key Elements:

- Field survey
- Horizontal geometry
- Intersection and turn lane design
- Erosion and sediment control
- Right-of-Way design
- NPDES permit application
- Major and minor drainage design
- Subsurface investigation
- Stormwater retention



Appalachian Corridor H West Virginia Dept. of Highways (WVDOH) Roadway Design

Appalachian Corridor H is being constructed from Weston, West Virginia to the state line near Staunton, Virginia. The new four-lane highway will be a major east-west route in West Virginia. The highway is also expected to spur the economic development of the areas through which it will pass. The construction budget for the project totals over \$11 million.

R.D. Zande & Associates is responsible for the design of the 1.6-mile section of Corridor H linking Davis and Bismark, West Virginia. The project involves the construction of a four-lane divided highway along West Virginia State Route 93 between the Mt. Storm power plant and the Tucker County / Grant County lines.

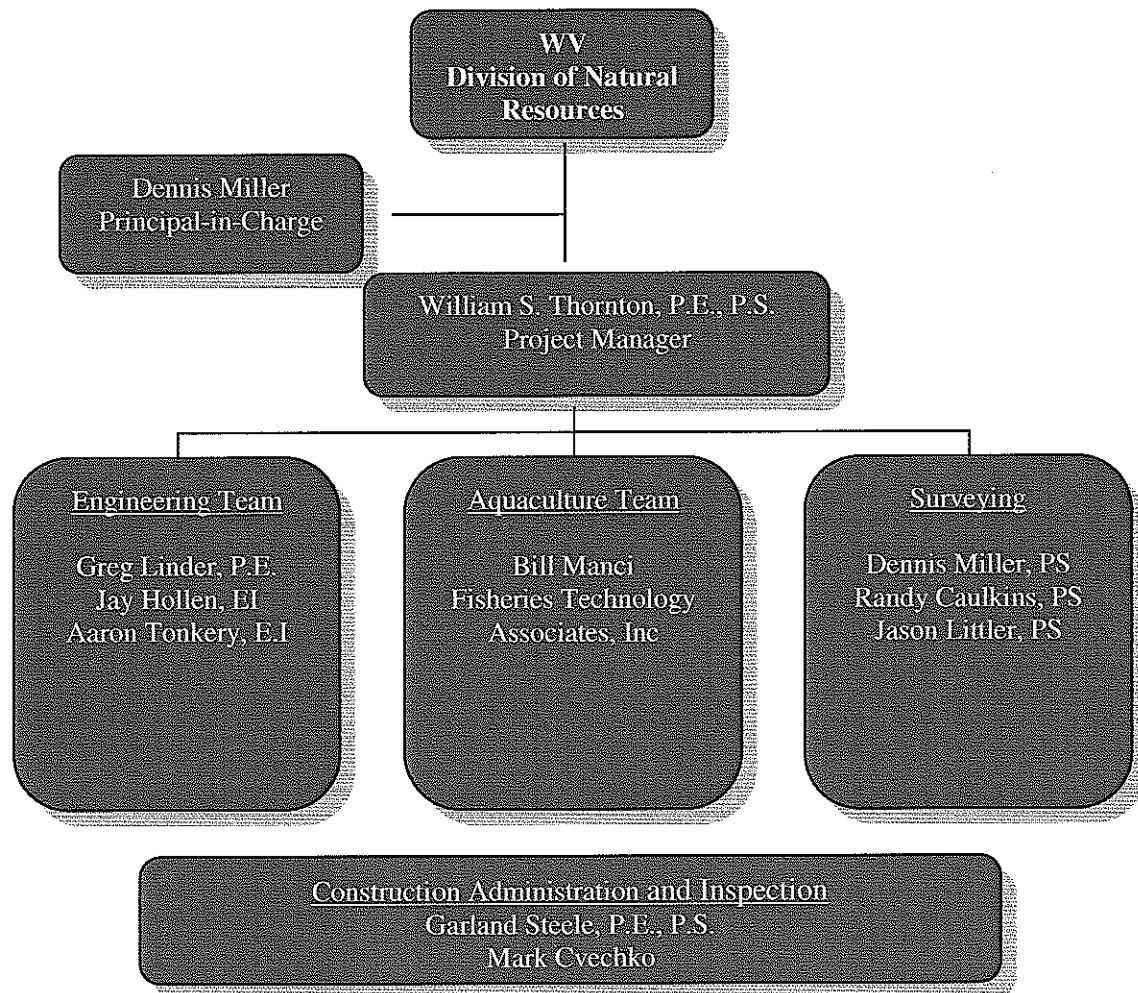
In addition to designing a portion of this highway, R.D. Zande has been responsible for completing all field surveys required for the alignment design, drainage calculations and mapping associated with the new highway.

Section 3 – Project Approach and Key Personnel

This project will combine the efforts of personnel from our Charleston and Buckhannon offices in addition to the expertise of our sub-consultant, Fisheries Technology Associates, Inc. We provide the unique advantage of having civil and structural engineers, landscape architects, planners, surveyors and construction inspectors who have worked hand-in-hand with our clients on numerous projects. Additionally, our project team is well versed in the preparation of contract documents, which include the drawings and specifications, as well as performing the Construction Administration and material testing. As a result, these professionals know how to efficiently and cost-effectively work with all regulatory agencies.

For the first phase of this project, our project team will visit and analyze all of the DNR's hatcheries to familiarize themselves with the operations. First and foremost, our team will identify ways to increase production by running the operations more efficiently. Our professionals are very experienced in hatchery operations and procedures to maximize operations. If it is determined that it will take more than just operational adjustments to increase the production to the levels desired by the DNR, our team will develop the most cost effective approach to expanding the existing facilities or perhaps developing an entirely new facility. We expect this initial investigation phase to take no more than three months from notice to proceed. Pending the results of our findings we will then develop a schedule for the next phase of this project.

Project Organizational Structure



Our ability to rapidly mobilize collaborative teams of engineers and planners, designers and field personnel provides our clients with uniquely effective and qualified teams for project implementation from conceptual design through construction management. Key personnel who will participate in projects for the WV Division of Natural Resources will be as follows. Their resumes are provided in the pages following.

William S. Thornton, P.E., P.S., Project Manager, Stantec

Mr. Thornton will serve as the primary point of contact with the WV Division of Natural Resources for this project. Mr. Thornton manages our Charleston, WV, office and has over 18 years of hands-on experience in the fields of engineering management, design engineering, surveying and construction including numerous highway, bridge and airport design projects and abandoned mine renovation projects funded by various state and federal agencies.

Bill Manci, Senior Biologist, Fisheries Technology Associates, Inc.

Mr. Manci brings over 20 years on many types of aquaculture and fish farming projects throughout the United States and other countries and is experienced in coldwater, coolwater and warmwater fish production facilities.

Greg Linder, P.E., Structural Engineer, Stantec

With diverse experience in civil and environmental engineering, Mr. Linder joined R.D. Zande & Associates in 2004 as a Project Manager. Since July of 1998, his primary responsibilities have included the design, inspection, evaluation, and rehabilitation of highway and railroad bridges. Secondary responsibilities have included hydrologic and hydraulic analyses and performing environmental studies along with the preparation of U.S. Army Corps of Engineers permits for waterways.

James Hollen, III, E.I., Project Engineer, Stantec

Mr. Hollen has 16 years experience as a civil and environmental, and architectural engineer and designer. His experience includes wastewater collection systems and lift station designs, water distribution systems and treatment facilities, water storage facilities, booster and lift stations, airport facility infrastructure (stormwater systems, snow removal, apron, taxiway and runway extensions), bridge and highway projects, and design for underground deep mines including a self-contained "packaged system" wastewater treatment plant. Mr. Hollen also has extensive experience in the preparation of contract documents (construction drawings

and specifications) and the preparation of Engineer's Opinion of Probable Construction Costs.

Aaron Tonkery, E.I., Engineer Intern, Stantec

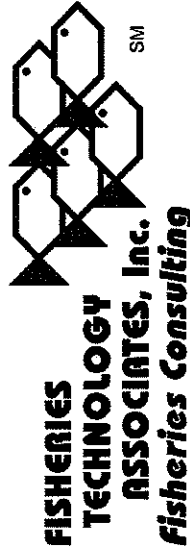
Mr. Tonkery is a Engineer Intern in the Environmental Department. His training and experience have included civil site design, water and wastewater engineering, abandoned mine lands projects and acid mine drainage projects. Mr. Tonkery is also very experienced in the preparation of NPDES and US Army Corps of Engineers permits.

Randy Calkins, P.S., Project Surveyor and Designer, Stantec

Mr. Calkins has a diverse background in civil site design, surveying, and construction layout, as well as experience in environmental testing, analysis and remediation.

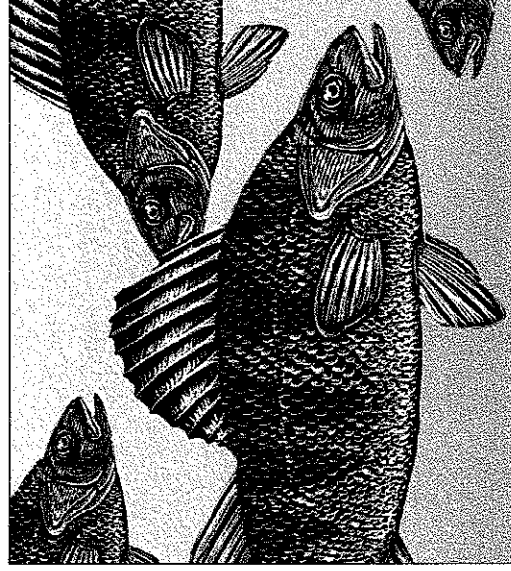
Section 4 – Fisheries Technology Associates Company Profile and Practice Areas

FISHERIES TECHNOLOGY
ASSOCIATES, INC.



COMPANY PROFILE

Fisheries Technology Associates, Inc., is a network/consortium of expertise from around the U.S.A. The professionals at FTA, Inc., are competent to consult in all areas of aquaculture and fisheries science and have many decades of combined experience in practical, applied, and theoretical aspects of the field. We emphasize cost-effective methods of design and problem-solving and understand that theory and experimental solutions are not always best in terms of profitability. We stress common-sense solutions to common problems. Our comprehensive knowledge and capabilities in aquaculture and fisheries are second to none, and are guided by innovation and creativity as important problem-solving tools.



HIGH-PERFORMANCE
AQUACULTURE, FISH
FARMING, AND
FISHERIES SERVICES

*Sustainability, Profitability,
and Excellence...since 1982*

Business Address:
506 Wabash St.
Fort Collins, CO 80526-3245
U.S.A.

Phone: 970-225-0150
Fax: 970-225-0150
Web Site: www.ftai.com

BUSINESS PHILOSOPHY

Our company is client-driven. We are here to serve you and your needs, and pride ourselves in our ability to customize our services to satisfy your specific information, technology, and management requirements. Note that we do not mass-market products or receive commissions or other incentives from manufacturers. This allows us to consider all options for you in a completely objective and credible manner--a manner that is focused only on your best interests. Do not hesitate to contact us to discuss your situation. **All conversations and client information are held in strict confidence.**

SERVICES

- ↓ Aquaculture Consultants for New and Existing Facilities
- ↓ Consultants to Aquaculture and Fisheries Suppliers
- ↓ Feasibility Studies and Aquaculture Production Assessments and Audits
- ↓ Business Evaluation, Financial Analysis, and Due Diligence
- ↓ Aquaculture and Fish Farming Statistics and Investor Intelligence
- ↓ Aquaculture Design and Aquaculture Management
- ↓ Water Recirculation Systems and Water Reuse Systems
- ↓ Aquaponics, Hydroponics, and Waste Reduction Technologies
- ↓ Aquaculture Real Estate Investment Guidance
- ↓ Fish Culture Workshops, Presentations, and Seminars
- ↓ Fisheries Management and Fisheries Consultants
- ↓ Analysis of Zooplankton and Benthic Macroinvertebrate Samples
- ↓ Water Feature Design and Management
- ↓ Pond, River, Reservoir, and Lake Design and Management
- ↓ Residential Pond Design and Management
- ↓ Lighting Control Systems: Sunrise/Sunset Simulation
- ↓ Water Testing and Water Analysis
- ↓ Legal, Regulatory, and Litigation Services
- ↓ Fish Hatcheries and Fish Farms, Financing Searches, and Buyer Searches
- ↓ Technical Writing and Technical Editing



Photo © Bill Mancini: Spawning female yellow perch (*Perca flavescens*) and accompanying male.

FISHERIES TECHNOLOGY ASSOCIATES, INC.

Business Address:
506 Wabash St.
Fort Collins, CO 80526-3245
U.S.A.

Phone: 970-225-0150
Fax: 970-225-0150
Web Site: www.ftai.com



Fisheries Technology Associates

...a full-service fish farming, aquaculture, and fisheries consulting company.
Our primary goal: simplify a complex world of choices and information and customize solutions for busy clients.

Aquaculture Consultants for New and Existing Facilities

Consultants to Aquaculture and Fisheries Suppliers

Feasibility Studies and Aquaculture Production Assessments and Audits

Strategic Planning, Business Evaluation, Financial Analysis, and Due Diligence

Aquaculture and Fish Farming Statistics and Investor Intelligence

Aquaculture Design and Aquaculture Management

Fish Farming Systems, Water Recirculation Systems, and Water Reuse Systems

Aquaponics, Hydroponics, and Waste Reduction Technologies

Aquaculture Real Estate Investment Guidance

Fish Culture Workshops, Presentations, and Seminars

Fisheries Management and Fisheries Consultants

Analysis of Zooplankton and Benthic Macroinvertebrate Samples

Water Feature Design and Management

Pond, River, Reservoir, and Lake Design and Management

Residential Pond Design and Management

Lighting Control Systems: Sunrise/Sunset Simulation (Dawn/Dusk Simulation)

Water Testing and Water Analysis

Legal, Regulatory, and Litigation Services

Fish Hatcheries and Fish Farms, Financing Searches, and Buyer Searches

Technical Writing and Technical Editing



Fish Farming

Fisheries Technology Associates is a world leader in aquaculture, fish farming, fish culture, and fisheries management consulting services. For more than 26 years we have delivered the quality of service and experience that our clients expect and deserve.

Information, Analysis, Production, and Management Consulting Services

We assist you at all stages of business and facility planning, evaluation, development, construction, modification, and management:

Investor Research and Industry Intelligence, Strategic Planning, Due Diligence

Business Planning and Market Planning

Feasibility Analysis and Site Evaluation

Design and Specification

Product and Materials Information, Evaluation, and Acquisition

Construction Oversight

Production and Processing Facility Initial Operation and Ongoing Management

Management Planning and Implementation

Independent Audits of Management and Production

Industry Intelligence, Analysis, Technical Audits, Planning, and Strategies

Technical and economic feasibility studies and financial analysis

Business planning, analysis, evaluation, and profitability

Marketing studies and plans and strategies for market penetration

Independent assessments, technical audits, and impartial due diligence for investors

Support and market research services for aquaculture suppliers

Information transfer from research to practical application

Fish farming statistics and investor research and intelligence

Workshops, presentations, and seminars

Personnel searches and training programs

Electrical and thermal energy management strategies

Waste heat and geothermal applications

Strategies and tactics for successful production

Organic and sustainable feed alternatives

Insurance and mortality-related issues

Legal services and expert legal testimony

Comprehensive water analysis

Design, Production, and Management

Aquaculture design and modification and equipment specification

Production technology

Operational troubleshooting

Hatchery and nursery design and management

Aquaculture facility management and evaluation

Independent management and production audits

Production pond design and management

Intensive production techniques

Intensive water recirculation / reuse systems

Processing facility design, management, and HACCP training

Feed manufacturing facility design and management

Disease diagnosis

Polyculture and multiple species

Integrated production and hydroponics / aquaponics

Waste management, waste reduction, and resource recovery

Innovative lighting-control systems

Emphasis

Thorough analysis based on decades of experience

Comprehensive industry coverage

Reduce costs through efficiency

Maximize production

Minimize waste

Integration of processes and production

Stabilize cash flow through species diversification

State-of-the-art design and management

Cost-effective fee schedule

Other Specific Services: Our Innovative Approach

Expertise with all aquaculture species:

■ Coldwater Finfish and Shellfish: Salmon, Trout, Char, Winter Flounder, Halibut, Turbot, Cod, Wolffish, Sablefish, Oyster, Clam, Mussel, Abalone, Geoduck Clam, Lobster

■ Coolwater Finfish: Yellow Perch, Walleye, Northern Pike, Muskellunge, Sturgeon, Hybrid Striped Bass, Paddlefish

■ Warmwater Finfish, Shellfish, Amphibians, and Reptiles: Catfish, Tilapia, Largemouth Bass, Striped Bass, Common Carp, Chinese Carp and Grass Carp, Sunfish, Bluegill, Baitfish, Goldfish, Tropical Fishes, Flounder, Mahimahi, Cobia, Snook, Threadfin, Mullet, Sea Bass, Sea Bream, Penaeid (Marine) Shrimp, Freshwater Shrimp (*Macrobrachium*), Australian Red Claw, Crayfish, Crab, American Lobster, Spiny Lobster, Queen Conch, Frog, Alligator

Assessment of facility potential to maximize production

Pumping and aeration assessment to conserve energy

Disease diagnosis

Comprehensive water-quality analysis

Assistance with predator problems

Complete feeding and nutritional assessment

Techniques to improve feed conversion and fish growth

Marketing studies and assistance with product marketing strategies

Efficient handling and management practices

Polyculture and hydroponics/aquaponics to minimize wastewater discharge - Combined fish and plant production systems

Alternative species/species diversification

Personnel training courses designed to meet specific needs of client

Water reuse systems that can make aquaculture possible in areas with little water or severe climate

Techniques to utilize waste heat from commercial, industrial, or geothermal sources

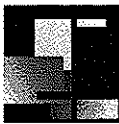
Low-head hydroelectric power generation

Cogeneration of power and heat

Aquaculture presentations to individuals and groups

Preparation of industry background and statistical information

Comprehensive business analysis to reduce costs and maximize profits



Lakes/Streams

Fisheries Technology Associates is a world leader in aquaculture, fish farming, fish culture, and fisheries management consulting services. For more than 26 years we have delivered the quality of service and experience that our clients expect and deserve.

Lakes, Ponds, Reservoirs, Streams, Rivers, and Other Water Features

We offer design, evaluation, characterization, remediation, enhancement, and management services for:

Natural and man-made lakes and reservoirs

Natural and man-made creeks, streams, and rivers

Residential and commercial lakes and ponds

Residential and commercial water features

Our services include:

Design of new systems

Design modifications for existing systems

Streambank and shoreline stabilization design recommendations

Development of new sportfishing and fee-fishing systems and strategies

Sportfishing remediation and enhancement

Stream habitat restoration and management

Ecosystem evaluation, assessment, and management recommendations

Sample analysis and characterization of benthic and pelagic invertebrates and zooplankton

Species and habitat recommendations

Management of water chemistry and winterkill or summerkill Events

Comprehensive water analysis

Management of aquatic animals and pests

Management of aquatic weeds and algae

No project is too large or too small.



High-Performance Aquaculture, Fish Farming, and Fisheries Services
Offering Sustainability, Profitability, and Excellence...since 1982

Bill Mancini President of FTA, Inc.,

Bill created the company in 1982 after receiving his formal training in zoology and fisheries science at the University of Wisconsin-Madison, and after a six-year career in aquaculture research. Bill has been a consultant since 1980 and has worked on many types of aquaculture and fish farming projects throughout the U.S.A. and other countries. He also has published more than 300 technical and popular articles on the subjects of aquaculture and fish farming, and served as an expert witness in aquaculture and fisheries-related litigation.

PROFESSIONAL CERTIFICATIONS

Certified Fisheries Professional, American Fisheries Society

Vocational Teaching Credential (Post-Secondary/Adult), State of Colorado

PROFESSIONAL EXPERIENCE

1982-Present: Senior Biologist and President, Fisheries Technology Associates, Inc. Specialized in technical and economic feasibility analysis, finfish and shellfish production technology, and facility design, management, and assessment. Managed a team of 20-25 technical professionals within the fisheries consulting consortium of Fisheries Technology Associates, Inc.

PROJECT EXAMPLES

- Designed 264,000 pounds/year indoor water reuse common carp production system and management plan for installation in the Middle East.
- Evaluated reconfiguration of 31.5-hectare threadfin production operation in Singapore.
- Analyzed technical and market feasibility of marine finfish production at a site in Baja California, Mexico.
- Analyzed technical and economic feasibility of yellow perch and aquaponic tomato production at 480,000 pounds/year site in Michigan.
- Analyzed technical and economic feasibility and developed biological design for yellow perch production at 5.2 million pounds/year site in Indiana.
- Analyzed market and business prospects of a fish meal and fish oil replacement in shrimp feeds for product developer in Maryland.
- Assisted in the design of a new solids removal system for a 3 million fish/year salmonid production facility in Alberta.
- Developed biological design and management plan for a 400,000 pounds/year indoor water reuse yellow perch, tilapia, and integrated plant production system for installation in Pennsylvania.

- Designed water treatment systems for large, mobile fish holding tanks and displays in Colorado.
- Designed dechlorination system for university fisheries research laboratory in Wisconsin.
- Assisted major insurance company in development of aquaculture insurance products.
- Remodeled and upgraded 550,000 pounds/year rainbow trout hatchery and rearing system in Kentucky.
- Assisted in reconfiguration of 600,000 pounds/year tilapia production system in Arizona.
- Analyzed technical feasibility of 2.45 million pounds/year indoor Atlantic salmon and yellow perch production system in Wisconsin.
- Analyzed technical and economic feasibility of yellow perch production at 3 million pounds/year site in Michigan.
- Analyzed technical and economic feasibility of yellow perch and hybrid striped bass production at 500,000 pounds/year power plant sites in Minnesota.
- Assisted in design of 1 million fish/year Atlantic salmon smolt production system in Maine.
- Assisted Turkish fish feed manufacturer in modifying and reformulating their inventory of feeds.
- Analyzed technical and economic feasibility of, and technology to produce, 3,100 metric tons/year of Atlantic salmon and rainbow trout in Guam.
- Upgraded many coldwater, coolwater, and warmwater fish production facilities. Surveyed many facilities and laboratories to evaluate potential and develop feasibility and management recommendations.
- Provided physical, chemical, and biological evaluations, designs, and management plans for many ponds, lakes, and reservoirs.
- Served as expert witness in aquaculture/fisheries litigations.

1995-2001: President (volunteer), Rocky Mountain Aquarium Foundation, a registered 501(c)(3) non-profit foundation dedicated to education in aquatic, terrestrial, and agricultural environments. Successfully attracted project funding through grant proposals and political support from government entities. Strong advocate for science education and demonstrated commitment to public outreach and education through regular public presentations. Developed unanimous support for aquarium project from Fort Collins City Council through public presentations at Council sessions and private meetings with City staff. Managed and coordinated team volunteer effort. Web site and curriculum: developed *River Explorations* as an interactive, Internet-based freshwater curriculum for grade-school students and their teachers. Wrote, designed, produced, and distributed periodic newsletter called *Fresh Waters*.

1976-82: Project Specialist, University of Wisconsin Aquaculture Research Program. Involved in all laboratory research functions including grant writing, experimental design and implementation, literature review, and publication writing and editing. Designed and conducted bioassay experiments on yellow perch. Evaluated physical and biological filtration in aquaculture systems.

ADDITIONAL MATERIAL

Bill is an accomplished author and editor. As the list of publications indicates, his work has appeared in popular and semi-technical publications and refereed technical journals. He works periodically as a

writer/editor for public-sector agencies, private individuals, and companies. Bill has formally reviewed scientific research proposals and reports for:

University of Wisconsin-Madison

Western and North Central Regional Aquaculture Centers

National Coastal Resources Research and Development Institute

U.S. Congress, Office of Technology Assessment

Other experience and capabilities include the following:

Three summers of field work at Horicon National Wildlife Refuge (Horicon Marsh, Wisconsin) assisting in mark/recapture of waterbirds for the development of waterbird census techniques, characterization and mapping of wetland vegetation, and bird surveys from airboats

Specific knowledge and application of criteria used in wetland delineation and mapping, as specified by U.S. Army Corps of Engineers

General and specific knowledge of upland and riparian habitats and hydrology (i.e., aquifers) through analysis of ties between terrestrial and aquatic environments

Functional and specific knowledge of Canada goose and migratory waterfowl ecology, raptors, prairie dogs and other mammals, reptiles, and other prairie inhabitants and their management

Functional and specific knowledge of native prairie plants and animals and restoration in Larimer County, Colorado, and the Fort Collins Natural Areas Policy Plan and Program

COMPUTER SKILLS (WORKING KNOWLEDGE)

WordPerfect, Word, Excel, Access, FrontPage, HTML, Powerpoint, Acrobat, TurboCAD

Bill has independently designed, built, published, and promoted (registered the sites to search engines) several Internet websites (e.g., www.ftai.com, www.colaqua.org, and www.thepaleodiet.com).

AFFILIATIONS

World Aquaculture Society (WAS), U.S. Chapter of the WAS; American Fisheries Society (AFS), AFS Fish Culture Section, AFS Bio-Engineering Section, AFS Fish Health Section; Joint Sub-Committee on Aquaculture, National Aquatic Animal Health Management Program, Steering Committee Work Group on Extension Services and Information Transfer; National Aquaculture Association; Aquaculture Association of Canada; Colorado Aquaculture Association (member and Webmaster); Rocky Mountain Aquarium Foundation Board of Directors

TEACHING EXPERIENCE

Aquaculture and pond management training courses and workshops:

Colorado State University, Division of Continuing Education

Guest Lecturer, Colorado State University

Front Range Community College/Larimer Center

Maryland Department of Agriculture and University of Maryland Eastern Shore

Maryland Aquaculture Association

Biometrics, Inc.

Wilfley Weber, Inc.

City of Fort Collins, Colorado

City of Loveland, Colorado

PUBLICATIONS AND PRESENTATIONS

These samples are drawn from a list of over 300 total items:

Manci, B. 2003-08. Contributing author and columnist. Fish Farming News, Stonington, Maine.

Junius, J. H., J. T. Scott, T. B. Lawson, D. E. Owsley, and W. E. Manci. 2004. Current application of water recirculation aquaculture filtration components, their integration, and economic implications. Presented at the aquaculture interchange program: biological filter workshop, 8-11 November, Honolulu, Hawaii.

Manci, B. 1994-2003. Contributing author and columnist. The Fish Line, Colorado Aquaculture Association, Boulder, Colorado.

Manci, B. 1992-2001. Contributing author and columnist. The Aquaculture News, Jonesville, Louisiana.

Manci, B. 2001. Is commercial yellow perch production in the U.S. feasible? Aquaculture Magazine 26(1):26-35.

Manci, B. 2000. Prospects for yellow perch aquaculture. Global Aquaculture Advocate 3(6):62-63.

Manci, B. 2000. Contributing author. Ag Journal, La Junta, Colorado.

Manci, B. 1999. Yellow perch. Wildlife Window 1(4):1, 9-10.

Manci, W. E. 1994. Book review: fish farming technology. Progressive Fish-Culturist 56:222-223.

Manci, W. E. 1993. A showcase for sustainable agriculture and water conservation: integrated fish and plant production at the Rocky Mountain Aquarium in Estes Park. Presented at the 1993 South Platte forum: seeking an integrated approach to watershed management in the South Platte basin. Fort Collins, Colorado.

Manci, W. E. 1993. Farming and the environment. Gareth Stevens, Milwaukee, Wisconsin. 32pp.

Manci, W. E. and D. S. Proebstel. 1993. Endangered fishes of the world. Pages 31-1,529 in Endangered wildlife of the world. Marshall Cavendish, North Bellmore, New York.

Manci, W. E. 1993. The marine world: too big to harm? Pages 1,421-1,424 in Endangered wildlife of the world. Marshall Cavendish, North Bellmore, New York.

Manci, W. E. 1993. Wetlands: the cradle of life. Pages 1,428-1,430 in Endangered wildlife of the world. Marshall Cavendish, North Bellmore, New York.

Hopkins, T. A. and W. E. Manci. 1993. Aquaculture: opportunity now, part 3-education and cooperation. Aquaculture Magazine 19(2):60-72.

Hopkins, T. A. and W. E. Manci. 1993. Aquaculture: opportunity now, part 2-the power of economics. Aquaculture Magazine 19(1):30-38.

Hopkins, T. A. and W. E. Manci. 1992. Aquaculture: opportunity now, part 1. Aquaculture Magazine 18(6):43-47.

- Manci, W. E., K. G. Richardson, and J. A. Bauer. 1992. Design and performance of an electronic lighting-control circuit that simulates sunrise and sunset. *Progressive Fish-Culturist* 54:127-129.
- Manci, B. 1989-91. Contributing author. *Catfish and Aquaculture News*, Ridgeland, Mississippi.
- Manci, W. E. 1991. Canadian update: cultivating the future. *Aquaculture Magazine* 17(5):98-101.
- Manci, W. E. 1990. Canada: ready for the '90s. *Aquaculture Magazine* 16(6):44-49.
- Manci, W. E. 1990. Private consultants in aquaculture and information transfer. *Fisheries* 15(4):6-10.
- Manci, W. E. 1989. Apogee Orbiter (Automatic Guided Vehicle system) owner's manual. Apogee Robotics, Inc., Fort Collins, Colorado.
- Manci, W. E. 1989. Master AGV control (MAC) software documentation. Apogee Robotics, Inc., Fort Collins, Colorado.
- Manci, W. E. 1989. I, the perch. *Wisconsin Outdoor Journal* 3(2):21-23.
- Hopkins, T. A. and W. E. Manci. 1989. Feed conversion, waste and sustainable aquaculture: the fate of the feed. *Aquaculture Magazine* 15(2):30-36.
- Manci, W. E. 1988-90. Contributing author. *Water Farming Journal*, Metairie, Louisiana.
- Manci, W. E. 1988-90. Contributing author. *AgBiotechnology News*, Cedar Falls, Iowa.
- Manci, W. E. 1988. Contributing author. *World Aquaculture News*, Arlington, Texas.
- Manci, W. E. 1988. Contributing author. *Fort Collins Coloradoan*, Fort Collins, Colorado.
- Manci, W. E. 1987. We have cultured fish! *Colorado Outdoors* 36(2):18-21.
- Manci, W. E. 1986. The world of the yellow perch. *Colorado Outdoors* 35(4):12-13.
- Manci, W. E. 1984. Passive aeration: part of the solution. *Aquaculture Magazine* 10(3):31-34, 10(4):44-46.
- Manci, W. E. 1984. Contributing author. *The Gooding County Leader*, Gooding, Idaho.
- Manci, W. E. 1983. Benefits of demand feeders. *Trout Growers Creel* 16(1):3
- Manci, W. E., J. A. Malison, T. B. Kayes, and T. E. Kuczynski. 1983. Harvesting photopositive juvenile fish from a pond using a lift net and light. *Aquaculture* 34:157-164.
- Yanzito, R. A. and W. E. Manci. 1982. Closed cycle aquaculture using solar energy. Presented at the second international seminar: energy conservation and use of renewable energies in the bio-industries. Oxford, England.
- Manci, W. E. and J. T. Quigley. 1981. Determination of operating parameter values for water reuse aquaculture. Pages 97-103 in L. J. Allen and E. C. Kinney, editors. *Proceedings of the bio-engineering symposium for fish culture*. American Fisheries Society, Fish Culture Section, Bethesda, Maryland.

MAJOR EDITING ASSIGNMENTS

National Park Service, Fort Collins, Colorado. Periodic editing assignments.

U.S. Forest Service, Fort Collins, Colorado. Periodic editing assignments.

Wisconsin Department of Natural Resources, Madison, Wisconsin. Numerous in-house research reports (fish and wildlife).

Wisconsin Department of Natural Resources, Madison, Wisconsin. 1991 International Canada goose symposium proceedings.

Wisconsin Department of Natural Resources, Madison, Wisconsin. Aquatic insects of the Bois Brule River system, Wisconsin.

Kansas Department of Wildlife and Parks, Emporia, Kansas. Strategic plan for North American quail management and research. National quail symposium (Quail III).

Information Transfer Center, National Biological Service, Fort Collins, Colorado. Periodic editing assignments.

Section 5 – Resumes

EDUCATION

B.S. Civil Engineering, 1989
West Virginia Institute of Technology

CERTIFICATIONS

Professional Engineer
West Virginia 1994, #12364
Ohio, 2000 #E-65227
Virginia, 2001, #35591

Professional Surveyor

West Virginia, 1996, #1642

AFFILIATIONS

American Society of Civil
Engineers (ASCE)
WV Section, ASCE, Past
President
Charleston Branch, ASCE
Past President

American Council of Engineering
Companies of WV (ACEC/WV)
Transportation Committee,
ACEC/WV
Plans Presentation Sub-
Committee, ACEC/WV
Technical Publications, Sub-
Committee, ACEC/WV

APPOINTMENTS

Sanitary Board, City of
Montgomery
City Engineer, City of
Montgomery
Advisory Board, Community &
Technical College at WVU
Institute of Technology

SUMMARY OF EXPERIENCE

Mr. Thornton is an experienced project manager and design engineer for civil/transportation engineering design projects. Mr. Thornton manages R.D. Zande & Associates Inc. Charleston, W.V. office. Prior to joining the firm, Mr. Thornton had more than 15 years of experience with other West Virginia consulting engineering firms, and three years with a construction firm performing major concrete paving projects in West Virginia, Pennsylvania and Ohio. Mr. Thornton also spent three summers with the WVDOH, Division of Highways during college.

Mr. Thornton has served as the City Engineer since 2001 for the community of Montgomery, West Virginia. In this role, he provides consultation on the construction and rehabilitation of a variety of infrastructure including streets, drainage, sidewalks, buildings, and traffic and other safety improvements. Mr. Thornton is involved not only in the engineering aspects, but also assists with the development of grant applications and other funding mechanisms. Mr. Thornton also serves as a member of the Montgomery Sanitary Board.

The major transportation design projects for the West Virginia Division of Highways with which Mr. Thornton has been involved included roadway design, drainage design, Right-of-Way Services and maintenance of traffic.

PROJECT EXPERIENCES

City of Montgomery Sidewalk Replacement Program—Montgomery, West Virginia. As City Engineer, responsible for design and construction phase services for replacement of sidewalks throughout the City. Prepared contract bid documents, provided bidding and award assistance, performed inspection services, and prepared all closeout and processing documents.

I-77 North Camden Interchange to Staunton Avenue Interchange—Wood County West Virginia. Design included replacement and widening of interstate bridge over the Little Kanawha River and the replacement and widening of the bridge over Staunton Avenue. The roadway work includes widening of I-77 to eight lanes from Camden Avenue to Staunton Avenue.

Corridor H Section 7—Forman to Moorefield, Grant County, West Virginia. Design and management included five miles of new mainline four-lane highway, several side road connectors, truck brake check area, truck escape ramp, and a wetland overlook area including over 8million cubic yards of earthwork.

I-79 Bridgeport to Meadowbrook- Harrison County. Included the widening of I-79 from two lanes North Bound and South Bound to four lanes North Bound and South Bound.

Corridor H Section 12 Section 01 - Tucker County, West Virginia. Included design and management for upgrade of approximately two miles of WV 93 between Davis and Bismark to a four-lane highway.

ODOT-Ashtabula Grade Separation. Design and management of a grade separation over two sets of railroad tracks with related approaches and utility relocation.

ODOT-MIA-75. Design of maintenance-of-traffic for two bridge deck replacement projects.

U.S. 52 Kermit Bypass-Mingo County, West Virginia. Included design and management of four miles of a new alignment four-lane expansion of U.S. 52 near Kermit, West Virginia. Design included over 10 million cubic yards of earthwork, two interchanges and a stream relocation.

U.S. 19 Corridor L Upgrade near Muddelty in Nicholas County.
Design and management of approximately four miles of the expansion of U.S. 19 in Nicholas County. This fast track project was completed in nine months.

Meadowbrook Road (U.S. 19 End) in Harrison County. Design and management of new alignment of two miles of Meadowbrook Road in Harrison County. This four lane divided highway included a bridge over the West Fork River and an intersection with U.S. 19.

WVDOH Master (On-Call) Engineering Services- Managed various highway, bridge, and related engineering services at locations throughout the state including:

- Lavallette to Huntington Road Widening
- Spencer Center Turn Lane
- Church Street in Ripley Center Turn Lane
- WV 14 and WV 15 Intersection Upgrade
- Washington Street in Ravenswood Center Turn Lane

Other Transportation Projects

- Ripley Town Bridge Replacement
- I-64 Cross Lanes Ramp B Expansion
- U.S. Rt. 60 Diamond to Chelyan Kanawha County
- Mon-Fayette Expressway in Monongahela County
- Marmet Pony Truss Bridge Replacement, Kanawha County
- Kelley Creek Bridge Replacement, Kanawha County

EDUCATION

B.S., Civil Engineering, 1998
West Virginia University, Morgantown, WV

B.S., Biology, 1993
Fairmont State College, Fairmont, WV

REGISTRATIONS

Professional Engineer
West Virginia, #15629, 2003
Kentucky, #24326, 2005

CERTIFICATIONS

West Virginia Div. of Highways- Natural Stream
Design, Levels I, II, III and IV

PROFESSIONAL AFFILIATIONS

American Society of Highway Engineers- Vice
President, North Central West Virginia Section

SUMMARY OF EXPERIENCE

With diverse experience in civil and environmental engineering, Mr. Linder joined R.D. Zande & Associates in 2004 as a Project Manager. Since July of 1998, his primary responsibilities have included the design, inspection, evaluation, and rehabilitation of highway and railroad bridges. Secondary responsibilities have included hydrologic and hydraulic analyses and performing environmental studies.

He has been involved with the engineering design and/or inspection of over 24 bridges, including highway, railway and pedestrian bridges. He has designed bridge structures for large governmental clients, as well as smaller governmental units and private sector organizations. Several of these projects have been "high profile" projects, allowing Mr. Linder the experience of working under intense public scrutiny.

In addition to engineering design, Mr. Linder has extensive experience in performing environmental studies, including endangered bat surveys, watershed management plans, and full-scale environmental assessments. He has also conducted analyses on water and soil samples using flow injection and flame absorption spectroscopy. Other environmental services in which Mr. Linder has been involved include the inspection of wetlands and wastewater treatment plants, benthic studies, soil and water sample collection, and monitoring well sampling.

Mr. Linder has worked with a variety of computer software, including MDX, Leap CONSPAN, Leap RC PIER, STAAD, and HEC-RAS. He has completed and worked with in-house spreadsheets and has experience using both manual calculations and software-assisted automatic calculation programs necessary for bridge design.

PROJECT EXPERIENCE PROFILES

Corridor H, WVDOT, Division of Highways, West Virginia

Part of the Appalachian corridor system, this project involved design of a new four-lane highway. As Project Engineer, was responsible for development of the layout and grading plans for the two major at-grade intersections.

US Rte 35, WVDOT, Division of Highways, West Virginia

Served as a Project Manager/Engineer for this design project involving a four-lane highway (with nine connector roads and two bridges) from Little Three Mile Creek to the Coast Guard Station.

Laurel Lake Sediment Removal Project, West Virginia Conservation Agency, Guyan Conservation District, Mingo County, West Virginia

As Project Manager, was responsible for oversight, design, and plan preparation. The project involved the removal of seven feet of sediment in the upper portion of the lake to restore recreational benefit and the design of a 0.25 mile access road along the lake and 0.5 miles of natural stream restoration to Laurel Creek, upstream of the lake.

Fisher Landslide Stabilization, West Virginia Conservation Agency, Western Conservation District, Jackson County, West Virginia

As Project Manager, was responsible for oversight, design, and plan preparation for a soldier pile retaining wall to stabilize a streambank failure on Mill Creek. This was an emergency project because the streambank failure endangered the stability of a furniture store.

Berger Slope Failure, West Virginia Conservation Agency, Northern Panhandle District., Brooke County, West Virginia

As Project Manager, was responsible for oversight, design, and plan preparation for streambank stabilization on Harmon Creek near Weirton. The project involved geotechnical investigation and a gabion wall design. This was an emergency project because the streambank failure endangered the stability of a local residence along Harmon Creek.

Upper Tract Bridge, West Virginia Division of Highways, Pocahontas County, West Virginia

As Project Manager, was responsible for oversight, design and plan preparation for the 346' long, and 30' wide, curved, steel bridge crossing the South Branch of the Potomac River. The bridge substructure consisted of integral abutments and T-Type piers supported on caisson foundations. The project also involved 740' of new, two-lane roadway design.

Mile Branch Truss Bridge, West Virginia Division of Highways, McDowell County, West Virginia

As Project Manager, was responsible for oversight, design, and plan preparation for the 180' X 22' wide steel bridge crossing the Dry Fork River. The bridge substructure consisted of integral abutments and T-Type piers supported on caisson foundations. The project also involved 370' of new two-lane roadway design.

PREVIOUS PROJECT EXPERIENCE PROFILES

North Shore Connector, Aerial Structure, Allegheny County, Pennsylvania

As Project Engineer, was responsible for final design of a 16-span, light rail, elevated structure that was planned to connect Pittsburgh's light rail system to the North Shore area of the city, including Heinz Field and PNC Park. The superstructure design consisted of finite element analysis of curved steel box girders.

Headsville Bridge Replacement, Mineral County, West Virginia

As Project Manager, was responsible for preparing the Bridge Replacement Study for six alternatives to replace the existing steel thru-truss. The project consisted of developing six new alignments with various span arrangements. In addition, hydraulic analyses were performed for all alignments and span arrangements.

Rail Rehabilitation Project, Akron and Canton, Ohio

As Inspection Team Leader, was responsible for the in-depth inspection of three railroad bridges and three culverts. Two of the bridges were twin rolled-beam structures. The other bridge was a twin built-up girder structure. Two of the culverts consisted of 96-inch corrugated metal pipes and the other culvert was a 371' twin box culvert.

Mon/Fayette Expressway, SR 0043, Section 52G, Washington County, Pennsylvania

As Staff Engineer, was responsible for final design for dual nine-span, continuous, steel, multi-girder bridges with overall lengths of 2,300' and 2,500' respectively, having maximum spans of 300'. Pier-substructure units were single-shaft, cast-in-place concrete with a maximum height of 230'. The structures span Mingo Creek, Froman Creek, SR 0088, and the Wheeling & Lake Erie Railroad.

SR 836 Extension, NW 107th Avenue to NW 137th Avenue, Miami-Dade County, Florida

Served as Project Engineer for the SR 836 extension design/build project, which consisted of a new, four-lane facility extending westward from the Homestead Extension of the Florida Turnpike (HEFT) to NW 137th Avenue, and improvements to the existing SR 836 main line and ramps to the east of the SR 836/NW 107th Avenue interchange. The project included the construction of new and reconstructed roadways, ten new bridges, retaining walls and noise abatement walls. Responsibilities included preliminary design for Bridges No. 2 and No. 3. Bridge No. 2 was a 724.5' curved steel, box girder structure. Bridge No. 3 was a 645' curved steel, box girder structure. Tasks included design of the primary and secondary superstructure elements, and providing steel quantities to the contractor for the bid package.

Bridge Design Group B, Allegheny County, Pennsylvania

As Project Engineer, was responsible for the replacement of Scotia Hollow Bridge No. 1 (XC01) and Licks Run Bridge No. 9 (LC09), and the rehabilitation or replacement of Catfish Run Bridge No. 3 (CT03). The project included structural inspection for each bridge and preparation of the inspection reports. After evaluation, it was determined that XC01 and LC09 needed to be replaced and CT03 needed rehabilitation. Plans and construction sequences for emergency repairs were prepared for XC01 and LC09. Subsequent to the structural inspection and emergency repairs, preliminary design was performed for the replacement of X01 and LC09, and the rehabilitation of CT03. Responsibilities included preparation of Erosion and Sediment Control Plans and Hydrologic and Hydraulic Reports for each structure and preliminary design.

NJ Route 18 Extension, Section 2F, NJDOT, New Brunswick, New Jersey

As Project Engineer, was responsible for Quality Assurance/Quality Control for the final design calculations for two pedestrian bridges. The first bridge was the Carpender Road Pedestrian Bridge over NJ Route 18. The bridge was a 156' prefabricated, truss structure. Responsibilities included reviewing the substructure and foundation design calculations. The second bridge was the Richmond Street Pedestrian Bridge over NJ Route 18. The bridge was a 200' prefabricated, truss structure with 145' elevated approach ramps consisting of prestressed concrete plank beam structures. Responsibilities included reviewing the substructure and foundation design calculations for the main span and reviewing the superstructure and substructure design calculations for the approach spans.

PA Route 28, Galleria Mall Interchange, Mills Corporation, Allegheny County, Pennsylvania

As Staff Engineer, was responsible for preliminary and final design of a 274' chorded, prestressed, I-beam bridge as part of the new interchange on S.R. 28 (also known as the Allegheny Valley Expressway). The superstructure consisted of 96" deep I-beams. The interchange served a privately developed regional mall along a rural portion of the highway approximately 1.1 miles northeast of the Harwick Interchange. The project was fast-tracked for the developer and included coordination with PENNDOT.

Star City Bridges (WV Route 7) Over the Monongahela River, John J. Sylvanus, Monongalia County, West Virginia

As Assistant Investigator, was responsible for preparing a confidential report outlining the conditions that led to a visibly out-of-plane distortion in the steel girder system at the completion of erection.

U.S. Route 33 (Nelsonville Bypass), ODOT, Hocking and Athens County, Ohio

As Staff Engineer, was responsible for performing origin-and-destination surveys for S.R. 78 and U.S. Route 33 (eastbound and westbound).

King Coal Highway, WVDOT, Division of Highways, Mingo County, West Virginia

As Staff Engineer, was responsible for designing the roadway drainage system and culverts for a 3.2-mile section of the 96-mile, four-lane divided highway. The culverts were designed for as much as 250' of roadway embankment.

**Enterprise/I-79 Connector, U.S. Route 19 to I-79, Environmental Assessment,
WVDOT, Division of Highways (WVDOH), Marion County, West Virginia**

As Staff Engineer, was responsible for the coordination of environmental and engineering services associated with the preparation of the NEPA document. Environmental services included data collection, field reconnaissance, and assessment of the environmental features encountered within the project area. The environmental features were delineated using 200:1 scale mapping. Engineering services included the development and evaluation of three alternative alignments that were approximately three miles long using environmental features mapping and current WVDOH design criteria. The typical section included two 12' lanes and two 8' shoulders. Plans, profiles, and preliminary construction cost estimates were prepared for each alternative alignment. The environmental assessment contained discussion of the impacts associated with each alternative and identified the preferred alternative. A Finding of No Significant Impact was expected.

**Southern Beltway, Pennsylvania Turnpike Commission, Allegheny and
Washington Counties, Pennsylvania**

As Staff Engineer, was responsible for performing Short-Eared Owl observations as part of the mitigation for the transportation project.

**Enterprise/I-79 Connector, U.S. Route 19 to I-79, Biological Assessment,
WVDOT, Division of Highways, Marion County, West Virginia**

As an Engineer, was responsible for the field reconnaissance, literature review, and preparation of a biological assessment of the Indiana Bat. The biological assessment evaluated the potential impacts of the proposed two-lane highway on available summer habitat in the project study area. The United States Fish and Wildlife Service was expected to issue a Biological Opinion.

EDUCATION

B.S., Civil Engineering Technology, 2000
Fairmont State College

B.S., Architectural Engineering Technology, 1991
Fairmont State College

REGISTRATIONS

Engineer Intern
West Virginia, (#7832), 2002

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers (ASCE)

Epsilon Pi Tau, National Engineering Technology
Honor Society

SUMMARY OF EXPERIENCE

Mr. Hollen has 15 years experience as a civil and environmental, and architectural engineer and designer. His experience includes water and wastewater distribution systems and treatment facilities, water storage facilities, booster and lift stations, airport facility infrastructure (stormwater systems, snow removal, apron, taxiway and runway extensions), bridge and highway projects, and design for underground deep mines including a self-contained "packaged system" wastewater treatment plant.

Mr. Hollen's responsibilities have included preliminary and detailed design, preparation of contract specifications and bid documents, quantity and cost estimates, permitting, shop drawing review, and resident construction observation. He has also been involved in water sampling and data collection of receiving streams used for water quality studies for the coal industry.

PROJECT EXPERIENCE PROFILES

Huntington Streetscape Project, Huntington, West Virginia

Mr. Hollen served as the Project Manager for the streetscape improvement project. He was responsible for oversight, project administration, design (from conceptual design through final design and review with City of Huntington personnel), and quality control / quality assurance for the project during the construction phase. Major aspects of the project included sidewalk replacement, curbside landscaping and seating, new streetlight and bollard design, and a gateway entrance, including decorative pavement design, to the City of Huntington.

Elkins Road PSD Water System Improvement, Phases I and II, Upshur County, West Virginia

Mr. Hollen assisted in the design of this water system improvement project which included new booster stations, water storage facilities, and water distribution lines

Water System Improvement, Upshur County Regional Airport, Buckhannon, West Virginia

Mr. Hollen was involved in the design of this project which provided a new water line and a 500-GPM emergency fire flow pump for this regional airport.

Water System Improvement Project, Philippi, West Virginia

Mr. Hollen assisted in the design, and was responsible for the drafting and construction observation of this water system improvement project that included new booster stations, water storage facilities, and water distribution lines.

Water System Improvements, Clay County, West Virginia

Mr. Hollen assisted in the design and was responsible for the drafting of a water system improvement project in Hartland and Triplett Ridge, which included new booster stations, water storage facilities, and water distribution lines.

Pope Properties Water Distribution System, Cross Lanes, WV

Mr. Hollen was responsible for the design of this new water distribution system which will serve a 172-unit apartment complex in Cross Lanes. Following the completion of the design, Mr. Hollen prepared bidding and contract documents, as well as performed construction administration tasks.

Water System Improvements Project, Davis, WV

Mr. Hollen was responsible for the design, including contract specifications, contract documents, and hydraulic analysis, drafting, and construction observation for this project for the Town of Davis.

Water System Improvements, Ivydale and Clay, West Virginia

Mr. Hollen assisted in the design and was responsible for the drafting of a water system improvement project which included new booster stations, water storage facilities, and water distribution lines.

Water System Improvements, Belington, West Virginia

Mr. Hollen assisted in the design of the water system improvements.

Water System Improvements, Thomas, West Virginia

Mr. Hollen assisted in the preliminary design of this water system improvement project.

Water Storage Facility, West Virginia American Water Company, Gassaway, West Virginia

Mr. Hollen was responsible for the drafting and assisted in the site surveying for this water storage facility.

Reservoir Replacement, Davis, West Virginia

Mr. Hollen was responsible for the preliminary engineering report for the Town of Davis Water Storage Facility to replace the existing reservoir.

Water and Wastewater System Improvements, Petersburg, West Virginia

Mr. Hollen assisted in the design for this project which involved relocation of existing utilities.

Sanitary Sewer System Evaluation, Hawthorne Valley, West Virginia

Mr. Hollen assisted in this SSES for Hawthorne Valley at the Snowshoe Mountain Resort near Marlinton, West Virginia.

Emergency Sanitary Sewer System Renovations, Belington, West Virginia

Mr. Hollen was responsible for the design, drafting, site surveying, and construction observation for this emergency project involving the replacement of the main gravity sewer line that collapsed under US Route 219.

Wastewater Collection and Treatment System, Harman, West Virginia

Mr. Hollen was responsible for the preliminary design and layout of this wastewater collection system and treatment facility.

Wastewater System Improvements, Clarksburg VA Hospital, West Virginia

Mr. Hollen's responsibilities included design, drafting, and construction observation.

Wastewater System Improvements, Beverly, West Virginia

Mr. Hollen was responsible for the design of this project, which entailed the renovation of two existing lift stations.

Wastewater System Improvements, Beverly, West Virginia

Mr. Hollen's responsibilities included design, drafting, and site surveying for this project for the United Parcel Service facility.

Wastewater System Improvements, Davis, West Virginia

Mr. Hollen assisted in the design, drafting, site surveying, and construction observation on this project.

Sanitary Sewer System Upgrade Study, Fairmont, West Virginia

Mr. Hollen assisted in site surveying and collecting data for an engineering report for the City of Fairmont to upgrade existing sanitary sewer systems in Meredith Springs and Dakota Camp.

Emergency Flood Repair, City of Belington, West Virginia

Mr. Hollen's responsibilities included design and construction observation for this emergency flood repair project that included three sanitary sewer lift stations.

Sanitary Sewer Improvements, Snowshoe Mountain Resort, Marlinton, West Virginia

Mr. Hollen's involvement included site surveying, evaluation, and replacement of portions of the existing sanitary sewer system for this resort.

Wastewater System Improvements, Monongah, West Virginia

This project entailed installing a new sanitary sewer forcemain and replacing portions of the existing sanitary sewer system. Mr. Hollen provided construction observation on this project.

Wastewater System Improvement, Beverly, West Virginia

Mr. Hollen was involved in design, site surveying, drafting, and construction observation for these wastewater system improvements.

Drainage System Improvements, Pruntytown Correctional Facility, West Virginia

Mr. Hollen participated in design and was responsible for construction observation for this correctional facility project near Grafton, West Virginia.

CSO Water Quality Report, Davis, West Virginia

Mr. Hollen was responsible for preparing this preliminary CSO Water Quality Report for the WVDEP.

CSO Water Quality Report, Belington, West Virginia

Mr. Hollen was responsible for preparing this preliminary CSO Water Quality Report for the WVDEP.

Facility Plan, Belington, West Virginia

Mr. Hollen was involved in preparation of the Wastewater System Facility Plan.

Master Plan Update, Elkins-Randolph County Airport, West Virginia

Mr. Hollen participated in the preparation of this airport master plan update.

Master Plan Update, Philippi-Barbour County Airport, Philippi, West Virginia

Mr. Hollen participated in the preparation of this airport master plan update.

Access Road, Upshur County Regional Airport, Buckhannon, West Virginia

Mr. Hollen was involved in the design of the access road for this regional airport.

Obstruction Removal, Mingo County Airport

Mr. Hollen was responsible for the preliminary design for the removal of obstructions in the navigable airspace at this airport.

Slide Remediation, Upshur Airport Authority, Buckhannon, West Virginia

Mr. Hollen assisted in the drafting of design documents and was responsible for construction observation for the Buckhannon-Upshur Airport Authority slide remediation project.

Apron Expansion and Taxiway Construction, Upshur County Regional Airport, Buckhannon, West Virginia

Mr. Hollen was involved in the design, drafting, and site surveying for this design and construction project.

Perimeter Fencing, Raleigh County Memorial Airport, Beckley West Virginia

Mr. Hollen participated in the design of this airport fencing project.

Parallel Taxiway, Elkins, West Virginia

Mr. Hollen was involved in the design and drafting for this parallel taxiway at the Elkins-Randolph County Airport.

Parallel Taxiway, Point Pleasant, West Virginia

Mr. Hollen was responsible for the design, drafting, site surveying, and construction observation of this taxiway project for the Mason County Airport Authority.

Drainage System Improvements, Martinsburg, West Virginia

Mr. Hollen was responsible for the construction observation of a drainage system improvements project for the Eastern West Virginia Regional Airport Authority.

Parallel Taxiway and Perimeter Fencing, Martinsburg, West Virginia

Mr. Hollen was involved in the design of this project for the Eastern West Virginia Regional Airport Authority.

Runway Safety Area Improvements, Mingo County Airport, West Virginia

Mr. Hollen was responsible for the preliminary design of these improvements at the Mingo County Airport.

Snow Removal Equipment Building, Upshur County Regional Airport, Buckhannon, West Virginia

Mr. Hollen assisted in the preliminary design of this project.

Snow Removal Equipment Building, Mason County Airport, Point Pleasant, West Virginia

Mr. Hollen assisted in the preliminary design of this project.

Snow Removal Equipment Building and Drainage Improvements, Elkins-Randolph County Airport, West Virginia

Mr. Hollen was responsible for construction observation of this snow removal equipment building and drainage systems improvement project.

Pavement Rehabilitation and Airfield Lighting, Wyoming County Airport, Pineville, West Virginia

Mr. Hollen assisted in the design and drafting for this pavement rehabilitation and airfield lighting installation project.

Runway Repairs, Mingo County Airport, West Virginia

Mr. Hollen was involved in the preliminary design for this project.

Natural Gas Service Station, Weston, West Virginia

Mr. Hollen was involved in the preliminary design of this project.

Food Lion Shopping Center, Buckhannon, West Virginia

Mr. Hollen was involved in the design and site surveying, drafting, and construction observation on the site development for this shopping center complex.

HVAC System, Clarksburg, VA Hospital, West Virginia

Mr. Hollen assisted in the design, drafting, and construction observation of this HVAC system designed for the Clarksburg VA Hospital.

HVAC Study, Glenville State College, West Virginia

Mr. Hollen assisted in the design, drafting, and field reconnaissance for this HVAC study project.

ADA Compliance Upgrade, Central National Bank, Buckhannon, West Virginia

Mr. Hollen was responsible for the preliminary study and design of renovations to bring the Central National Bank building into compliance with the Americans with Disabilities (ADA) Act.

Multi-Tenant Industrial Facility, Philippi, West Virginia

Mr. Hollen assisted in the design, drafting, and performed construction observation for this industrial facility and access road.

Parking Improvements, Buckhannon, West Virginia

Mr. Hollen was involved in the design and was responsible for drafting the parking improvements for the Upshur County Public Library.

Child Development Center, Buckhannon, West Virginia

Mr. Hollen's responsibilities included design, drafting, and construction observation on the Child Development Center of North Central West Virginia.

City Hall Renovation, Buckhannon, West Virginia

Mr. Hollen assisted in drafting and construction observation of this renovation project.

Upshur County Courthouse Annex, Buckhannon, West Virginia

Mr. Hollen's responsibilities included design, drafting, and construction observation.

Jenkins Ford Auto Body Repair Shop, Buckhannon, West Virginia

Mr. Hollen assisted in design and drafting, and was responsible for the construction observation of this project.

Architectural Study and Evaluation, Weston Hospital, Weston, West Virginia

Mr. Hollen assisted in this study and evaluation of the historical Weston Hospital for the Lewis County Development Authority for future use of the facility.

Architectural Renovations, Grafton Housing Authority, West Virginia

Mr. Hollen was responsible for all construction observation for architectural renovations designed for the Housing Authority in Grafton.

Architectural Renovations, Buckhannon, West Virginia

Mr. Hollen assisted in the design, and was responsible for the drafting and construction observation for architectural renovations designed for the Buckhannon Housing Authority.

Coal Mining Projects, West Virginia

Mr. Hollen's experience in the coal industry includes filing permits for construction of new underground mines, assisting in the design and layout of three new underground deep mines in Upshur and Barbour County, assisting in the design and drafting for a self-contained "paged system" wastewater treatment for a new underground deep mine, assisting in design and drafting of new security facilities for new and existing mines, and responsibilities for water sampling and data collection of receiving streams located near new and existing mines that was then used to establish a baseline on water quality before and during mining of the coal.

Street Map Preparation, South Charleston, West Virginia

Mr. Hollen was responsible for the design and drafting of the street map.

PROJECT EXPERIENCE PROFILES – CONSTRUCTION SERVICES

St. Joseph's Hospital Addition and Renovation Project, Buckhannon, West Virginia

Mr. Hollen served as the Clerk of the Works for this project. He was responsible for providing on-sight observation, reviewing and processing of all pay estimates and change orders, coordinating between the Owner and the Contractor, and for making sure the project was proceeding according to the schedule.

Talcott Elementary School Site Design, Talcott, West Virginia

Mr. Hollen served as the Project Manager for this civil and site improvement project for the new Talcott Elementary School. He was responsible for the oversight, design, and project administration of the project (from the conceptual stage through the construction stage), which included a new building site, design of three access roads, a stormwater collection system, a new water distribution system, a new wastewater collection system, and a packaged treatment plant.

Field for the Future, Upshur County Board of Education, Buckhannon, West Virginia

Mr. Hollen served as the project manger for this project which included the design of the new synthetic athletic filed, the design of the new stormwater collection system, the proposed waste area for the excavation material from the old field, and the preparation of all local, state, and federal permits required for the project.

Weaver Highwall and Mine Drainage, Barbour and Randolph Counties, West Virginia

Mr. Hollen provided engineering, design, and drafting for this AML project in central West Virginia.

AARON TONKERY, E.I.
Project Engineer

EDUCATION

B.S., Civil Engineering Technology, 2000
Fairmont State College
Fairmont, West Virginia

CERTIFICATIONS

West Virginia-Engineer Intern #07945

SUMMARY OF EXPERIENCE

Mr. Tonkery is a Project Engineer in the Buckhannon, WV office. His training and experience has included civil site design, highway design, water and wastewater engineering, abandoned mine lands projects, acid mine drainage projects, and NPDES permit writing.

Prior to joining R.D. Zande & Associates, Mr. Tonkery served as a Highway Engineer Trainee for the West Virginia Division of Highways (WVDOH).

PROJECT EXPERIENCE PROFILES

U.S. Route 35, WVDOH – Mason County, WV

Is a member of the project team that is currently designing roadway, stormwater, and sediment & erosion control plans for a 1.85 mile section of roadway near Point Pleasant. Also performed H&H studies on Twomile and Threemile Creeks using HEC-RAS software.

Greenland Gap Wind Energy Project, M.A. Mortenson – Grant County, WV

Is a member of the project team that is currently designing roadway, stormwater, and sediment & erosion control plans for 20+ miles of access roads to approximately 140 wind energy turbines.

Appalachian Corridor H, WVDOH – Mount Storm, WV

Is a member of the project team that is currently designing roadway, stormwater, and sediment & erosion control plans for a 1.61 mile section of roadway near Mount Storm.

Old Bridgeport Hill Mine Drainage Project, WVDEP – Clarksburg, WV

Participated in the site design, stormwater design, and cost estimating efforts on this AMD Project located in Harrison County, WV.

Gladly Fork Coal Company (Stonecoal Creek), WVDEP – Buckhannon, WV

Performed hydraulic calculations for intake lines of a chemical treatment facility used to treat acid mine drainage leading to Stonecoal Lake. Also performed stormwater calculations for project site and H&H study on a section of Stonecoal Creek.

Texas Roadhouse, Texas Roadhouse Landholdings, LLC – Parkersburg, WV

Performed site design, stormwater management, and all permit applications for this restaurant built in Wood County.

Holiday Inn Express, Quest Development Co. – Weston, WV

Prepared stormwater management plan and assisted in the site design for this hotel proposed to be constructed in Lewis County.

Huntington Streetscape Phase II, City of Huntington – Huntington, WV

Prepared stormwater design for this streetscape project located in Cabell County.

Laurel Lake Sediment Removal Project, WVCA – Mingo County, WV

Participated in the design in which sedimentation was removed from the upper portions of Laurel Lake.

North Fork of Hughes River Streambank Stabilization Project, WVCA – Cairo, WV

Performed an H&H study using HEC-RAS for this streambank stabilization project.

Spencer Hydrologic & Hydraulic Study, WVCA – Spencer, WV

Performed an H&H study using HEC-RAS along Spring Run through the town of Spencer.

Danehart Acid Mine Drainage (AMD) Project, ODNR – Yorkville, OH

Participated in the site design, stormwater design, and cost estimating efforts on this AMD project. This project, located in Belmont County, Ohio involved a failed ditch that created unstable spoil slopes behind a residence. The project included geotechnical investigations, field surveying to develop mapping, property surveying to define project limits, engineering design with quantity calculations, and development of specifications and construction plans.

Flint Run Acid Mine Drainage (AMD) Project, ODNR – Jackson County, OH

Assisted in the design of the drainage plan to treat acid mine drainage. The Flint Run AMD Reclamation Project is comprised of about 171 acres of ponds, lakes, spoil piles, orphan highwalls, and exposed, covered and vegetated fine and coarse coal refuse. The project area discharges what is considered the “worst” acid mine drainage in the State of Ohio and has been identified as the largest contributor of acid mine drainage to the Little Raccoon Creek watershed.

Murray City Acid Mine Drainage and Art Project, ODNR – Hocking County, OH

Participated in the site design, stormwater design, and cost estimating efforts on this AMD and Art Project. A combination of Stabilization Ponds, Successive Alkaline Producing Systems (SAPS), and Precipitate Ponds were used to passively treat the acid mine drainage discharging into Snow Fork Creek.

Nutter Tipple Reclamation Project, ODNR – Logan, OH

Computed quantities and performed other calculations, as well as assisted with cost estimating efforts on this Abandoned Mine Lands (AML) project. This project involved reclamation of a 7.2-acre abandoned coal tipple site that contained ASTs, USTs, and other potential hazmat environmental concerns.

Pope Properties, Mr. Joe Pope – Cross Lanes, WV

Assisted in the design of a wastewater collection system and water distribution system for an apartment complex.

Pizza Hut, Mr. David Rexroad – Buckhannon, WV

Assisted in the civil site design that included stormwater management plans.

Risk Assessment, Various County Commissions – West Virginia

Performed cost estimate loss calculations for the Hazard Risk Assessments per the guidelines in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, for Doddridge, Preston, and Taylor County Commissions in West Virginia.

Institute for Software Research, Central Contracting Company – Fairmont, WV

Provided resident construction observation services on the development of this site.

Hazleton Federal Prison, P.J. Dick Corporation – Hazleton, WV

Performed floor flatness and levelness testing on concrete floor surfaces of various buildings at the Hazleton, WV Federal Prison site.

Project Impact, Tucker / Randolph County Commissions – West Virginia

Was involved in the placement of USGS benchmarks that established certified flood plain elevations throughout Randolph and Tucker Counties.

West Virginia State College Economic Assessment, WVSC – Institute, WV

Prepared an Economic Depreciation Assessment of an Anaerobic Digester Pilot Plant for West Virginia State College.

NPDES Permit Application Forms

Assisted in the preparation of appropriate documents and mapping for obtaining NPDES Permits on the following projects:

- Deer Creek Development, Deer Creek Ridge, LLC – Buckhannon, WV
- Auto Disposal Systems, Inc., ADS, Inc. – Buckhannon, WV
- State Office Consolidation Building, BBL Carlton – Huntington, WV
- A.F. Wendling, Inc., AFW, Inc. – Buckhannon, WV
- Wabasso Village, Wabasso Homeowner's Association – Snowshoe, WV
- Treetop Village, Treetop Homeowner's Association – Snowshoe, WV
- Lease Offices of Bunker Hill, Mr. Jim Smith - Bunker Hill, WV
- Universal Well Services, Inc., UWS, Inc. – Buckhannon, WV
- Pizza Hut Site Location, Mr. David Rexroad – Buckhannon, WV
- Upper Tract Bridge, WVDOH – Pendleton County, WV
- Mile Branch Bridge, WVDOH – McDowell County, WV
- Lignetics, Inc. Stormwater Improvement Project, Lignetics, Inc. – Glenville, WV
- Jemsite Development Intersection, Jemsite Development LLC – Buckhannon, WV
- Countryside Estates, Mrs. Sharon K. Strader – Buckhannon, WV
- Ace Landholdings, LLC, Mr. C.J. Martin – Jane Lew, WV
- Northwest Quad Development Site, Mr. David R. Rexroad – Clarksburg, WV
- Baker-Atlas, Mr. C.J. Martin – Buckhannon, WV
- Texas Roadhouse, Texas Roadhouse Landholdings, LLC – Parkersburg, WV
- Greenland Gap Wind Energy Project, M.A. Mortenson – Grant County, WV
- U.S. Route 35, WVDOH – Mason County, WV
- U.S. Route 33-Corridor H, WVDOH – Grant County, WV

EDUCATION

A.S., Surveying Technology,
Penn State University

REGISTRATIONS

Professional Surveyor,
West Virginia (#627), 1979

SUMMARY OF EXPERIENCE

Mr. Calkins has a diverse background in civil site design, surveying, and construction layout, as well as experience in environmental testing, analysis and remediation. He has utilized SurvCad with AutoCAD and AutoCAD Land Development with AutoCAD to produce quality, accurate plans, cross sections, and volume calculations. Mr. Calkins' experience includes providing specifications for construction activities on numerous Abandoned Mine Land projects in West Virginia and Ohio and Bond Forfeiture sites in West Virginia.

Mr. Calkins has over thirty years of experience in all types of surveying procedures, ranging from small to large property surveys, construction surveys associated with coal mining activities, construction surveys ranging from small civil site surveys to multi-million dollar construction projects, and design surveys including topographical and planimetric surveys for project sites of all sizes. He has also performed quantity calculations and developed design criteria for numerous projects of small and multi-million dollar sizes requiring design quantities, design plans, and design specifications for bid submittals.

Mr. Calkins also has considerable experience with environmental permit and reporting requirements for such diverse applications as surface and deep mine permitting requirements for the States of West Virginia and Maryland; Phase I Environmental Site Assessments for private individuals and lending institutions; Corps of Engineers and West Virginia permits for construction activities within streams and wetlands, as well as other permitting requirements such as NPDES permits, calculation briefs and hydraulic calculations.

Mr. Calkins has designed simple cut and fill construction operations, complex site designs involving hydrologic and hydraulic calculations, wetland enhancements such as design of man-made wetlands, and passive acid mine drainage treatment designs.

PROJECT EXPERIENCE PROFILES

Hodgesville PSD Waterline Extension Feasibility Study, Upshur County, West Virginia

Mr. Calkins was the Project Manager for the preliminary investigation and AML&R grant report and supporting documents for the Hodgesville PSD Waterline Extension located in Upshur County, West Virginia. The project involved extending about 1.5 miles of eight-inch waterline to serve twelve residents whose water supply had been diminished or contaminated by pre-1977 mining. The project involved a preliminary investigation to determine the impact pre-law mining has had on the water resources within the study area. This study included surface and ground water sampling and public and private record search to determine if resident's potable water supply had been impacted by mining, and if the mining that impacted potable water supplies occurred prior to the Surface Mining and Reclamation Control Act of August 3, 1977. Pre-law impacts qualify for assistance from the Abandoned Mine Lands program. The final report included a complete hydrologic and geologic investigation of the study area and development of supporting documents to apply for the AML&R Grant of the waterline extension.

Flint Run East Acid Mine Drainage Reclamation Project

Mr. Calkins served as the Project Manager on this \$1.3 million Abandoned Mine Lands Reclamation Project located in Jackson County, Ohio. The Flint Run Acid East Acid Mine Drainage Reclamation Project required 44-drafted construction plan sheet (24" x 36") and Detailed Conditions and detailed Specifications. The Project hydrologically isolated a coal refuse fill area and constructed passive acid mine drainage treatment systems to add alkalinity to Project waters. The Project also involved implementation of a sediment and erosion control plan, clearing and grubbing operations, and controlled release of approximately 12.8 M gallons of impounded waters within the Project area. The scope of the work will be to excavate approximately 73,091 cubic yards of material to install and construct site drainage conveyance structures through and around the Project area. An additional 207,600 cubic yards of materials will be moved to provide positive drainage toward constructed drainage conveyance structures and away from the coal refuse fill area. Approximately 17,381 cubic yards of material will be moved to construct passive acid mine drainage treatment systems and approximately 42,143 cubic yards of these materials will be required for construction of compacted embankments associated with the passive acid mine drainage treatment systems and soil lining for ditches and channels. Some encountered materials and some cleared and grubbed materials will require special handling and placement.

Site drainage conveyances include approximately 2,450 linear feet of vegetation lined "vee" bottom ditches; 4,200 linear feet of rock riprap "vee" bottom ditches; and 8,750 linear feet of flat bottom and broad crested spillway rock riprap channels. A 24-inch, twin 30-inch, and a 36-inch PE culvert will be installed in connection with construction of site drainage conveyances.

Passive acid mine drainage treatment systems to be constructed include a Sediment Pond, a SAPS Pond, a Wetland Ditch, a Horizontal Limestone Bed Pond, a Fresh Water Storage Pond, a Steel Slag Leach Bed, and three (3) associated Flush Ponds. Construction activities will include installation of custom and standard perforated underdrain piping systems and header pipes; solid outlet pipes (with anti-seep collars through embankments); various riser pipes; and construction of connector and outlet ditches between system structures. Outlet pipes will require either butterfly or screw gate valves to control flows and connector ditches will require construction and installation of flow measurement weirs. Other components of the passive treatment system include ODOT sized No. 2 Stone (limestone), Mushroom Compost, and various sized Steel Slag.

Old Bridgeport Hill Mine Drainage, Phase II

Mr. Calkins served as the Project Manager on this \$312,000 Abandoned Mine Lands construction Project located in Harrison County, West Virginia. The Project involved capturing and conveying mine drainage around several businesses located down gradient of a large abandoned mine. Four (4) wet mine seals were designed and approximately 1,400 linear feet of grouted rock riprap ditch, 80-foot subsurface drain, eight culverts, a manhole, and three drop inlets. The Project required close coordination with the West Virginia Department of Highways to marry the Abandoned Mine Lands project to an on-going storm sewer system construction Project. Mr. Calkins successfully negotiated moving several proposed drop inlets on the new storm sewer system constructed by the WVDOH to provide convenient outlets for piping and ditches from the Abandoned Mine Lands Project. The Project also involved dewatering and treatment of approximately 17.4 M gallons of water estimated to be in the mine pool behind wet mine seal constructions. Several of the constructions were located in very close proximity to local business buildings and in a buried and overhead rich mine field. Close coordination with the businesses and both public and private utilities were a necessary part of this Project.

Hodgesville PSD Waterline Extension Feasibility Study, I.D. No. 275

Mr. Calkins was the Project Manager for the Preliminary Investigation and AML&R Grant report and supporting documents for the Hodgesville PSD Waterline Extension located in Upshur County, West Virginia. The Project involved extending about 1.5 miles of eight-inch waterline to serve twelve residents whose water supply had been diminished or contaminated by pre-1977 mining. The Project involved a Preliminary Investigation to determine the impact pre-law mining has had on the water resources within the study area. This study included surface and ground water sampling and public and private record search to determine if residents potable water supply have been impacted by mining. And second, if the mining that impacted potable water supplies occurred prior to the Surface Mining and Reclamation Control Act of August 3, 1977. Pre-law impacts qualify for assistance from the Abandoned Mine Lands program. The final report included a complete hydrologic and geologic investigation of the study area and development of supporting documents to apply for the AML&R Grant for the waterline extension.

McElwain Waterline Extension Feasibility Study, I.D. No. 271

Mr. Calkins was the Project Manager for the Preliminary Investigation and AML&R Grant report and supporting documents for the McElwain Waterline Extension located in Webster County, West Virginia. The Project involved either extending about 0.6 miles of six-inch waterline or drilling a new well to serve the McElwain Residence. The McElwain residence has had their potable water supply diminished and contaminated by mining operations. The Project involved a Preliminary Investigation to determine the impact pre-law mining has had on the water resources within the study area. This study included surface and ground water sampling and public and private record search to determine if McElwain's potable water supply have been impacted by mining. And second, if the mining that impacted the potable water supply occurred prior to the Surface Mining and Reclamation Control Act of August 3, 1977. Pre-law impacts qualify for assistance from the Abandoned Mine Lands program. The final report included a complete hydrologic and geologic investigation of the study area and development of supporting documents to apply for the AML&R Grant for the waterline extension.

Arlington (Cox) Drainage Emergency

Mr. Calkins served as the Project Manager on this \$72,000 emergency abandoned mine lands project. Due to the emergency classification, fieldwork and generation of construction plans and specifications was on an accelerated time frame. The Project involved acid mine drainage that was impacting a single family dwelling and caused mold and mildew to develop in the basement to an extent the family's asthma sensitive children required medical attention. From start to completion the Project took only three (3) weeks to complete, including field surveying and mapping, water sampling of the mine pool and seeps, design and implementation of a subsurface investigation plan to define the mine pool and coordinate construction activities in the abandoned mine with the existing dwelling. The Project included dewatering and treatment of an estimated 9.2 M gallons of water estimated to be in the mine pool behind collapsed entryways. The Project involved approximately 700 cubic yards of excavation and regrading, installation of wet mine seals and subsurface drains around the dwelling, approximately 250 feet of ditch installation, sediment control, clearing and grubbing, and revegetation of all disturbed areas.

Sauls Run Strip and Landslide Emergency

Mr. Calkins served as the Project Manager on this \$580,000 emergency abandoned Mine Lands Project. Due to the emergency classification, fieldwork, and generation of construction plans and specifications was on an accelerated time frame. The Project was completed from start to finish in four (4) weeks, including field surveying to supplement existing aerial photography, design and implementation of an extensive subsurface investigation plan, and design of the Project to meet WVDEP goals. The Project involved three (3) slips that were threatening three (3) homes located in Lewis County, West Virginia. The Project involved approximately removing and regrading approximately 50,000 cubic yards of material to provide stable slopes behind these houses. The Project also involved approximately 4,100 feet of constructed ditch, sediment control, clearing and grubbing, and revegetation of all disturbed areas. The Project involved a comprehensive subsurface investigation plan and analyses of existing slope stability, as well as proposed slope stability. The accompanying construction specifications allowed prospective Contractors to choose from two reclamation plans. One plan was haul all excess material off-site to a disposal area approved by the WVDEP and the other plan involved keeping all excavated materials on-site. The on-site approach required design and installation of rock underpads and rock french drains to ensure slope stability and provide free draining of placed backfill materials.

Weaver Highwall and Mine Drainage

Mr. Calkins served as Project Manager on this \$750,000 abandoned mine lands Project located in Barbour and Randolph Counties in West Virginia. The Project involved approximately 4,200 linear feet of highwall varying in height from 25 feet to 50 feet; at least twenty (20) collapsed openings, thirteen (13) of which are discharging acid mine drainage; several scattered refuse piles and numerous subsidence features above the orphan highwall, some of which capture surface streams; scattered household trash and abandoned automobiles; and uncontrolled mine drainage that impacts down gradient residents. Historic water data estimates of acid mine drainage flowing from the seeping collapsed portals is approximately 95 gallons per minute exhibiting a pH of 3.2 with acidity concentrations around 200 mg/l, iron concentrations around 10 mg/l, aluminum concentrations around 15 mg/l, and manganese concentrations around 2 mg/l. The Project involved approximately 50,000 cubic yards of backfill, regrading, and refuse cover, approximately 4000 feet of constructed ditches in the form of open limestone ditches (an integral part of the passive treatment system), four (4) limestone pond passive acid mine drainage treatment systems, sediment control, clearing and grubbing and trash removal, and revegetation of all disturbed areas. The Project also involved a large subsurface investigation program to quantify mine pools within the large abandoned deep mine complex feeding the seeping collapsed portals. A total of fourteen (14) holes were drilled and four (4) piezometers were installed to monitor the mine pool during the design phase. Wetlands were delineated and a State 401 Certification and USACOE Nationwide 27 Permit was obtained for the construction Project.

McElwain Waterline Extension Feasibility Study, Webster County, West Virginia

Mr. Calkins was the Project Manager for the preliminary investigation and AML&R grant report and supporting documents for the McElwain Waterline Extension located in Webster County, West Virginia. The project involved either extending about 0.6 miles of six-inch waterline or drilling a new well to serve the McElwain Residence.

Old Bridgeport Hill Mine Drainage, Phase II, Harrison County, West Virginia

Mr. Calkins served as the project manager on this abandoned mine lands construction project located in Harrison County, West Virginia. The project involved capturing and transporting mine drainage around several businesses located down gradient of the abandoned mine.

Flint Run East Acid Mine Drainage Reclamation Project, Jackson, Ohio

Mr. Calkins served as the project manager on this \$1.3 million abandoned mine lands reclamation project located in Jackson County, Ohio. The Flint Run acid east acid mine drainage reclamation project required 44-drafted construction plan sheet (24"x36") and detailed condition and detailed specifications. The project hydrologically isolated a coal refuse fill area and constructed passive acid mine drainage treatment systems to add alkalinity to project waters. The project also involved implementation of a sediment and erosion control plan, clearing and grubbing operations, and controlled release of approximately 12.8 M gallons of impounded waters within the project area.

**Ohio Abandoned Mine Lands Projects, Ohio Department of Natural Resources
Midvale Coal Number 7, Tuscarawas County, Ohio**

Mr. Calkins served as the Project Manager for the surveying and mapping of the Midvale Coal Number 7 project. This project included field surveying and development of mapping on about 38 acres of severely disturbed land encompassing an abandoned coal tippie and refuse disposal site. The project scope also included coal refuse testing and neutralization recommendations, off-site soil borrow delineation and testing, and hazmat (PCB) testing and reporting.

Misco Burning Gob, Perry County, Ohio

Mr. Calkins served as the Project Manager for this project, developing mapping from aerial photography. GPS surveying techniques were used to set aerial photography control. In addition, GPS techniques were used to verify the accuracy of the aerial mapping developed.

Murray City AMD and Art Project, Murray City, Ohio

Mr. Calkins served as the Project Manager and primary designer for this innovative project, which is only the second of its type in the United States, combining mediation of environmental problems with art. The \$619,000 project will combine passive treatment of acid mine drainage with community awareness and recreation facilities.

Mr. Calkins developed construction plans and specifications for competitive bids to build the passive acid mine drainage treatment system. The project required 26-drafted construction plan sheets (24"x36"). Tasks included literature research, historical water quality and quantity data review, and field data collection to begin the process of plan development and fulfill requirements for necessary permits. Completed Environmental Assessment, Ohio EPA Notice of Intent, and local floodplain coordinator permits were submitted and approved for the project.

Field data collection included surveying tasks to supplement existing mapping to match FEMA and USGS elevations, locating and mapping underground utilities, staking and mapping proposed boreholes, surveying and mapping floodplain and floodway cross sections, and expanding the mapped area to the north by some eight hundred feet. RDZ developed and implemented a subsurface investigation plan to define and identify materials to be encountered during construction excavation operations, to identify and quantify potential soil borrow areas, and to define the mine pool elevation contributing to the seeps, through installation of a piezometer into the deep mine works.

R.D. Zande developed spreadsheets using historical water quality and quantity data from MCRP to identify and define the seeps impact on Snow Fork Creek and for proper sizing of the passive acid mine drainage treatment systems. The Murray City seeps contribute 22% of the acid load to Snow Fork Creek. Hydrologic and hydraulic calculations of the area were performed to ensure proposed constructions would in no way exacerbate local flooding problems. R. D. Zande developed an innovative design of an upstream alkaline addition system coupled with sized series of alkaline addition systems ponds (SAPS) to mitigate the acid mine drainage emanating from the abandoned deep mine works. R.D. Zande designed wet mine seals to be installed in the collapsed mine openings to eliminate potential uncontrolled mine blowouts, to stabilize the mine pool, and to ensure continued positive flow through the designed treatment system. The severity of the acid mine drainage dictated a two-stage SAPS system conforming to area constraints while incorporating recreation facilities to be built in Phase II of the Project. These constraints limited the quantity of acid mine drainage the system could effectively treat.

R. D. Zande developed a back-up upstream alkaline addition treatment system that would discharge during high run-off periods to mitigate high flow acid mine drainage bypassing the proposed SAPS treatment system. In this manner, all of the acid mine drainage emanating from the seeps would be exposed to a treatment process prior to discharge into Snow Fork Creek. Construction activities were further hampered by governmental restrictions inside the floodplain and floodway of Snow Fork Creek.

The location of the seeps, close in elevation to Snow Fork Creek, provided another challenge in the design to ensure positive flows through the systems prior to final discharge points on Snow Fork Creek. The final design included a mine pool equalization pond, an upstream alkaline addition pond, raising Township Road about four feet in elevation to accompany flows through the system, two SAPS ponds, two aeration ponds, an aluminum precipitate pond, ditches and channels with engineered linings to direct water through or around the system, a sediment and erosion control plan, and re-establishment of vegetation with a mowing and vegetation maintenance plan.

Nutter Tipple D-716 Bond Forfeiture Project, Perry County, Ohio

Mr. Calkins served as the Project Manager and primary designer on this \$97,000 project. This project involved reclamation of a 7.2-acre abandoned coal tipple site that also contained ASTs, USTs, and other potential hazmat environmental concerns. Mr. Calkins managed the surveying that complimented available aerial mapping and conducted subsurface investigations to determine the slope stability of Ohio SR 93 along the project limits. Mr. Calkins developed bid-ready construction plans and specifications based upon ODNR's preferred reclamation alternative. The project required 24-drafted construction plan sheets (24" by 36") and site specific Detailed Conditions and Detailed Specifications. Nutter Tipple included debris and hazmat material handling and removal, 14,194 yards of regrading, 1,500 LF of channels and ditches with engineered linings, temporary and permanent erosion control plans, 225 feet of underdrain, and 7.2 acres of re-vegetation and mowing maintenance fertilizer requirements. Mr. Calkins developed a calculation brief with project quantities and completed an engineer's cost estimate.

Flint Run Acid Mine Drainage Reclamation Project, Jackson County, Ohio

Mr. Calkins served as the Project Manager and primary designer for this project. The project is comprised of about 171 acres of ponds, lakes, spoil piles, orphan highwalls, and exposed and covered vegetated fine and coarse coal refuse. The project area discharges the worst acid mine drainage in the State of Ohio and has been identified as the largest contributor of acid mine drainage to the Little Raccoon Creek watershed.

Mr. Calkins managed an in-depth field and literature investigation of the site, including the present and past land uses and owners of the project area; literature and field investigation of the local geology and immediate investigation of four lakes, eleven impoundments, seventeen monitoring wells, and twenty-four surface water sites to quantify and qualify the ground and surface water at the project site; hydrographic field surveying to determine impounded water quantities and quality as well as lakebed sediment identification and analysis; a groundwater trace study to determine hydraulic connections between the lakes, ponds and depressions and the coal refuse fill areas; and conventional and GPS field surveying techniques to determine the accuracy of mapping development.

These investigations resulted in a report detailing the results of the literature and field investigations, probable sources and causation of acid mine drainage, and remediation and reclamation alternatives to abate the acid mine drainage and other environmental problems associated with the site. An innovative design of up-stream alkaline addition leach beds, coupled with open limestone channels and aerobic wetlands were proposed to reduce or eliminate acid mine drainage with acidities ranging to 7,000 mg/l. The final report detailed six reclamation alternatives with approximate construction quantities and associated costs for each alternative detailed, including a preferred alternative with reclamation costs exceeding \$4.6 million.

Danehart Acid Mine Drainage Reclamation Project, Belmont County, Ohio

Mr. Calkins served as the Project Manager and primary designer for this project. The project involved a failed ditch that created unstable spoil slopes behind a residence. Mr. Calkins managed the geotechnical investigations, field surveying to develop mapping, property surveying to define project limits, engineering design with quantity calculations, and development of specifications and construction plans. Mr. Calkins developed bid-ready construction plans and specifications based on ODNR's preferred reclamation alternative. This \$56,000 project required 15-drafted construction plan sheets(24"x36").

The project included 510 cubic yards of regrading, 150 LF of channels and ditches with engineered linings, 72 feet of underdrain, an eighty foot-long pier and cribbing retaining wall up to fifteen high, sediment and erosion control plans, and 0.3 acres of revegetation and mowing maintenance fertilizer requirements. Mr. Calkins developed a calculation brief with project quantities and completed an engineer's cost estimate.

Linden Acid Mine Drainage Bioremediation

Mr. Calkins served as the Project Manager for the generation of mapping from GPS field surveying on this four-acre site. The existing conditions map included topographic and planimetric features generated from field data and drawn in CADD-based computer system.

Muddy Creek Tipple Complex, West Virginia Division of Environmental Protection

Mr. Calkins served as Project Manager and primary designer for this Abandoned Mine Lands project. This \$900,000 construction project involved two coal refuse piles with unstable outcrops that required regrading and stabilization, numerous deep mine entries that required wet and dry seals, dilapidated mine tipple structures that required demolition, soil borrow area design and computations, site survey and cross sections, site water and soils analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design and computations.

Lake Milton Investigation, Jackson County, Ohio

Mr. Calkins served as the Project Manager and primary designer for this project. The Lake Milton Investigation involved embankment stabilization determination and impounded water quantity and quality, as well as sediment identification and analysis. This 220-acre impoundment had developed a piping leak that had compromised the integrity of the impoundment embankment. Mr. Calkins conducted in-depth literature and field investigations including current and past land uses, a geotechnical investigation (embankment stability), aerial mapping, ground water and surface water quantity and quality, and impounded water quality and quantity and sediment identification. The investigation resulted in a report detailing existing and historic conditions at the site, the current stability of the embankment, water quality and quantity, lakebed sediment and impounded water quantities, and reclamation design alternatives with approximate construction quantities and costs associated with each design alternative.

Brownton School Refuse, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this Abandoned Mine Lands project. This \$350,000 construction project involved two coal refuse piles with unstable outcrops that required regrading and stabilization, a slip that required regrading, stabilization and drainage control construction, installation of a steel arch culvert beneath the County Road, soil borrow area design and computations, site survey and cross sections, site water and soils analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design and computations.

Superior Hydraulics Abandoned Mine Lands Project, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this \$150,000 construction project that involved de-watering a large underground mine pool to relieve hydraulic pressure on collapsed entryways and allow safe installation of wet mine seals to continually drain impounded waters, removal and demolition of several coke ovens at the base of steep topographical slopes, mine discharge water treatment plants, site survey and cross sections, and site drainage evaluation, design, and computations.

Connors Highwall, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this \$180,000 construction project. It involved approximately 2,500 LF of orphaned unstable highwall that required backfilling, installation of two 42-inch reinforced concrete culverts beneath a county road, site survey and cross sections, site water and soils analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design, and computations.

Bismark Strip Drainage and Refuse, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this Abandoned Mine Lands \$1.0 million construction project, which involved scattered coal, refuse that required regrading, soiling, and revegetation. The project area encompassed several acid mine drainage seeps. Utilizing evolving technology, Mr. Calkins designed passive water treatment facilities and constructions to neutralize about 330 gallons per minute of acid mine drainage. The project also required soil borrow area design and computations, revegetation and seed and fertilizer application rate calculations, site survey and cross sections, site water and soils analysis and evaluation (including a six-month baseline to determine the site's effect on local surface and groundwater regimes), and site drainage evaluation, design, and computations.

Burdock Highwall Abandoned Mine Land Project, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this \$85,000 abandoned mine lands construction project that involved scattered coal refuse, about 1,400 LF of highwall that required backfilling, soil borrow area design and computations, site survey and cross sections, site water and soils analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design and computations. Mr. Calkins supervised the topographic survey of the site and computer generation of existing site conditions, including topographical and planimetric features.

Pringle Drainage Abandoned Mine Land Project, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer of this project which involved scattered coal refuse around three collapsed mine portals. The scattered refuse required soil cover with borrow material and the collapsed mine portals required wet mine seals and backfilling the associated depressions. The project included soil borrow area design and computations, revegetation and seed and fertilizer application rate calculations, site survey and cross sections, site water and soils analysis and evaluation, and site drainage evaluation, design, and computations. Mr. Calkins supervised the topographic survey of the site and computer generation of existing site conditions, including topographical and planimetric features.

Francis Drainage and Refuse, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this Abandoned Mine Land \$1.2 million construction project which involved two refuse piles as well as scattered coal refuse that required regrading, soiling, and revegetation. The project area encompassed several acid mine drainage seeps. Utilizing evolving technology, Mr. Calkins designed passive water treatment facilities to include wetlands, anoxic limestone drains, reverse alkaline producing systems, a series of alkaline producing systems, and constructions to neutralize about 600 gallons per minute of acid mine drainage. The project also required soil borrow area design and computations, revegetation and seed and fertilizer application rate calculations, site survey and cross sections, site water and soils analysis and evaluation (including a six-month baseline to determine the site's effect on local surface and groundwater regimes) and site drainage evaluation, design, and computations.

Adaland Tipple and Refuse, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and designer for this \$100,000 Abandoned Mine Land construction project that involved two coal refuse piles with unstable outcrops that required regrading, stabilization and revegetation. Potentially hazardous materials, including asbestos, unknown petroleum-based liquids, car batteries, gasoline tanks, and tires were present within the project limits. The project required soil borrow area design and computations, revegetation and seed and fertilizer application rate calculations, site survey and cross sections, site water and soils analysis and evaluation, hazardous materials quantification and qualification, and site drainage evaluation, design, and computations.

Zebs Creek Highwall, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this \$1.0 million Abandoned Mine Land construction project that involved approximately 6,500 LF of orphaned unstable highwall that required backfilling, remediation of affected existing wetlands, site survey and cross sections, site water and soils analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design and computations. A Corps of Engineers and West Virginia Water Resources permit was required to eliminate wetlands and mitigate eliminated wetlands on-site. Two of the three wetlands designed for mitigation were functional in that acid mine drainage was passively treated in these wetlands.

Clarksburg (Ryder Avenue) Drainage, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager and primary designer for this Abandoned Mine Lands \$65,000 construction project that involved several homes located at, or near, the cropline of a coal seam and along the down dip side of a large abandoned underground mining operation. The homes experienced drainage problems in basements or yards. The project required design of an underdrain system to intercept water from the mines before it reached local residents. Subsidence support, in the form of backstowing with stone aggregate, was also designed and provided for yards exhibiting subsidence depressions.

Thomas (Euclid Avenue) Subsidence, West Virginia Division of Environmental Protection

Mr. Calkins served as Project Manager and primary designer for this \$3.2 million Abandoned Mine Lands construction project that involved regrading an abandoned surface mine located up-dip of an abandoned deep mine. The surface mine area had several large depressions impounding water that eventually leaked into the deep mine works causing pillar deterioration and accompanying subsidence damage to several homes located down-dip, but adjacent to the surface mine area. The project required regrading operations, site survey and cross sections, site water and soil analysis and evaluation, revegetation and seed and fertilizer application rate calculations, and site drainage evaluation, design and computations. Approximately ninety structures required stabilization through designed drill hole patterns and injection of grout and concrete to provide subjacent support to these structures.

Bond Forfeiture Program, West Virginia Division of Environmental Protection

Mr. Calkins served as the Project Manager in evaluating 435 Bond Forfeiture sites within the State of West Virginia. Under this contract, field reconnaissance was conducted with water samples obtained at all discharge points. Upstream and downstream water samples were also obtained on receiving streams to determine the site impact on the local surface water regime. On sites where detrimental stream impacts were observed, a six-month baseline water study was developed to determine seasonal variations in water quality and quantity. As bond forfeiture monies allowed, select sites were chosen for construction work that would eliminate or otherwise positively impact receiving streams. Most of these projects utilized evolving technology to passively treat the acid mine drainage emanating from these sites.

Small Operators Assistance Program (SOAP), States of West Virginia and Maryland

Mr. Calkins served as the Project Manager for numerous SOAP programs in West Virginia, and for Mountaineer Mining Company's SOAP application for Maryland. In this capacity, he was responsible for administering state contracts to aid qualifying small operators in meeting all requirements for and obtaining proper State and Federal government permits for surface and deep mining operations. His responsibilities encompassed field and laboratory evaluations and testing which included hydraulic and hydrologic studies encompassing groundwater and surface water evaluations, and design of six-month baseline sampling to delineate project area impacts on local hydrologic regimes; geologic investigations, testing and recommendations (including drilling, sampling and testing of all overburden to be disturbed by the project), surveying of haul roads, pre-blast surveys; sediment pond areas, and spoil placement areas; and meeting criteria for the State Historic Preservation Office.

Grafton Coal Company, Clarksburg, West Virginia

Mr. Calkins served as party chief and engineering technician for this major coal producing company. He conducted surveys on all phases of surface and deep mining operations, including sediment control structures, haul roads, valley fills, property and mineral lines, and deep mine direction and control.

Mr. Calkins was also in charge of several Abandoned Mine Lands construction projects that included cut and fill operations as well as burning coal refuse extinguishment. He was also in charge of office calculations associated with those operations. These calculations ranged from deep mine projections and mapping to reserve calculations and mine feasibility studies. Other duties included tonnage estimates, reserve calculations, stockpile volumes, hydraulic and hydrologic calculations and design, valley fill and haul road designs, and reporting to private individuals and government agencies.

Philippi Bypass, Philippi, West Virginia, Central Contracting Company

This project constructed 0.821 miles on new two-lane highway to modern standards and included a 900-foot bridge across the Tygart Valley River. Mr. Calkins was the office coordinator and was responsible for all construction layout computations, including final subgrades, final grades, and other ancillary constructions associated with this project. Because unknown deep mine works were encountered on a portion of this project, the profile grades and associated cross grades had to be re-designed and submitted to the WVDOH for approval and construction. Additionally, several intersection grading plans had to be re-designed and submitted to WVDOH for approval and construction.

Route 279, Harrison County, West Virginia, Groundbreakers, Inc.

This project involved construction of the North Bridgeport Bypass in Harrison County, West Virginia to modern standards. Mr. Calkins was responsible for all final grade calculations. Additionally, the alignment and profile grade of an ancillary road had to be redesigned to accommodate additional spoil room for the main relocation and construction.

Interstate 64 Bridge over 40th Street, Nitro, West Virginia, National Engineering and Contracting

This project involved rehabilitation of an existing interstate bridge to accommodate an additional lane of traffic in both directions. Additionally, approximately 2,000 feet of Interstate 64 was redesigned (design/build) to accommodate three lanes of traffic in each direction. The bridge was located on a curve at full superelevation, which complicated the design and computations for this project. Mr. Calkins was responsible for all layout computations including final grades and bridge grades.

Charleston Newspaper Parking Garage, Charleston, West Virginia, BBL Carlton

This project involved construction of a five-story parking garage located on a restricted lot in Charleston, West Virginia. Mr. Calkins was responsible for layout computations and design and implementation of a foundation drainage system.

Interstate 79, Harrison County, West Virginia, BECDIR Construction Company

This project involved rehabilitation of the Meadowbrook Bridge to accommodate an additional lane of traffic in each direction. Additionally, approximately 1,900 feet of Interstate 79 was redesigned (design/build) to accommodate three lanes of traffic north of the bridge and four lanes of traffic south of the bridge. Mr. Calkins was responsible for all layout computations including final grades and bridge grades.

Corridor H, Moorfield, West Virginia, Odom Construction Company

This project involves construction of four miles of interstate standard road through some of the most rugged terrain in West Virginia. Initial work on this project involved staking, clearing, and grubbing limits, verifying field reference monuments, and obtaining waste permits for more than 2,000,000 cubic yards of excess excavated materials. Mr. Calkins was responsible for office calculations and design of waste fills and sediment control structures.

Burnsville Dam, Burnsville, West Virginia, US Army Corps of Engineers

Mr. Calkins served as survey crew chief for construction of the dam from initial ground breaking to final quantity calculations and project acceptance by Corps of Engineers. Duties included layout and calculations for the dam and appurtenances, layout and calculations for two access roads, two waste dumps and two quarries.

Relocation and Construction of U.S. Route 50, WVDOT

Mr. Calkins served as survey crew party chief on the upgrade of US Route 50 to interstate standards and associated relocation of city streets, utilities, and other appurtenances through Clarksburg, West Virginia. The project included 2.5 miles of four-lane highway, 0.75 miles relocation of US Route 19, relocation and reconstruction of County Routes, three roadway bridges, two railroad bridges, five retaining walls, channel relocation and construction with energy dissipaters, and numerous utility relocations. Mr. Calkins also performed volume calculations for cut and fill operations as well as borrow sites.